



ICAO

*International Civil Aviation Organization*

**Sixth Meeting of the Asia/Pacific ATS Inter-Facility  
Data-Link Communication Implementation Task Force  
(APA TF/6) of APANPIRG**

Web-conference, 14 – 16 July 2020

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**Agenda Item 2: Review of Outcome of relevant meetings**

**OUTCOME OF APANPIRG/30 AND CNS SG/23 MEETINGS ON AFS AND AIDC**

(Presented by the Secretariat)

**SUMMARY**

This paper reviews the outcome of APANPIRG/30 on the Aeronautical Fixe Service and ATS Interfaculty Data Communication related matters including discussion on the same subject by the Twenty-second meeting CNS Sub-group of APANPIRG.

**1. INTRODUCTION**

1.1 APANPIRG/30 meeting held in November 2019 in Bangkok, Thailand reviewed the outcome of the Twenty-third Meeting of CNS Sub-group (CNS SG/22) on the AIDC related information including the outcome of the APA TF/5 meeting.

**2. DISCUSSION**

2.1 The implementation status and issues of AIDC implementation in the APAC Region were reviewed by CNS SG/23 meeting held in July 2019 and noted by APANPIRG/30 meeting. The relevant section of discussions on the AIDC and AFS planning and implementation are provided in the paragraphs below for review by this meeting.

**Aeronautical Fixed Service (AFS)**

2.2 The updates on ATN/AMHS/AIDC implementation progress achieved by States/Administrations including their near term plan were noted by CNS SG/23 and APANPIRG/30 meetings. The meeting is expected to further review and update the implementation status provided in **Appendix A** to this paper which was updated by CRV OG/7 meeting in January 2020.

**Role of AFTN/ATSMHS Routing Directory during Transition**

2.3 The CNS SG/23 meeting noted the function and role of AFTN and ATSMHS routing directory (28th Edition) during the transition period from point to point connection to AFTN/ATSMHS over CRV environment. The meeting discussed that if direct routing was allowed in the hybrid environment with CRV and point to point connection by end of 2020, i.e. direct routings

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are only implemented for those States/Administrations who have joined CRV while for those States/Administrations not joining CRV yet are still required to follow the current routing directory. As result of discussions, the meeting agreed to fully follow the AFTN/ATSMHS routing directory during the transition period by end of 2020. For inter-regional traffic, it is required to follow the existing entry/exit points and procedure.

**Inter-Regional Communication Connection**

2.4 Kuwait highlighted an issue of missing flight plans at CRV OG/5 meeting. India, Pakistan, Singapore and Oman, Bahrain, Kuwait are the designated entry/exit countries between the APAC and the MID Regions. The performance of the four interregional circuits between two regions were analyzed. Among the reported cases, one reason was due to a communication failure, unavailability of alternative routes, and delay in AFTN failure detection. The meeting recommended to initiate further action including alternative communication link, to encourage entry/exit points at the APAC and MID Region to join the CRV project and to migrate the Inter-Regional connection to AMHS with enhanced connection reliability and availability. The CRV OG/5 meeting encouraged Kuwait, Bahrain, Oman in the MID Region and India and Pakistan in APAC Region to join CRV to improve the circuit performance.

**AMHS via secure VPN over the internet**

2.5 States joined CRV may consider some alternate means of exchanging messages in the event of a local or regional CRV failure. In late November 2018, Airservices Australia experienced a network outage in their international service provider's network which caused delay in the exchange of data between the USA, Indonesia, Singapore and South Africa. Australia proposed to consider using Business to Business (B2B) Virtual Private Networks (VPN) which has been implemented with FAA and Airways New Zealand. The States/Administrations were encouraged to consider the role of bi-lateral B2B VPNs to ensure the continuity of AMHS services in the event of a local or regional CRV failure.

**CRV Regional Diversity Planning**

2.6 There are some locations where the infrastructure or the traffic do not justify additional Points of Presence (POPs) that, in theory, would prevent single points of failure. ATSMHS require AMHS to have dynamic alternative routing. The concern expressed about single points of failure in the Pacific region with one POP is presented. B2B VPNs over the Internet could be a viable solution as they are low in cost and readily implemented. In order to pursue B2B VPNs as backup to the CRV for AMHS, the following issues need to be addressed:

- Procedures to determine what failures would activate the use of B2B VPNs by users;
- Security of B2B VPNs for AMHS (internal issue); and
- Procedures to activate B2B VPNs for AMHS at affected Communication Centers.

2.7 CRV member states were also reminded of the guidelines given in ICAO Doc 9855 AN/459 *on the Use of the Public Internet for Aeronautical Applications*.

**Connecting of Service Providers to the CRV**

2.8 The CRV OG/6 meeting acknowledged that by allowing connection from Service Providers (such as PCCWG, Aireon, SITA, etc.) and Service Consumers (such as Airlines, Airports, MET Organisations, etc) to the CRV, potential telecommunications cost reduction could be achieved with added value to the use of the CRV. The process for connecting Service Providers and Service Consumers to the CRV was adopted by the CRV OG/6 meeting through Decision CRV OG/6/2.

