



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

**FINAL REPORT OF
THE NINTH MEETING OF AERONAUTICAL COMMUNICATIONS SERVICES
IMPLEMENTATION COORDINATION GROUP OF APANPIRG (ACSICG/9)**

Video Tele-conference (VTC), 19-21 April 2022

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

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

Page

PART I - HISTORY OF THE MEETING

Introduction.....	iii
Attendance	iii
Opening of the Meeting	iii
Officers and Secretariat.....	iii
Working Arrangements, Language and Documentation.....	iv
Conclusions/Decisions - Definition	iv

PART II - REPORT OF AGENDA ITEMS

Agenda Item 1:	Adoption of Agenda	1
Agenda Item 2:	Review of outcomes of relevant meetings.....	1
Agenda Item 3:	Review the report of the Ninth and Tenth Meetings of Common aeRonautical VPN Operations Group (CRV OG/9 and CRV OG/10).....	2
Agenda Item 4:	Review and update ATN Document Tree to include IPS service	11
Agenda Item 5:	Review and update AMHS/AFTN Communication Chart and coordination with ATS Messaging Management Center (AMC).....	12
Agenda Item 6:	Review and update the AMHS/ATN Implementation Status	
	6.1 Update status of AMHS implementation	13
	6.2 Report on the readiness status of AMHS to support IWXXM	14
	6.3 Update AIDC service over AMHS	14
Agenda Item 7:	Inter-regional AFS connection	15
Agenda Item 8:	Issues on AFS related cyber-safety/security and resilience.....	17
Agenda Item 9:	Review and update Subject/Tasks List.....	18
Agenda Item 10:	Next meeting date and any other business	18

LIST OF APPENDICES

Appendix A:	CRV Implementation Status Table
Appendix B:	Revised amended Pro Document
Appendix C:	AFTN/ATSMHS Routing Directory Asia and Pacific Regions
Appendix D:	Implementation Status of ATN/AMHS in the APAC Region
Appendix E:	AMHS Focal Contact Point
Appendix F:	AMHS Readiness Report for Supporting IWXXM Traffic

Appendix G: Implementation Status of AIDC in the APAC Region

Appendix H: Updated Work Programme of ACSICG

LIST OF ATTACHMENTS

Attachment 1: List of participants

Attachment 2: List of working, information papers

PART I – HISTORY OF THE MEETING

1. Introduction

1.1. The Ninth Meeting of the Aeronautical Communications Services (ACS) Implementation Coordination Group (ACSICG/9) was held from *19 to 21 April 2022*. The meeting was organised via Video Tele-Conferencing (VTC) using Microsoft TEAMS.

2. Attendance

2.1 The Meeting was attended by **One hundred forty five (145)** participants from **Twenty one (21)** States/Administrations, **Four (4)** International Organizations and **Three (3)** Aviation Industries including Afghanistan, Australia, Bhutan, China, Hong Kong China, Macao China, Fiji, India, Indonesia, Japan, Lao PDR, Mongolia, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, USA, Vietnam, CANSO, IATA, IFALPA, IFATCA, Frequentis, IDS Airnav, PCCW Global and ICAO. The list of participants is provided in **Attachment 1**.

3. Opening of the Meeting

3.1 The meeting was opened by Mr. Hoang Tran, International Telecommunications Lead, FAA ATO Program Management Organization and Co-Chair of ACSICG. Mr. Hoang Tran, extended warm welcome to all participants and expressed his thanks to Member States/Administrations and International Organizations for the continuous support to ICAO regional activities, as well as to the ICAO APAC Regional Office on the efforts for meeting online. He expressed that with more than 100 delegates joining the meeting, the ACSICG/9 would serve as a forum of cooperation between all members to contribute to a safe and efficient aeronautical communications environment. He pointed out that members may take the opportunity now with low traffic volume to improve the aeronautical communications environment, such as implementation of CRV, to prepare for future traffic.

3.2 Mr. Chonlawit Banphawatthanarak, Chief, Policy and Strategy Management Bureau, Aeronautical Radio of Thailand Ltd. and Co-Chair of ACSICG, extended a warm welcome to all participants. He expressed deep appreciation and gratitude to the efforts of all parties to make great achievements, and communicated his thanks to the ICAO Secretariat for arranging meeting online due to the pandemic situation. He encouraged everyone to participate as much as possible and to contribute to and get benefitted from the forum as a whole. He welcomed the strong participation from Member States to the meeting.

3.3 Mr. Luo Yi, Regional Officer, CNS, and Ms. Soniya Nibhani, Regional Officer, ANS (CNS) Implementation on behalf of the ICAO APAC Regional Director welcomed all participants to the meeting and wished to meet in-person next time. Mr. Luo Yi reminded the history of ACSICG and its achievements with the highlight on the objective of the meeting and emphasized the need for the ACSICG members to continue making efforts for the coordinated implementation and to work out solutions to the issues identified by the meeting. He added that as the planning and operation of the current hybrid aeronautical communications infrastructure are challenging, harmonized joint effort is the way to the future and wished for the success of the meeting.

4. Officers and Secretariat

4.1 Mr. Hoang Tran, International Telecommunications Lead, FAA ATO Program Management Organization and Mr. Chonlawit Banphawatthanarak, Chief, Policy and Strategy Management Bureau, Aeronautical Radio of Thailand Ltd co-chaired the meeting. Mr. Luo Yi, Regional Officer CNS and Ms. Soniya Nibhani, Regional Officer ANS (CNS) Implementation, ICAO Asia and Pacific Regional Office, acted as secretary for the meeting with the support of Mr. How Sze Lung,

Regional Officer CNS, Ms. Zhong Wenhan, Regional Officer CNS, and Ms. Varapan Meefuengsart, Programme Assistant of the same office.

5. Working Arrangements, Language and Documentation

5.1 The ACSICG/9 met as a single body during the meeting. The working language for the meeting was English inclusive of all documentation and this Report. The meeting considered **Fifteen** (15) Working Papers, **Seven** (7) Information Papers and **One** (1) Presentation under its **Ten** (10) Agenda Items. The list of Papers and Presentations is provided in **Attachment 2**.

6. Conclusions/Decisions - Definition

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

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

PART II – REPORT OF AGENDA ITEMS

Agenda Item 1: Adoption of agenda

Adoption of Agenda- Sec (WP/01)

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

Agenda Item 2: Review of outcomes of relevant meetings

Review of Relevant Meetings - Sec (WP/02)

- 2.1 The paper summarized relevant information and updates with the highlight on the reviewed outcomes of CRV OG/8, ACSICG/8, SWIM TF/5, SURSG/1, ATMAS TF/2, SRWG/5 and relevant discussions of other meetings of CNS SG/25 and APANPIRG/32.

- 2.2 The CNS SG/25 meeting adopted **Eight** (8) Conclusions and **Five** (5) Decisions. In addition, based on the outcome of discussions on various agenda items, the CNS SG/25 meeting developed **Four** (4) Draft Conclusions for consideration by APANPIRG/32 Meeting, which was adopted by APANPIRG/32. The meeting noted Conclusion/Decision adopted by CNS SG/25 and also reviewed the different Conclusions and Decisions adopted by APANPIRG/32 in December 2021 of interest to the group and discussed the follow-up, including the CNS related deficiency and CNS SG/25 Action Items.

Internet Protocol Suite (IPS) ecoDemonstrator Validation and Development Update – USA (IP/06)

- 2.3 The paper presented Internet Protocol Suite (IPS) ecoDemonstrator Validation and Development in USA. Firstly, USA shared an overview of the current Air-Ground environment on the existing network Aircraft Communications Addressing and Reporting System (ACARS) and Aeronautical Telecommunications Network (ATN). The meeting was informed that the IPS is intended to provide a migration from legacy ATN and ACARS to IP-based protocols which have no changes to the existing applications (e.g. CPDLC) while moving away from legacy protocols. USA further introduced the benefits of moving to IPS, the IPS system architecture from end-end perspective, evolution of the technology, and standardization activities. Lastly, the meeting was informed about some validation and testing efforts that have been taken, including ecoDemonstrator IPS Activities in 2019 and 2021, and Collins and Honeywell flight test summary.

- 2.4 The meeting enquired if the Datagram Transport Layer Security (DTLS) adopted for air-ground communication to be a symmetric encryption method, in contrary to the asymmetric encryption adopted in the PKI mechanism for ground-ground communications. In addition, upon the meeting asked for further details of lessons learnt from the IPS Lab and Flight Test Activities, the presenter Mr Greg Saccone, Co-chair of AEEC IPS Subcommittee Group, highlighted the importance of correct configuration. The authentication performance between SATCOM and VDL Mode 2 and the generally good performance in various multi-link tests. He mentioned a validation report was being compiled and would be submitted to ICAO CP-DCIWG.

- 2.5 The ICAO Secretariat referred to the Strategy for Implementation of the Air-Ground Data Link in the Asia/Pac Region, which was revised by ACSICG/7. The strategy mentioned that *States should consider implementing ATN OSI/IPS Gateway to support aircrafts equipped with either ATN/OSI or ATN/IPS in addition to existing ACARS*. The meeting was informed that after the 41st Assembly with the GANP 7th Edition endorsed, this strategy might need further review by ACSICG to align. The Co-Chair also reminded the meeting that the CNS SG/25 discussed the domain naming and IPv6 address management on top of authentication, which is a part of big picture to air-ground and ground-ground IPS implementation. In future when the ATN/IPS are available to ANSP to use ground-based gateway as a

subscription of service, the domain naming safety and IPv6 address framework will be important. ANSP would then need to consider those factors to support the future of ATN/IPS for air-ground.

Outcomes of Relevant Meetings Related to IWXXM – Sec (IP/07)

2.6 The paper presented recent outcomes from APANPIRG and its contributory bodies' meetings regarding the States' implementation of ICAO provisions to disseminate meteorological information in the ICAO meteorological information exchange model (IWXXM) form. Recent discussions on IWXXM within the APANPIRG, MET SG and MET/IE WG forums focused on developing supporting resources, including an *Online Register of IWXXM Exchange Status, IWXXM Implementation in APAC Region – Frequently Asked Questions (FAQs)*, and reviewing the status of implementation by the States of IWXXM for the dissemination of OPMET messages which were shared in details in this paper.

Agenda Item 3: Review the report of the Ninth and Tenth Meetings of Common aeRonautical VPN Operations Group (CRV OG/9 and CRV OG/10)

Review the report of the Ninth meeting of Common aeRonautical VPN Operations Group (CRV OG/9) - Sec (WP/03)

3.1 The paper summarized the relevant outcomes of the Ninth Meeting of the Common aeRonautical Virtual Private Network Operations Group of APANPIRG (CRV OG/9) held from 25 to 27 January 2022 via video tele-conference. CRV OG/9 meeting report, working papers, information papers, and other resources can be accessed by following link:

<https://www.icao.int/APAC/Meetings/Pages/2022-CRV-OG-9.aspx>

Outcomes of Ad-hoc expert Strategy, Design, Transition and, Operations Groups

3.2 The paper presented an update on the progress of the Ad Hoc expert groups for Strategy, Design, Transition and Operations. CRV OG/8 meeting held via VTC during 17-19 May 2021 created an Ad Hoc Group of experts to progress sections of the CRV Operations Manual. The outcomes of three ad-hoc group meeting held on 13th September 2021, 12th November 2021, and 13th January 2022, all by VTC, were presented to the meeting. The latest version has been presented in the ad-hoc group on 10th March 2022 with the aim to publish by 31st March 2022.

ICAO ATN/AMHS Guidance Document Tree

3.3 The paper presented the ICAO ATN/AMHS Guidance Document Tree and proposed to add CRV reference documents into the ATN Guidance Document tree, including CRV operations manual, CRV Implementation Plan, Voice over Internet Protocol (VoIP) and Analog Voice Interface Control Document for CRV, and [CRV Landing Page](#) published on ICAO APAC Website to provide integrated ATN/AMHS structure for APAC States/Administrations.

3.4 Mr. Hoang Tran, ACSICG Chair suggested that ASIA/PAC Regional ATN Documentation Tree should include CRV Reference documents. It was suggested that CRV manual may be added under Policy & Service Definition documents, Voice over Internet Protocol (VoIP) and Analog Voice Interface Control Document for CRV may be added under Interface Control Documents (ICDs) and CRV Implementation plan may be added under Implementation Documents. The CRV OG/9 meeting recommended that ACSICG/9 may create an ad-hoc group to update the ATN/AMHS Guidance Tree, which will be further discussed through WP/04 of ACSICG/9. The meeting agreed that Member States would provide the suggestion for modification related to CRV in the tree, which resulted into an action item of CRV OG/9.

CRV Implementation Plan

3.5 The ICAO Secretariat shared the information about latest version of published CRV Implementation plan on ICAO APAC e-documents portal and concern raised by some States for publication of some information. The meeting agreed that ICAO Implementation Plan will be continued to upload on ICAO APAC e-documents portal. Under Table 1 (National Points of Contact), Table 2 (Local Points of Contact), Appendix A and Appendix B (Network Assignment for APAC and MID region), a message would be added to refer to ICAO APAC CRV Secure portal or CRV Portal hosted by New Zealand to get required information along with the instructions needed as an action item of CRV OG/9, which has been completed.

VoIP Regional dial plan

3.6 USA provided an overview of the Voice over Internet Protocol (VoIP) dial plan implemented in the CRV network. The CRV OG/9 meeting was informed that USA has accepted responsibility for maintaining the CRV dial plan for all member states and any updates/changes should be submitted to be added to the dial plan by contacting USA or CRV OG Co-Chairs.

CRV Operations Manual

3.7 New Zealand presented the status of the current draft of the CRV Operations Manual. The meeting was informed that since publication of the CRV Operations Manual in December 2020, there have been many updates including those coming from the Ad Hoc Groups presented by WP/03. The updates are currently in DRAFT for publication pending updates from PCCW and the next Ad Hoc Groups meeting. The updates in different sections were explained.

Latest CRV operational performance report

3.8 PCCWG shared Latest CRV Updates and CRV Network Yearly Service Review for 2021. The CRV OG/9 was informed about 2021 Ticket Summary by Ticket Type and their overview. PCCWG informed that there are 45 circuits in 27 cities with different CRV packages, A, B+, C+, C and D. There are 2 service providers in the CRV network and 5 circuits (A, B+ and C+) are under implementation. It was further informed that 9 cities are joining CRV in 2022, which are Mumbai (India), Jakarta (Indonesia), Makassar (Indonesia), Kathmandu (Nepal), Moscow (Russia), Khabarovsk (Russia), New Caledonia, Sri Lanka, and French Polynesia.

Update the APAC CRV Implementation Table

3.9 The meeting was informed that the format of CRV Implementation table updated by CRV OG/8 is modified to accommodate other necessary information required by the ICAO Secretariat time-to-time for monitoring the progress and implementation status of CRV, and connected States by CRV for each Member State. The CRV OG/9 meeting updated the CRV Implementation Status Table, which is provided in **Appendix A** to the report.

Extension of CRV Contract

3.10 The paper presented the request received by APAC Member States for extension of current contract of CRV with PCCWG for one year due to current pandemic situation. The meeting was informed that as per the current contract, all Authorities shall join the CRV program and sign the relevant Service Contract(s) with PCCWG with the billing start date on or before 31 December, 2022. For authorities, which join CRV after 31 December, 2022, any additional charges may be imposed. The CRV OG/9 meeting invited Member States who have not already contracted or initiated CRV contract process to share their intention to join CRV in next few year, if there is any plan.

Upgrade/Downgrade CRV Circuits Subscribed

3.11 The paper summarized the outcomes of discussion of ad-hoc group formed by action item 8-3 of ACSICG/8 that States should have option to upgrade/downgrade the circuits based on the need. The first meeting of Ad-hoc group formed by ACSICG/8 as per ACTION ITEM 8-3 discussed and agreed that PCCWG will draft relevant clauses to add in Terms and Conditions document of CRV contract for consideration of CRV OG/9 and PCCWG will present sample calculation of penalty charges in case package degradation are opted by any contracting States within their terms of contract of CRV in CRV OG/9 for Member State's understanding. In response, PCCWG presented next described WP/09 to the CRV OG/9 for further discussion.

Upgrade/Downgrade CRV Circuits Subscribed by PCCWG

3.12 In WP/09 of CRV OG/9, PCCWG highlighted the CRV contract T&Cs and listed some examples to illustrate the cost implications in related to upgrade / downgrade the existing CRV services within the contract period. PCCWG informed that CRV user committed to pay the agreed monthly charges over the contract period known as TCV (The total contract value (TCV) = one time installation charge + monthly charges x 60 months (i.e., 5 years)). The hypothesis cases were listed in order to illustrate different scenario. The meeting was informed that termination will require cancellation charges(= monthly charge x remaining months), while downgrade or upgrade if the new "Package" contract is less than 5-year term, the new monthly charge will be confirmed once a formal request is submitted. The estimation of budget based on remaining contract period was presented to the meeting as follows:

Contract period	
5 years	Quotation is based on "price sheet_6 Package"
4 years	budgetary 10% increase loading under on "price sheet_6 Package"
3 years	budgetary 20% increase loading under on "price sheet_6 Package"
2 years	budgetary 30% increase loading under on "price sheet_6 Package"
1 year	budgetary 40% increase loading under on "price sheet_6 Package"

3.13 The CRV OG/9 meeting further discussed the questions raised by States, including any charges for upgrade/downgrade/terminate the contract during renewal period, upgrade/downgrade/addition of new services/ addition of new sites, should not considered as a new contract, the current terms and conditions did not mention the cases of upgrade/downgrade of services, no additional charges in case of upgrading CRV packages in previous discussion, etc.

3.14 The CRV OG/9 meeting did not agree to the proposal presented by PCCWG and proposed to create an ad-hoc group named as ICAO CRV Steering Group to devise the terms and conditions for addition of new services, for upgrade/downgrade of packages along with addition of new sites by contracted states into their contract, which resulted into an action item of CRV OG/9.

3.15 The CRV OG/9 meeting recommended that ICAO APAC Office would send a State Letter to APAC Member States, who have not joined/not initiated process to join CRV to share their intention to join CRV and when they intend to do so as an action item of CRV OG/9. The abovementioned ICAO CRV Steering Group will discuss and finalise the requirements of current CRV contract extension based on feedback received from Member States who would join CRV in next few years which resulted into an action item of CRV OG/9.

3.16 The CRV OG/9 meeting agreed for one day CRV OG/10 meeting on 18 April 2022 before ACSICG/9 meeting. The outcomes of CRV OG/10 has been presented through WP/11 of ACSICG/9.

Non-aviation providers joining CRV

3.17 PCCWG introduced PCCW Console Connect Aviation Platform for non-ANSP users to exchange SWIM Data with CRV members. PCCWG informed that in order to provide an easy, managed, flexible and scalable mechanism for non ANSP users to exchange SWIM data with those CRV users, PCCW Global planned to extend its EMS node with its own developed software defined interconnection platform - Console Connect for Aviation and purposed built SWIM as Service Platform. Additionally, PCCWG informed that the SWIM services from ANSPs on CRV will be listed on PCCW SWIM Registry where users can select and subscribe and concluded that the Console Connect Platform provides an alternative path for non-ANSP users to exchange SWIM data with ANSPs who are on the CRV Network. Furthermore, Fiji added that if ANSPs will be SWIM providers, SWIM data can be shared on CRV among ANSPs.

CRV Post Implementation Issues in Bhutan

3.18 The meeting was informed about the issues faced by Bhutan related to CRV post implementation due to the non-readiness of peer States and the action taken by CRV OG and ACSICG for its resolution. After first meeting of the ad-hoc group established by ACSICG/8 and CRV OG/8, the ad-hoc group agreed that Bhutan connects to AMHS through CRV tunnel directly to New Zealand, and New Zealand acts as a bridge between CRV and existing AMHS circuits for Bhutan. The second meeting of the Ad-hoc group discussed the AFTN Routing Directory changes and agreed that Bhutan and New Zealand will bilaterally coordinate to implement CRV connectivity and the next meeting will be based on the request from Bhutan and New Zealand. Bhutan and New Zealand further updated that they have completed System Engineering Plan (SEP), signed a technical letter, managed router service, were ready to perform the acceptance and bidirectional test.

Current Status of CRV Implementation in India

3.19 The CRV OG/9 meeting was informed about the latest progress of CRV implementation in India. India informed that India had planned to implement the CRV after the CRV trials were successful but the implementation got delayed due to issues related to taxation and some other clauses along with delay due to the COVID-19 Pandemic. Furthermore, India has been informed by PCCW that lead time requirements for setup of CRV network in India may take 8 months after signing of the agreement, and India requested PCCW to keep themselves in the readiness and reduce the lead-time to get the network established at the earliest after signing of the agreement.

3.20 The CRV OG/9 meeting shared the concern of high lead time of 8 months given the situation that many states are waiting for India to join CRV, as India is BBIS. PCCWG informed that high lead time is due to shortage of chips for the NID routers, local fiber providers need to install fiber at customer site with approval from local government, and due to pandemic situation and PCCWG is trying its best to take necessary action to reduce the lead time.

3.21 Sri Lanka shared a concern for high lead time and PCCW indicated that if there are lead time issues for a state, they would work with member state on the agreed installation date. PCCWG informed the meeting that PCCWG is considering the current situation and will provide an official response if there is any contractual and commercial impacts for member states who sign the contract in 2022 but the installation date exceeds the standard lead time in 4 weeks to Sri Lanka, CRV OG Chairs, and the ICAO Secretariat as an action item of CRV OG/9.

Update on Fiji's CRV Network Upgrade

3.22 The paper presented information about Fiji's CRV network upgrade from Package C+ to CRV Package B+ for voice and AMHS services. The CRV OG/9 meeting was informed that Fiji has signed and implemented CRV Package C+ with PCCWG in 2019 and requested PCCWG to downgrade the CRV SLA to Package D to reduce operational cost due to impact of COVID-19 pandemic in April 2020. Fiji further explained CRV Package C+ and the downgraded CRV Package D for the Fiji CRV

Connection by diagrams, and shared the plan to upgrade its CRV network from CRV Package C+ to Package B+ to support voice and AMHS services to Australia, New Zealand & USA in the 2nd Quarter of 2022.

3.23 In response to a question, Fiji informed that Fiji neither paid any penalty for downgrading the package or upgrading it back nor signed any new service order for 5 years. Fiji added that downgrade of CRV package was discussed with PCCW global on a special condition to return to the original package in a certain timeframe due to the impact of COVID 19 on the revenue.

SWIM User Network Requirements analysis

3.24 USA presented an analysis of the network requirements for SWIM users. CRV has been considered as an underlying Internet Protocol (IP) network for SWIM services. The meeting was informed that from the network point of view, SWIM users can be categorized into three different groups: a) SWIM subscribers (can be ANSPs or any entities), b) Global Enterprise Messaging Service (GEMS) providers, and c) ANSP based SWIM providers (and subscribers). USA added that the use of CRV to support SWIM may result in additional bandwidth demands due to the nature of XML based messages. However, CRV can provide a reliable and better secured network compared with the Public Internet.

3.25 The CRV OG/9 meeting was recommended to consider this approach and coordinate with the SWIM Task Force for network connection planning. The meeting agreed that the ICAO Secretariat would present a paper to SWIM TF on behalf of CRV OG to inform about the relevant discussion in CRV OG as an action item of CRV OG/9. It was also agreed that CRV ad-hoc expert Strategy and Design group would join SWIM TF meetings to note important discussions related to CRV and to inform CRV OG about the relevant outcomes, which resulted into an action item of CRV OG/9.

SWIM Providers joining CRV

3.26 New Zealand presented discussion on SWIM Meteorological providers joining CRV for the delivery of SWIM based Meteorological Data. New Zealand shared the concerns about *whether or not Meteorological Services need to go through the documented process to add a new service to the CRV as a Service Provider*. The meeting agreed that the process to join CRV by non-aviation service providers such as Meteorological Service providers required detailed deliberations. The meeting agreed that a specialised meeting would be organised to discuss and devise a method for non-aviation service provider's joining process to CRV, which resulted into an action item of CRV OG/9.

