International Civil Aviation Organization

THE FIRST MEETING OF AERONAUTCAL COMMUNICATION SERVICE (ACS) IMPLEMENTATION CO-ORDINATION GROUP OF APANPIRG (ACSICG/1)

Seoul, Republic of Korea, 13 - 16 May 2014

Ministry of Land, Infrastructure and Transport

KAC
KOREA AIRPORTS CORPORATION

Agenda Item 4:   **Review States' ATN/AMHS Implementation Status, Transition and Operational Issues**

REVIEW REPORT OF ATNICG WG/12 MEETING

(Presented by the Secretariat)

SUMMARY

This paper presents outcome of ATNICG WG/12 Meeting for review by the meeting. Actions on the recommendations and follow-up actions are expected to be taken by this meeting.

1.   Introduction

1.1   The Twelfth Working Group meeting of Aeronautical Communications Services Implementation Co-ordination Group (ATNICG WG/12) of APANPIRG was held at the Holiday Inn Hotel, Renton, WA, USA from 5 to 8 August 2013.   The meeting was hosted by Federal Aviation Administration (FAA).

1.2   The meeting was attended by 46 participants from 12 States (Australia, Fiji Islands, India, Indonesia, Japan, Myanmar, New Zealand, the Philippines, Republic of Korea, Singapore, Thailand, USA and 3 representatives from Industry). The meeting considered 11 Working Papers and 12 Information Papers.

1.3   The report of the ATNICG WG/12 can be accessed at following ICAO APAC Website: http://www.icao.int/safety/acp/Pages/default.aspx

2.   Discussion

2.1   The meeting reviewed the outcome of the action taken by the Seventeenth Meeting of CNS Sub Group (CNS SG/17) and APANPIRG/24 on the outcome of ATNICG/8 meeting (WP/2).

Developments of ACP Working Group I and Working Group M

2.2   The meeting noted the outcome of Sixteenth meeting of Aeronautical Communication Panel (ACP) Working Group – I (IPS) (ACP WG-I/16) and Twentieth meeting of Working Group - M (Maintenance) (ACP WG-M/20) presented by USA (WP/4). The Working Group meetings were held in Montreal from 28 January to 1 February 2013.   Report and papers discussed at the meeting are available at ACP website: www.icao.int/anb/panels/acp

ACP WG-I/16 Meeting

2.3   The primary objective of the WG/I was to update the ICAO Doc. 9896, the Aeronautical Telecommunication Network Internet Protocol Suite (ATN IPS) Technical Manual. The primary function of ACP WG-M is to maintain the ICAO Doc. 9880, ATN Open System Interface (OSI). Main issues discussed are highlighted below:

a)   ICAO Secretariat to obtain IPV6 address blocks for the Regions (Open-ICAO);

b)   to develop justification for a block of address /16 (Open-ICAO);

c)   to develop transition guideline for IP   v4/6 (Open-FAA);

d)   to develop SWIM Operational Concept (AN-Conf/12 to set priority); and

e)   the need to establish a Cyber Security Task Force within ACP and to address security threat and prevention was identified.

2.3.1   ICAO Doc. 9896 Sections 2.4.1.1 and 2.4.2.1 were proposed to change as follow to clarify that "Host" may not need both TCP and UDP:

Section 2.4.1.1 IPS hosts requiring connection-oriented transport service shall implement the Transmission Control Protocol (TCP) as specified in RFC 793;

Section 2.4.2.1   IPS hosts requiring connectionless transport service shall implement the User Data Gram Protocol (UDP) as specified in RFC 768.

2.3.2   Eurocontrol presented the main goal of Project 15.02.10 which is to verify and demonstrate the suitability of PENS as the IP network backbone infrastructure for ATM environment. The project tasks included the following:

- Evaluation of suitability of end-to-end PENS performances;

- Establishment of a Security Policy;

- Verification of surveillance IP Multicast applications on PENS; and

- Verification of VoIP for G/G and ground segment of A/G Communications on PENS.