2.9 CRV OG is not responsible for the accreditation/certification/validation of a Service Providers, but taking all reasonable steps in assessing the Service Providers to ensure they have sufficient systems and process in place to provide their service over the CRV. In this connection, the CRV OG/6 meeting encouraged States to use CRV for the exchange of ADS-B data and agreed that there is a potential to reduce the costs of space based ADS-B service delivery over CRV.

#### **ICAO No Country Left Behind Initiative applied to CRV**

2.10 France DSNA provided two concrete cost comparison cases, one for French Polynesia and one for New-Caledonia. These examples indicated that additional financial efforts by small States were required which have little needs and incentive to make connection to CRV.

2.11 PCCWG informed that Package D is the lowest reasonable offer they can make and that it doesn't want to weaken the network performance by offering a cheaper solution that may introduce risks. From PCCWG perspective, amongst the solutions proposed by France, the only one that could solve the problem is to have a cost sharing scheme between small Island States and the peering bigger States to acquire mutual benefits. PCCWG was encouraged to further explore more cost effective solutions for any countries facing challenges in procuring CRV services with financial constraints. PCCWG would also study how CRV could interface with PASNET, and revert the solution/proposal to CRV OG/7 for consideration.

#### **CRV Security Encryption Solution**

2.12 France informed the CRV OG/6 meeting that security risk assessment on CRV was performed according to the French law deriving from the EU NIS Directive and encryption has to be set up for the New-Caledonia/Fiji and French Polynesia/New-Zealand connections.

2.13 French DSNA proposed to test and implement trials on IPsec encryption, given that it was a proven, standardized, easy to configure multi-vendor solution at a lower price. The CRV OG/6 meeting suggested DSNA to conduct the test by coordination with counterpart and request support from PCCWG when available. The meeting encouraged States/Administrations to share their best practices regarding cybersecurity resolution by engagement of local resources with papers or high level guidance materials.

#### **Supporting the Implementation of IWXXM**

2.14 The *Guidelines* developed and endorsed by the ICAO Meteorology Panel (METP) is available on the METP Secure website: <https://portal.icao.int/METP/Pages/default.aspx> and on the public website <https://www.icao.int/airnavigation/METP/Pages/default.aspx>. Noting that the *Guidelines* document indicates that AMHS provides a mechanism for the exchange of IWXXM information, the Secretariat highlighted the previous APANPIRG Conclusions (27/50 and 28/16), which urged States/Administrations to progress the planning and implementation of AMHS networks and infrastructure to support the regional implementation of IWXXM.

#### **IWXXM Distribution over AMHS**

2.15 The AMHS File Transfer Body Part (FTBP) enhanced feature can support distribution of eXtensible Markup Language (XML) based IWXXM data as a message “attachment”. In order to support IWXXM over AMHS, and ensure delivery of the data to intended destinations, the following steps were recommended by USA for consideration:

- Implementation of FTBP capability to AMHS systems;
- Additional bandwidth of CRV may be required for IWXXM traffic; and

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- Implementation of Meteorology Systems/Services, such as NOAA NextGen IT/WebService and FAA CSS Wx, to provide and consume IWXXM data.

**CAAP-FAA AMHS/AIDC Planned Implementation**

2.16 The Philippines and USA proposed to implement Air Traffic Services (ATS) Message Handling System (AMHS) and ATS Inter-Facility Data Communications (AIDC) between Manila Area Control Center (ACC) and Oakland Center. The bi-lateral agreement to establish the CRV connection between USA and Philippines was agreed in March 2019. The voice service between Manila ACC and Oakland Center will be migrated to CRV network from the existing T1/E1 circuit. USA updated the meeting that the AMHS and AIDC connection over CRV is expected to be completed by June 2020.

**The Fifth Meeting of the Asia/Pacific AIDC Task Force (WP/06)**

2.17 The APA TF/5 meeting was held in Bangkok from 23 to 25 April 2019. The papers and report of the meeting is provided at the following website:

<https://www.icao.int/APAC/Meetings/Pages/2019-APA-TF5.aspx>

2.18 The main achievements of the APA TF/5 meeting were highlighted below:

- The meeting considered that CRV could be used to resolve latency issue of AFTN communication circuit used for AIDC application;
- The meeting considered necessary to present the AIDC implementation status shown on graphical map for quick and easy understanding by APANPIRG and decisions makers of States. Singapore and India offered to take the task for the development. The Task Force co-chair presented the chart of AIDC implementation status chart as shown in *Appendix F* to the report of CNS SG/23 meeting; and
- AIDC Implementation Issues consolidated by Indonesia were reviewed and updated. Total 84 issues among which additional 11 issues were identified. 31 issues were closed including some caused by link latency.

**Updates to the AIDC (ATSU) pairs identified by APANPIRG**

2.19 The meeting further reviewed the hot-spot identified by RASMAG/23 and APANPIRG/29 meetings. The meeting noted that the hot-spot identified by RASMAG/23 and APANPIRG/29 meetings were updated the Task Force. The progress and target date of implementation are highlighted below:

- Jakarta and Chennai - 4Q 2020;
- Jakarta and Ujung Pandang - 4Q 2020 and
- Jakarta /Melbourne FIRs - 4Q 2020.