Technical Proposal for Regional IP Network Interconnection

3.27 PCCWG shared the meeting how States in CRV Network can communicate with States in REDDIG II Network. PCCWG proposed to establish two (2) Interconnection Points between CRV Network and REDDIG II Network for Primary and Backup respectively. Additional resources are required to build these connections were explained in the paper. PCCWG invited the CRV OG/9 meeting to confirm which States will require communication between CRV Network and REDDIG II Network and the meeting did not receive any immediate request and interest from Member States to join REDDIG II network. However, France informed that in future France is interested to interconnect with REDDIG II as well as with New PENS.

MPLS/IP Based Inter-Regional Connection

3.28 The paper provided current status of discussion being done for potential interconnection of CRV and REDDIG II (presented by PCCWG through WP/07), and CRV and New PENS. APAC member states were requested to record their interest, willingness, or need for interconnection of the CRV with other regional networks such as REDDIG II / New PENS with the ICAO secretariat. In order to

enhance global connectivity among states of different regions, it was suggested to States that connect to the CRV should also connect to other regional networks such as REDDIG and New PENS.

Updates on CRV Pioneer State Contribution to the ICAO Managed Service Agreement (MSA)

3.29 The ICAO Secretariat informed meeting in CRV OG/2 about the fund balance of USD 104,596 and proposed a draft of revision of Annex 1b to the MSA, and adopted by APANPIRG/28 as Conclusion APANPIRG/28/19: *Amendment of the Management Service Agreement for CRV project (RAS14801)* which remains as one of outstanding Conclusions/Decisions up to APANPIRG/32 held in December 2021. The paper presented an update on the relevant development of using the balance of the MSA.

3.30 With the efforts of the ICAO Secretariat, ICAO TCB, CRV OG co-chairs and ACSICG Chair, the Revised Annex 1 to Management Service Agreement (MSA) was prepared that the fund will be utilised in the span of 5 years starting from 31 March 2022 to 31 March 2027. The CRV OG/9 meeting requested Member States to provide examples of activities under different categories provided in scope of supporting CRV Network as described in section 10.5 as an action item of CRV OG/9.

3.31 With aforementioned, the following draft conclusion for the next step for using the rest of CRV Pioneer State Contribution to the ICAO Managed Service Agreement (MSA) proposed by CRV OG/9 was endorsed by ACSICG/9 for CNS SG/26 consideration.

Draft Conclusion ACSICG/09/01 (CRV OG/09/01):Revised Amendment of the Management Service Agreement for CRV project (RAS14801)		
What: Recognizing that ICAO Technical Cooperation Bureau satisfactorily completed all the defined work items in the initial Management Service Agreement (MSA) and Project Document of RAS14801, that the required payments were settled, and that in end 2016, all the requirements of both parties have been fully completed and closed on record, That, i) all Pioneer States are encouraged to counter-sign the Revised amended Pro Document provided in Appendix B to the report; ii) any Pioneer State not countersigning is entitled to get its share of the remaining fund balance back. and iii) a Pioneer State for which a direct CRV connection is not considered feasible in 2017 by the selected vendor is entitled to get its initial contribution in full	Expected impact: ☐ Political / Global ☐ Inter-regional ☒ Economic ☐ Environmental ☒ Ops/Technical	
Why: The initial scope of MSA was completed by ICAO TCB which allowed for a successful evaluation process and selection of a best and final offer; a majority of Pioneer States is willing to use the rest of their initial contribution to continue to support CRV implementation.	Follow-up: ☒Required from States	
When: 23-Nov-22	Status: Draft to be adopted by PIRG	
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:		

3.32 This draft conclusion will be presented to APANPIRG/33 and may supersede outstanding Conclusion APANPIRG/28/19: *Amendment of the Management Service Agreement for CRV project (RAS14801)*.

Estimate of work for safety assessment/ security assessment

3.33 New Zealand presented an estimate of work for a safety assessment or security assessment of the CRV network. It was explained that the possible assessments are Physical Inventory, Overall Security Review, Visibility and Management Audit, Performance Analysis and Quantitative Data. The options and pricings of assessments were shared in details through this paper. New Zealand volunteered to lead the task to prepare the Terms of Reference (ToR) of Security and safety assessment of CRV as an action item of CRV OG/9.

CRV Diversity and Security Implementation

3.34 The CRV OG/9 meeting was informed about the methods used by the FAA in the CRV network to provide security and diversity for AMHS and voice services. Diversity implementation for AMHS traffic and voice traffic which both have primary and backup method were introduced respectively in detail. Additionally, FAA shared that in the event of failure on CRV access, the FAA and Airservices have implemented a backup Internet VPN. USA shared that some degree of privacy is accomplished using GRE (Generic Routing Encapsulation) tunnels over MPLS between corresponding CRV users and additional network level security is provided by the FAA's firewall infrastructure.

Action Item 7-8 Charging structure for an ANSP service provider on Surveillance

3.35 The joint paper of Australia, Fiji, and PCCWG presented the procurement process for ANSP to operate surveillance services like Space ADS-B over the CRV network. The CRV OG/9 meeting was informed that PCCWG has confirmed that there is no special charging structure for adding the Space Based ADS-B services and stated that for ANSP that have implemented CRV, there is no additional cost to setup the new GRE tunnel between CRV Users under the CRV network, noting that Aireon LLC has already connected to the CRV. However, CRV Users have to consider whether the CRV bandwidth is enough to do so. The additional bandwidth cost is provided the CRV Pricing Schedule in the CRV Common Packages. Two scenarios were presented in detail in the paper.

Review ToR and Subject Task List

3.36 The CRV OG/9 meeting reviewed the ToR of CRV OG and reviewed and further updated the Subject Task list for CRV OG. The Meeting identified that there is no need for revision of ToR of CRV OG other than minor editorial correction while the meeting identified some new Items for the work programme of CRV OG.

Review the report of the Tenth meeting of Common aeRonautical VPN Operations Group (CRV OG/10) - Sec (WP/11)

3.37 The paper summarized the relevant outcomes of the Tenth Meeting of the Common aeRonautical Virtual Private Network Operations Group of APANPIRG (CRV OG/10) held on 18 April 2022 via video tele-conference. CRV OG/10 meeting report, working papers, information papers, and other resources can be accessed by following link:

<https://www.icao.int/APAC/Meetings/Pages/2022-CRV-OG-10.aspx>

Proposal to Extend CRV Contract

3.38 The paper presented the relevant outcomes of the first meeting of the ICAO CRV Steering Group to discuss the necessity of extending the current CRV contract and corresponding recommendations.

3.39 As a follow up action of ACTION ITEM 9-4 of CRV OG/9, the ICAO APAC Office issued a State Letter to request States/Administrations to share the intention to join CRV and its Tentative Timelines. In response, total **13** (thirteen) member states shared their intention to join CRV along with

tentative timelines, including 10 (ten) States/Administration intend to join CRV by Q4 2022, 2 (two) States intend to join CRV after Q4 2022, and 1 (one) State has no plan yet.

3.40 To follow up ACTION ITEM 9-5 of CRV OG/9, the first meeting of **ICAO CRV Steering Group** created by CRV OG/9 was held on **31 March 2022**. The meeting reviewed the responses received from Member States, discussed the requirement of additional efforts to support pacific Member States to join CRV, and advised to extend the contract duration for **one additional year**.

3.41 Based on the proposal of draft conclusion by CRV OG/10, the ACSICG/9 meeting endorsed the following draft conclusion for the consideration of CNS SG/26 and APANPIRG/33 meeting. The ICAO Secretariat will inform Member States about the extension of the current contract on same Terms and Conditions.

Draft Conclusion ACSICG/09/02 (CRV OG/10/01): Extension of CRV Contract for one year		
What: a) Recognizing that as per current contract, all authorities shall join the CRV project and sign the relevant Service Contract(s) with PCCWG with the billing start date on or before 31 December 2022 to not impose additional charges by the service provider and based on the survey responses of 2022, many Member States are in process to join CRV which may not be completed by December 2022, it is recommended to extend current CRV contract for one year. b) If agreed to extend, as per amended CRV contract, all authorities shall join the CRV program and sign the relevant Service Contract(s) with PCCWG with the billing start date on or before 31 December 2023 to not impose additional charges by the service provider. c) After the extension, the CRV contract expiry date will be 31 December 2028.		Expected impact: ☐ Political / Global ☐ Inter-regional ☒ Economic ☐ Environmental ☒ Ops/Technical
Why: Several ICAO Member States have requested to extend CRV contract due to COVID-19 pandemic in CRV Implementation webinar held in 2021 and based on the response of the survey done in 2022, many Member States are in process to join CRV which may not be completed by December 2022.	Follow-up: ☒ Required from States	
When: 23-Nov-22	Status: Draft to be adopted by PIRG	
Who: ☒ Sub groups ☒ APAC States ☒ ICAO APAC RO ☐ ICAO HQ ☐ Other:		

3.42 Singapore queried for the rate for additional one year term after CRV contract extension. The meeting was informed that the current contract extension will be based on same terms and conditions and rates. After initial five years term, states may renew the CRV contract on yearly basis till expiry of the contract. However, States and PCCWG may negotiate bilaterally for better rate to renew the contract for more than one year. Nevertheless, the last date of contract cannot exceed CRV contract expiry date.

Upgrade/Downgrade/Addition of New Services or Sites in CRV Contract

3.43 The paper presented the relevant outcomes of the first Meeting of the ICAO CRV Steering Group for the discussion to upgrade/downgrade/addition of new services or sites into current CRV contract.

3.44 In the first meeting of ICAO CRV Steering Group held on **31 March 2022**, PCCWG shared the revised proposal for upgrade/downgrade/addition of new sites and services with reasonable pre-estimate of the anticipated losses suffered by PCCW Global. The proposal was being presented by PCCWG in SP/01.

3.45 The revised proposal **withdraw cancellation charges and mandate of five years term** for each **upgrade** case and **addition of new sites/services**. Therefore, Member States may upgrade or add new sites or services in their contract without any additional charges or additional terms on the same rate. The revised proposal recommended to calculate **pre-estimate of the anticipated losses** suffered by PCCW Global by a proposed formula in case of **downgrade** and proposed to share the anticipated losses between PCCWG and States equally. Additionally, the mandate of five years terms for downgrade cases was withdrawn. Therefore, Member States may downgrade the current package in their contract with additional charges of 50% of **the anticipated losses** but without additional terms on the same rate.

3.46 The proposal was accepted by all members of CRV Steering group for submission to CRV OG/10 deliberation and agreement.

3.47 The CRV OG/10 meeting deliberated and reviewed the proposal submitted by PCCWG for upgrade/downgrade/addition of new services or site into current CRV Contract, and endorsed the proposal to work further for revision of relevant documentation of CRV common package.

3.48 CRV OG Chair (Asia) appreciated the support and contribution of ICAO CRV Steering Group members for presenting a pragmatic solution to the meeting.

3.49 India enquired when the presented proposal would be formally approved by PCCWG and reflected into relevant documentation of CRV common package. PCCWG informed that the formalization of the proposal would be ready tentatively by **May 2022**.

3.50 The ICAO Secretariat added that next ICAO CRV Steering group will review and discuss the phrasings of revised terms and conditions prepared by PCCWG in **July 2022**. The revised common package would be presented to CRV OG/11 for endorsement and approval. However, the presented proposal is applicable immediately after the endorsement by CRV OG/10 and ACSICG/9.

CRV Operations Manual

3.51 New Zealand presented the status of the current draft of the CRV Operations Manual. The meeting was informed that since publication of the CRV Operations Manual in December 2020, there have been many updates including those coming from the Ad Hoc Groups. The current DRAFT version of the Operations Manual is ready for publication as version 1.1. The updates in different sections were explained in detail in this paper.

3.52 CRV OG Co-Chair Asia presented and explained the revised Operational Manual to the meeting. The CRV OG Operational Manual can be accessed [here](#). It was added that Member States can request access to the manual by requesting access to the portal by following the steps mentioned on [CRV Landing Page](#).

3.53 Based on the proposal by CRV OG/10 in this paper, the ACSICG/9 meeting adopted the following **Decision**:

Decision ACSICG/09/03 (CRV OG/10/02) - Publication of the ICAO APAC CRV OG Operations Manual v1.1		
What:	The current Draft of the APAC CRV Operations Manual is ready for publication following updates from the Ad Hoc groups.	Expected impact:
		☐ Political / Global ☐ Inter-regional

		☐ Economic ☐ Environmental ☒ Ops/Technical
Why: Ongoing improvements to the documentation supporting the APAC CRV network	Follow-up:	☐ Required from States
When: 21-Apr-22	Status:	Adopted by ACSICG
Who: ☐ Sub groups ☐ APAC States ☐ ICAO APAC RO ☐ ICAO HQ ☒ Other: CRV OG and ACSICG		

Agenda Item 4: Review and update ATN Document Tree to include IPS service

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

4.1 The paper presented the ICAO ATN/AMHS Guidance Document Tree and proposed to add CRV reference documents into the ATN Guidance Document tree, including CRV operations manual, CRV Implementation Plan, Voice over Internet Protocol (VoIP) and Analog Voice Interface Control Document for CRV, and [CRV Landing Page](#) published on ICAO APAC Website to provide integrated ATN/AMHS structure for APAC States/Administrations.

4.2 The CRV OG/9 meeting reviewed the ATN/AMHS Documentation Tree and considered if addition of CRV reference documents is required. Mr. Hoang Tran, ACSICG Chair suggested that ASIA/PAC Regional ATN Documentation Tree should include CRV Reference documents. It was suggested that CRV manual may be added under Policy & Service Definition documents, Voice over Internet Protocol (VoIP) and Analog Voice Interface Control Document for CRV may be added under Interface Control Documents (ICDs) and CRV Implementation plan may be added under Implementation Documents. The CRV OG/9 meeting recommended that ACSICG/9 may create an ad-hoc group to update the ATN/AMHS Guidance Tree. The CRV OG/9 meeting agreed that Member States would provide the suggestion for modification related to CRV in the tree which resulted into an action item.

4.3 The meeting reviewed the ATN/AMHS Documentation Tree and considered the recommendation of the CRV OG/9 for addition of CRV reference documents including the document locations on the ATN/AMHS Documentation tree, and necessary modifications on the tree structure. The ACSICG/9 meeting agreed to deliberate the recommendation of the CRV OG/9 to form an ad-hoc group for this purpose.

4.4 The meeting requested volunteers from the meeting for updating ICAO APAC ATN/AMHS Guidance Document Tree. China, Fiji, Singapore, and USA volunteered for the Ad-Hoc group. ACSICG Co-Chair suggested that the inclusion of Mr. Vaughan Hickford, CRV OG Co-Chair (Asia) would be beneficial for the group because of his detailed knowledge about CRV OG Operational Manual and other CRV Documentation. New Zealand shared provisional participation in the Ad-Hoc group. Therefore, the Ad-Hoc group will be comprised of China, Fiji, New Zealand (Tentative), Singapore, USA, and the ICAO Secretariat. The Ad-Hoc group will prepare revised ICAO APAC ATN/AMHS Guidance Document Tree and present it to the next ACSICG meeting for endorsement and approval. **ACTION ITEM 9-1.**

Agenda Item 5: Review and update AMHS/AFTN Communication Chart and coordination with ATS Messaging Management Center (AMC)

(Note: AMHS implementation status be fetched from AMC, and States/Administrations are requested to update during the meeting.)

APAC AMHS Implementation Status from AMC - Thailand (WP/05)

5.1 This paper presented the AMHS implementation status information in Asia/Pacific Region updated in ATS Messaging Management Centre (AMC) in Attachment A of the paper. AMC was implemented by EUROCONTROL to provide off-line network management services in support of the ground ATS Messaging network of Air Navigation Service Providers (ANSPs). The meeting was invited to review and update information to AMC via AEROTHAI if necessary, including points of contact in record.

AFTN/ATSMHS Routing Directory and the Communication Chart - Sec (WP/12)

5.2 The paper presented the current status of the AFTN/ATSMHS routing directory and the latest Communication Chart for Asia and Pacific Regions. The meeting was informed that the ICAO Asia and Pacific Regional Office has prepared and published AFTN Routing Directory for 28 times, which is based on the existing AFTN circuits in APAC. The updated AFTN/ATSMHS Routing Directory (28th Edition) formulated by ACSICG/5 was adopted by Conclusion CNS SG/22/7 through CNS SG/22 meeting. Based on CRV OG/5 consideration, the ACSICG/6 meeting and the CNS SG/23 meeting further reviewed the role of AFTN/ATSMHS Routing Directory during transition period, and as a result of discussions, the CNS SG/23 meeting **agreed to fully follow the AFTN/ATSMHS routing directory during the transition period by end of 2020.**

5.3 The meeting highlighted the any to any connectivity for IP network, as well as the reality that not all APAC States have joined CRV, while automation systems still heavily depend on the character-based message exchanging applications, this hybrid environment might keep on existing and there was not yet a clear timeframe for a full transition to CRV. As such, the ACSICG/9 meeting **agreed to fully follow the AFTN/ATSMHS routing directory** for present time in APAC region. For inter-regional traffic, it is required to follow the existing entry/exit points and procedure.

5.4 Since the publication of the AFTN/ATSMHS Routing Directory (28th Edition AFTN Routing Directory, only the Philippines and USA proposed changes to the Directory to reflect the new AMHS connection between the two States on April 21, 2021, and Hong Kong, China advised some changes to its alternate routing in this regard. Australia also provided revision after the ACSICG/8 meeting. Additionally, the meeting was informed that the latest COM Charts can be accessed by EUROCONTROL's air traffic services (ATS) messaging management centre (AMC) website <https://ext.eurocontrol.int/amc> and APPENDIX Y of EASPG/03 Final Report.

5.5 The meeting updated the AFTN/ATSMHS Routing Directory for Asia and Pacific Region which would be published as 29th edition of AFTN/ATSMHS Routing Directory after adoption. Subsequently the meeting endorsed the following Draft Conclusion for consideration by CNS SG/26. The draft AFTN/ATSMHS Routing Directory is provided in **Appendix C** to this report.

Draft Conclusion ACSICG/09/04 - Revised AFTN/ATSMHS Routing Directory		
What:	That, the AFTN/ATSMHS Routing Directory for the APAC Region provided in Appendix C to the Report be further updated and distributed to States/Administrations as 29 th Edition.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical

Why: A number of new ATSMHS connections have been established and became operational. Consequential amendments to the AFTN/ATSMHS Routing Directory are required.	Follow-up: ☐ Required from States
When: 19-Aug-22	Status: Draft to be adopted by Subgroup
Who: ☒ CNS SG ☒ APAC States ☒ ICAO APAC RO ☐ ICAO HQ ☐ Other:	

Agenda Item 6: Review and update the AMHS/ATN Implementation Status

6.1 Update status of AMHS implementation

FAA AMHS Traffic Load Salt Lake City Communication Centre - USA (WP/13)

6.1 This paper presented by FAA on the traffic load measured at the Salt Lake City (SLC) Communications center that supports AMHS connections to Brisbane, Australia; Nadi, Fiji; Christchurch, New Zealand; Fukuoka, Japan; and Manila, Philippines. The FAA SLC AMHS has a bandwidth of 2Mbps provided by CRV. The current average monthly measurement of the bandwidth usage is 27 kbps for incoming traffic and 35 kbps for outgoing traffic. Based on the traffic, the AMHS bandwidth between FAA, Australia and Japan need to be monitored and action taken as needed to increase the bandwidth in support of IWXXM and other XML based messages being introduced in the near future.

AMHS/ATN Implementation Status of Thailand (IP/03)

6.2 Thailand completed the AMHS system implementation in July 2011. Currently Thailand is transitioning from AFTN to AMHS and has completed commissions of AMHS connection including other BBIS States i.e. Hong Kong China, India, Singapore, Beijing and Rome, and BIS States i.e. Cambodia, Lao PDR, Malaysia, Bangladesh, Myanmar and Bhutan. Commissioning with Vietnam would be completed in Q3 2022. In addition, Thailand has completed commission of SITA AMHS gateway interconnections on 14th September 2017. Thailand AMHS system is able to support IWXXM, and they have implemented AIDC services over AMHS with Malaysia, Lao PDR, Cambodia and Myanmar. The paper also shared the AFTN/AMHS traffic load report for Bangkok COM Centre. Thailand supplemented that the bandwidth of the interregional connection between Bangkok and Rome to be 2Mbps, and Singapore provided the bandwidth of the interregional connection between Singapore and London currently to be 64Kbps. Singapore observed not many attachments sent via IWXXM during their testing, they would soon start exchanging messages and they would upgrade the bandwidth if required.

AMHS/ATN Implementation Status in India (IP/04)

6.3 The paper presented current implementation status of AMHS & CRV in India with BIS and BBIS states. The meeting was informed that the AMHS connectivity has been successfully implemented between Mumbai and three BBIS (viz. Singapore, Bangkok and Beijing) and with five BIS (viz. Karachi, Colombo, Dhaka, Kathmandu and Paro (Bhutan). India shared the recent AMHS progresses, including Mumbai-Muscat (Oman) and Mumbai-Nairobi (Kenya) which would both be commissioned soon. Furthermore, India updated the CRV implementation status that India has placed the purchase order with PCCW Global for CRV implementation at Mumbai, and is awaiting commencement of work from PCCW Global shortly and installation and testing on CRV is expected to be completed in Q3-4/2022. India supplemented that their interregional connection between Mumbai and Muscat are dedicated circuits.

6.4 The meeting discussed on a draft reporting template on the monitoring of AFTN/AMHS traffic load. Upon discussion, the meeting agreed to monitor under different scenarios as follows:

- The CRV OG may monitor Bandwidth Utilization Rate of APAC member states already implemented CRV by adding it into its meeting agenda items. The APAC member states may request PCCWG to share information about Bandwidth Utilization Rate in monthly report and then present it to CRV OG meetings. **ACTION ITEM 9-2**
- For States' non-CRV AMHS connections, after deliberation and considering the multi-facet of data sources, the ICAO Secretariat will consult with experts to propose a common template to report on the monitoring of connection loading. **ACTION ITEM 9-3**
- For States' AFTN-only connections, there is no concern over increased traffic load from XML-based message and thus no such need to monitor the traffic in this regard.

Updated AMHS Focal Contact Point and Implementation Status of ATN/AMHS in the APAC Region

6.5 The meeting was invited to provide updates to the AMHS Focal Contact Point and Implementation Status of ATN/AMHS in the APAC Region. The updated files are provided in **Appendix D** and **Appendix E** to this report respectively.

6.2 Report on the readiness status of AMHS to support IWXXM

AMHS Readiness Status for Supporting IWXXM Traffic in APAC Region - Sec (WP/14)

6.6 This paper summarised the outcomes from previous meetings for States/Administrations in APAC Region on supporting IWXXM traffic via AMHS implementation, reviewed AMHS readiness status for supporting IWXXM Traffic of the States/Administrations in APAC Region, and listed out the States/Administrations that have no AMHS in operations such that IWXXM message would not be distributed to these States/Administrations. As of CNS SG/25, there were 12 States/Administrations provided their status on AMHS readiness and experience for supporting IWXXM Traffic with details provided in Appendix A to the paper, out of the 23 States/Administrations in the APAC Region which put their AMHS into operations per the AMHS Routing Directory Tables from the ATS Messaging Management Centre (AMC) as of March 2022. States that have and have no AMHS service in operation were summarized in Appendices B and C to the paper respectively.

6.7 States/Administrations are reminded of the targets set in Beijing Declaration on “commit to implementation **by 2022**: Common ground/ground telecommunication infrastructure to support ANS applications” with reporting indicators including the status of Aeronautical Message Handling System (AMHS) with File Transfer Body Parts (FTBP) function for IWXXM data. The meeting updated the AMHS Readiness Table for Supporting IWXXM Traffic that is provided in **Appendix F** to the report.

6.3 Update AIDC service over AMHS

Repository of AIDC Implementation Status in APAC – Sec (WP/06)

6.8 To follow up the **ACTION ITEM 7-1** of APA TF/7, the Secretariat has worked on the table formatting and separated AIDC and ATM System Implementation columns from the ATN/AMHS/AIDC implementation table into a standalone table. The meeting updated this AIDC and ATM System Implementation Status table, which is provided in **Appendix G** to the report.