2.3.3   The following deliverables were related to the Security tasks:

- Security Risk Assessment (SRA) which had been completed for the following applications: FMTP, AMHS, VoIP, LARA & Network Elements

- Security System Specification:
  ➢ Development of Security System Model
  ➢ Security System Model Testing
  ➢ Vulnerability tests and Test Bed tools
  ➢ Tests including civil/military interoperability

- SWIM Backbone Security Management
  ➢ Final Security Risk Assessment & Security Model

2.3.4   SESAR P 15.2.10 deliverables on security will be finalised before the next WG-I meeting in November 2013.   They could become relevant inputs for the development of Security implementation guidance for IPS. ICAO and EUROCONTROL will ask SESAR Joint Undertaking (JU) approval for making these deliverables available to ACP WG-I.

File Transfer Body Parts (FTBP)

2.4   WP/8 to ACP WG-M discussed the issue reported by AFSG in Europe regarding transfer of binary data in AMHS using File Transfer Body Parts (FTBP).

2.4.1   File Transfer Body Part (FTBP) is specified as the preferred means for transfer of binary data in AMHS. Support of FTBP by AMHS UAs is mandated in Europe, as per EUR AMHS Manual Appendix B. However, effective use of FTBP is likely to generate a number of issues with regard to the interpretation of Doc 9880 and of EUR AMHS Manual.

2.4.2   Most of the questions identified during this EUR ICAO activity are likely to also appear in other ICAO Regions, as soon as AMHS is considered for transfer of messages other than those currently exchanged in AFTN. The paper considered three issues:

      a) the number of "body parts" contained in the most basic message elements;

      b) priority and filing time for a basic message containing an FTBP; and

      c) the use of FTBP for character-oriented messages.

2.4.3   The need was identified to accommodate yet undefined data types in AIXM and WXXM and legacy issues.

2.4.4   There was an amendment proposal regarding Part II of Doc 9880. The proposal resulted from lessons learnt in Europe during AMHS operational service (IP/5). It was identified that the current AFTN/AMHS gateway specification regarding processing of AFTN SVC messages reporting about an unknown addressee indicator makes message interpretation difficult for messaging users and system operators, due to a partial loss of information at the gateway. This could be enhanced by a limited change to the gateway specification and corresponding implementation to AMHS gateway applications. The change consists of converting all AFTN SVC ADS UNKNOWN messages to AMHS IPMs instead of converting some of them to AMHS NDRs. This is seen as a change of minor impact by gateway manufacturers.

2.4.5   The observation of the problem and the principle of the change proposal were agreed during the work of ICAO AFSG subgroups in Europe in 2013. It was noted that the issue is not limited to Europe, and that the amendment proposal should be introduced in Doc 9880 Part II by ACP WG-M. The sections of Doc 9880 affected: *Part II, sections 4.4.4, 4.3.1.5 and 4.5.6.1.1*

2.4.6   The participants of the ATNICG working group was invited to provide comments to the proposed Amendment Proposal (detailed amendment proposal is provided in the Attachment to IP/5) to DSNA/DTI – Mr. Jean-Marc Vacher (Tel.: +33 (5) 6214 5474, Fax: +33 (5) 6214 5401) E-mail: jean-marc.vacher@regis-dgac.net Updates on this subject from AFSG held in April 2014 is expected.

      Ad-hoc Working Group: MPLS VPN support VoIP and Data (AMHS, ATFM, AIDC, OPMET databanks, etc.)

2.5   Under this agenda item, the meeting discussed a number of papers containing the proposal and considerations on the subject presented by Japan (WP/3), USA (WP/10 and IP/6).

2.5.1   WP/3 from Japan briefly introduced the result of their initial study on the implementation of common IP based VPN using MPLS technology and provided some recommendations for consideration. The paper also highlighted a number of issues for the construction of IP-VPN network. Options were also proposed to resolve each issue. The meeting appreciated the result of the initial study conducted by Japan which is useful for further consideration by the dedicated Task Force (CRV TF).

2.5.2   WP/10 from USA recommended the implementation of a regional Internet Protocol Virtual Private Network and proposed initial actions to be taken by a number of States in the Asia/Pacific Region. The presentation highlighted a number of issues facing Aeronautical Fixed Service (AFS) enhancement. Some recommendations were also provided for consideration by the meeting. Some introduction information on Multiprotocol Label Switching (MPLS) was also attached to the presentation.