2.20 Chennai and Kuala Lumpur was implemented on 15 May 2017 with a limited set of messages and LOA to be signed in 4Q 2019 (SOP was signed 26 April in 2017):

- Manila and Fukuoka – coordination in progress;
- Manila and Taipei – operational trial in May, 2019. LOA to be signed 3Q 2019;
- Manila and Hong Kong – 2Q 2019;
- Manila and Ho Chi Minh – technical test in June 2019, and implementation 4Q 2019; and
- Manila and Singapore: 2Q 2019.

2.21 Manila and Kota Kinabalu: - technical test in May 2019, and implementation 4Q 2020;

- Manila and Ujung Pandang: - technical test in May 2019, and implementation 4Q 2019;
- Urumqi/Lahore: New IDD service provider selected by Pakistan and communication being improved and LHD reduced;
- Beijing/Ulaanbaatar: coordination is underway for testing and implementation;
- Hong Kong/Guangzhou AIDC operational trial was conducted since 2Q 2018; and
- Mumbai/Karachi and Muscat – coordination is underway for implementation and Mumbai side is ready (added by RASMAG/22).

**Achievements and Terms of Reference of the APA Task Force and Action items**

2.22 The meeting noted the achievements of APA Task Force summarized by its co-chair:

- Completed Regional AIDC Implementation Guidance Material;
- Created greater awareness of the benefit of AIDC, especially to address LHD issues;
- Promoted implementation/trials by States;
- Identified LHD hotspots implemented or implementing AIDC by 2020; and
- Co-operation amongst States through sharing of implementation issues which led to resolution of some identified issues.

2.23 Noting the achievements made by the APA TF in completion of tasks specified in the TOR which focusing Southeast Asia and Bay of Bengal sub-regions, the meeting invited the AIDC Task Force to discuss a dissolved date of the Task Force at its next meeting.

2.24 Upon a query regarding on whether the implementation status chart can be included into the updated seamless ANS plan, the co-chair of APA TF stated that the chart in the current form is not completed as it is based on reported implementation status in the APA TF only and further updates including verification and confirmation would be required. The AIDC implementation status chart presented to the CNS SG/23 meeting is provided in **Appendix B** to this paper.

**Third Meeting of System Wide Information Management Task Force**

2.25 The meeting noted the following outcomes of SWIMTF/3 meeting held in Bangkok from 7 to 10 May 2019:

- APAC SWIM Implementation Materials to be completed by SWIMTF/4 meeting;
- SWIMTF/3 developed a philosophy and roadmap for APAC SWIM implementation which was adopted by CNS SG/23 meeting through Conclusion CNS SG/23/4 (SWIMTF/3/1);
- Guidance for SWIM Service Identifiers (SSID) and SWIM Service Versioning was kept in the SWIM Respository of APAC SWIM Portal for refernce and furture consideration for endorsement;
- Interoperable Registry Model developed by the SWIMTF was adopted by CNS SG/23 meeting as APAC SWIM Registry through Conclusion CNS SG/23/5 (SWIMTF/3/3);

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- Asia/Pacific FIXM version 4.1 Extension was endorsed by the SWIMTF/3 and CNS SG meetings;
- A test platform for SWIM based services and applications validation associated with Task 2-1-3 was carried out and led by Japan, China, and Republic of Korea in collaboration with technical supporters from Japan Electronic Navigation Research Institute (ENRI), China Air Traffic Management Bureau (ATMB), Korea Airports Corporation;
- The SWIM ASEAN Demonstration was scheduled for 12-15 November 2019 in Singapore and Thailand (one day in Bangkok and one day in Singapore);
- Seventeen (17) States/Administrations provided responses to the APAC SWIM Survey conducted during December 2018 to March 2019. Several recommendations and conclusions derived from the survey were reviewed and noted by the meeting;
- Through a launch ceremony of CRV for APAC Region, the meeting re-confirmed a conclusion of CRV OG/5 meeting that CRV will be used to support SWIM Implementation in APAC Region;
- Reconfirmed that “the concern on CRV bandwidth was not a technical issue but a decision of the CRV subscriber to opt for CRV bandwidth requirements to meet its operational needs”;
- SWIMTF/3 recommended that initial tests for SWIM applications over CRV could be conducted between those participating States of ASEAN SWIM Demonstration. Similar trials may also be conducted by States for validating the test bed (China, Japan and Republic of Korea);
- SWIMTF/3 endorsed the SWIM Education Video and Education Brochure for publication and distribution. ACSICG/6 meeting appreciated the SWIM Education Video. Further SWIM training package and training programme were developed by the SWIMTF in coordination with Global Aviation Training (GAT); and
- SWIMTF/4 meeting is scheduled for 18 to 21 May 2020 in conjunction with METP WG-MIE/7 meeting tentatively scheduled for 11-15 May 2020 in Thailand.

**SWIM Project Team of EUR/NAT Region**

2.26 The meeting noted that a SWIM Project Team (SWIM PT) was established to deal with SWIM implementation in the ICAO European Region. The first meeting of the SWIM PT was held in September 2018. APAC SWIM TF would keep close liaison and communication with other regional SWIM-related working groups in order to share experience gained and lessons learnt on SWIM implementation.