6.9 Considering the necessity of a comprehensive monitoring tool for AIDC implementation status in APAC region to support data statistics and analysis, the ICAO Secretariat designed and a new

table to maintain a common understanding between ATMAS TF and ACSICG on AIDC implementation, and eventually build up the regional repository of AIDC Implementation Status.

6.10 The meeting reviewed and accepted the format of AIDC repository in APAC region for ATMAS TF/3 consideration. Additionally, as suggested by ACSICG Co-Chairs, once the table is adopted by both meetings, the ICAO Secretariat will fill the table according to the latest updates from States/Administrations and share it with States/Administrations in due course to ask for supplements of the additional information, validation.

Agenda Item 7: Inter-regional AFS connection

MPLS/IP Based Inter-Regional Connection- Sec (WP/07)

7.1 The paper provided current status of discussion being done for potential interconnection of CRV and REDDIG II and CRV and New PENS. The paper presented the final technical proposal for interconnection of CRV and REDDIG II and proposed various business model to way forward. It also requested APAC member states to record their interest, willingness, or need for interconnection of the CRV with other regional networks such as REDDIG II / New PENS with the ICAO secretariat.

7.2 The meeting was informed that there were communications requirements between APAC ANSPs and SAM ANSPs in order to set up the AMHS P1 connection between AMHS COM Centres of Christchurch (New Zealand) and Santiago (Chile). Noting interconnecting requirements, early discussion among regional networks service providers for CRV and REDDIG II and the CRV OG was initiated.

7.3 Three possible solutions were envisaged to connect the AMHS COM Centres of Santiago (Chile) and Christchurch (New Zealand):

1. *Installing a CRV node in Chile or a REDDIG node in New Zealand*
2. *Using the FAA nodes (CRV and REDDIG II) to redirect packets between the two networks*
3. *MPLS Network-to-Network Interface (NNI) between Lumen and PCCW Global connecting CRV and REDDIG II*

7.4 After further discussion, the interested proposal was Solution-3. Further discussion on the administrative and technical aspects to establish the required aeronautical communications between APAC and SAM ANSPs through MPLS NNI were done on 3 November 2021 by teleconference. The teleconference participants agreed for the proposal presented by PCCW Global, and agreed that Lumen and PCCW Global will work on the proposal and will present a document, not later than December 15th 2021, in order to be analysed by the Board/Committee of both networks (CRV and REDDIG II). Final technical proposal agreed by Lumen on 15th December 2021 was presented by PCCWG through WP/07 to CRV OG/9.

7.5 The CRV OG/9 meeting was informed that Interconnection Link for CRV and REDDIG II will be connected between PCCWG provided Router and Lumen provided Router. This link will be **shared responsibility between PCCWG and Lumen**. In case of any fault issue, States in CRV Network will report to PCCWG and States in REDDIG II Network will report to Lumen respectively. PCCWG invited the CRV OG/9 meeting to confirm which States will require communication between CRV Network and REDDIG II Network to determinate the sizing and cost of the interconnection solution.

7.6 The meeting did not receive any immediate request and interest from Member States to connect to REDDIG II network. However, France informed that in future France is interested to interconnect with REDDIG II as well as with New PENS.

7.7 As the technical proposal for interconnection of CRV and REDDIG II is ready, it was required to think about the **way forward for the business case for the proposed interconnection** along with next course of action for PCCWG and Lumen for this interconnection requirements. With aforementioned, the following potential business solutions are proposed by the ICAO Secretariat for meeting consideration.

7.8 PCCWG and Lumen should prepare an **estimate for the infrastructure cost** for the interconnection. It is also required to provide **potential revised package/monthly recurring cost** for New Zealand and Chile by respective service provider assuming both will subscribe to the services and assuming that PCCWG and Lumen will revise charges in case both states wish to avail interregional connection services.

7.9 With information about **approximately infrastructure cost and revised recurring charges**, following options can be explored.

Option -1

7.10 The infrastructure cost will be shared **equally** among PCCWG and Lumen. Based on the revised recurring charges and assuming no one time charges, both service providers would calculate and submit **payback period**. Based on payback period, the way forward with this option may be discussed.

Option -2

7.11 The infrastructure cost would be **shared** between **service providers and member states**. 60% of the cost would be shared by both service providers and 40 % of the cost would be shared by APAC and SAM Member States.

7.12 In this option, 40% of the cost may be shared by:

- All APAC and SAM States equally.
- Only by BBIS States of both regions.
- Only by future potential consumers of services from both regions.
- By Volunteer Member States of both regions.

7.13 Other options for cost sharing may be discussed.

7.14 Apart from member states who are immediately interested to join the interconnection services, the member who would contribute will get some concessional discount in future once the wish to avail interconnection services.

7.15 The meeting was invited to **create an ad-hoc group** to discuss potential options for business cases to move forward with the proposal. The ad-hoc group may be composed of volunteer member states from APAC and SAM regions along with both service providers and the ICAO Secretariat.

7.16 ICAO Secretariat informed that the third Meeting of the European Aviation System Planning Group (EASPG) held from *30 November to 2 December 2021* adopted EASPG Conclusion 3/15 – *Coordination on the Interregional AFS Gateways* to initiate necessary interregional coordination with other Regions (i.e., APAC, SAM) in order to support the AFS to SWIM Transition Task Force (AST TF). In response ICAO APAC Office and ICAO EUR/NAT Office coordinated internally as well as with the service providers of regional network in respective regions.

7.17 PCCWG, the CRV service provider, and British Telecom, the New PENS service provider, had a discussion on **1 March 2022** on the matter. In the meeting, British telecom shared their

interest to work on the regional interconnection with PCCWG. However, as the British telecom contracting party is EUROCONTROL, the need of initial discussion among British Telecom, EUROCONTROL and respective ANSPs to request for the intention of EUR/NAT ANSPs to connect to APAC Member States ANSPs were raised.

7.18 The internal meeting of British Telecom, EUROCONTROL and ANSPs was held recently. The meeting requested which states in APAC would connect to European countries now and in future and what will be financial model for the interconnection benefits. It was added that the financial model being prepared for CRV-REDDIG II Interconnection may be utilized for CRV-New PENS interconnection with required modifications.

7.19 The meeting deliberated the necessity for forming an Ad-Hoc group and advised that all member states having interregional connections in APAC region should be a member of Ad-Hoc group. However, other interested member states are invited to the Ad-Hoc group as well. No other Member States than having interregional connections shared their interest to join the group.

7.20 The meeting agreed to form an Ad-Hoc group comprised of APAC Member States having interregional connections, CRV OG Chairs, CRV and REDDIG II service providers, interested states of SAM region, and the ICAO Secretariat under CRV OG. The ICAO Secretariat will coordinate with relevant APAC member states to nominate focal points for Ad-Hoc group. **ACTION ITEM 9-4.** The ICAO Secretariat will coordinate with ICAO SAM Office to get nomination from interested SAM member states for this task. **ACTION ITEM 9-5.**

Agenda Item 8: Issues on AFS related cyber-safety/security and resilience

Aeronautical Fixed Service (AFS) Cybersecurity Considerations for Information over CRV - USA (WP/08)

8.1 This paper presented some interim security considerations for CRV, including Digital Identity and Network Information Security, prior to International Aviation Trust Framework (IATF) to be implemented in future. The IATF Digital Identity concept uses Public Key Infrastructure (PKI) Digital Certificates to identify the correspondents of an information exchange and potentially secure or encrypt the exchanged data. Interim measures on Digital Identity to be considered, including formalization with technical agreements, use of IPsec tunnels, adopt Access Control Lists and limit of exposure for public data publication and private data exchange to protect against DDoS. The requirements were listed in the paper in detail.

8.2 Network Information Security requirements include the use of IPv6, Domain Name System (DNS), information security, network management and network contingencies. IATF envisions that the aviation community will inter-communicate using IPv6 addresses from an ICAO block and with a secure DNS, which is essential to fulfil the Digital Identity concept. PKI Certificates play a large role in information security, which applies to both data integrity and confidentiality, with interim methods including use of IPsec tunnels for sensitive data, scanning for incoming information for malicious content and additional schema validation for XML formatted message, e.g. IWXXM, were explained in the paper. Network Management should isolate operational systems, networks and applications from public networks and other organizational devices by protecting them with security devices. Enterprise System Managers (ESM) should be used to monitor access and detect threats in real-time to allow mitigation responses. Network Contingency should plan for normal failures and situations where systems or traffic has been compromised.

8.3 SWIM interchanges with external entities will typically contain XML formatted data (e.g. IWXXM, FIXM, AIXM). These exchanges can eventually be protected with Signing as a Service (SaaS) and Verifying as a Service (VaaS) using Digital Identities. In the interim, information exchanges should

be protected according to the network infrastructure used, XML information received should be schema-validated, and users should scan published information prior to uploading.

8.4 The ICAO Secretariat appreciated USA for the continuous effort to address cybersecurity issues, recalled that there were many useful presentations in the APAC Regional Cybersecurity Webinar in 2021. The interim measures proposed in the paper is more tangible and implementable comparing high level concepts, which can be considered as a useful reference for the CRV OG Operations Manual. While CRV OG and SWIM TF have their corresponding action items, the Co-Chairs noticed that the coming XML-based messages may compromise automation systems and it would be necessary to formulate managing plans to address the possible threat in cybersecurity. The ICAO Secretariat suggested to add regular Agenda Item for ACSICG meetings and invite States and Organizations concerned to continue the discussion on improving in the cybersecurity ideas presented in this paper. With CANSO and IATA expressed their interest to contribute to this Agenda Item, the Secretariat will coordinate with interested parties to discuss various tasks under this Agenda Item. **ACTION ITEM 9-6.**

Agenda Item 9: Review and update Subject/Tasks List

Review Work Programme for ACSICG- Sec (WP/10)

9.1 The work programme for ACSICG was developed by ACSICG/3 meeting based on a project approach. The work programme reviewed by ACSICG/8 meeting and discussed in ACSICG/9 for review and updates. The work programme of ACSICG reviewed and updated by the meeting is provided in **Appendix H.**

Agenda Item 10: Next meeting date and any other business

CRV Post Implementation Issues in Bhutan – Sec, Bhutan & New Zealand (WP/09)

10.1 The meeting was informed about the issues faced by Bhutan related to CRV post implementation due to the non-readiness of peer States and the action taken by CRV OG and ACSICG for its resolution. The meeting was reminded that during the CRV OG/8 meeting, Bhutan put forward some problems related to CRV post-implementation, as the follow-up action, an ad-hoc group with experts from six countries, including Australia, Bhutan, India, New Zealand, Singapore, and Thailand was established to discuss a way out for Bhutan to use its CRV service to some extent temporarily. After first meeting, the ad-hoc group agreed that Bhutan connects to AMHS through CRV tunnel directly to New Zealand, and New Zealand acts as a bridge between CRV and existing AMHS circuits for Bhutan. Bhutan also sent a State Letter to ICAO APAC Office to support on the issue. The second meeting of the Ad-hoc group discussed the AFTN Routing Directory changes and agreed that Bhutan and New Zealand will bilaterally coordinate to implement CRV connectivity and the next meeting will be based on the request from Bhutan and New Zealand.

10.2 Bhutan and New Zealand further updated that they have completed System Engineering Plan (SEP), signed a technical letter, and managed router service as of 20th December, 2021. However, due to some technical setup issues, Bhutan revised the SEP (System Engineering Plan) document, and the managed router service revision has been completed on 25th February, 2022. Bhutan now awaits for the technical setup from New Zealand. The acceptance and bidirectional test will be performed between the two countries after the completion of technical setup from New Zealand.

10.3 The meeting noted that Thailand has already implemented CRV and it planned to test CRV circuits with Bhutan in **June 2022**. The meeting discussed the need to continue the work of Ad-Hoc group formed in ACSICG/8, as mentioned above.

10.4 It was agreed that Bhutan and New Zealand would continue to work on above mentioned on-going proposal. The Ad-Hoc group will meet in last week of **June 2022** to note the status of testing of

CRV circuits between Bhutan and Thailand and progress on implementation of the temporary routing through New Zealand. **ACTION ITEM 9-7** Based on the status, the Ad-Hoc group will decide to continue the task to implement GRE tunnel between Bhutan and New Zealand or to close the action item.

Amendment 91 to Annex 10 Volume III on Selective Calling Codes – Sec (WP/15)

10.5 The paper presented the main points of State Letter Ref.: AN 7/64.2.2-20/127 and the action required by the letter regarding the Adoption of Amendment 91 to Annex 10, Volume III, which concerns the expansion of the pool of selective calling (SELCAL) codes, for review and action by the meeting.

10.6 The State Letter was circulated to States on 9 December 2020 which required several actions by States, including a) Notify any disapproval before 22 March 2021; b) Notify any differences and compliance before 3 October 2022; c) Consider the use of the Electronic Filing of Differences (EFOD) System for notification of differences and compliance. The meeting was informed that Aviation Spectrum Resources, Inc. (ASRI), which is the Official ICAO Registrar of the Selective Calling (SELCAL) system would like to remind all Air Navigation Service Providers (ANSPs) that the deadline (November 2022) is approaching for all ANSPs to be ICAO compliant with the SELCAL32 amendment to support an additional sixteen (16) new audio tones, in addition to the existing 16 audio tones. Furthermore, ASRI requested ICAO Regional Offices' support in distributing the SELCAL32 Brochure which provided details on the SELCAL code pool expansion to all ANSPs in the region to promote the implementation of the SELCAL32 ground system upgrades by the November 2022 deadline. More information on SELCAL32 can be found at www.asri.aero/SELCAL.

10.7 The meeting was invited to notify ICAO HQ on any differences and compliance **before 3 October 2022**, and copy notifications to the ICAO Regional Office accredited to your Government. The Secretariat further explained that the Guidance Material was incorporated in the State Letter. Information on the capability to support SELCAL codes of States is accessible via the contact published in their AIPs.

ICAO APAC Webinars: Implementation of CRV – Sec (IP/02)

10.8 The meeting reviewed the outcomes of the ICAO APAC Webinar on Implementation of CRV in APAC region which was successfully conducted on 20 July 2021 with 100% positive responses. Furthermore, the meeting was informed about a series of 14 ICAO APAC Webinars on various topics planned in 2022 through the State Letter. The information about the webinar on **Implementation of CRV on 29th June 2022** with its detailed agenda and program was also shared.

AIDX Survey – IATA (IP/05)

10.9 The paper provided a brief on IATA's Aviation Information Data Exchange (AIDX) industry survey. The AIDX is the global XML messaging standard for exchanging flight data between airlines, airports, and any third party consuming operational data. The AIDX Working Group develops and maintains the AIDX messaging standard to support the efficient and effective exchange of operational flight data across the aviation industry. The meeting was informed that IATA is undertaking the survey (<https://www.surveymonkey.com/r/AIDX>) to better understand where the AIDX standard is used around the world, by which industry players, and for which business scope, which will also help IATA to define the work plan of the AIDX Group, as well as to develop and enhance the AIDX Standard for the benefit of the aviation industry. IATA shared their appreciation and encouraged States to participate and complete the survey no later than **30 April 2022**.

Date and Venue for the Next Meeting

10.10 The meeting discussed the need to meet Face-to-Face (F2F) and concluded that next meeting would be organised in F2F to further progress the tasks listed in the Terms of Reference, with a

tentative date in the end of **May 2023**. However, member states having travel restrictions may request to join the meeting in virtual mode. ICAO Secretariat will inform about possibilities of virtual mode option based on the venue and available facilities to such states. The ICAO Secretariat will coordinate for hosting the next meeting in members States of the group or will organise it in ICAO APAC Office Bangkok, and inform participants in due course for the exact dates and venue.

CRV IMPLEMENTATION STATUS TABLE

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

ACSICG/9
Appendix A to the Report

SN	State/ Administrati on (with* is BBIS; marked in blue- not yet join CRV/ no updates provided)	States /Administrati ons connected	Intended date for CRV cut- over	Applications targeted	Migration scheme	Prerequisites/ dependencies
				Indonesia TBC 2022 (AMHS/AIDC, Voice, ADS-B);		
3	Bangladesh					
4	Bhutan		Contract signed on Oct 2019. CRV installed successfully in Dec 2021. CRV P2P Test between Paro- Mumbai & Paro- Bangkok to be done once India and Thailand join CRV	AMHS first and Voice & ADS-B will follow up after AMHS.	Staged Approach	Dependent on India and Thailand for utilization of CRV network.
5	Brunei Darussalam					

ACSICG/9
Appendix A to the Report

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

ACSICG/9
Appendix A to the Report

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

ACSICG/9
Appendix A to the Report

SN	State/ Administrati on (with* is BBIS; marked in blue- not yet join CRV/ no updates provided)	States /Administrati ons connected	Intended date for CRV cut- over	Applications targeted	Migration scheme	Prerequisites/ dependencies
12	Fiji*	Australia New Zealand USA	Contract in May 2018 and service readiness in 3Q 2018.	Data (AMHS) and VoIP With: Australia ATS voice April 2019 completed, AMHS completed in July 2019, NZ ATS voice completed April 2019 and USA ATS voice completed in March 2019 and AMHS completed in April 2019.	Staged Approach	CBA, safety case
13	France: -New Caledonia -French Polynesia	Fiji New-Zealand &USA	Q2/2022 Q1/2023	ATS Voice, AMHS AIDC, AMHS with USA, AFTN/AMHS with NZ.	Staged Approach	Depends on : - solving legal issues raised in 2021 with PCCWG - an agreement with peer States on adding a layer of encryption (PSK) over CRV if we are able to sign the contract in 2022

ACSICG/9
Appendix A to the Report

SN	State/ Administrati on (with* is BBIS; marked in blue- not yet join CRV/ no updates provided)	States /Administrati ons connected	Intended date for CRV cut- over	Applications targeted	Migration scheme	Prerequisites/ dependencies
14	India*		Contract for CRV implementation with M/s PCCW in India will be signed by Feb 2022.	AFTN/AMHS,ADS-B,AIDC,ATS Voice	Staged Approach	Internal Administrative/financial approvals & safety case
15	Indonesia		Contract in 3Q2021 and service readiness in 4Q2021.	AFTN, AMHS, ADS-B and voice		CBA completed Delayed by 2022 due to COVID-19 (CRV OG/9 updates)
16	Japan*	Hong Kong China USA Singapore China RoK	Contract signed in Nov.2017 and service readiness in1Q 2018 for Fukuoka	Data first with: Hong Kong completed 3Q2020 USA completed 1Q2019 Singapore completed 4Q2020 China completed 1Q2021 Voice Plan with: USA 2Q 2021 Daegu and Incheon (R.O.K) started in1Q2021 Philippines, Taipei FIR, add R.O.K will start from 1Q 2022	In progress	

ACSICG/9
Appendix A to the Report

SN	State/ Administrati on (with* is BBIS; marked in blue- not yet join CRV/ no updates provided)	States /Administrati ons connected	Intended date for CRV cut- over	Applications targeted	Migration scheme	Prerequisites/ dependencies
17	Kiribati					
18	Lao PDR					
19	Malaysia		In the process of settling the CRV contract terms and signing of the CRV contract between Malaysia and PCCWG Implementation status: CRV service started in Nov 2021. Service cut over will be in stages, starting with AHMS in Q1 2022.	AFTN, AMHS, ADS-B and ATS voice	Staged Approach	
20	Maldives					
21	Marshall Islands					

ACSICG/9
Appendix A to the Report

SN	State/ Administrati on (with* is BBIS; marked in blue- not yet join CRV/ no updates provided)	States /Administrati ons connected	Intended date for CRV cut- over	Applications targeted	Migration scheme	Prerequisites/ dependencies
22	Micronesia (Federated States of)					
23	Mongolia	CAAM and PCCWG made ICMP package test in 2021.	Contract in 1Q2022 and service readiness in 4Q2022	AFTN, ADS-B, AMHS, Voice With: China Dec, 2022(AMHS), (ADP) TBD Voice, ADS-B, AFTN Russia TBD (AFTN, ADS-B, AMHS, Voice)	Staged Approach	Negotiations with neighbouring countries and stakeholders on CRVs and its use are critical to implementation.
24	Myanmar		Contract will be signed after discussed with PCCW Global. Implementation was targeted in 3Q/2023 depends on PCCW's proposal quotation, and getting the Budget approval from Authority concerned.	AFTN/AMHS, AIDC, ADS-B and Voice	Staged Approach	One of counterparts join in
25	Nauru					

ACSICG/9
Appendix A to the Report

SN	State/ Administrati on (with* is BBIS; marked in blue- not yet join CRV/ no updates provided)	States /Administrati ons connected	Intended date for CRV cut- over	Applications targeted	Migration scheme	Prerequisites/ dependencies
26	Nepal		SO signed with PCCW	AFTN/AMHS	Staged Approach	BBIS-state India joining the CRV network, as most traffic is routed through it
27	New Zealand	Australia USA Fiji French Polynesia Chile	Contract signed in July 2018 and service implemented December 2018	Australia Voice Completed March 2019 and AMHS June 2019 Completed USA Voice Completed March 2019 and AMHS March 2019 Completed Fiji Voice Completed April 2019 French Polynesia AMHS and Voice Chile AMHS (SAM regional network REDDIG)	Awaiting French Polynesia joining. Awaiting outcome of inter-regional network connectivity discussion. For Chile	CBA attractive if all counterparts join in.
28	Pakistan					
29	Palau					

ACSICG/9
Appendix A to the Report

SN	State/ Administrati on (with* is BBIS; marked in blue- not yet join CRV/ no updates provided)	States /Administrati ons connected	Intended date for CRV cut- over	Applications targeted	Migration scheme	Prerequisites/ dependencies
30	Papua New Guinea	Australia USA-Oakland USA-Aireon		Australia: AFTN June 2021, Voice Oct 2021 USA-Oakland Voice November 2021 USA-Aireon Space based ADSB-July 2021	Staged Approach	Completed
31	Philippines	Hong Kong China Singapore USA	Contract signed in March 2018 and service readiness in 2Q2018	Completed: with HONG KONG AIDC - 2Q2019; AMHS - 2Q2019; Voice - 3Q2018. with SINGAPORE AIDC – 4Q2019; AMHS – 4Q2020; Voice – 1Q2020. with USA AMHS – 2Q2021; Voice – 4Q2019. Planned: with JAPAN Voice – 1Q2022.	Staged Approach	Success transition to the New ATM center in 4Q2018

ACSICG/9
Appendix A to the Report

SN	State/ Administrati on (with* is BBIS; marked in blue- not yet join CRV/ no updates provided)	States /Administrati ons connected	Intended date for CRV cut- over	Applications targeted	Migration scheme	Prerequisites/ dependencies
32	Republic of Korea	Japan China	Contract in 3Q 2019 and service readiness in 4Q 2022	Completed: with Japan Voice –March 2021 Planned; With Japan Voice additional lines-from 2022 to 2023 Data(AMHS) POT in 4Q and operation from 4Q 2022 With China Data(AMHS) POT in July and operation from 4Q 2022	Staged Approach	
33	Samoa					
34	Singapore*	Australia Japan Philippines	Contract signed in May 2019 and service readiness in Dec 2019	Data (AMHS over IP) with: Australia Dec 2020 (completed); Japan Nov 2020 (completed); Philippines Dec 2020 (completed); Malaysia 2022. Voice with: Philippines Mar 2020 (completed).	Staged Approach	
35	Solomon Islands					

ACSICG/9
Appendix A to the Report

SN	State/ Administrati on (with* is BBIS; marked in blue- not yet join CRV/ no updates provided)	States /Administrati ons connected	Intended date for CRV cut- over	Applications targeted	Migration scheme	Prerequisites/ dependencies
36	Sri Lanka	Planned: Australia India Indonesia Maldives Singapore	Nov-Dec 2022	Q1 2023 - AMHS with Singapore TBD - AMHS connectivity with Mumbai, and Male. TBD - Direct Speech facilities with Chennai, Trivandrum, Mumbai, Male, Jakarta, Melbourne, Singapore.	Phased Approach	Package D is planned based on CBA conducted. Comparison of performance of Package D and existing IPLC circuit.
37	Thailand*		1. Contract in 3Q2021 Status: Completed 2. Service readiness in 2Q2022	Data first Then voice, subject to safety case: China 2Q2022 Hong Kong 2Q2022; Singapore 2Q2022; India 2022.	Staged Approach	
38	Timor Leste					
39	Tonga					
40	Tuvalu					

ACSICG/9
Appendix A to the Report

SN	State/ Administrati on (with* is BBIS; marked in blue- not yet join CRV/ no updates provided)	States /Administrati ons connected	Intended date for CRV cut- over	Applications targeted	Migration scheme	Prerequisites/ dependencies
41	United States*	Australia Fiji Japan Philippines New Zealand Papua New Guinea Tahiti Russia	Contract in January 2018	1) AMHS with Australia Fiji Japan Philippines New Zealand Papua New Guinea (2021) Indonesia (2022) 2) AIDC with Fiji Japan New Zealand Papua New Guinea (Direct planned 2021) Tahiti (via New Zealand) Indonesia (Direct planned 2022) Russia (when join CRV) 3) VoIP with Fiji Japan Philippines New Zealand Papua New Guinea (direct planned 2021) Indonesia (2022)	Staged approach	

ACSICG/9
Appendix A to the Report

SN	State/ Administrati on (with* is BBIS; marked in blue- not yet join CRV/ no updates provided)	States /Administrati ons connected	Intended date for CRV cut- over	Applications targeted	Migration scheme	Prerequisites/ dependencies
42	Vanuatu					
43	Viet Nam	Hong Kong, China	4Q/2022	AFTN, AMHS connectivity with Hong Kong		

ACSICG/9
Appendix B to the Report



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**ANNEX 1 TO THE MANAGEMENT SERVICE AGREEMENT
BETWEEN THE INTERNATIONAL CIVIL AVIATION ORGANIZATION
AND THE CIVIL AVIATION AUTHORITIES AND/OR RELATED AIR NAVIGATION SERVICE
PROVIDERS HAVING SIGNED THE AGREEMENT**

Project Title: Common Regional Virtual Private Network (CRV) multinational service with a common service provider

Project No.: RAS/14/801 – Revision B

Duration: 5 years

Sector and Sub-Sector: Transport and Civil Aviation

Country Implementing Agency: Civil Aviation Authorities and/or related ANSPs

Executing Agency: International Civil Aviation Organization (ICAO)

Location: Asia Pacific

Estimated Start Date: 31 March 2022

Estimated Project Cost: US\$ 88,000

Brief Description: Under Revision B, ICAO will assist the Civil Aviation Authorities and/or related ANSPs in the continuation of the APAC CRV Project through the provision of expertise and support to the CRV Network (Stage 2). The ICAO assistance covers the specific work scope outlined in this project document.