**The Result of APAC SWIM Survey**

2.27 The meeting noted a summary of results from the APAC Regional SWIM Survey conducted based on Conclusion CNS SG/22/6 during December 2018 to March 2019. Seventeen (17) States/Administrations had provided responses to the SWIM survey, including Australia, Bhutan, China, Fiji, Hong Kong China, Indonesia, Japan, Lao PDR, Macao China, Mongolia, Nepal, New

Zealand, Republic of Korea, Republic of the Philippines, Singapore, Thailand and United States. Many of them provided more than one responses from different group of stakeholder. The recommendations resulted from the survey were reviewed and considered by the SWIMTF/3 meeting.

2.28 Considering the SWIM survey result, the SWIMTF/3 meeting agreed that higher priority should be given to the SWIM implementation for cross-border ATFM and A-CDM operations and the associated required information services.

### **Launch ceremony of CRV for Asia and Pacific Regions**

2.29 At a joint session of SWIMTF/3 and CRV OG/6, Ms. Jeri Groce, Chairperson of SWIM Task Force introduced the work programme of SWIMTF and Mr. Terence Palmer, co-chair of CRV OG introduced the work programme of CRV Operation Group to the joint meeting. The meeting reconfirmed that the CRV will be used to support SWIM implementation in the APAC Region.

### **SWIM-enabled MET Information Services and related Issues**

2.30 The meeting noted that the Hong Kong Observatory (HKO) of Hong Kong China SWIM-enabled MET system supports MET information exchange services to filter, transform and distribute MET information for use in user's SWIM systems. One of two possible issues identified relevant to MET information in SWIM is the required bandwidth of CRV whether large enough to support SWIM enabled information services involving exchange of large volume data such as gridded data, image data and other binary MET data. Most of the APAC States plans to implement CRV with 10MB or below at the moment. Further coordination between IMP and MET/P may be required to define the bandwidth requirement of the SWIM network and work out the recommended solution. In this connection, the meeting recalled the outcome of discussions at CRV OG/5 meeting regarding the required bandwidth “the concern on bandwidth was not a technical issue but a decision of the CRV subscriber to opt for the CRV bandwidth requirements to meet its operational needs”

### **APAC SWIM Education Materials**

2.31 In following up an Action Item of the SWIM TF, SWIM education video and SWIM Brochure had been developed by ICAO APAC Office in cooperation with member States and industry. The SWIMTF/3 meeting endorsed the video for distribution. The brochure had been forwarded to ICAO Headquarters for further review and action. The SWIM Educational video was presented to APANPIRG/30 meeting. It was informed that the video had been also presented to the DGCA Conf/56. The video is posted on the following ICAO APAC Webpage:  
<https://www.icao.int/APAC/Pages/swim.aspx>.

### **Transition to SWIM – Common Benefit to APAC Region**

2.32 It is important for each State and/or region to decide what aim for by introducing SWIM. Japan presented following ideas on common value and benefits to promote transition to SWIM in APAC Region.

2.33 One idea is to increase productivity with digital information such as digitalizing the flight plan for sharing with stakeholders related to ATFM and A-CDM using FIXM format; digitalizing NOTAM service using AIXM format and digitalizing weather information using IWXXM format.

2.34 Another idea to restructure ANS system by less dependency on legacy function which would make it possible to gradually abolish old communication functions while integrating AFTN / AMHS services into SWIM.

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**IWXXM Distribution over AMHS Coordination**

2.35 USA stated that the Common AeRonautical Virtual Private Network (CRV), an underlying Internet Protocol (IP) based network does have enough bandwidth required by IWXXM traffic although IWXXM traffic load is expected to be ten folds over legacy Traditional Alphanumeric Code (TAC) format with compression applied. The respective MET authorities are expected to implement IWXXM version 3.0 prior to November 2020 and implement Extensible Markup Language (XML) gateway or equivalent.

2.36 A quick survey indicated that some MET facilities do not have capability to exchange XML format with other ANSPs over AMHS. In order to have a smooth transition, MET facilities need to implement the following:

- XML exchange capability with respective AMHS or its XML gateway;
- allow bi-directional exchange of IWXXM (publication/consuming);
- underlying network to support the XML exchange;
- XML schema validation capability;
- mapping WMO ID to AFTN/AMHS address for transmission of IWXXM; and
- compression capability

2.37 The IWXXM data currently includes MET data: METAR, SIGMET, TAF, and SPECI. The AMHS infrastructure can support this requirement. However, if the MET data in IWXXM format be expanded in the future to include Volcanic Ash Advisory, Tropical Cyclone Advisory, Space Wx, SIGWX, then further coordination between MET and COM would be required to avoid overloading the AFS network that may cause delay in distributing critical service such Air Traffic Inter-Facility Data Communication (AIDC). It was further clarified that versions of IWXXM should have no much impact on its exchange over AMHS. It should be transparent to AMHS as version 3 and version 2 should have no difference for their exchange over AMHS. However, it should be single attachment of FTBP with agreed max. size of the file. It was noted, the MET Workshop on IWXXM in June 2019 generally agreed that the single file size of FTBP should be less than 2 Mbytes.