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1. BACKGROUND

ACSICG/9
Appendix B to the Report

1.1 The Civil Aviation Authorities and/or related ANSPs as listed in Appendix A, hereinafter collectively referred to as the “Parties” and individually as the “Party”, have determined that the Common Regional Virtual Private Network (CRV) multinational service with a common service provider can more effectively:

- provide network services to the Parties;
- support a common Internet Protocol (IP) network;
- establish services based on Voice over IP (VoIP); and
- enhance network diversity and timely service implementation and delivery.

1.2 In 2014, all Parties jointly agreed to appoint ICAO Technical Cooperation Bureau or TCB to assist in the procurement management (i.e. Stage 1) of the CRV project and in the selection of the common Service Provider (RAS14801 Revision A). Upon selection of the common service provider after a Sealed Tender (ST) process through TCB, each Party were expected to subscribed to the Services by signing an individual Service Contract with the Service Provider for the procurement, installation, training, testing, commissioning and operation of the CRV network and the associated services.

1.3 After selection of the common service provider in 2016, a fund balance of USD 104,596 remained as on 31 March 2017. CNS SG/21 (17 to 21 July 2017) and APANPIRG/28 (11 to 14 September 2017) agreed to manage the remaining funds not used for the CRV selection process, to procure common services or expertise to support the implementation of the CRV Network (Stage 2).

1.4 As at 31 December 2021, the remaining fund for use are approximately USD 88,000 allowing for the return of funds to two pioneer Member States in terms of the Conclusion APANPIRG/28/19 “Amendment to the Management Service Agreement for CRV Project (RAS14801)”.

1.5 As a result of the discussions between the Parties, Revision B has been developed to utilise the carry-over funds from the completion of the activities of Stage 1 to procure common services or expertise to support the implementation of the CRV Network (Stage 2).

2. SCOPE OF SERVICES TO BE PROVIDED

2.1 Through this Revision, the following services will be provided by ICAO within the scope of supporting the CRV Network (Stage 2), as may be required:

- a) Provision of expertise through engagement of subject matter experts;
- b) Capacity building through training;
- c) Procurement of common services to support the implementation of the CRV Network;
- d) Other support, as needed.

3. IMPLEMENTATION STRATEGY

3.1 The Parties, through the CRV OG will be agreed on which activities to undertake based on needs priority assessment. Upon determination, the decision will be communicated to TCB through the APAC Regional Office for execution, as appropriate.

3.2 In case the proposed activities exceed the available funds, TCB will communicate this to the Parties through the Regional Office. At this point, the parties will need to decide to either reduce scope of activities, inject additional funds and/or a combination thereof.

4. BUDGET

4.1 The detailed budget is as attached at Appendix A.

4.2 Funds will be equally shared among the Civil Aviation Authorities and/or related ANSPs that have signed the MSA and continue to be party to this Revision, and provided by them in advance of commencement of the project.

4.3 The total estimated amount is of US\$ 88,000 as per Appendix A. This amount is the total estimated amount including administrative and technical support.

5. RISK ASSESSMENT

5.1 Delay in the signing of this project document.

Risk Level: Medium

Mitigation: ICAO will work through the APAC Regional Office to facilitate the signing of the Project Document Revision B.

6. PROJECT MONITORING, REVIEW AND REPORTING

6.1 Monitoring activities

6.1.1 The overall implementation of the project is monitored through regular reporting and project review meetings as appropriate.

6.1.2 ICAO will execute and monitor the project in close consultation with the focal point designated by each Party.

6.1.3 ICAO will maintain the financial accounting and budgetary control of the project, in accordance with its policies and practices.

ACSICG/9
Appendix B to the Report

6.1.4 ICAO may carry out missions on site to monitor the progress of the project, in accordance with the approved work plan or as required.

6.2 ICAO roles and responsibilities include:

- a) to execute and monitor the project under the direction of the Director, TCB. The Director, TCB will delegate the responsibility for the monitoring/oversight of project activities to the appropriate level within the designated/nominated representatives of the Parties;
- b) to provide financial management and budgetary control in accordance with its policies, rules, practices, processes and procedures;
- c) briefing of personnel;
- d) administering ICAO experts' contracts;
- e) to provide financial statements in accordance with ICAO policies, rules, practices, processes and procedures;
- f) organizing experts' travel to duty station;
- g) formalizing acceptance of the completed project deliverables;
- h) revising the project document (PRODOC) as requested;
- i) formalizing all activities required to close the project.

This Project Document is not intended and should not be construed as a recognition or endorsement by ICAO of any functions and/or responsibilities entrusted to or performed by regional entities.

7 PROJECT RULES AND REGULATIONS

7.1 International experts/personnel

7.1.2 ICAO will recruit and deploy international experts/personnel in accordance with ICAO policies, practices, ICAO/TCB Field Staff Services Rules and applicable process and procedures. In particular, as consultants engaged by ICAO, their entitlement payments will be issued by ICAO. The lead-time required for the recruitment of the experts may range between six (6) weeks to three (3) months, from the moment the funds are committed until the deployment of the experts. In the eventuality of a contract extension being required for one or more ICAO expert(s), the Implementing Agency will need to issue the necessary request at least three (3) months prior to the end of the ICAO expert(s)' contract, subject to availability of funds; the request will include a justification and corresponding additional duration, as appropriate.

7.2 Procurement

7.1.1 The procurement of equipment or services are carried out in accordance with ICAO's Procurement Code, Financial Regulations and Rules, and applicable process and procedures.

7.2 Finance

7.2.1 The reception and management of funds for this project are subject to ICAO's Financial Regulations and Rules, and applicable process and procedures. The use of any of the resources for this project will be processed upon reception of proper formal authorization.

ACSICG/9
Appendix B to the Report

7.2.2 The unauthorized use of project resources is not allowed and could result in project delay and the discontinuation of the project's activities.

7.2.3 The provision of financial management and budgetary control of the project and submitting financial reports will be in accordance with ICAO rules, regulations, process and procedures.

7.2.4 ICAO will provide the financial statements concerning the services covered by this document, indicating the status of the funds, in US dollars. Any clarification or discrepancy with the financial statements must be officially communicated to ICAO within 30 days of receiving them, after which they are deemed accepted by the Parties.

7.2.5 If additional information is required after the deadlines set in the previous paragraph, costs related to such information will be charged to the project, with prior approval from the Parties.

7.3 General regulations

7.3.1 All project's activities are managed in accordance with the applicable ICAO policies, rules, regulations, processes and practices and applicable process and procedures.

7.3.2 Project activities, including reports and/or deliverables prepared by the ICAO experts may be reviewed by ICAO Headquarters and/or Regional Office, as appropriate.

7.3.3 This document was developed in English by the parties. Any document related to the implementation of this project that is required to be translated into another official language of ICAO, as may be required, shall be performed by ICAO and charged to the project, as appropriate. Any document related to the implementation of this project that is required to be translated into any other language not an official language of ICAO, shall be translated independently by that Party at its own cost. In case of disagreements on the text of any of the documents, the prevailing version will be the text in the original English language.

8 LEGAL FRAMEWORK

8.1 This project document shall constitute Revision B to Annex 1 (RAS14801) to the Management Service Agreement between the Parties.

8.2 The Project Document Revision B will come into force upon its signing by the Parties.

8.3 Any change, amendment or revision to this Project Document Revision (including scope, duration, budget, responsibilities, or other), will need to be formally approved in writing by the Parties.

8.4 Nothing contained in or relating to this Project Document Revision B shall be deemed a waiver, express or implied, of any of the privileges and immunities of ICAO and its personnel.

9 LIABILITY

ACSICG/9
Appendix B to the Report

9.1 The Parties shall indemnify, defend, and hold and save harmless, ICAO and its officials, agents and employees, from and against all suits, proceedings, claims, demands, losses, and liability of any kind or nature brought against ICAO, including, but not limited to, all litigation costs and expenses, attorney's fees, settlement payments, and damages. For the avoidance of doubt, the Parties shall be obligated, at their sole expense, to defend ICAO and its officials, agents, and employees, regardless of whether the suits, proceedings, claims, and demands in question actually give rise to or otherwise result in any loss or liability.

9.2 ICAO shall advise the Parties about any such suits, proceedings, claims, demands, losses, or liability within a reasonable period of time after having received actual notice thereof. ICAO shall have control over any assertion or defense of the privileges and immunities of ICAO or any matter relating thereto, including the assertion or defense that ICAO is acting as mandatory for the Parties, for which only ICAO itself is authorized to assert and maintain. ICAO shall have the right to be represented in any such suit, proceeding, claim or demand by independent counsel of its own choosing and shall also be indemnified, held, and saved harmless by the Parties for such litigation costs and expenses and attorney's fees.

9.3 ICAO shall have the right to set-off any costs incurred pursuant to this Article from any remaining funds received under this Agreement.

9.4 The obligation under this clause shall survive the termination of this Agreement.

ACSICG/9
Appendix B to the Report

APPENDIX A

**PROJECT BUDGET COVERING MSA CONTRIBUTION
(IN UNITED STATES DOLLARS)**

COUNTRY: REGIONAL PROJECT
PROJECT NO: RAS14801
PROJECT TITLE: COMMON REGIONAL VIRTUAL PRIVATE NETWORK (CRV) APAC
WORK ORDER: RAS14801-01
VERSION: 3

	TOTAL		2022		2023		2024		2025		2026	
	w/m	\$	w/m	\$	w/m	\$	w/m	\$	w/m	\$	w/m	\$
PROJECT PERSONNEL												
INTERNATIONAL PROFESSIONAL POSTS												
11.501 CONSULTANCIES AND CONTRACTORS (TSS FEE)		35 000		5 000		10 000		10 000		10 000		
SUB-TOTAL (INTERNATIONAL PROFESSIONAL POSTS)		35 000		5 000		10 000		10 000		10 000		
16.001 INTERNATIONAL TRAVEL		11 000		2 000		2 000		2 000		3 000		2 000
TOTAL (PROJECT PERSONNEL)		46 000		7 000		12 000		12 000		13 000		2 000
EQUIPMENT												
41.001 EXPENDABLE EQUIPMENT - INTERNATIONAL		30 000		10 000		20 000						
TOTAL (EQUIPMENT)		30 000		10 000		20 000						
MISCELLANEOUS												
51.001 REPORTING COSTS		2 200										2 200
52.001 MISCELLANEOUS EXPENSES		2 000		500		800		300		300		400
B807F PROFESSIONAL LIABILITY INSURANCE												
53.001 OVERHEAD CHARGES		7 500		2 100		2 700		1 200		1 300		200
TOTAL (MISCELLANEOUS)		12 000		2 600		3 500		1 500		1 600		2 800
PROJECT TOTAL		88 000		19 600		35 500		13 500		14 600		4 800



INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA AND PACIFIC OFFICE

AFTN/ATSMHS ROUTING DIRECTORY

ASIA AND PACIFIC REGIONS

Appendix C of the ACSICG/9 Report

MAY 2022

PREPARED BY THE ICAO ASIA AND PACIFIC REGIONAL OFFICE

EXPLANATORY NOTES

The Routing Directory is based on the existing AFTN circuits in the Asia and Pacific Regions.

I. Explanation of columns:

- a) Column A contains destination AFTN routing indicators. These indicators employ the minimum number of characters to preclude ambiguity.
- b) Columns 1, 2, 3 etc. contain the location indicators of the originating/relaying AFTN COM centres/stations in the heading and the AFTN routing indicators in conjunction with the destination indicators.
- c) Primary Routing is indicated in the left-hand subdivision under each origin, in upper case letters.
- d) Alternate routing is indicated in the right-hand subdivision under each origin, in lower case letters.
- e) National and/or non-AFTN routing is indicated by the letter (N). Local arrangement for alternate routing is indicated by the letter n.

II. Explanation of Symbols:

- A stations - stations in the "A" Aeronautical Fixed Service
Routing Area (AFSRA) - Solomon Is., Nauru,
and Papua New Guinea.
- AG stations - stations in Solomon Is.
- AN stations - stations in Nauru
- AY stations - stations in Papua New Guinea

- B stations - stations in the "B" AFSRA - (Greenland, Iceland)
- C stations - stations in the "C" AFSRA - (Canada)
- D stations - stations in the "D" AFSRA - (West Africa)
- E stations - stations in the "E" AFSRA - (Europe)
- F stations - stations in the "F" AFSRA - (Central and South Africa)
- G stations - stations in the "G" AFSRA - (Coastal West Africa)

- H stations - stations in the "H" AFSRA - (Coastal East Africa)
- HE stations - stations in the Arab Republic of Egypt

- K stations - stations in the "K" AFSRA - (U.S.A.)
- L stations - stations in the "L" AFSRA - (Europe, Mediterranean)
- M stations - stations in the "M" AFSRA - (Caribbean, Central America)

2.

N stations - stations in the "N" AFSRA (South Pacific)
NC stations - stations in Cook Is.
NF stations - stations in Fiji
NFT stations - stations in Tonga
NG stations - stations in Kiribati
NGF stations - stations in Tuvalu
NI stations - stations in Niue Island
NL stations - stations in Futuna and Wallis Islands
NS stations - stations in Samoa
NST stations - stations in American Samoa
NT stations - stations in French Polynesia
NV stations - stations in Vanuatu
NW stations - stations in New Caledonia
NZ stations - stations in New Zealand

O stations - stations in the "O" AFSRA - (Middle East)
OA stations - stations in Afghanistan
OB stations - stations in Bahrain
OE stations - stations in Saudi Arabia
OI stations - stations in Iran, Islamic Rep. of
OJ stations - stations in Jordan
OK stations - stations in Kuwait
OL stations - stations in Lebanon
OM stations - stations in United Arab Emirates
OO stations - stations in Oman
OP stations - stations in Pakistan
OR stations - stations in Iraq
OS stations - stations in Syria
OT stations - stations in Qatar
OY stations - stations in Yemen

P stations - stations in the "P" AFSRA - (North Pacific)
PA stations - stations in Alaska
PB stations - stations in Baker Is.
PC stations - stations in Phoenix Is.
PG stations - stations in Mariana Is. Guam
PH stations - stations in Hawaii
PJ stations - stations in Johnston Is.
PK stations - stations in Marshall Is.
PL stations - stations in Line Is.
PM stations - stations in Midway Is.
PT stations - stations in Federated State of Micronesia
PW stations - stations in Wake Is.

R stations - stations in the "R" AFSRA - (West Pacific)
RC stations - stations in China
RJ stations - stations in Japan
RK stations - stations in Republic of Korea
RO stations - stations in Japan (Ryukyu Is.)
RP stations - stations in the Philippines

3.

S	stations - stations in the "S" AFSRA - (South America)
SA	stations - stations in Argentina
SC	stations - stations in Chile
T	stations - stations in the "T" AFSRA - (North East Caribbean)
U	stations - stations in the "U" AFSRA - (Russian Federation)
UT	stations - stations in Uzbekistan
V	stations - stations in the "V" AFSRA - (East and West Asia)
VA	stations - stations in India (West)
VC	stations - stations in Sri Lanka
VD	stations - stations in Cambodia
VE	stations - stations in India (East)
VG	stations - stations in Bangladesh
VH	stations - stations in Hong Kong
VI	stations - stations in India (North)
VL	stations - stations in Lao People's Democratic Republic
VM	stations - stations in Macau
VN	stations - stations in Nepal
VO	stations - stations in India (South)
VQ	stations - stations in Bhutan
VR	stations - stations in Maldives
VT	stations - stations in Thailand
VV	stations - stations in Viet Nam
VY	stations - stations in Myanmar
W	stations - stations in the "W" AFSRA (Brunei, Indonesia, Malaysia, Singapore, Southern South East Asia)
WA	stations - stations in Indonesia (Eastern part of Indonesia)
WB	stations - stations in Malaysia (East)
WBA	stations - stations in Brunei
WBS	stations - stations in Brunei
WI	stations - stations in Indonesia (Western part of Indonesia)
WM	stations - stations in Malaysia (West)
WP	stations - stations in Timor Leste
WR	stations - stations in Indonesia (Middle part of Indonesia)
WS	stations - stations in Singapore
Y	stations - stations in "Y" AFSRA (Australia)
Z	stations - stations in the "Z" AFSRA (China, Dem. People's Rep. of Korea, Mongolia)
Z	stations (except ZK and ZM) - stations in China
ZK	stations - stations in Democratic People's Republic of Korea
ZM	stations - stations in Mongolia

Note 1: The names of the continents, areas and countries appearing in parentheses indicate broadly the geographical location of the AFSRAs. The chart contained in Doc 7910, shows the delineation of these AFSRAs.

4.

AMENDMENTS

RECORD OF AMENDMENTS AND CORRIGENDA
RELATING TO AFTN ROUTING DIRECTORY, ASIA AND PACIFIC REGIONS,
TWENTY-SEVENTH EDITION

[illegible][illegible]

5.

A	1		2		3		4		5		6	
ORIGIN DESTINATION	AGGG		ANAU		AYPM		KSLC		NCRG		NFFN	
AG	(N)	n	YB		YB		YB	nf	NZ		YB	ks
AN	YB		(N)	n	YB		YB	nf	NZ		YB	ks
AY	YB		YB		(N)	n	YB	nf	NZ		YB	ks
B	YB		YB		YB		(N)	n	NZ		KS	yb
C	YB		YB		YB		(N)	n	NZ		KS	yb
D	YB		YB		YB		(N)	n	NZ		YB	ks
E	YB		YB		YB		(N)	n	NZ		YB	ks
F	YB		YB		YB		(N)	n	NZ		YB	ks
G	YB		YB		YB		(N)	n	NZ		YB	ks
H	YB		YB		YB		(N)	n	NZ		YB	ks
K	YB		YB		YB		(N)	n	NZ		KS	yb
L	YB		YB		YB		(N)	n	NZ		YB	ks
M	YB		YB		YB		(N)	n	NZ		KS	yb
NC	YB		YB		YB		NZ	yb	(N)	n	YB	ks
NF (EX. NFT)	YB		YB		YB		NF	yb	NZ		(N)	n
NFT	YB		YB		YB		NZ	yb	NZ		YB	ks
NG (EX. NGF)	YB		YB		YB		NF	yb	NZ		NGT	n
NGF	YB		YB		YB		NF	yb	NZ		NGF	n
NI	YB		YB		YB		NZ	yb	NZ		YB	ks
NL	YB		YB		YB		NF	yb	NZ		NW	n
NS (EX. NST)	YB		YB		YB		NZ	yb	NZ		YB	ks
NST	YB		YB		YB		NST	n	NZ		KS	yb
NT	YB		YB		YB		NZ	yb	NZ		YB	ks
NV	YB		YB		YB		YB	nf	NZ		YB	ks
NW	YB		YB		YB		NF	yb	NZ		NW	yb
NZ	YB		YB		YB		NZ	yb	NZ		YB	ks
OA	YB		YB		YB		(N)	n	NZ		YB	ks
OB	YB		YB		YB		(N)	n	NZ		YB	ks
OE	YB		YB		YB		(N)	n	NZ		YB	ks
OI	YB		YB		YB		(N)	n	NZ		YB	ks
OJ	YB		YB		YB		(N)	n	NZ		YB	ks
OK	YB		YB		YB		(N)	n	NZ		YB	ks
OL	YB		YB		YB		(N)	n	NZ		YB	ks
OM	YB		YB		YB		(N)	n	NZ		YB	ks
OO	YB		YB		YB		(N)	n	NZ		YB	ks
OP	YB		YB		YB		RJ	yb	NZ		YB	ks
OR	YB		YB		YB		(N)	n	NZ		YB	ks
OS	YB		YB		YB		(N)	n	NZ		YB	ks
OT	YB		YB		YB		(N)	n	NZ		YB	ks
OY	YB		YB		YB		(N)	n	NZ		YB	ks
P	YB		YB		YB		(N)	n	NZ		KS	yb
RC	YB		YB		YB		RJ	yb	NZ		YB	ks
RJ,RO	YB		YB		YB		RJ	yb	NZ		YB	ks
RK	YB		YB		YB		RJ	yb	NZ		YB	ks
RP	YB		YB		YB		RP	rj	NZ		YB	ks
S	YB		YB		YB		(N)	n	NZ		KS	yb
T	YB		YB		YB		(N)	n	NZ		KS	yb

[illegible]

7.

A	1		2		3		4		5		6	
ORIGIN DESTINATION	NFTF		NGFU		NGTT		NIUE		NSFA		NSTU	
AG	NZ		NF		NF		NZ		NZ		KS	
AN	NZ		NF		NF		NZ		NZ		KS	
AY	NZ		NF		NF		NZ		NZ		KS	
B	NZ		NF		NF		NZ		NZ		KS	
C	NZ		NF		NF		NZ		NZ		KS	
D	NZ		NF		NF		NZ		NZ		KS	
E	NZ		NF		NF		NZ		NZ		KS	
F	NZ		NF		NF		NZ		NZ		KS	
G	NZ		NF		NF		NZ		NZ		KS	
H	NZ		NF		NF		NZ		NZ		KS	
K	NZ		NF		NF		NZ		NZ		KS	
L	NZ		NF		NF		NZ		NZ		KS	
M	NZ		NF		NF		NZ		NZ		KS	
NC	NZ		NF		NF		NZ		NZ		KS	
NF (EX. NFT)	NZ		NF		NF		NZ		NZ		KS	
NFT	(N)	n	NF		NF		NZ		NZ		KS	
NG (EX. NGF)	NZ		NF		(N)	n	NZ		NZ		KS	
NGF	NZ		(N)	n	NF		NZ		NZ		KS	
NI	NZ		NF		NF		(N)	n	NZ		KS	
NL	NZ		NF		NF		NZ		NZ		KS	
NS (EX. NST)	NZ		NF		NF		NZ		(N)	n	KS	
NST	NZ		NF		NF		NZ		NZ		(N)	n
NT	NZ		NF		NF		NZ		NZ		KS	
NV	NZ		NF		NF		NZ		NZ		KS	
NW	NZ		NF		NF		NZ		NZ		KS	
NZ	NZ		NF		NF		NZ		NZ		KS	
OA	NZ		NF		NF		NZ		NZ		KS	
OB	NZ		NF		NF		NZ		NZ		KS	
OE	NZ		NF		NF		NZ		NZ		KS	
OI	NZ		NF		NF		NZ		NZ		KS	
OJ	NZ		NF		NF		NZ		NZ		KS	
OK	NZ		NF		NF		NZ		NZ		KS	
OL	NZ		NF		NF		NZ		NZ		KS	
OM	NZ		NF		NF		NZ		NZ		KS	
OO	NZ		NF		NF		NZ		NZ		KS	
OP	NZ		NF		NF		NZ		NZ		KS	
OR	NZ		NF		NF		NZ		NZ		KS	
OS	NZ		NF		NF		NZ		NZ		KS	
OT	NZ		NF		NF		NZ		NZ		KS	
OY	NZ		NF		NF		NZ		NZ		KS	
P	NZ		NF		NF		NZ		NZ		KS	
RC	NZ		NF		NF		NZ		NZ		KS	
RJ,RO	NZ		NF		NF		NZ		NZ		KS	
RK	NZ		NF		NF		NZ		NZ		KS	
RP	NZ		NF		NF		NZ		NZ		KS	
S	NZ		NF		NF		NZ		NZ		KS	
T	NZ		NF		NF		NZ		NZ		KS	

8.

[illegible]

A	1		2		3		4		5		6	
ORIGIN DESTINATION	NTAA		NVVV		NWWW		NZCH		OPKC		PKMJ	
AG	NZ		YB		NF		YB	ks	VA	zb	KS	
AN	NZ		YB		NF		YB	ks	VA	zb	KS	
AY	NZ		YB		NF		YB	ks	VA	zb	KS	
B	NZ		YB		NF		KS	yb	OK	oi	KS	
C	NZ		YB		NF		KS	yb	OK	oi	KS	
D	NZ		YB		NF		YB	ks	OK	oi	KS	
E	NZ		YB		NF		YB	ks	OK	oi	KS	
F	NZ		YB		NF		YB	ks	OK	oi	KS	
G	NZ		YB		NF		YB	ks	OK	oi	KS	
H	NZ		YB		NF		YB	ks	OK	oi	KS	
K	NZ		YB		NF		KS	yb	OK	oi	KS	
L	NZ		YB		NF		YB	ks	OK	oi	KS	
M	NZ		YB		NF		KS	yb	OK	zb	KS	
NC	NZ		YB		NF		NC	n	VA	zb	KS	
NF (EX. NFT)	NZ		YB		NF		YB	ks	VA	zb	KS	
NFT	NZ		YB		NF		NFT	n	VA	zb	KS	
NG (EX. NGF)	NZ		YB		NF		YB	ks	VA	zb	KS	
NGF	NZ		YB		NF		YB	ks	VA	zb	KS	
NI	NZ		YB		NF		NI	n	VA	zb	KS	
NL	NZ		YB		NL		YB	ks	VA	zb	KS	
NS (EX. NST)	NZ		YB		NF		NS	n	VA	zb	KS	
NST	NZ		YB		NF		KS	yb	VA	zb	KS	
NT	(N)	n	YB		NF	nt	NT	n	VA	zb	KS	
NV	NZ		(N)	n	NF		YB	ks	VA	zb	KS	
NW	NZ	nw	YB		(N)	n	YB	ks	VA	zb	KS	
NZ	NZ		YB		NF		(N)	n	VA	zb	KS	
OA	NZ		YB		NF		YB	ks	OA	oi	KS	
OB	NZ		YB		NF		YB	ks	OK	oi	KS	
OE	NZ		YB		NF		YB	ks	OK	oi	KS	
OI	NZ		YB		NF		YB	ks	OI	ok	KS	
OJ	NZ		YB		NF		YB	ks	OK	oi	KS	
OK	NZ		YB		NF		YB	ks	OK	oi	KS	
OL	NZ		YB		NF		YB	ks	OK	oi	KS	
OM	NZ		YB		NF		YB	ks	OK	oi	KS	
OO	NZ		YB		NF		YB	ks	OK	oi	KS	
OP	NZ		YB		NF		YB	ks	(N)	n	KS	
OR	NZ		YB		NF		YB	ks	OI	ok	KS	
OS	NZ		YB		NF		YB	ks	OI	ok	KS	
OT	NZ		YB		NF		YB	ks	OK	oi	KS	
OY	NZ		YB		NF		YB	ks	OK	oi	KS	
P	NZ		YB		NF		KS	yb	VA	zb	(N)	n
RC	NZ		YB		NF		YB	ks	VA	zb	KS	
RJ,RO	NZ		YB		NF		YB	ks	VA	zb	KS	
RK	NZ		YB		NF		YB	ks	VA	zb	KS	
RP	NZ		YB		NF		YB	ks	VA	zb	KS	
S	NZ		YB		NF		KS	yb	OK	oi	KS	
T	NZ		YB		NF		KS	yb	OK	oi	KS	

[illegible]

A	1		2		3		4		5		6	
ORIGIN DESTINATION	PTKK		PTPN		PTRO		PTSA		PTYA		RCTP	
AG	KS		KS		KS		KS		KS		RP	vh
AN	KS		KS		KS		KS		KS		RP	vh
AY	KS		KS		KS		KS		KS		RP	vh
B	KS		KS		KS		KS		KS		VH	rp
C	KS		KS		KS		KS		KS		VH	rp
D	KS		KS		KS		KS		KS		RP	vh
E	KS		KS		KS		KS		KS		VH	rp
F	KS		KS		KS		KS		KS		RP	vh
G	KS		KS		KS		KS		KS		RP	vh
H	KS		KS		KS		KS		KS		RP	vh
K	KS		KS		KS		KS		KS		VH	rp
L	KS		KS		KS		KS		KS		VH	rp
M	KS		KS		KS		KS		KS		VH	rp
NC	KS		KS		KS		KS		KS		RP	vh
NF (EX. NFT)	KS		KS		KS		KS		KS		RP	vh
NFT	KS		KS		KS		KS		KS		RP	vh
NG (EX. NGF)	KS		KS		KS		KS		KS		RP	vh
NGF	KS		KS		KS		KS		KS		RP	vh
NI	KS		KS		KS		KS		KS		RP	vh
NL	KS		KS		KS		KS		KS		RP	vh
NS (EX. NST)	KS		KS		KS		KS		KS		RP	vh
NST	KS		KS		KS		KS		KS		RP	vh
NT	KS		KS		KS		KS		KS		RP	vh
NV	KS		KS		KS		KS		KS		RP	vh
NW	KS		KS		KS		KS		KS		RP	vh
NZ	KS		KS		KS		KS		KS		RP	vh
OA	KS		KS		KS		KS		KS		RP	vh
OB	KS		KS		KS		KS		KS		RP	vh
OE	KS		KS		KS		KS		KS		RP	vh
OI	KS		KS		KS		KS		KS		RP	vh
OJ	KS		KS		KS		KS		KS		RP	vh
OK	KS		KS		KS		KS		KS		RP	vh
OL	KS		KS		KS		KS		KS		RP	vh
OM	KS		KS		KS		KS		KS		RP	vh
OO	KS		KS		KS		KS		KS		RP	vh
OP	KS		KS		KS		KS		KS		RP	vh
OR	KS		KS		KS		KS		KS		RP	vh
OS	KS		KS		KS		KS		KS		RP	vh
OT	KS		KS		KS		KS		KS		RP	vh
OY	KS		KS		KS		KS		KS		RP	vh
P	(N)		(N)		(N)		(N)		(N)		VH	rp
RC	KS		KS		KS		KS		KS		(N)	n
RJ,RO	KS		KS		KS		KS		KS		RJ	vh
RK	KS		KS		KS		KS		KS		RJ	vh
RP	KS		KS		KS		KS		KS		RP	vh
S	KS		KS		KS		KS		KS		VH	rp
T	KS		KS		KS		KS		KS		VH	rp

[illegible]

A	1		2		3		4		5		6	
ORIGIN DESTINATION	RJJJ		RKSS		RPLL		UH HH		UUUU		VABB	
AG	WS	vh	RJ		WS	vh	UU	zb	RJ	n	VT	vc
AN	WS	vh	RJ		WS	vh	UU	zb	RJ	n	VT	vc
AY	WS	vh	RJ		WS	vh	UU	zb	RJ	n	VT	vc
B	KS	ws	RJ		VH	ws	UU	zb	BI	n	VT	vc
C	KS	ws	RJ		KS	vh	UU	zb	EG	n	VT	vc
D	WS	vh	RJ		WS	vh	UU	zb	LF	n	HK	vt
E	WS	vh	RJ		VH	ws	UU	zb	(N)	n	VT	vc
F	WS	vh	RJ		WS	vh	UU	zb	LF	n	HK	vt
G	WS	vh	RJ		WS	vh	UU	zb	LE	n	HK	vt
H	WS	vh	RJ		WS	vh	UU	zb	LG	n	HK	vt
K	KS	ws	RJ	zb	KS	vh	UU	zb	RJ	n	VT	vc
L	WS	vh	RJ		VH	ws	UU	zb	(N)	n	VT	vc
M	KS	ws	RJ		KS	vh	UU	zb	EG	n	VT	vc
NC	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
NF (EX. NFT)	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
NFT	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
NG (EX. NGF)	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
NGF	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
NI	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
NL	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
NS (EX. NST)	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
NST	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
NT	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
NV	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
NW	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
NZ	KS	ws	RJ		WS	vh	UU	zb	RJ	n	VT	vc
OA	WS	vh	RJ		WS	vh	UU	n	LC	n	OP	vn
OB	WS	vh	RJ		WS	vh	UU	n	LC	n	OO	op
OE	WS	vh	RJ		WS	vh	UU	n	LC	n	OO	op
OI	WS	vh	RJ		WS	vh	UU	n	LC	n	OP	oo
OJ	WS	vh	RJ		WS	vh	UU	n	LC	n	OO	op
OK	WS	vh	RJ		WS	vh	UU	n	LC	n	OO	op
OL	WS	vh	RJ		WS	vh	UU	n	LC	n	OO	op
OM	WS	vh	RJ		WS	vh	UU	n	LC	n	OO	op
OO	WS	vh	RJ		WS	vh	UU	n	LC	n	OO	op
OP	WS	vh	RJ		WS	vh	UU	n	LC	n	OP	oo
OR	WS	vh	RJ		WS	vh	UU	n	LC	n	OO	op
OS	WS	vh	RJ		WS	vh	UU	n	LC	n	OO	op
OT	WS	vh	RJ		WS	vh	UU	n	LC	n	OO	op
OY	WS	vh	RJ		WS	vh	UU	n	LC	n	OO	op
P	KS	ws	RJ		KS	vh	UU	zb	EG	n	VT	vc
RC	RC	vh	RJ		RC	vh	UU	zb	RJ	n	VT	vc
RJ,RO	(N)	n	RJ	zb	VH	rc	UU	zb	RJ	n	VT	vc
RK	RK	zb	(N)	n	VH	rc	UU	zb	RJ	n	VT	vc
RP	WS	vh	RJ		(N)	n	UU	zb	RJ	n	VT	vc
S	KS	ws	RJ		KS	vh	UU	zb	LE	n	VT	vc
T	KS	ws	RJ		KS	vh	UU	zb	EG	n	VT	vc

[illegible]

A	1		2		3		4		5		6	
ORIGIN DESTINATION	VCCC		VDPP		VECC		VGZR		VHHH		VIDD	
AG	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
AN	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
AY	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
B	WS	va	VT		VA	vg	VT	va	RJ	vt	VA	n
C	WS	va	VT		VA	vg	VT	va	RJ	rp	VA	n
D	WS	va	VT		VA	n	VT	va	VT	vvt	VA	n
E	WS	va	VT		VA	n	VT	va	VT	rj	VA	n
F	WS	va	VT		VA	vo	VT	va	VT	rp	VA	ve
G	WS	va	VT		VA	n	VT	va	VT	vvt	VA	n
H	WS	va	VT		VA	n	VT	va	VT	vvt	VA	n
K	WS	va	VT		VA	vg	VT	va	RJ	rp	VA	n
L	WS	va	VT		VA	n	VT	va	VT	rj	VA	n
M	WS	va	VT		VA	vg	VT	va	RJ	rp	VA	n
NC	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
NF (EX. NFT)	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
NFT	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
NG (EX. NGF)	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
NGF	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
NI	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
NL	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
NS (EX. NST)	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
NST	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
NT	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
NV	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
NW	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
NZ	WS	va	VT		VA	vg	VT	va	VT	rp	VA	n
OA	VA	ws	VT		VA	n	VT	va	ZB	vt	VA	n
OB	WS	va	VT		VA	n	VT	va	VT	rp	VA	n
OE	WS	va	VT		VA	n	VT	va	VT	rp	VA	n
OI	WS	va	VT		VA	n	VT	va	VT	rp	VA	n
OJ	WS	va	VT		VA	n	VT	va	VT	rp	VA	n
OK	WS	va	VT		VA	n	VT	va	VT	rp	VA	n
OL	WS	va	VT		VA	n	VT	va	VT	rp	VA	n
OM	WS	va	VT		VA	n	VT	va	VT	rp	VA	n
OO	WS	va	VT		VA	n	VT	va	VT	rp	VA	n
OP	VA	ws	VT		VA	n	VT	va	ZB	vt	VA	n
OR	WS	va	VT		VA	n	VT	va	VT	rp	VA	n
OS	WS	va	VT		VA	n	VT	va	VT	rp	VA	n
OT	WS	va	VT		VA	n	VT	va	VT	rp	VA	n
OY	WS	va	VT		VA	n	VT	va	VT	rp	VA	n
P	WS	va	VT		VA	vg	VT	va	RJ	rp	VA	n
RC	WS	va	VT		VA	vg	VT	va	RC	rp	VA	n
RJ,RO	WS	va	VT		VA	vg	VT	va	RJ	rc	VA	n
RK	WS	va	VT		VA	vg	VT	va	RJ	zb	VA	n
RP	WS	va	VT		VA	vg	VT	va	RP	rc	VA	n
S	WS	va	VT		VA	vg	VT	va	RJ	rp	VA	n
T	WS	va	VT		VA	vg	VT	va	RJ	rp	VA	n

[illegible]

A	1		2		3		4		5		6	
ORIGIN DESTINATION	VLVT		VMMC		VNKT		VOMM		VQPR		VRMM	
AG	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
AN	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
AY	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
B	VT	vv	VH	zg	ZB	va	WM	va	VA		VC	
C	VT	vv	VH	zg	ZB	va	WM	va	VA		VC	
D	VT	vv	VH	zg	ZB	va	VA	wm	VA		VC	
E	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
F	VT	vv	VH	zg	ZB	va	VA	wm	VA		VC	
G	VT	vv	VH	zg	ZB	va	VA	wm	VA		VC	
H	VT	vv	VH	zg	ZB	va	VA	wm	VA		VC	
K	VT	vv	VH	zg	ZB	va	WM	va	VA		VC	
L	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
M	VT	vv	VH	zg	ZB	va	WM	va	VA		VC	
NC	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
NF (EX. NFT)	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
NFT	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
NG (EX. NGF)	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
NGF	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
NI	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
NL	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
NS (EX. NST)	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
NST	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
NT	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
NV	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
NW	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
NZ	VT	vv	VH	zg	VA	zb	WM	va	VA		VC	
OA	VT	vv	VH	zg	VA	zb	VA	n	VA		VC	
OB	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
OE	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
OI	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
OJ	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
OK	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
OL	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
OM	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
OO	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
OP	VT	vv	VH	zg	ZB	va	VA	wm	VA		VC	
OR	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
OS	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
OT	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
OY	VT	vv	VH	zg	VA	zb	VA	wm	VA		VC	
P	VT	vv	VH	zg	ZB	va	WM	va	VA		VC	
RC	VT	vv	VH	zg	ZB	va	WM	va	VA		VC	
RJ,RO	VT	vv	VH	zg	ZB	va	WM	va	VA		VC	
RK	VT	vv	VH	zg	ZB	va	WM	va	VA		VC	
RP	VT	vv	VH	zg	ZB	va	WM	va	VA		VC	
S	VT	vv	VH	zg	ZB	va	WM	va	VA		VC	
T	VT	vv	VH	zg	ZB	va	WM	va	VA		VC	

[illegible]

A	1		2		3		4		5		6	
ORIGIN DESTINATION	VTBB		VVTs		VVVV		VYYY		WBKK		WBSB	
AG	WS	wm	VT	vh	VVT		VT		WM		WS	wm
AN	WS	wm	VT	vh	VVT		VT		WM		WS	wm
AY	WS	wm	VT	vh	VVT		VT		WM		WS	wm
B	VH	ws	VH	vt	VVT		VT		WM		WS	wm
C	VH	ws	VH	vt	VVT		VT		WM		WS	wm
D	WS	va	VT	vh	VVT		VT		WM		WS	wm
E	LI	ws	VH	vt	VVT		VT		WM		WS	wm
F	WS	va	VT	vh	VVT		VT		WM		WS	wm
G	WS	va	VT	vh	VVT		VT		WM		WS	wm
H	WS	va	VT	vh	VVT		VT		WM		WS	wm
K	VH	ws	VH	vt	VVT		VT		WM		WS	wm
L	LI	ws	VH	vt	VVT		VT		WM		WS	wm
M	VH	ws	VH	vt	VVT		VT		WM		WS	wm
NC	WS	wm	VT	vh	VVT		VT		WM		WS	wm
NF (EX. NFT)	WS	wm	VT	vh	VVT		VT		WM		WS	wm
NFT	WS	wm	VT	vh	VVT		VT		WM		WS	wm
NG (EX. NGF)	WS	wm	VT	vh	VVT		VT		WM		WS	wm
NGF	WS	wm	VT	vh	VVT		VT		WM		WS	wm
NI	WS	wm	VT	vh	VVT		VT		WM		WS	wm
NL	WS	wm	VT	vh	VVT		VT		WM		WS	wm
NS (EX. NST)	WS	wm	VT	vh	VVT		VT		WM		WS	wm
NST	WS	wm	VT	vh	VVT		VT		WM		WS	wm
NT	WS	wm	VT	vh	VVT		VT		WM		WS	wm
NV	WS	wm	VT	vh	VVT		VT		WM		WS	wm
NW	WS	wm	VT	vh	VVT		VT		WM		WS	wm
NZ	WS	wm	VT	vh	VVT		VT		WM		WS	wm
OA	VA	ws	VT	vh	VVT		VT		WM		WS	wm
OB	WS	va	VT	vh	VVT		VT		WM		WS	wm
OE	WS	wm	VT	vh	VVT		VT		WM		WS	wm
OI	WS	wm	VT	vh	VVT		VT		WM		WS	wm
OJ	WS	wm	VT	vh	VVT		VT		WM		WS	wm
OK	WS	wm	VT	vh	VVT		VT		WM		WS	wm
OL	WS	wm	VT	vh	VVT		VT		WM		WS	wm
OM	WS	wm	VT	vh	VVT		VT		WM		WS	wm
OO	WS	wm	VT	vh	VVT		VT		WM		WS	wm
OP	VA	ws	VT	vh	VVT		VT		WM		WS	wm
OR	WS	wm	VT	vh	VVT		VT		WM		WS	wm
OS	WS	wm	VT	vh	VVT		VT		WM		WS	wm
OT	WS	wm	VT	vh	VVT		VT		WM		WS	wm
OY	WS	wm	VT	vh	VVT		VT		WM		WS	wm
P	VH	ws	VH	vt	VVT		VT		WM		WS	wm
RC	VH	ws	VH	vt	VVT		VT		WM		WS	wm
RJ,RO	VH	ws	VH	vt	VVT		VT		WM		WS	wm
RK	VH	ws	VH	vt	VVT		VT		WM		WS	wm
RP	VH	ws	RP	vh	VVT		VT		WM		WS	wm
S	VH	ws	VH	vt	VVT		VT		WM		WS	wm
T	VH	ws	VH	vt	VVT		VT		WM		WS	wm

[illegible]

A	1		2		3		4		5		6	
ORIGIN DESTINATION	WIII		WMKK		WPDL		WSSS		YBBB		ZBBB	
AG	YB	ws	WS	vt	Y		YB	wi	AG	n	RJ	zg
AN	YB	ws	WS	vt	Y		YB	wi	AN	n	RJ	zg
AY	YB	ws	WS	vt	Y		YB	wi	AY	n	RJ	zg
B	YB	ws	WS	vt	Y		RJ	yb	KS	nf	RJ	zg
C	YB	ws	WS	vt	Y		RJ	yb	KS	nf	RJ	zg
D	YB	ws	WS	vt	Y		YB	vt	FA	ws	RJ	op
E	WS	yb	WS	vt	Y		EG	vt	WS	wi	RJ	zg
F	YB	ws	WS	vt	Y		YB	vt	FA	ws	RJ	op
G	YB	ws	WS	vt	Y		YB	vt	FA	ws	RJ	op
H	YB	ws	WS	vt	Y		YB	vt	FA	ws	RJ	op
K	YB	ws	WS	vt	Y		RJ	yb	KS	nf	RJ	zg
L	WS	yb	WS	vt	Y		EG	vt	WS	wi	RJ	zg
M	YB	ws	WS	vt	Y		RJ	yb	KS	nf	RJ	zg
NC	YB	ws	WS	vt	Y		YB	wi	NZ	ks	RJ	zg
NF (EX. NFT)	YB	ws	WS	vt	Y		YB	wi	NF	nz	RJ	zg
NFT	YB	ws	WS	vt	Y		YB	wi	NZ	ks	RJ	zg
NG (EX. NGF)	YB	ws	WS	vt	Y		YB	wi	NF	nz	RJ	zg
NGF	YB	ws	WS	vt	Y		YB	wi	NF	nz	RJ	zg
NI	YB	ws	WS	vt	Y		YB	wi	NZ	ks	RJ	zg
NL	YB	ws	WS	vt	Y		YB	wi	NF	nz	RJ	zg
NS (EX. NST)	YB	ws	WS	vt	Y		YB	wi	NZ	ks	RJ	zg
NST	YB	ws	WS	vt	Y		YB	wi	KS	nf	RJ	zg
NT	YB	ws	WS	vt	Y		YB	wi	NZ	ks	RJ	zg
NV	YB	ws	WS	vt	Y		YB	wi	NV	n	RJ	zg
NW	YB	ws	WS	vt	Y		YB	wi	NF	nz	RJ	zg
NZ	YB	ws	WS	vt	Y		YB	wi	NZ	ks	RJ	zg
OA	WS	yb	VO	vt	Y		VC	vt	WS	wi	OP	vn
OB	WS	yb	WS	vt	Y		OB	vt	WS	wi	OP	zg
OE	WS	yb	WS	vt	Y		OB	vt	WS	wi	OP	zg
OI	WS	yb	WS	vt	Y		OB	vt	WS	wi	OP	zg
OJ	WS	yb	WS	vt	Y		OB	vt	WS	wi	OP	zg
OK	WS	yb	WS	vt	Y		OB	vt	WS	wi	OP	zg
OL	WS	yb	WS	vt	Y		OB	vt	WS	wi	OP	zg
OM	WS	yb	WS	vt	Y		OB	vt	WS	wi	OP	zg
OO	WS	yb	WS	vt	Y		OB	vt	WS	wi	OP	zg
OP	WS	yb	VT	ws	Y		VT	oo	WS	wi	OP	zg
OR	WS	yb	WS	vt	Y		OB	vt	WS	wi	OP	zg
OS	WS	yb	WS	vt	Y		OB	vt	WS	wi	OP	zg
OT	WS	yb	WS	vt	Y		OB	vt	WS	wi	OP	zg
OY	WS	yb	WS	vt	Y		OB	vt	WS	wi	OP	zg
P	YB	ws	WS	vt	Y		RJ	yb	KS	nf	RJ	zg
RC	WS	yb	WS	vt	Y		RJ	vt	WS	wi	RJ	zg
RJ,RO	WS	yb	WS	vt	Y		RJ	vt	WS	wi	RJ	zg
RK	WS	yb	WS	vt	Y		RJ	vt	WS	wi	RK	rj
RP	WS	yb	WS	vt	Y		RP	vt	WS	wi	VH	zg
S	YB	ws	WS	vt	Y		RJ	yb	KS	nf	RJ	zg
T	WS	yb	WS	vt	Y		RJ	yb	KS	nf	RJ	zg