**3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- note the information provide in this paper;
  - review and update the implementation status in the ATN/AMHS/AIDC implementation table provided in **Appendix A**; and
  - Verify and update the information contained in AIDC implementation status Chart provided in **Appendix B**.
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**ATN/AMHS/AIDC Implementation Status in the APAC Region**

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

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	Plan to upgrade AMHS support IWXXM traffic from Nov. 2020.		2017. LOA needs to be updated.		
BANGLADESH	In Q1/2013, Bangladesh installed ATN/AMHS and BIS Router at Dhaka (VGHS) with User Agents at Chittagong (VGEG) and Sylhet (VGSY).	COMSOFT	Tentative date of implementation of AIDC is Q4 of 2018 with Kolkata and Myanmar.		The Bangladesh ATM Upgrade Project (BATMUP) under Public Private Partnership (PPP) in Dhaka is expected to be completed by 2018.

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
					As soon as the ATM up-gradation is completed hopefully Bangladesh will be able to implement AIDC with Kolkata and Myanmar by the end of 2018.
BHUTAN	<p>ATN/AMHS circuits, using IP over VPN, with Thailand (Bangkok) and India (Mumbai) commissioned in June and July 2017 respectively.</p> <p>IOT and POT with Mumbai completed on 27<sup>th</sup> June 2017.</p> <p>IOT and POT with Thailand completed on 2<sup>nd</sup> May 2017.</p> <p>TMC signing with both countries at final stage.</p>	AEROTHAI 'S AMHS System	Currently not applicable. If required in the future, will be decided after CRV implementation (scheduled for mid-2019).		

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
BRUNEI DARUSSALAM	ATN BIS Router planned for 2015 and AMHS planned for 2015				
CAMBODIA	BIS Router and AMHS installed. Cambodia (CATS) AMHS connected with Bangkok via VSAT IP link since 10 December 2013	AVITECH	AIDC function and capability made available.  Ready for testing with neighbors ATS Facilities starting from 2017 and target date of implementation with Bangkok in 4Q2019	THALES which supports AIDC ICD Version 1.	
CHINA	ATN Router and AMHS including NCC deployed in 2008 which is being upgraded to support ATN/IPS with target date of completion in December 2013.	IN-HOUSE (Aero-Info Technologies Co., Ltd)	AIDC between some of ACCs within China has been implemented. AIDC between several other ACCs are being implemented.		

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	<p>The Beijing-Hong Kong AMHS link was put into operation in 2018;</p> <p>With Thailand is completed POT, after sign the TMC circuit and was put into operation in Q12020</p> <p>AMHS/ATN technical tests with Macau completed in 2009. Plan for ATN/AMHS implementation with Macao China in 2019.</p> <p>ATN/AMHS circuit with ROK has been put into operation since June 2011.</p> <p>ATN/AMHS tests with India has been put into operation since 2016.</p> <p>ATN and AMHS IOT with Mongolia is completed in May 2018. Plan for commissioning after POT completion in 2020</p> <p>Connection tests with Nepal is TBD.</p> <p>AMHS testing with Japan in 2020.</p>		<p>AIDC between Sanya and Hong Kong put in to operational use since 8 Feb 2007.</p> <p>AIDC between Dalian and Incheon implemented in Nov. 2016;</p> <p>Guangzhou with Nanning/Zhanjiang/Zhuhai implemented;</p> <p>Nanning and Kunming/Guiyang/Zhanjiang implemented in 2011;</p> <p>Zhanjiang/Haikou;</p> <p>Chengdu and Chongqing/Guiyang implemented in 2011;</p>		

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	AMHS testing with Russia in 2020.		Guiyang and Chongqing/Kunming implemented in 2011;  For Beijing/Ulaanbaatar, planned date of testing in 2020.		
HONG KONG, CHINA	<p>Manila / Philippines CRV/AMHS circuit was put into operation in May 2019.</p> <p>Beijing / China ATN/AMHS circuit was put into operation in 2018. Plan to migrate to CRV in 2020.</p> <p>Bangkok / Thailand ATN/AMHS circuit was put into operation use in 2014. Plan to migrate to CRV in Q32020.</p> <p>Fukuoka / Japan</p>	COMSOFT	<p>AFTN-based AIDC with Sanya put into operational use in Feb 2007. AIDC technical trial with Taipei conducted in 2010 and completed in 2012 and put into operational use in Nov. 2012</p> <p>AIDC technical and interoperability tests with Guangzhou were conducted successfully in April and June 2017 respectively and put</p>	Raytheon ATM system Support AIDC ICD Version 3 commissioned in November 2016.	Already support exchange of IWXXM messages based on FTBP.