[illegible]

A	1		2		3		4		5		6	
ORIGIN DESTINATION	ZGGG		ZJHK		ZKKK		ZMUB					
AG	VH	zb	VH	zg	ZB	n	ZB					
AN	VH	zb	VH	zg	ZB	n	ZB					
AY	VH	zb	VH	zg	ZB	n	ZB					
B	ZB	vh	ZG	vh	ZB	n	ZB					
C	ZB	vh	ZG	vh	ZB	n	ZB					
D	ZB	vh	ZG	vh	ZB	n	ZB					
E	VH	zb	VH	zg	ZB	n	ZB					
F	ZB	vh	VH	zg	ZB	n	ZB					
G	ZB	vh	ZG	vh	ZB	n	ZB					
H	ZB	vh	ZG	vh	ZB	n	ZB					
K	ZB	vh	ZG	vh	RK	zb	ZB					
L	VH	zb	VH	zg	ZB	n	ZB					
M	ZB	vh	ZG	vh	ZB	n	ZB					
NC	VH	zb	VH	zg	ZB	n	ZB					
NF (EX. NFT)	VH	zb	VH	zg	ZB	n	ZB					
NFT	VH	zb	VH	zg	ZB	n	ZB					
NG (EX. NGF)	VH	zb	VH	zg	ZB	n	ZB					
NGF	VH	zb	VH	zg	ZB	n	ZB					
NI	VH	zb	VH	zg	ZB	n	ZB					
NL	VH	zb	VH	zg	ZB	n	ZB					
NS (EX. NST)	VH	zb	VH	zg	ZB	n	ZB					
NST	VH	zb	VH	zg	ZB	n	ZB					
NT	VH	zb	VH	zg	ZB	n	ZB					
NV	VH	zb	VH	zg	ZB	n	ZB					
NW	VH	zb	VH	zg	ZB	n	ZB					
NZ	VH	zb	VH	zg	ZB	n	ZB					
OA	ZB	vh	ZG	vh	ZB	n	ZB					
OB	ZB	vh	ZG	vh	ZB	n	ZB					
OE	ZB	vh	ZG	vh	ZB	n	ZB					
OI	ZB	vh	ZG	vh	ZB	n	ZB					
OJ	ZB	vh	ZG	vh	ZB	n	ZB					
OK	ZB	vh	ZG	vh	ZB	n	ZB					
OL	ZB	vh	ZG	vh	ZB	n	ZB					
OM	ZB	vh	ZG	vh	ZB	n	ZB					
OO	ZB	vh	ZG	vh	ZB	n	ZB					
OP	ZB	vh	ZG	vh	ZB	n	ZB					
OR	ZB	vh	ZG	vh	ZB	n	ZB					
OS	ZB	vh	ZG	vh	ZB	n	ZB					
OT	ZB	vh	ZG	vh	ZB	n	ZB					
OY	ZB	vh	ZG	vh	ZB	n	ZB					
P	ZB	vh	ZG	vh	ZB	n	ZB					
RC	ZB	vh	VH	zg	ZB	n	ZB					
RJ,RO	ZB	vh	ZG	vh	RK	zb	ZB					
RK	ZB	vh	ZG	vh	RK	zb	ZB					
RP	VH	zb	VH	zg	ZB	n	ZB					
S	ZB	vh	ZG	vh	ZB	n	ZB					
T	ZB	n	ZG	vh	ZB	n	ZB					

[illegible]

25.

A	1		2		3		4		5		6	
ORIGIN DESTINATION	ZGGG		ZJHK		ZKKK		ZMUB					

AFTN/ATSMHS CONNECTIONS - ASIA/PAC ROUTING DIRECTORY

Terminal 1 (^ - BBIS)	Terminal II	ATSMHS or AFTN	Over CRV (Y/N)
Apia/Faleolo	Christchurch	AMHS/UA	N
Bangkok^	Beijing	AMHS	N
	Mumbai	AMHS	N
	Dhaka	AMHS	N
	Ho-Chi-Minh	AFTN	N
	Hong Kong	AMHS	N
	Kuala Lumpur	AMHS	N
	Phnom Penh	AMHS	N
	Rome	AMHS	N
	Yangon	AMHS	N
	Singapore	AMHS	N
	Vientiane	AMHS	N
	Paro	AMHS	N
Beijing^	Bangkok	AMHS	N
	Fukuoka	AMHS	Y
	Guangzhou	AFTN	N
	Hong Kong	AMHS	Y
	Karachi	AFTN	N
	Khavarosk	AFTN	N
	Kathmandu	AFTN	N
	Mumbai	AMHS	N
	Pyongyang	AFTN	N
	Seoul	AMHS	N
	Ulaan Baatar	AFTN	N
	Yangon	AFTN	N
Brisbane^	Christchurch	AMHS	Y
	Timor Leste	AFTN/UA	N
	Jakarta	AFTN	N
	Johannesburg	AMHS	N
	Honiara	AFTN/UA	N
	Nadi	AMHS	Y
	Nauru	AFTN/UA	N
	Port Moresby	AFTN	Y
	Port Vila	AFTN/UA	N
	Singapore	AMHS	Y
	USA	AMHS	Y
Brunei	Kuala Lumpur	AFTN	N
	Singapore	AFTN	N
Chennai	Mumbai	AFTN	N
	Kolkata	AFTN	N
	Kuala Lumpur	AFTN	N

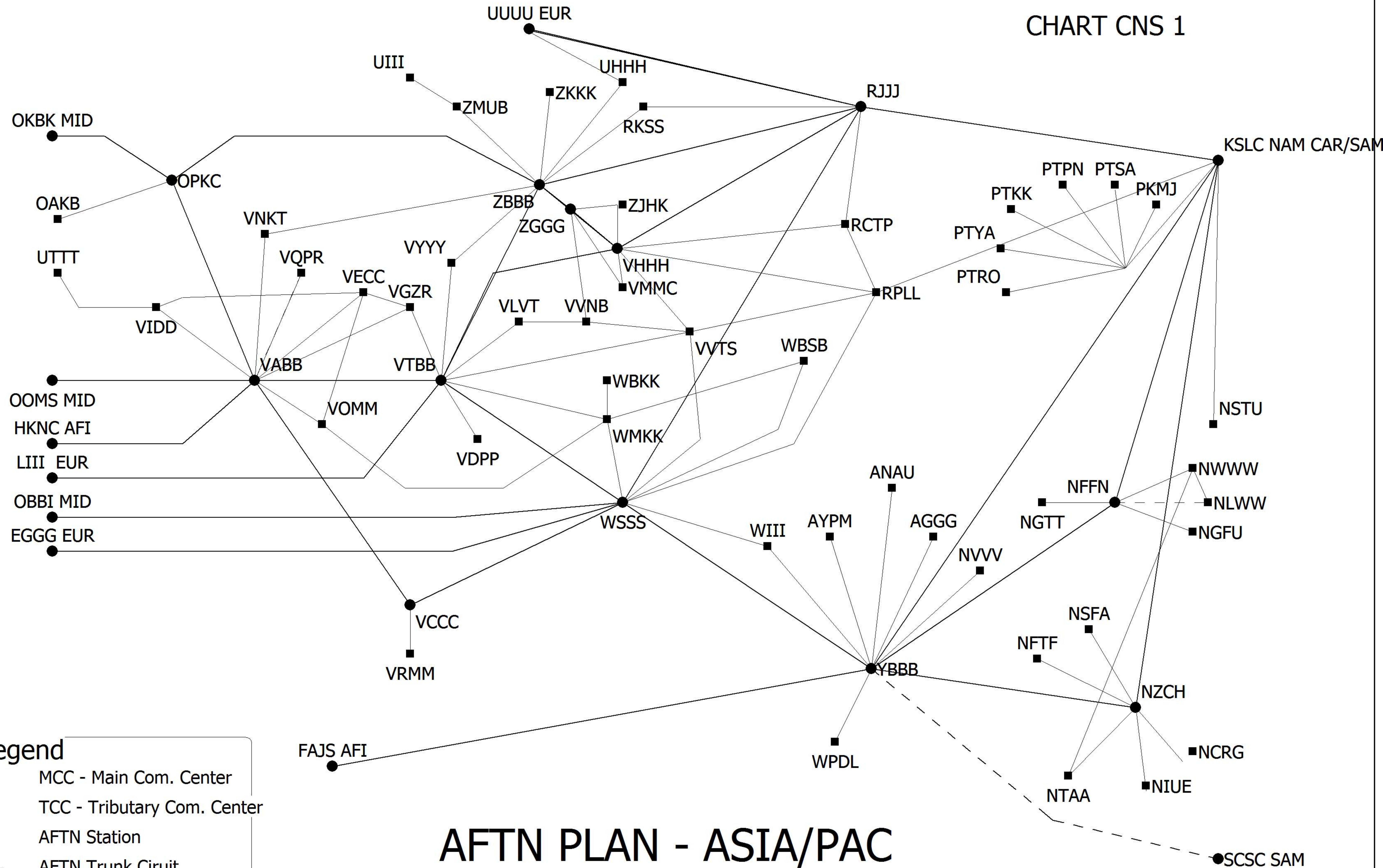
Terminal 1 (^ - BBIS)	Terminal II	ATSMHS or AFTN	Over CRV (Y/N)
Christchurch	Apia/Faleolo	AMHS/UA	N
	Niue	AMHS/UA	N
	Rarotonga	AMHS/UA	N
	Brisbane	AMHS	Y
	Papeete/Tahiti	AFTN	N
	Tonga/Fua'Amotu	AMHS/UA	N
	USA	AMHS	Y
Chuuk	USA	AMHS/UA	N
Colombo	Mumbai	AMHS	N
	Male	AFTN	N
	Singapore	AFTN	N
Delhi	Mumbai	AFTN	N
	Kolkata	AFTN	N
Dhaka	Bangkok	AMHS	N
Fukuoka^	Beijing	AMHS	Y
	Hong Kong	AMHS	Y
	Moscow	AFTN	N
	Seoul	AFTN	N
	Singapore	AMHS	Y
	Taipei	AMHS	Y
	USA	AMHS	Y
Guangzhou	Beijing	AFTN	N
	Hong Kong	AFTN	N
	Macau	AFTN	N
	Haikou	AFTN	N
	Hanoi	AFTN	N
Hanoi	Ho-Chi-Minh	AFTN	N
	Vientiane	AFTN	N
	Guangzhou	AFTN	N
Haikou	Guangzhou	AFTN	N
	Hong Kong	AFTN	N
Ho-Chi-Minh	Bangkok	AFTN	N
	Hanoi	AFTN	N
	Hong Kong	AFTN	N
	Singapore	AFTN	N
	Manila	AFTN	N
	Phnom Penh	AFTN	N
Hong Kong^	Bangkok	AMHS	N
	Beijing	AMHS	Y
	Guangzhou	AFTN	N

Terminal 1 (^ - BBIS)	Terminal II	ATSMHS or AFTN	Over CRV (Y/N)
	Ho-Chi-Minh	AFTN	N
	Macau	AMHS	N
	Manila	AMHS	Y
	Haikou	AFTN	N
	Taipei	AMHS	Y
	Fukuoka	AMHS	Y
Honiara	Brisbane	AMHS/UA	N
Jakarta	Brisbane	AFTN	N
	Singapore	AMHS	N
Karachi	Beijing	AFTN	N
	Mumbai	AMHS	N
	Kabul	AFTN	N
	Kuwait	AMHS	N
	Tehran (<i>Not listed in the ANP AFTN Planning Table</i>)		
Kathmandu	Beijing	AFTN	N
	Mumbai	AMHS	N
Kolkata	Mumbai	AFTN	N
	Delhi	AFTN	N
	Chennai	AFTN	N
Koro	USA	AMHS/UA	N
Kosrae	USA	AMHS/UA	N
Kuala Lumpur	Bangkok	AFTN	N
	Brunei	AFTN	N
	Singapore	AFTN	N
	Chennai	AFTN	N
Macau	Guangzhou	AFTN	N
	Hong Kong	AMHS	N
Majuro	USA	AMHS/UA	N
Male	Colombo	AFTN	N
Manila	Hong Kong	AMHS	Y
	Ho Chi Minh	AFTN	N
	Singapore	AMHS	Y
	Taipei	AMHS	Y
	USA	AMHS	Y
Mumbai^	Bangkok	AMHS	N
	Dhaka	AMHS	N

Terminal 1 (^ - BBIS)	Terminal II	ATSMHS or AFTN	Over CRV (Y/N)
	Kolkata	AFTN	N
	Colombo	AMHS	N
	Delhi	AFTN	N
	Karachi	AMHS	N
	Kathmandu	AMHS	N
	Beijing	AMHS	N
	Chennai	AFTN	N
	Muscat/Seeb	AFTN (No connection)	N
	Nairobi	AFTN	N
	Paro	AMHS	N
	Singapore	AMHS	N
Nadi^	Brisbane	AMHS	Y
	Funafuti	AMHS/UA	N
	Noumea	AMHS	N
	Tarawa	AMHS/UA	N
	USA	AMHS	Y
	Wallis Is.	AMHS/UA	N
Nauru	Brisbane	AMHS/UA	N
Niue	Christchurch	Email	N
Noumea	Nadi	AMHS	N
Pago Pago	USA	AMHS/UA	N
Papeete/Tahiti	Christchurch	AFTN	N
Paro	Mumbai	AMHS	N
	Bangkok	AMHS	N
Phnom Penh	Bangkok	AMHS	N
	Ho Chi Minh	AFTN	N
Pohnpei	USA	AMHS/UA	N
Port Moresby	Brisbane	AFTN	Y
Port Vila	Brisbane	AMHS/UA	N
Pyongyang	Beijing	AFTN	N
Rarotonga	Christchurch	AFTN	N
Salt Lake City^	Brisbane	AMHS	Y
	Christchurch	AMHS	Y
	Chuuk	AMHS UA	N
	Fukuoka	AMHS	Y
	Koro	AMHS UA	N
	Kosrae	AMHS UA	N

Terminal 1 (^ - BBIS)	Terminal II	ATSMHS or AFTN	Over CRV (Y/N)
	Majuro	AMHS UA	N
	Manila	AMHS	Y
	Nadi	AMHS	Y
	Pago Pago	AMHS UA	N
	Pohnpei	AMHS UA	N
	Yap	AMHS UA	N
Seoul	Beijing	AMHS	N
	Fukuoka	AFTN	N
Singapore^	Bangkok	AMHS	N
	Bahrain	AFTN	N
	Brisbane	AMHS	Y
	Brunei	AFTN	N
	Colombo	AFTN	N
	Ho-Chi-Minh	AFTN	N
	Jakarta	AMHS	N
	Kuala Lumpur	AMHS	N
	London	AMHS	N
	Manila	AMHS	Y
	Mumbai	AMHS	N
	Fukuoka	AMHS	Y
Taipei	Hong Kong	AMHS	Y
	Manila	AMHS	Y
	Fukuoka	AMHS	Y
Tarawa	Nadi	AMHS/UA	N
Timor Leste	Brisbane	AMHS	N
Tonga/Fua'Amotu	Christchurch	AMHS/UA	N
Ulaan Baatar	Beijing	AFTN	N
	Irkutsk	AFTN	N
Vientiane	Bangkok	AMHS	N
	Hanoi	AFTN	N
Wallis Is.	Nadi	(planning)	-
Yangon	Bangkok	AMHS	N
	Beijing	AFTN	N
Yap	USA	AMHS/UA	N

CHART CNS 1



Legend

- MCC - Main Com. Center
- TCC - Tributary Com. Center
- AFTN Station
- AFTN Trunk Circuit
- AFTN Circuit
- Non_implemented Circuit

AFTN PLAN - ASIA/PAC

7 April 2022

ACSICG/9
Appendix D to the Report

Implementation Status of ATN/AMHS in the APAC Region Extracted from ATN/AMHS/AIDC Implementation Table

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
AFGHANISTAN			
AUSTRALIA	AMHS over CRV with: Singapore, New Zealand, Fiji and USA AMHS over leased line with: South Africa AFTN over CRV with: PNG AFTN over leased line with: Indonesia Planning to migrate existing AFTN connections with Indonesia and PNG to AMHS over CRV (TBC, pending readiness both ends) Extended AMHS with FTBP in support of IWXXM exchange in operation since Nov. 2020.	Frequentis Comsoft	
BANGLADESH	In Q1/2013, Bangladesh installed ATN/AMHS and BIS Router at Dhaka (VGHS) with User Agents at Chittagong (VGEG) and Sylhet (VGSY).	COMSOFT	

ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
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 27 th June 2017. IOT and POT with Thailand completed on 2 nd May 2017. TMC signing with both countries signed.	AEROTHAI'S AMHS System	
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	

ACSICG/9
Appendix D to the Report

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. Hong Kong China The Beijing-Hong Kong AMHS link was put into operation in 2018; CRV/AMHS circuit was put into operation in April 2021 Thailand With Thailand was put into operation in Q12020 Plan implement IOT and POT in 2022 Macau China AMHS/ATN technical tests with Macau completed in 2009. Plan for ATN/AMHS implementation with Macao China is TBD. Korea ATN/AMHS circuit with ROK has been put into operation since June 2011. Completed CRV/AMHS IOT in 2021 Plan implement POT in Q2 2022 India ATN/AMHS tests with India has been put into operation since 2016. Mongolia ATN and AMHS IOT with Mongolia is completed in May 2018. Plan for commissioning after POT completion in 2021 Nepal Connection tests with Nepal is TBD. Japan AMHS testing with Japan was completed in March 2021.It will put into operation after TMC is signed.	IN-HOUSE (Aero-Info Technologies Co., Ltd)	IN-HOUSE (Aero-Info Technologies Co., Ltd)
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ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
	China have completed TMC signed and circuit put into operation in 2021 Russia AMHS IOT with Russia in 2021.		
HONG KONG, CHINA	Manila / Philippines CRV/AMHS circuit was put into operation in May 2019. Beijing / China CRV/AMHS circuit was put into operation in April 2021 Macao / China ATN/AMHS circuit was put into operation in December 2009. Wait for Macao to join CRV. Bangkok / Thailand ATN/AMHS circuit was put into operation use in 2014. Wait for Thailand to join CRV. Fukuoka / Japan CRV/AMHS circuit was put into operation in September 2020. HoChiMinh / Vietnam Currently on AFTN. Simple AMHS IOT was conducted in Dec 2019. Wait for Vietnam to join CRV. Taibei / China CRV/AMHS circuit was put into operation in June 2020.	COMSOFT	

ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
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. Upgrade of ATN/AMHS to support IPS and IWXXM planned with tentative target date of Q2 2023.	COMSOFT	
COOK ISLANDS			
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	The ATN BIS Router and AMHS planned for in 2011.		

ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	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. Upgrade of AMHS to support the Extended ATS service with up to 4.0MB file size including FTBP. and IWXXM planned with tentative target date of Q2 2023.	COMSOFT	B2B connection between Nadi AMHS and Brisbane AMHS planned for Q3, 2022 as backup for CRV.
FRANCE (French Polynesia Tahiti)	Planned for implementation of AMHS in 2022 (T2). Using IP with New Zealand since 2017.	COMSOFT	

ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
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; (IOT/POT) between Mumbai – Muscat is scheduled with mutual agreement between India & Oman between 0600-0900 UTC from 21.06.2021. Technical Memorandum of Cooperation (TMC) between Oman and India has been signed in Feb.-2022. As agreed mutually, Mumbai- Muscat AMHS circuit will be commissioned on 25/04/2022 at 0600UTC. Technical Memorandum of Cooperation (TMC) between Oman and India has been signed in Feb.-2022. As agreed mutually, Mumbai- Muscat AMHS circuit will be commissioned on 25/04/2022 at 0600UTC.	COMSOFT	INDIA
INDONESIA	ATN BIS Router and AMHS with Singapore implemented since February 2018; AMHS Trial (IOT) with Brisbane pending for CRV implementation.	IDS	For CRV, target of contract in 2Q2022 and implementation in 4Q2022.

ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
JAPAN	ATN BBIS router and AMHS installed at USA in 2000. Connection tests with USA in 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. Hong-Kong AMHS/FTBP over CRV was put into operation in September 2020. Singapore AMHS/FTBP over CRV was put into operation in December 2020. Beijing/China AMHS/FTBP over CRV was put into operation in March 2021. Taipei/China AMHS/FTBP over CRV was put into operation in March 2022. Incheon/Korea Plan for AMHS/FTBP over CRV IOT in 4Q 2022	NEC	Japan and USA conducting testing AIDC over AMHS and cutover date is 5 May 2017.
KIRIBATI	Connection with Nadi using UA/AMHS implemented in 2015.		
LAO PDR	- ATN BIS Router and AMHS Implemented with Bangkok and Phnom Penh. - AFTN used with Hanoi and Kunming. - For Yangon we have no direct link the connection is used via Bangkok.	THALES	

ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
MALAYSIA	ATN BIS Router completed 2007. AMHS for Malaysia – Singapore implemented in March 2020. AMHS for Malaysia – Thailand implemented in Dec 2019.	FREQUENTIS	
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 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.		
MARSHALL ISLANDS			
MICRONESIA (FEDERATED STATES OF)			
Chuuk			
Kosrae			
Pohnpei			
Yap			

ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
MONGOLIA	AMHS/AFTN gateway implemented 2012. ATNBIS router implemented in 2014. ATN and AMHS IOT with China was completed in May 2018. ATN and AMHS POT with China was completed in May 2019. Upgraded the AMHS system and purchased UA terminals in 2020, but it is not yet fully operational due to the Covid-19 pandemic situation. The AMHS system is planned to be fully operational in the fourth quarter of 2022.	COMSOFT	
MYANMAR	AMHS including AFTN/AMHS gateway implemented in Nov 2011. Connection with Thailand implemented in 4Q2016. Planned for AMHS connection with Beijing. Target date TBC.	THALES	AMHS including AFTN/AMHS gateway implemented in Nov 2011. Connection with Thailand implemented in 4Q2016. Planned for AMHS connection with Beijing. Target date TBC.
NAURU			
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	

ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
NEW CALEDONIA	New router and AMHS commissioned December 2016	COMSOFT	
NEW ZEALAND	An AMHS connection with the USA over CRV was implemented in April 2019. The AFTN connection to Australia was moved to CRV in June 2019. The AFTN connection to Australia over CRV was replaced with an AMHS connection over CRV in September 2020 Work to provide an AMHS connection over CRV between Bhutan and New Zealand as a temporary solution for their usage of CRV (pending Thailand and India connecting to CRV) is ongoing (April-2022).	Frequentis Comsoft	
PAKISTAN	ATN/AMHS connections with Mumbai and Kuwait since 2015 and 2018 respectively. AMHS connection with Beijing, Kabul, Tehran and Muscat will be provided after up gradation of existing AMHS at Karachi which is already in progress.	Existing COMSOFT After up gradation ISD	
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	

ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
PHILIPPINES	ATN/AMHS Boundary Intermediate System was installed at the new Manila CNS/ATM Center; • Site Acceptance, Oct. 2015 • Commissioned & operational, March 2018 AMHS implementation over CRV with the following adjacent FIR's; • HONG KONG - May 2019 • TAIPEI - Sept. 2019 • SINGAPORE - Dec. 2020 • OAKLAND - April 2021	Frequentis - Comsoft	The New ATN/AMHS of Manila CNS/ATM center has been in domestic operations since March 2018. And with the implementation of CRV, AMHS connection has been implemented with the following adjacent FIR's; -HONG KONG -TAIPEI -SINGAPORE -OAKLAND
REPUBLIC OF KOREA	Plan to upgrade AMHS supporting IWXXM from 2022 over CRV 1) AMHS/CRV IOT with China and Japan in 4Q of 2021 2) AMHS/CRV POT with China on July 2022, and with Japan in 4Q 2022 3) Cutover to CRV with China and Japan in 4Q 2022 4) Implementation of AMHS/CRV with China and Japan in 4Q 2022	FREQUENTIS	

ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
SINGAPORE	AMHS implemented with: 1) AMHS circuit with India put into operational use in Mar 2011. 2) AMHS circuit with UK put into operational use in Mar 2012. 3) AMHS circuit with Thailand put into operational use in Dec 2014. 4) AMHS circuit with Australia put into operational use in Oct 2016. 5) AMHS circuit with Indonesia put into operational use in Feb 2018. 6) AMHS circuit with Malaysia put into operational in Mar 2020. 7) AMHS circuit with Japan put into operational in Dec 2020. 8) AMHS circuit with Philippines put into operational in Dec 2020. Inter-Operability Test (IOT) with Vietnam and Sri Lanka started in 2019 and 2022 respectively. IOT with Bahrain and Brunei to be confirmed.	FREQUENTIS COMSOFT	
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	

ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
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, Malaysia and Rome implemented. Bangkok - Vietnam Circuit Commissioning: Planned for end of 3Q2022 Connection with SITA (SITA AMHS Gateway inter-connections) implemented.	AEROTHAI's AMHS System	
TONGA	AMHS planned for 2008. The provider is linked to the New Zealand AFTN		CPDLC and ADS-C is not considered for lower airspace
UNITED STATES	- Australia - Fiji - New Zealand - Japan - Philippines - Indonesia (2023)	IN-HOUSE	
VANUATU			

ACSICG/9
Appendix D to the Report

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
VIET NAM	AMHS (basic) implemented from 4Q/2018. Plan AMHS extended from Q4 2022 IOT with Singapore from 10/2019 to 8/2020 IOT with Hong Kong 12/2019 IOT with Thailand 6/2020, POT 8/2020.	IN-HOUSE	
Wallis and Futuna (FRANCE)	AMHS implementation planned for end of 2017		

ACSICG/9
Appendix E to the Report

AMHS FOCAL CONTACT POINT
(Key: **MAIN** – Main Contact; **ALT** – Alternative Contact)

Note: Info in yellow extracted from https://applications.icao.int/atn_chart/atn_chart.asp

CAT	STATE/ NAME OF CONTACT	TITLE/ORGANIZATION	TEL/ FAX / E-MAIL
	AFGHANISTAN		
MAIN			Tel: Fax: E-mail:
ALT			Tel: Fax: E-mail:
	AUSTRALIA		
MAIN	Mr. Pierre Kemmers	AIS Business Manager Airservices Australia	Tel: +61 2 6268 4426 Fax:- Email: pierre.kemmers@airservicesaustralia.com
ALT			Tel: Fax: E-mail:
	BANGLADESH		
MAIN	Mr. Saleh Ahmed Khan	Director (Communication)	Tel: 8911011 Fax: E-mail: dcom@bracnet.net
ALT			Tel: Fax: E-mail:
	BHUTAN		

ACSICG/9
Appendix E to the Report

CAT	STATE/ NAME OF CONTACT	TITLE/ORGANIZATION	TEL/ FAX / E-MAIL
MAIN	Ms. Devi M Adhikari	Sr. Communication Officer	Tel:975-08-272511 Fax: - E-mail:dmadhikari@doat.gov.bt
ALT	Mr. Sonam Dorji	Communication Officer	Tel: 975-08-272511 Fax: - E-mail:sonamdorji@doat.gov.bt
	BRUNEI DARUSSALAM		
MAIN	Mr. Hedus Abdullah	Aeronautical Telecommunications Engineer	Tel: 673 233-0518 Fax: 673 233-3666 E-mail: hedus_abdullah@civil-aviation.gov.bn
ALT			Tel: Fax: E-mail:
	CAMBODIA		
MAIN			Tel: Fax: E-mail:
ALT			Tel: Fax: E-mail:
	CHINA		
MAIN	Mr Wang Tian Yu	Engineer, CNS Division of ATMB , CAAC	Tel: 86-10-87786968 Fax: 86-10-87786910 E-mail: wangtianyu@atmb.net.cn
ALT			Tel: Fax: E-mail:
	HONG KONG, CHINA		

ACSICG/9
Appendix E to the Report

CAT	STATE/ NAME OF CONTACT	TITLE/ORGANIZATION	TEL/ FAX / E-MAIL
MAIN	Ms. Silvia Mak	Senior Aeronautical Communications Supervisor	Tel: 852 2910-6201 Fax: 852 2910-1160 E-mail: wymak@cad.gov.hk
ALT			Tel: Fax: E-mail:
	MACAO, CHINA		
MAIN	Mr. Lo Veng Tong, Freeman	Safety Officer Telecommunications and Radio	Tel: 85328511213 Fax: 85328338089 E-mail: freemanlo@aacm.gov.mo
ALT			Tel: Fax: E-mail:
	FIJI		
MAIN	Mr. Kelepi Dainaki	Team Leader CNS/ATM Support	Tel: 679 673-1623 Fax: 679 673-1123 E-mail: KelepiD@fijiairports.com.fj
ALT	Mr. Shivam Naicker	Senior ATO – ATM System	Tel: 679 673-1630 Fax: 679 673-1123 E-mail: ShivamN@fijiairports.com.fj
	FRENCH POLYNESIA		
MAIN	Mr. Dider YVETOT	ATM Team leader	Tel: (+689) 40.86.10.32 Fax: E-mail: didier.yvetot@aviation-civile.gouv.fr
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	INDIA		

ACSICG/9
Appendix E to the Report

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MAIN	Mr. Ajay Kumar Kapur	General Manager (CNS-COM)/Airports Authority of India, Rajiv Gandhi Bhawan, New Delhi-110003	Tel:+91 (11) 2461 0537 Fax:+91 (11) 2463 2930 E-mail: akkapur@aai.aero
ALT	Mr. Hemant Ramchandani	Joint General Manager (CNS)/ CSI Airport Mumbai-400099	Tel: +91 (22) 2682 8123 Fax: +91 (22) 2682 8000 E-mail: hemantr@aai.aero
	INDONESIA		
MAIN	Mr. Arian Nurahman	Inspector of Air Navigation (CNS) DGCA Indonesia	Tel: +6285695414428 Fax: E-mail: arian.nurahman@gmail.com
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	JAPAN		
MAIN	Mr. Yasushi Iwasawa	Special Assistant to the Director Operations and Flight Inspection Division Air Navigation Services Department Japan Civil Aviation Bureau	Tel:81-3-5253-8751 Fax:81-3-5253-1664 E-mail: iwasawa-y28j@mlit.go.jp
ALT	Mr. Hideaki Murakata	Chief of Flight Information 1 st Section Operations and Flight Inspection Division Air Navigation Services Department Japan Civil Aviation Bureau	Tel:81-3-5253-8751 Fax:81-3-5253-1664 E-mail: murakata-h446b@mlit.go.jp
	KIRIBATI		
MAIN			Tel: Fax: E-mail:

ACSICG/9
Appendix E to the Report

CAT	STATE/ NAME OF CONTACT	TITLE/ORGANIZATION	TEL/ FAX / E-MAIL
ALT			Tel: Fax: E-mail:
	LAO PDR		
MAIN			Tel: Fax: E-mail:
ALT			Tel: Fax: E-mail:
	MALAYSIA		
MAIN	Mr. Muniandy Amasee	Asst Director	Tel: 603-88714280 Fax: 603-88810530 E-mail: muniandy@dca.gov.my
ALT			Tel: Fax: E-mail:
	MALDIVES		
MAIN			Tel: Fax: E-mail:
ALT			Tel: Fax: E-mail:
	MALSHALL ISLANDS		
MAIN			Tel: Fax: E-mail:

ACSICG/9
Appendix E to the Report

CAT	STATE/ NAME OF CONTACT	TITLE/ORGANIZATION	TEL/ FAX / E-MAIL
ALT			Tel: Fax: E-mail:
	MICRONESIA (FEDERATED STATES OF)		
MAIN			Tel: Fax: E-mail:
ALT			Tel: Fax: E-mail:
	MONGOLIA		
MAIN	Mrs Idermaa Khayankhyarvaa	Foreign relations specialist of CNS	Tel: 976-71281657 Fax: 976-71285503 E-mail: h_idermaa@mcaa.gov.mn
ALT	Mr Tsend-Ayush Batbayar	Specialist of Air Navigation Service Department Civil Aviation Authority of Mongolia	Tel: 976-71283060 Fax: E-mail: tsendayush.b@mcaa.gov.mn
	MYANMAR		
MAIN			Tel: Fax: E-mail:
ALT			Tel: Fax: E-mail:
	NAURU		

ACSICG/9
Appendix E to the Report

CAT	STATE/ NAME OF CONTACT	TITLE/ORGANIZATION	TEL/ FAX / E-MAIL
MAIN			Tel: Fax: E-mail:
ALT			Tel: Fax: E-mail:
	NEPAL		
MAIN	Mr. Mahendra Singh Rawal	Director , CNS/ATM dept	Tel: 977 (1) 426-5243 Fax: 977 (1) 426-2516 E-mail: mrawal@wlink.com.np
ALT			Tel: Fax: E-mail:
	NEW ZEALAND		
MAIN	Mr. Ian Dore	Software Team Leader (AIM/AMHS), ATS Development	Tel: 64 (3) 358-1697 Mobile: 64 (27) 444-9808 Fax: E-mail: ian.dore@airways.co.nz
ALT	Mr Hamish Helm	System Specialist (AIM/AMHS), ATS Development	Tel:64 (3) 358-1629 Mobile: 64 (21)804 426 Fax: E-mail:hamish.helm@airways.co.nz
	PAKISTAN		
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ACSICG/9
Appendix E to the Report

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ALT	Shahid Hussain	Sr Joint Director Com Ops	Tel: 021-99071941, 0346-2890989 Fax: - Email: shahid.hussain@caapakistan.com.pk;
	PALAU		
MAIN			Tel: Fax: E-mail:
ALT			Tel: Fax: E-mail:
	PAPUA NEW GUINEA		
MAIN			Tel: Fax: E-mail:
ALT			Tel: Fax: E-mail:
	PHILIPPINES		
MAIN	Ms. Mary Lyn C. Santamaria	FIC, Manila Aeronautical Data Communication Center	Tel: 63 (2) 8672-7733 Fax: 63 (2) 8851-6953 E-mail: santamariamarylyn@yahoo.com
ALT	Mr. Florante B. Banaria	CNS Systems Officer Supervisor, Manila CNS/ATM	Tel: 63 (2) 8672-7723 Fax: E-mail: florante_bb@yahoo.com
	REPUBLIC OF KOREA		
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ACSICG/9
Appendix E to the Report

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ACSICG/9
Appendix E to the Report

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ACSICG/9
Appendix E to the Report

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AMHS Readiness Report for Supporting IWXXM Traffic

No.	States/Administration	Name of State (Administration)/name of BBIS/BIS location where AMHS is installed:	AFTN/AMHS transition date/schedule	Readiness Status of AMHS for supporting File Transfer Body Part (FTBP), the Interpersonal Message (IPM) Heading Extension (IHE) to support for exchanging IWXXM reports of a maximum size of 4MB and FTBP of maximum 2MB:	Capacity status of the operational AFS links to support the exchange of the required meteorological information in both IWXXM GML form and TAC form:
1	Australia	Airservices - Brisbane	Completed. AMHS exchange in place with USA, Fiji, New Zealand, Singapore and South Africa. AFTN still in place with Indonesia and PNG, migration to AMHS based on pending readiness both partners Several Pacific island nations connecting via FCO CADAS ATS Terminal, currently over AFTN. Airservices plans to migrate to AMHS P3 CADAS but will need to provide user training. All domestic users and data originators still on AFTN, no desire by external partners to migrate to AMHS, awaiting SWIM instead.	Full compliance and support since Nov 2020	Airservices has contracted a 2.0Mbps bandwidth using CRV Package C+ for Voice & AMHS services. Bandwidth on the leased line with South Africa / Johannesburg is also 2Mbps.
2	China	Beijing	AMHS deployed in 2008 which was upgraded to support ATN/IPS in 2013 and upgraded to support exchanging IWXXM in 2020.	support	CRV bandwidth is 3M. Minimally 64kbps for each AMHS connection.
3	Hong Kong China	Hong Kong China	AMHS is in operation since December 2009 and upgraded to support the exchange of IWXXM since November 2020.	Support	2MB for CRV and 64kbps for IPLCs

ACSICG/9
Appendix F to the Report

4	Fiji	Fiji Airport/Air Traffic Management Centre	Completed. In June 2019, Fiji completed the transition of ATN BBIS to IPS for the AMHS service from Nadi to Salt Lake, USA & Brisbane, Australia over the CRV network. The local end User still operates on AFTN terminal and is converted to AMHS over the AFTN/AMHS Gateway.	The Comsoft AMHS System supports File Transfer Body Part (FTBP). The AMHS system will be upgraded to support the exchange of IWXXM reports of a maximum size of 4MB and FTBP in Q2 of 2023.	Nadi has contracted a 1.0Mbps bandwidth using CRV Package C+ for Voice & AMHS services. The total bandwidth usage for voice and data is 768K from the total 1.0Mbps. The bandwidth for AMHS is 64Kbps each to Brisbane & Salt Lake Center. It is noted in the ACSICG/7 WP04 presented by USA that 64Kbps is the minimum recommended required bandwidth for AMHS to exchange FTBP for IWXXM.
5	India	AAI/Mumbai Airport	AMHS is in operation since 2011. India is in the process of tendering for replacement of existing AMHS system . The Tender action stands delayed due to COVID pandemic.	AMHS messages with FTBP having attachment size upto 1 MB has been exchanged bothways on Mumbai – Singapore AMHS circuit. However, AMHS messages with attachments above 1 MB size are not supported by Mumbai AMHS.	Indian Meteorological Department is in the process of upgradation of HPC & DB to support IWXXM.

ACSICG/9
Appendix F to the Report

6	Japan	Japan/ Fukuoka	ATN BBIS router and AMHS installed at 2000. Connection tests with USA 2000 - 2004 and put into operational use in 2005 and over CRV in February 2019. Put into AMHS operation with Hong- Kong and Singapore in 2021. AMHS implementation with China in 2021 , AMHS implementation with Taipei in 2022 , Korea in 2022.	Already support exchange of IWXXM messages based on FTBP in August 2015. It is possible to send , receive and transfer up to 2GB for the contents such as FTBP,IPM and IHE in AMHS, and the size of IWXXM supported system by Japan Meteorological Agency is 2MB	AFS links over CRV is a Package A, Bandwidth 2M.
7	Macao China	Macao China	Q4/2009	Q2/2023	To be determined
8	Philippines	Philippines/A TMC Manila	Completed March 2018	Can support IHE and FTBP maximum 1MB (tested with Taipei on 13-May-20)	1MB Philippines has contracted 2Mbps bandwidth using CRV package “A” voice and data services.
9	Republic of Korea	Gimpo international airport	ATN/AMHS with China put into operational use in June, 2011. AMHS implementation with China and Japan over CRV will be in 4Q, 2022.	AMHS implementation for supporting FTBP and IHE will be in 4Q, 2022.	AFS links over CRV is a Package A, Bandwidth 2M.
10	Singapore	Singapore	March 2011	Yes, since 2020.	2MB for CRV and minimally 64kbps for IPLCs

ACSICG/9
Appendix F to the Report

11	Thailand	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, Malaysia and Rome implemented. Connection with SITA (SITA AMHS Gateway inter-connections) implemented. Bangkok - Vietnam Circuit Commissioning: Planned for end of 3Q 2022	Completed, the IWXXM exchange has been implemented since November 2020.	The capacity of links readied to support in both form.
12	USA	Federal Aviation Administration	Q4, 2020	Yes. FAA AMHS has FTBP capability. National Weather Service (NWS) projected to implement IWXXM by Q3, 2022	Yes. 2MB bandwidth over CRV

ACSICG/9
Appendix G to the Report

Implementation Status of AIDC in the APAC Region Extracted from ATN/AMHS/AIDC Implementation Table

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
AFGHANISTAN			
AUSTRALIA	AFTN/AMHS based AIDC Implemented between Brisbane and Melbourne. For neighbouring ANSP of <u>Brisbane</u>, AIDC implemented with Auckland, Nadi, Oakland, Port Moresby, Ujung Pandang For neighbouring ANSP of <u>Melbourne</u>, AIDC implemented with Johannesburg and Mauritius.		CPL and CDN exchange limited
BANGLADESH	Tentative date of implementation of AIDC is Q4 of 2023 with Kolkata and Yangon.		Implementation of AIDC is included in the “Modernization of CNS-ATM System of CAAB” project which is going on G2G agreement with French Government and likely to be implemented by the end of 2023.
BHUTAN	Currently not applicable. If required in the future, will decide after CRV implementation.		

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
BRUNEI DARUSSALAM			
CAMBODIA	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	AIDC between most of ACCs within China has been implemented. ——AFTN-based AIDC in Sanya and Guangzhou with Hong Kong China put into operational use in 2007 and 2013 respectively. ——AIDC in Shanghai and Guangzhou with Taipei China put in to operational use since 2013. AIDC between several adjacent FIRs in the Asia-Pacific region are being implemented. Operational : ——AIDC between Dalian and Incheon put into operational use since October 2016. ——OLDI between Shenyang and Khabarovsk put into operational use since Oct.2019. Trial Operational: ——AIDC between Kunming and Vientiane put into pre-operational trails since January 2021.(interrupted for technical reasons) Test: ——AIDC technical test between Beijing ACC and Ulaanbaatar ACC was completed by the Q4 of 2021.	The Automation Systems involved all support the AIDC ICD Version 3.0 and processing the following messages: ABI, EST, ACP, TOC, AOC, LAM, and LRM. Les NUMEN-2000 system in Shenyang able to support both AIDC and OLDI since Oct.2019 and can additionally process the following OLDI-related messages: ABI, ACT, MAC, HOP, ACP, LAM, and LRM.	IN-HOUSE (Aero-Info Technologies Co., Ltd)

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	——AIDC technical test between Lanzhou ACC and Ulaanbaatar ACC was completed by the end of 2021. ——AIDC technical test between Kunming and Yangon under test and progress since May 2017 ——AIDC technical test between Sanya ACC and Hanoi ACC conducted since 2019.		
HONG KONG, CHINA	AFTN-based AIDC with Sanya put into operational use in Feb 2007. AIDC with Taipei FIR put into operational use in Nov 2012. AIDC with Guangzhou put into operational use in May 2018. AIDC with Manila put in operational use in May 2019.	Raytheon ATM system Support AIDC ICD Version 3 commissioned in November 2016.	
MACAO, CHINA	[Not applicable for using AIDC, looking into the possible application between TWR and ACC/APP]		
COOK ISLANDS			
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	With neighboring ACCs to be implemented		

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
FIJI ISLANDS	AFTN based AIDC implemented between Nadi/ Brisbane, Auckland and Oakland.	Adacel ATM system for AIDC - 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)	Implementation of AIDC (based on Version 3) with adjacent centers (Oakland and Auckland) since 2009.	THALES EUROCAT for AIDC	

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
INDIA	Initially-15-May-2017, AIDC implemented between Chennai and Kuala Lumpur with ABI and EST messages. India is currently using APAC AIDC ICD version 3. A. Implementation within India: Testing & trials: I. At Delhi with: Ahmedabad, Varanasi, Nagpur II. At Chennai with: Mumbai, Kolkata, Trivandrum, Mangalore, Trichy, Hyderabad, Bengaluru III. At Kolkata with: Chennai, Nagpur, Varanasi, Guwahati IV. At Mumbai with: Chennai, Ahmedabad, Nagpur Operational: Chennai- Mumbai; Delhi-Nagpur; Delhi-Ahmedabad, Functional: Delhi-Varanasi, LOA to be signed shortly. B: Implementation with Neighboring States: The status on AIDC implementation with following ATSUs of neighboring FIRs is as under: I. Chennai & Kuala Lumpur (Malaysia) – ABI, EST successful. CDN is done with voice confirmation. TOC/AOC is implemented w.e.f. 1st Jan 2021. LOA signed on 26th May 2021 effective from 1st June 2021.	Mumbai: Raytheon Auto track-III Chennai- Raytheon Auto track-III + Delhi: INDRA Aircon Kolkata: INDRA Aircon Bengaluru: SELEX Hyderabad: SELEX Ahmedabad: INDRA Aircon 2100 Nagpur: INDRA Aircon 2100 Varanasi: INDRA Aircon 2100 Guwahati: INDRA Aircon 2100 Trivandrum: INDRA Aircon 2100 Mangalore: INDRA Aircon 2100 Trichy: INDRA Aircon 2100 All these systems follow APAC AIDC ICD Ver 3.0 of 2007	

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	II. Chennai & Male (Maldives) –Trails have been successful. Safety Assessment conducted on 9th April 2021 for implementation. AIDC between Chennai & Male operational w.e.f.01.09.2021. LOA signed on 20.07.2021. III. Chennai & Colombo (Sri Lanka) - Colombo in process to address the syntax errors in ABI. Thereafter, trails will be conducted. LOA in progress. IV. Chennai & Yangon (Myanmar) – Trials commenced in January 2018. Issues of incorrect reference number in Counter CDN from Yangon persists. Yangon has intimated that, they will inform Chennai for conducting the Test, as soon as they are ready V. Mumbai & Male (Maldives) – Safety Assessment conducted on 9th April 2021 for implementation. AIDC between Mumbai & Male operational w.e.f. 01.11.2021. LOA signed on 13.09.2021 VI. Mumbai & Mogadishu - Successful trials conducted in March 2021. Minor adaptation system issues with Mogadishu automation system identified. Resolution awaited from Mogadishu. VII Mumbai & Muscat - Successful trials conducted in March 2021. System issues with Muscat's automation system identified. Resolution awaited from Muscat ATCAS vendor VIII. Ahmedabad & Karachi (Pakistan) – Automatic message exchange (e.g. ABI, EST) happens for most of the East bound flights between Karachi & Ahmedabad. Karachi Automation system not generating auto ACP message in response of EST messages. Pakistan is currently doing technical trials between Lahore and Delhi ACCs in first phase. Pakistan will take up test trials between Karachi and		

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	Mumbai & Karachi and Ahmedabad in second and third phase respectively. IX. Delhi & Lahore (Pakistan)- Under test trails. During the first test trials during the March'2021 it was identified that Lahore Automation system not generating automatic ACP messages. Also Delhi system is rejecting the AIDC messages because of the extra space in messages from Lahore. X. Kolkata & Yangon (Myanmar) – Initial trials were conducted in Q4 of 2018 in which some ABI and message reference errors were encountered. Vendor at both ends modified the software and issues were mitigated. In the next trials in Q1 of 2020 most message exchanges were successful. LOA to be negotiated and signed. C. Under Planning I. To conduct operational trials between Kolkata-Dhaka, Mumbai-Karachi (Pakistan), Chennai-Jakarta and Varanasi-Kathmandu subject to readiness from the concerned states. D. Seychelles and Sana ATSU do not have a compatible ATM Automation system in place for AIDC coordination with Mumbai ATSU E. Delhi – Karachi: AIDC between Delhi & Karachi will not be required due to re-structuring of FIRs		

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
INDONESIA	AIDC implementation in Ujung Pandang ACC conducted as follows: 1) Ujung Pandang ACC –Brisbane ACC: Implemented since July 2017. 2) Ujung Pandang ACC – Manila ACC: Implemented since 4Q 2020; 3) Ujung Pandang ACC – Kota Kinabalu ACC: - Successfully tested and waiting for Kota Kinabalu responds 4) Ujung Pandang ACC – Oakland ARTCC: - - ready for trial, waiting for Oakland responds; 5) Ujung Pandang ACC – Port Moresby ACC: Implemented since 2Q2021. 6) Ujung Pandang ACC – Jakarta ACC; - Target date for operational trial in 3Q2021 until now. - Target date for implementation 3Q2022. AIDC implementation in Jakarta ACC will be carried out with the following priorities: 1) Jakarta – Ujung Pandang (3Q2021); 2) Jakarta – Chennai: testing (2022); 3) Jakarta – Melbourne: testing (2023); 4) Jakarta – Colombo: testing (2024); 5) Jakarta – Singapore: testing (2022); 6) Jakarta - Kuala Lumpur: testing (2024); 7) Jakarta – Kota Kinabalu: testing (2025).	Thales TopSky in Makassar able to support ICD version 3 since December 2015. AIDC JATSC Airnav Indonesia creates its own AIDC equipment. Currently, it is in the pilot phase and the results of its development will be reported to ICAO and AIDC taskforce (ATMAS)	
JAPAN	AIDC implemented between Fukuoka ATMC and Oakland ARTCC in 1998.		Japan and USA conducting testing AIDC over AMHS and cutover date is 5 May 2017.