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

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
COOK ISLANDS					
DEMOCRATIC PEOPLE’S REPUBLIC OF KOREA	The ATN BIS Router and AMHS planned for in 2011.		With neighboring ACCs to be implemented		
FIJI ISLANDS	<p>ATN BBIS IPS router and AMHS implemented over CRV for connection to USA in April, 2019 with Australia planned for June, 2019.</p> <p>.</p> <p>For connections with sub-regional centers:</p>	COMSOFT	AFTN based AIDC implemented between Nadi/ Brisbane, Auckland and Oakland.	<p>- Support and implemented AIDC messaging: ABI, EST, CPL, CDN, ACP, TOC, AOC with all three centers</p> <p>- AIDC ICD version 2.0 implemented with Auckland and Oakland.</p>	

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

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
			<ul style="list-style-type: none"> <li>- Mumbai-Male test trials completed; LOA signed.</li> <li>- Trivandrum-Male under test trial. LOA signed.</li> <li>- Mumbai-Muscat under test trial;</li> <li>-Ahmedabad-Karachi under test trial. LOA signed.</li> </ul>		between Chennai and Mumbai. 3) AMHS implemented and working between A. BBIS: Mumbai-Singapore, Bangkok B: BIS: Mumbai, Kathmandu, Dhaka, Karachi, Colombo & Paro
INDONESIA	ATN BIS Router and AMHS with Singapore implemented Since February 2018;  AMHS Trial (IOT) with Brisbane pending for CRV implementation.	IDS  ELSA	Implementation Jakarta (new ATM system in 4Q2020) The target date of AIDC implementation will commence testing in 4Q2020 including following pairs:  Jakarta-Singapore; Jakarta-Chennai;	Thales in Makassar able to support ICD Version 3 since December 2015	For CRV, contract in 1Q2020 and implementation in 2Q2020

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
			<p>Jakarta-Ujung Pandang;                      Jakarta-Melbourne;                      Jakarta – Kuala Lumpur</p> <p>Ujung Pandang – Brisbane:                      implemented in July 2017.</p> <p>Ujung Pandang – Manila                      - Successful testing conducted; Target date of implementation 4Q2019</p> <p>Ujung Pandang - Kota Kinabalu                      - Implementation date TBC</p> <p>-Ujung Pandang – Oakland, test conducted, and target date for implementation in 3Q2019.</p>		

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
			- Ujung Pandang – PNG trial 3Q2020		
JAPAN	<p>ATN BBIS router and AMHS installed at 2000. Connection tests with USA 2000 - 2004 and put into operational use in 2005.</p> <p>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.</p> <p>Upgrading connection with Hong Kong and Singapore using VPN will be implemented in 2020 after implementation of CRV.</p>	NEC	<p>AIDC implemented between Fukuoka ATMC and Oakland ARTCC in 1998.</p> <p>AIDC implemented between Fukuoka ATMC and Anchorage ARTCC in 2005.</p> <p>AIDC implemented between Tokyo ACC/Fukuoka ACC and Incheon ACC in 2010.</p>		Japan and USA conducting testing AIDC over AMHS and cutover date is 5 May 2017.

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	Coordinating for all other circuits upgrading.		<p>Implemented between Fukuoka and Incheon since June 2009.</p> <p>AIDC implemented between Fukuoka ACC/Naha ACC and Taipei ACC implemented.</p> <p>AIDC between Fukuoka ACC and Shanghai ACC under negotiation.</p>		
KIRIBATI	Connection with Nadi using UA/AMHS implemented in 2015.				
LAO PDR	ATN BIS Router and AMHS completed, planned for operation with Bangkok since 4Q 2016.	THALES	<p>AIDC testing with Bangkok in 2017 and target for implementation in 4Q2019.</p> <p>Testing with Hanoi on-going since 2017; with</p>	THALES which is able to support ICD Version 2.	

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			Cambodia operational test again in June 2018, and implementation 2Q 2019. Testing with Kunming and Yangon ongoing.		
MALAYSIA	<p>ATN BIS Router completed 2007. AMHS implementation planned for Q42017;</p> <p>Malaysia – Singapore for AMHS implementation in March 2020.</p> <p>Malaysia – Thailand for AMHS implementation in 2019.</p>	FREQUENT IS	<p>AIDC testing with Bangkok ACC conducted since 2016. Operational trial will commence in August 2019.</p> <p>AIDC Between Kuala Lumpur/ Chennai implemented in phases from May 2017 implementation for ABI, EST and MAC along with response messages LAM, LRM and ACP. Review on the CDN message implementation</p>	SELEX which is able to support ICD Version 3.	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
			<p>conducted in Aug. 2017. SOP signed 26 April, 2017.</p> <p>AIDC testing with Singapore on going since 2016. Target date for operational trial from 3Q2018, and Implementation 2Q2019.</p> <p>Planned testing with Ho Chi Minh ACC – 3Q2019;</p> <p>AIDC between KK ACC and Manila ACC in 4Q2020 and technical testing 2Q 2019.</p> <p>KK ACC with Ujung Pandang TBC;</p> <p>AIDC between Kuching ACC and</p>		

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
			<p>Singapore planned for 2Q2020;</p> <p>AIDC technical test between Kota <u>Kinabalu</u> ACC and Singapore planned for 3Q2019;</p> <p>AIDC between Kuala Lumpur and Jakarta testing planned for 4Q2020.</p>		
MALDIVES	<p>In the process of replacing the existing operational AFTN system by AMHS. It is expected to complete the installation before the end of 2019.</p> <p>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.</p> <p>Also will look for the possibility of implementing the CRV network to use</p>		<p>Connection established with all the adjacent ATSUs. Interoperability tests successfully completed in 2017.</p> <p>LOA signed for operational trials between Mumbai, Chennai, and Trivandrum. Operational trials were</p>	SELEX which is able to support ICD Version 3.	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	with AMHS and AIDC during the same phase.		<p>also successful with these ATSUs, while several issues were resolved from both ends.</p> <p>Ready to sign LOA with Melbourne and is expected during the 2nd quarter of 2019.</p> <p>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.</p>		
MARSHALL ISLANDS					

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
MICRONESIA (EDERATED STATES OF)					
Chuuk					
Kosrae					
Pohnpei					
Yap					
MONGOLIA	<p>AMHS/AFTN gateway implemented 2012.</p> <p>ATNBIS router implemented in 2014.</p> <p>ATN and AMHS IOT with China was completed in May 2018. Plan for commissioning after POT completion in 2019.</p>	COMSOFT	<p>ATM automation system supports both AIDC and OLDI.</p> <p>Coordinating with Russia on OLDI connection in target date 2016.</p> <p>Coordinating with China on AIDC connection between Beijing/Ulaanbaatar technical trials in progress. Planned date of testing in 2019.</p>	INDRA Aircon 2100 supporting AIDC ICD Version 2.	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
MYANMAR	<p>AMHS including ATFN/AMHS gateway implemented in Nov. 2011;</p> <p>Connection with Thailand implemented in 4Q2016;</p> <p>Planned for AMHS connection with Beijing. Target date TBC.</p>	THALES	<p>AIDC connection pre-operation test with Thailand conducted in 4Q2017 and Target date of implementation 1Q2020;</p> <p>AIDC testing with Kunming Chennai, Kolkata and Vientiane conducted in 2020.</p>	THALES Automation system (Topsky ATC supports APAC AIDC ICD Ver. 2.	
NAURU					
NEPAL	<p>AFTN/AMHS Gateway implemented in 2012.</p> <p>AMHS implemented with India since June 2014.</p> <p>AFTN connection with China. Plan to test AMHS connection soon.</p>	COMSOFT	<p>Nepal uses custom built ATM system from NEC.</p> <p>Some issues regarding ICD need to be resolved in order to proceed ahead with AIDC testing with India and China.</p>		

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

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

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	<p>Hong Kong 1Q2019 and with Singapore is planned over CRV by end of 2Q2020.</p> <p>AMHS implementation with Oakland USA via CRV is planned for 3Q2020.</p>		<p>Coordination is underway for using AIDC function of the new ATM system with adjacent ACCs.</p> <p>Planned implementation:                  2Q2019 – Singapore ACC;                  4Q2019 – Ujung Pandang ACC;                  3Q2019 – Taipei ACC;                  2Q2019- Hong Kong ACC;</p>		
REPUBLIC OF KOREA	<p>ATN/AMHS circuit with China put into operational use in June 2011.</p> <p>AMHS implementation with China over CRV in 2Q2020.</p> <p>AMHS implementation with Japan over CRV in 4Q2020.</p>	SAMSUNG	<p>AIDC implemented between ACC and Fukuoka ATMC in 2010</p> <p>AIDC between Incheon and Dalian implemented in Nov. 2016.</p>	Rockheed Martin System	