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	AIDC implemented between Fukuoka ATMC and Anchorage ARTCC in 2005. AIDC implemented between Tokyo ACC/Fukuoka ACC and Incheon ACC in 2010. AIDC implemented between Fukuoka ACC/Naha ACC and Taipei ACC in 2012.		
KIRIBATI			
LAO PDR	- Vientiane ACC AIDC used for coordination between Bangkok and Phnom Penh ACCs since 2020. - Operation trials are on going with Kunming, Hanoi and Yangon ACCs.	THALES which is able to support ICD Version 2.	
MALAYSIA	<u>Kuala Lumpur ACC and Bangkok ACC</u> AIDC technical test between Kuala Lumpur ACC and Bangkok ACC conducted since November 2016 (ABI/EST/ACP/LAM/LRM/CDN/REJ/TOC/AOC). The operational trial commenced in August 2019 (EST/ACP/LAM/LRM). The operational implementation commenced on 14th March 2020 (EST/ACP/LAM/LRM).	SELEX which is able to support ICD Version 3.	

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	<u>Kuala Lumpur ACC and Chennai OCC</u> AIDC technical test between Kuala Lumpur ACC and Chennai OCC conducted since 31st July 2013. The operational trial implemented in phases from September 2016 (ABI/EST/MAC/LAM/LRM/ACP). Review on the CDN message implementation conducted in August 2017. SOP signed 26 April, 2017. The MOU signed on March 2020. The operational implementation commenced on 1st April 2020 (ABI/EST/ ACP/LAM/LRM/CDN/REJ/MAC). The operational trial for TOC/AOC started on 1st July until 1st August 2020. The operational implementation for TOC/AOC commenced on 1st January 2021. The updated LOA signed on 26th May 2021. <u>Kuala Lumpur ACC and Singapore ACC</u> AIDC technical test between Kuala Lumpur ACC and Singapore ACC conducted since April 2015 (ABI/EST/ ACP/LAM/LRM/CDN/REJ). The operational trial started on September 2018 (EST/ACP/LAM/ LRM). The operational implementation commenced on 1st November 2019 (EST/ ACP/LAM/LRM).		

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	<u>Kuala Lumpur ACC and Ho Chi Minh ACC</u> AIDC technical test between Kuala Lumpur ACC and Ho Chi Minh ACC To Be Discussed (TBD). <u>Kuala Lumpur ACC and Jakarta ACC</u> AIDC technical test between Kuala Lumpur ACC and Jakarta ACC TBD. <u>Kota Kinabalu ACC and Manila ACC</u> AIDC Technical Test 1 between Kota Kinabalu ACC and Manila ACC started on 21 – 22nd May 2019 (ABI / EST / ACP / LAM / LRM / TOC / AOC / MAC). Technical Test 2 was conducted on 21 – 22nd October 2019 (ABI / EST / ACP / LAM / LRM / TOC / AOC / MAC). Upcoming AIDC Technical Test between Kota Kinabalu ACC and Manila ACC to be conducted in Q32021 <u>Kota Kinabalu ACC and Ujung Pandang ACC</u> AIDC Technical Test 1 between Kota Kinabalu ACC and Ujung Pandang ACC started on 7 – 8th August 2019 (ABI / EST / ACP / CDN / LAM / LRM / REJ / MAC). Technical Test 2 was conducted on 23 – 24th October 2019 (ABI / EST / ACP / LAM / LRM / TOC / AOC / MAC). Technical Test 3 was conducted on 11th March 2020 (EST / ACP / LAM / LRM). Upcoming AIDC Technical Test between Kota Kinabalu ACC and Ujung Pandang ACC to be conducted in Q32021		

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	<u>Kota Kinabalu ACC and Jakarta ACC</u> AIDC Technical Test between Kota Kinabalu ACC with Jakarta ACC is to be discussed. <u>Kota Kinabalu ACC and Singapore ACC</u> AIDC Technical Test between Kota Kinabalu ACC and Singapore ACC started on 22nd September 2015 (ABI / EST / ACP / CDN / LAM / LRM / REJ / MAC). AIDC Technical Test 1 was conducted on 18 – 19th November 2019 (ABI / EST / ACP / CDN / LAM / LRM / REJ / MAC). Technical Test 2 was conducted on 16th January 2020 (EST / ACP / LAM / LRM). AIDC Operational Trial started since 16th November 2020 and to be extended until 30th June 2021. Agreement on Operational Implementation has been materialized on 3rd June 2021. Operational Implementation is agreed to be conducted on 1st July 2021 (EST / ACP / LAM / LRM) <u>Kuching ACC and Singapore ACC</u> AIDC Technical Test (First and Second) between Kuching ACC and Singapore ACC was conducted both on 11 November 2015 and 24-25 November 2015 (ABI, EST, LAM, CDN, ACP, REJ, and LRM). However, it was discontinued until November 2019. The AIDC Technical Test (Third and Fourth) was conducted both on 20-21 November 2019 and 14 January 2020 (ABI, EST, LAM, CDN, ACP, REJ, and LRM) AIDC Operational Trial was started on 20 July until 18 October 2020. Then it was continuing until 31 January 2021.		

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	Agreement on Operational Implementation has been materialized on 12 January 2021 via videoconference. The operational implementation was on 1 February 2021. The AIDC messages included for exchange are EST, LAM, LRM and ACP. <u>Kuching ACC and Jakarta ACC</u> AIDC between Kuching ACC and Jakarta ACC TBD.		
MALDIVES	Connection established with all the adjacent ATSUs. Interoperability tests successfully completed in 2017. 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.	SELEX which is able to support ICD Version 3.	
MARSHALL ISLANDS			

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
MICRONESIA (EDERATED STATES OF)			
Chuuk			
Kosrae			
Pohnpei			
Yap			
MONGOLIA	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 completed between 2016-2021. A software update to include AIDC in the Aircon2100 automation system as a function which will be operational in the fourth quarter of 2022.	INDRA Aircon - 2100 supporting.	
MYANMAR	AIDC connection pre- operation test with Thailand conducted in 4Q2017 and Target date of implementation 4Q2020; AIDC testing with Chennai, Kolkata and Vientiane conducted in 2020. Myanmar improved ATS Surveillance Coverage at coordination point with China and will start AIDC test again with Kunming ACC in 2020.	THALES Automation system (Topsky ATC) supports APAC AIDC ICD Ver. 2.	
NAURU			

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
NEPAL	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 ZEALAND	AIDC implemented between New Zealand, Australia, Fiji, Tahiti, Chile and USA.	Supported the Basic 5 message set. ATM systems are LEIDOS and ADACEL	
PAKISTAN	Implemented between Karachi and Lahore ACCs. Lahore/Delhi ACC AIDC trials are being carried out which started in March 2021 (Phase-1), Karachi/Mumbai & Karachi/Ahmedabad are planned in Phase-2. After modification of Lahore/Karachi FIRs boundaries, trials between Karachi/Delhi ACC are not required.	ATM system from Indra AIRCON 2100 version-2 in Lahore and Karachi ACC, Si-ATM version-3 in Islamabad ACC	Existing ATM system are likely to be upgraded in Lahore and Karachi ACC.
PAPUA NEW GUINEA	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.	

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
PHILIPPINES	AIDC implementation status/update over AMHS with the following FIR's; HONG KONG – Implemented, May 2019 SINGAPORE – Implemented, December 2020 TAIPEI – Implemented, December 2019 UJUNG PANDANG – Implemented, December 2020 HO CHI MINH – Technical test conducted on November 2021. KOTA KINABALU – Technical test conducted November 2021. OAKLAND – 1st test to be scheduled.	THALES which is able to support ICD Version 2.	The New ATN/AMHS of Manila CNS/ATM center has been in domestic operations since March 2018. And with the implementation of CRV, AMHS connection has been implemented with the following adjacent FIR's; -HONG KONG -TAIPEI -SINGAPORE -OAKLAND
REPUBLIC OF KOREA	AIDC implemented between ACC and Fukuoka ATMC in 2010 AIDC between Incheon and Dalian implemented in Nov. 2016. AIDC implementation between Incheon and Shanghai will be in 2Q, 2023.	Rockheed Martin System	
SINGAPORE	1) Operational with Ho Chi Minh implemented Jul 2014. 2) Operational with Kuala Lumpur implemented Nov 2019. 3) Operational with Kuching ATCC implemented Feb 2021. 4) Operational with Kota Kinabalu ATCC implemented Jul 2021.	THALES supports ICD Version 3 since December 2018	

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	5) Operational with Manila implemented Nov 2019. 6) Technical trials with Jakarta ACC will be initiated once the Jakarta ACC ATMS renewal is completed.		
SRI LANKA	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	The implementation with - Malaysia has done since 14th March 2020 - Lao PDR has done since 14th July 2020 - Cambodia has done on 22nd February 2021 In addition, it is planned to implement AIDC with Myanmar.	THALES which supports AIDC feature, APAC AIDC ICD V.3.	
TONGA			
UNITED STATES	- Fiji, Japan, New Zealand - Tahiti (via New Zealand), - Papua New Guinea via Australia	IN-HOUSE which is able to support APAC and NAT ICDs currently Version 2.	

ACSICG/9
Appendix G to the Report

State/Organization	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	- Philippines (2021) - Indonesia via Australia (Direct planned for 2023)		
VANUATU			
VIET NAM	Operational between Ho Chi Minh and Singapore since July 2014. Technical testing between Ho Chi Minh with Philippines conducted on June 15-16, 2021 and November 10, 2021. Operational trial will be done Technical testing with Cambodia conducted on October 11, 2021; Operational trial will be done Technical testing between Hanoi and Vientiane, Lao. PDR—already done Operation trial ongoing with Malaysia TBC Operation between Ho Chi Minh and Hanoi Plan for implementation in 2022.	Support ICD Version 1.0 with THALES at Ho Chi Minh ATM system. Support ICD Version 3.0 with Selex at Hanoi ATM System.	
Wallis and Futuna (FRANCE)		COMSOFT	

Updated Work Programme of ACSICG

Reference	Title of Work	Task	Planned Start	Planned completion	Status	Action Parties	Comment
2-1	COM Strategies	Revise Strategy for implementation of Communications Systems to support ATM operations in APAC	2016	2020	Close	G/G Australia/New Zealand, USA and Japan,New Zealand, and USA	Closed in ACSICG/6
2-2	AMHS Implementation	Implement AMHS transition including migration of concerned connections to SITA Type X mid 15 and updating APAC AMHS Naming Plan	2015	2020	Close	Australia, Singapore and Thailand	Closed in ACSICG/7
2-3	AMHS Implementation Registration	Continue coordination with members and other regions to maintain the AMC	On-Going	On-Going	On-going	Thailand	
2-4	Support AIDC implementation	Support Implementation of AIDC including PAN Regional AIDC ICD	2015	2021	On-going		
2-5	SWIM implementation APAC framework (SIAF) Project	Develop Cost Benefit Analysis to support SWIM using existing underlying ATN and IP sub-network	2016	2017	Close		Dependencies: SWIM ConOPs and Technical Manual In ACSICG/4, it was modified to Action Item 4-1
		Develop SWIM implementation roadmap and B1-SWIM ANRF			Close		
		Develop SWIM CONOPS refinement for APAC (FIXM, WXXM, AIXM, NOTAM) - models/infrastructure			Close		
		Develop SWIM guidance and requirements (performance, functional, safety, security)			Close		
		Develop SWIM governance architecture			Close		
		Develop SWIM governance entity/procedures	2015	2017	Close		
		Develop SWIM access points/services architecture and definition (iterative)			Close		
		Support testing of SWIM based applications (FIXM, IWXXM)			Close		
		Coordinate SWIM implementation and transition from existing environment to SWIM	2015		Close		
2-6	CRV Project (under the TOR of CRV Task Force)	MSA/DOA	2014	2015	Close		closed in CRV OG/5
		Cost Benefit Analysis	2014	2015	Close		closed in CRV OG/5
		Users requirements (including performance and safety requirements)	2014	2015	Close		closed in CRV OG/5
		RFI	2014	2016	Close		closed in CRV OG/5
		Sealed Tender		2016	Close		closed in CRV OG/5
		Develop/agree on CRV Design (including an IPv6 address plan)		2017	Close		
		Implementation plan		2018	Close		

ACSICG/9
Appendix H to the Report

Reference	Title of Work	Task	Planned Start	Planned completion	Status	Action Parties	Comment
		Set up CRV OG		2016	Close		
2-7	CRV-OG	Oversight CRV operations and migration of applications	2016	2021	On-going		
2-8	Support ATFM Implementation using FIXM over CRV	Support development of ATFM IP ICD including coordination on the use of CRV to support ATFM FIXM (IP ICD developed by ACSICG has been provided to ATFM Group which is considered completed)	2015	2017	Close		Task description modified in ACSICG/5 . It is revised text Close in CRV OG/5
2-9		Coordinate the IP network service for ATFM	2016	2019	Close		Added into revised text of 2-8 in ACSICG/5
2-10	Support transition of ATC voice service	Coordinate the use of VoIP technology to support the existing service based on Multiplexer	2015	2019	Close		Closed in CRV OG/5
4-1	Monitoring the SWIM implementation and work of APAC SWIM Task Force	Develop Cost Benefit Analysis to support SWIM using existing underlying ATN and IP sub-network	2016	2020	Close		
		Coordinate SWIM implementation and transition from existing environment to SWIM and confirm role of CRV (SWIM over CRV - role has been confirmed in 2019)	2017	2020	Close		Closed in ACSICG/8
4-2	AMHS Support IWXXM requirement 2020	Implement AMHS FTBP to meet the requirement of IWXXM including the basic AMHS plus FTBP sub-set of extended AMHS as defined in Doc9880. (Requirements for implementation is 5 November 2020) and monitor the possible compression solution following the ICAO guidelines for IWXXM implementation	2017	2020	On-going	All States/Administrations	
5-1	AFTN/ATSMHS Routing Directory and coordination with AMC	Update to the Directory and prepare a draft new Edition of the Directory	2018		Close	All States/Administrations	Completed
6-1	AMHS direct routing requirement	Develop AMHS routing policy to gain the benefits of implementation of AMHS over CRV.	2019	NA	On-going		
CNS SG/23 Task 2019	Update AMS and Datalink Strategies	Review and update AMS and Datalink Strategies (task given by CNS SG/23 Meeting)	2019	2020	Close		

Reference	Title of Work	Task	Planned Start	Planned completion	Status	Action Parties	Comment
7-1	Monitoring the SWIM implementation and work of APAC SWIM Task Force	Demonstrate capability of CRV to support SWIM and evaluate the impacts on network bandwidth to incorporate AMHS service.	2016	2021	On-going	Hong Kong China, Singapore and Thailand, IATA as reporter to SWIM TF	On-going
7-2	CRV Operations Manual	A small ad hoc working group with CRV OG members from USA, Singapore and New Zealand to further improve the draft and get it ready for consideration by CNSG SG through a joint working paper. Thailand also agreed to provide some support to review the revised draft.	2020	2020	Close	CRV OG co-chair, New Zealand, USA, Singapore, Thailand	SL Ref.:T 8/9.1 – AP262/20 (CNS), 22 December 2020 , Subject: The availability of various regional guidance materials for implementation of Air Navigation Facilities and Services in the Asia and Pacific Regions, Conclusion CNS SG/24/4 - Publishing of CRV operational manual to provide the information and directions required for CRV OG performance and CRV operations
7-3		States with designated BBIS: Australia, China, Hong Kong, China, Fiji, India, Japan, Singapore, Thailand and USA should increase their respective connection bandwidth to greater than 64kbps if feasible and applicable. ~~Any ANSPs that are not on the above list should upgrade their AMHS with FTBP functionality to support IWXXM traffic. ICAO Regional Office will issue a reminder to States/Administrations that have no AMHS with FTBP capability to implement or upgrade their AMHS with FTBP function as soon as possible. States/Administrations should also be requested to deploy AMHS connection with a minimum of 64Kbps bandwidth.~~	2020		On-going	ICAO Secretariat	State Letter: Ref.: T 8/3.5 & T 8/2.11– AP160/20 (CNS), 6 August 2020 , Subject: Reminder for implementation of ATS Message Handling System (AMHS) in APAC Region by 2020. Traffic load data will support further action (ACSICG/9)

ACSICG/9
Appendix H to the Report

Reference	Title of Work	Task	Planned Start	Planned completion	Status	Action Parties	Comment
8-1	Suggested Implications to Cybersecurity and Associated Requirements for CRV Operations	i) The Meeting requested the ICAO Secretariat to inform and follow-up about the different requirements defined in Section 3 in Flimsy01 of ACSICG/8 with different CNS Contributory bodies for their simultaneous and timely implementation. ii) CRV OG Chairs to note various requirements defined in Section 3 and initiate action to prepare strategies for contracting other services on CRV for future potential needs.	2021		Close	i) ICAO Secretariat ii) CRV OG Chairs	Replaced by new action items 9-6 by WP/08 of ACSICG/9
8-2	Interconnection of Regional Networks	ICAO Secretariat to take necessary action to discuss the interconnection of various regional networks at higher level.	2021		Close	ICAO Secretariat	Ad-hoc group created in ACSICG/9 under CRV OG. Referred back to CRV OG Keep Agenda Item in the meeting to note updates
8-3	Upgrade/Downgrade CRV Circuits Subscribed	ICAO Secretariat to take necessary action to discuss this issue with CRV OG as States should have option to upgrade/downgrade the circuits based on the need.	2021	ACSICG/10	Open	ICAO Secretariat, ACSICG chairs, CRV OG Chairs,	Meeting was held on 28 September 2021 . PCCWG will draft relevant clauses to add in Terms and conditions document of CRV contract for consideration of CRV OG/9. PCCWG will present sample calculation of penalty charges in case package degradation are opted by any contracting States within their terms of contract of CRV in
8-4	AMHS Routing Update due to CRV Post Implementation Issues in Bhutan	All six member States (Bhutan, India, Thailand, Singapore, Australia, and New Zealand) to create an Ad-hoc group with support of the ICAO Secretariat to further discuss about implementation of Option 2.	2021	ACSICG/10	Open	Bhutan, India, Thailand, Singapore, Australia, and New Zealand, ICAO Secretariat	Meeting was held on 27 May, 19 August, 03 September 2021 . New Zealand will act as BBIS No AMC updates required As on 15 Sep 2021, Next meeting after Bhutan and New Zealand discussion.

ACSICG/9
Appendix H to the Report

Reference	Title of Work	Task	Planned Start	Planned completion	Status	Action Parties	Comment
9-1	Update ICAO APAC ATN/AMHS Guidance Document Tree	Ad-Hoc Group will update ICAO APAC ATN/AMHS Guidance Document Tree	2022	ACSICG/10	Open	ICAO Secretariat, China, Fiji, New Zealand (Tentative), Singapore, USA	
9-2	Traffic Loading of CRV connection	States implemented CRV should note the Bandwidth Utilization rate and may present this data in upcoming CRV OG meetings.	2022	CRV OG/11	Open	ICAO Secretariat, Member States	
9-3	A common template to report the monitoring of connection loading	ICAO Secretariat will consult with experts to propose a common template to report on the monitoring of connection loading	2022	ACSICG/10	Open	ICAO Secretariat	To support Action Item 7-3
9-4	MPLS/IP Based Inter-Regional Connection	To discuss the potential options for business cases to move forward with the proposal in MPLS/IP Based Inter-Regional Connection between CRV and REDDIG II.	2022	ACSICG/10	Open	ICAO Secretariat under CRV OG, APAC Member States having interregional connections, CRV OG Chairs, CRV and REDDIG II service providers, and interested states of SAM region	
9-5	Nomination of SAM Member States to ad-hoc group under action item 9-4	ICAO Secretariat will coordinate with ICAO SAM Office to get nomination from interested SAM Member states for joining the Ad-Hoc Group in Action Item 9-4	2022	Jul-22	Open	ICAO Secretariat	
9-6	New Agenda Item to discuss Cybersecurity issues in Aeronautical Communications	Create a regular Agenda Item from ACSICG/10 and invite States and Organizations concerned to continue the discussion on improving in the cybersecurity ideas presented in various cybersecurity-related meetings and webinars.	2022	ACSICG/10	Open	ICAO Secretariat, CANSO, IATA	
9-7	Continuation of Action Item 8-4	Bhutan and New Zealand would continue to work on above mentioned on-going proposal. The Ad-Hoc group will meet in last week of June 2022 to note the status of testing of CRV circuits between Bhutan and Thailand and progress on implementation of the temporary routing through New Zealand.	2022	ACSICG/10	Open	ICAO Secretariat, Ad-hoc expert group	

ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 1 to the Report

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ACSICG/9
Attachment 2 to the Report

LIST OF WORKING/INFORMATION PAPERS

WP/IP No.	Agenda Item	Subject	Presented by
WORKING PAPERS			
WP/01	1	Revised Provisional Agenda	Secretariat
WP/02	2	Outcomes of Relevant Meetings	Secretariat
WP/03	3	Review of Outcomes of CRV OG/9 Meeting	Secretariat
WP/04	4	ICAO ATN/AMHS Guidance Document Tree	Secretariat
WP/05	5	APAC AMHS Implementation Status from AMC	Thailand
WP/06	6	Repository of AIDC Implementation Status in APAC	Secretariat
WP/07	7	CRV and REDDIG II and New PENS MPLS_IP Based Inter-regional Connection	Secretariat
WP/08	8	Aeronautical Fixed Service (AFS) Cybersecurity Considerations for Information over CRV	USA
WP/09	10	CRV Post Implementation Issues in Bhutan	Secretariat
WP/10	9	Review Work Programme for ACSICG	Secretariat
WP/11	3	Review of Outcomes of CRV OG/10 Meeting	Secretariat
WP/12	5	AFTN ATSMHS Routing Directory and Chart	Secretariat
WP/13	6	FAA AMHS Traffic Load	USA
WP/14	6	AMHS readiness status for supporting IWXXM Traffic	Secretariat
WP/15	10	Amendment 91 to Annex 10 Volume III on Selective Calling Codes	Secretariat
INFORMATION PAPERS			
IP/01	-	Meeting Bulletin	Secretariat
IP/02	10	ICAO APAC Webinars: Implementation of CRV	Secretariat
IP/03	6	AMHS/ATN Implementation Status of Thailand	Thailand
IP/04	6	AMHS and CRV Implementation status	India
IP/05	10	AIDX Survey	IATA
IP/06	2	Internet Protocol Suite (IPS) ecoDemonstrator Validation and Development Update	USA
IP/07	2	Outcomes of Relevant Meetings Related to IWXXM	Secretariat
PRESENTATION			
PP/01	-	AMHS to SWIM - Ideas on supporting transition on communication patterns	IDS AirNav