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

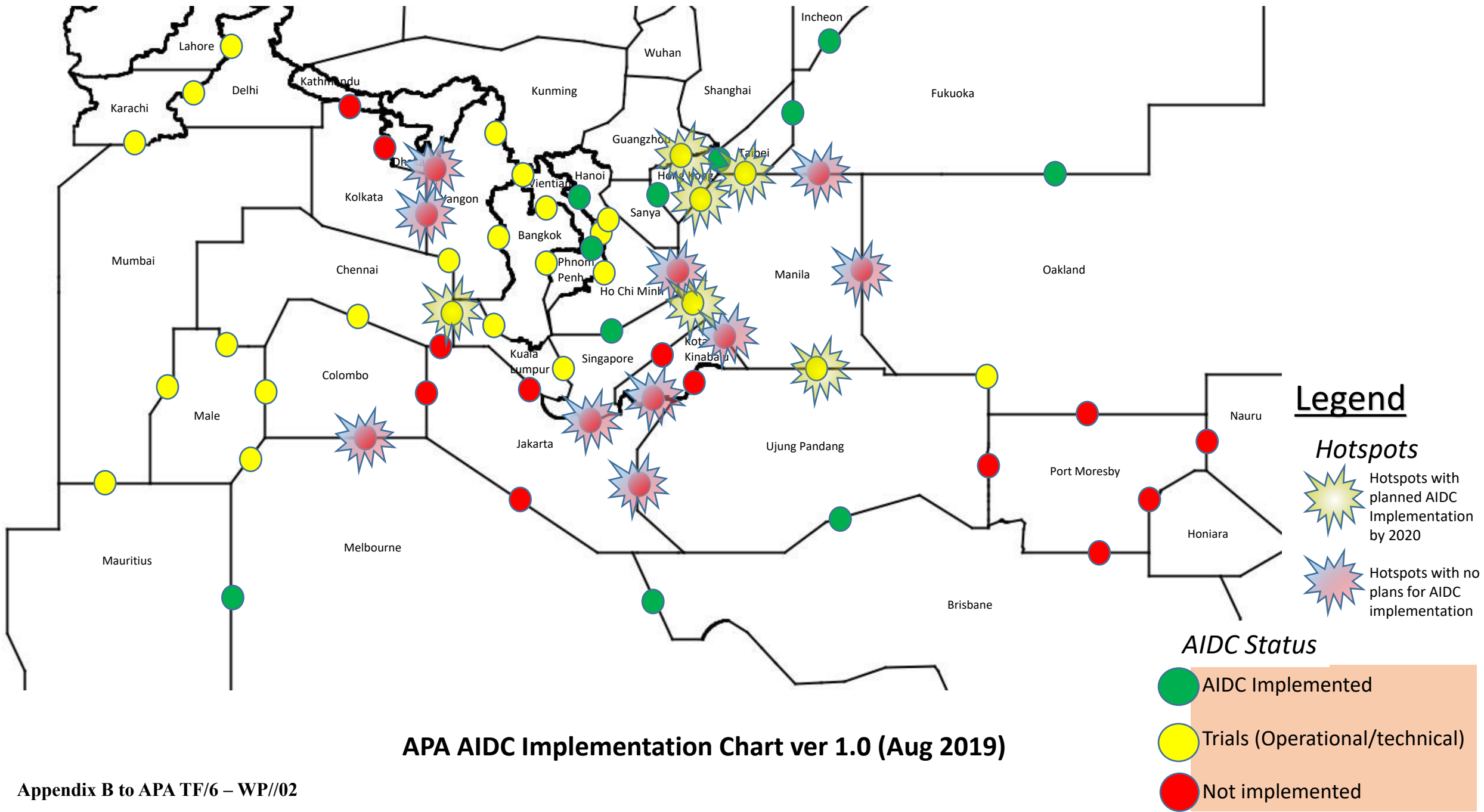
State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
SRI LANKA	<p>ATN BIS Router Planned for 2013. IP based AMHS implemented by Oct. 2017.</p> <ul style="list-style-type: none"> <li>- Mumbai tested May 2017 operational planned for Q4 2017;</li> <li>- Singapore testing in Q4 2017 operational for 2018;</li> <li>- Male testing and operational date TBD.</li> </ul>	IDS	<p>Trials with Male planned for in 3Q2019.</p> <p>Trial with Chennai on-going. Plan for implementation in 2018 and with Melbourne plan for 1Q2018.</p>	INTELCAN which is able to support ICD Version 3.	
THAILAND	<p>BBIS/BIS Routers already implemented. AMHS has been implemented since July 2011.</p> <p>Connection with Bangladesh, Bhutan, Cambodia, China, India, Lao PDR, Myanmar, Singapore, Hong Kong China implemented.</p> <p>Implementation with Malaysia planned for 2019.</p> <p>Interoperability Test: with Viet Nam planned for end of 3Q2019 and Italy planned for end of 4Q2019</p>	AEROTHAI's AMHS System	<p>AIDC Connection test with Lao PDR, Cambodia, Myanmar and Malaysia underway since 2016;</p> <p>Operation trial with these States from late 2017 to early 2019. Target date of implementation is around 2Q2020.</p>	<p>THALES which is being implemented with planned completion in 4Q2019.</p> <p>AIDC feature supports APAC AIDC ICD V.3.</p>	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	Connection with SITA (SITA AMHS Gateway inter-connections) implemented.				
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	<ul style="list-style-type: none"> <li>- Australia (1/2019)</li> <li>- Fiji (1/2019)</li> <li>- New Zealand (1/2019)</li> <li>- Japan (2/2019)</li> <li>- Philippines (3<sup>rd</sup> 2020)</li> </ul>	IN-HOUSE	<ul style="list-style-type: none"> <li>- Fiji, Japan, New Zealand,</li> <li>- Tahiti (via New Zealand), - Papua New Guinea (via Australia)</li> <li>- Philippines (3<sup>rd</sup> 2020)</li> <li>- Indonesia via Australia (2019)</li> <li>- Russian Federation (pending joining CRV)</li> </ul>	IN-HOUSE which is able to support APAC and NAT ICDs currently Version 2.	
VANUATU					

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
VIET NAM	<p>AMHS (basic) implemented. Trial phase from 4Q/2015 to 3Q/2018. IOT with Thailand in progress from 4Q/2017 Plan to use AMHS in 4Q/2018;</p> <p>Planned for IOT with Hong Kong, Singapore and Thailand in 2019</p> <p>For IOT with Laos PDR and Cambodia in 2019.</p>	IN-HOUSE	<p>Operational between Ho Chi Minh and Singapore since July 2014. Trial for additional messages sets since 2018.</p> <p>Implementation between Ho Chi Minh with Philippines planned for 4Q2020;</p> <p>Technical testing with Cambodia already done; Trials between Hanoi and Vientiane, Lao. PDR on going.</p> <p>with Malaysia TBC</p> <p>Testing with Cambodia on – going; For operation trial TBC.</p>	<p>Support ICD Version 1.0 with THALES at Ho Chi Minh ATM system.</p> <p>Support ICD Version 3.0 with Selex at Hanoi ATM System.</p>	

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Wallis and Futuna (FRANCE)	AMHS implementation planned for end of 2017			COMSOFT	

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**APA AIDC Implementation Chart ver 1.0 (Aug 2019)**