2.5.3   IP/6 from USA described the transition process for the MEVA III satellite network from MEVA II network which enhanced communications services between the USA and member States in the Caribbean, Central and South America Regions. It was proposed to consider this typical sample process as it would apply for the Asia/Pacific MPLS VPN solution. The core elements in the process include establishment of a Telecommunication Management Group (TMG) and a TMG Task Force. For the provider selection, the TMG carried out the Request for Information and Request for Proposal i.e. TMG issued the RFI and RFP and reviewed responses, interviewed and selected the vendor and service provider and elaborated the Work Breakdown Statement. ICAO Technical Cooperation Bureau (TCB)'s assistance through its Civil Aviation Purchasing Service (CAPS) was provided as requested for the process.

2.5.4   The meeting proposed roadmap for completing the task assigned by APANPIRG was provided for consideration by CRV TF.

Development on PAN Inter-regional ICD for AIDC

2.6   The meeting also noted updates on PAN regional ICD for AIDC presented by the Secretariat (IP/7). The meeting noted work and latest development by the inter-regional AIDC Task Force. The 2nd meeting of the Task Force (IRAIDTF/2) was held from 22 to 26 July 2013 in Bangkok, Thailand. The meeting developed version 0.8 of the pan inter-regional ICD for AIDC. The meeting also noted the AIDC implementation status provided in the Attachment A to the paper. The meeting noted several related issues discussed by the IRAIDTF/2. (The IRAIDTF/3 meeting was held in Montreal from 24 to 28 March 2014 and delivered version 0.85 of the draft PAN regional ICD for AIDC).

SWIM including updates on FAA SWIM Programme
(Implementation/operations/governance)

2.7   Under this agenda, a number of presentations were made by USA including IP/4 – USA SWIM programme overview; WP/11 regarding FAA SWIM Governance and Interoperability (detailed information available on a website was provided at end of the presentation). Chairman commented that the SWIM Governance input can also be forwarded for consideration by the global SWIM Task Force to be established by ICAO HQ after the Assembly this year.

SWIM development status in Republic of Korea

2.8   Republic of Korea provided updates on the development status of SWIM and standardization of SOA by ISO. The Republic of Korea has developed the SWIM project since December 2012. The INHA University leads the project with members from the Korea Airports Cooperation, a company, some other universities, and consultant groups which are involved in the project. The milestone of this project is indicated as follows: the fundamental scheme is worked out in 2013, core functions will be implemented by 2014, and test-bed system will be developed by 2015. Development schedule for some core functions in 2014 may be advanced by one year. In 2016, the test-bed will be connected to the practical aeronautical data systems for verification of their interoperability.

2.8.1   It was emphasized that the aeronautical data format needs to be defined for data interoperability with other countries. Based on the SWIM operational concepts, the SOA plays an important role to manage the aeronautical data. Some of the key issues need to be considered first such as 'governance' that determines important functions and roles of aeronautical data service, 'standardization' that provides interoperability between countries, 'scalability' that gives flexible data management, and 'security' that protects unwanted access or attacks or abuses.   SOA standard is being undergoing by the standard body of ISO/IEC SC32. One of the current items being studied by the project team is the governance. Republic of Korea expressed interest to participate in the activities of global SWIM panel or Task Force.

SWIM and AMHS

2.9   USA made a presentation on the roadmap to information distribution SWIM over AMHS (WP/06) and described the relation between SWIM and AMHS (WP/07). It was proposed to continue taking SWIM over AMHS as one task for the ACSICG working group. The roadmap including task items for moving ahead for IMS – SWIM over AMHS are suggested (slide 5 of WP/06). Assuming the initial application will be the OPMET information or weather products, three activities are required to be addressed including a) specification of HTTP over AMHS function; b) profiles to be defined for OGC WFS and WMS to carry text weather (eventually OGC WCS for raster products; c) WXXM profile/extension for text weather products need to be defined.

2.9.1   The meeting reconfirmed that the CONOPS for SWIM should be developed by ICAO as soon as possible and followed by the development and agreement on governance for aeronautical information systems at the global level. At the same time, exchange of information of SWIM study and sharing experience gained in developing SWIM operational concept by member States/Administration at regional level should be encouraged. The ACSICG should continue to keep this in its work programme and agenda at future meetings.   Protection of the AMHS investment and fully using AMHS in a mixed environment should also be supported.   The result of regional study and experience gained could be forwarded for consideration by the global SWIM panel or task force.

2.9.2   This would be a balanced approach between the bottom-up approach and top-down. Regional input would facilitate the development of CONOPS of SWIM at global level. Regional agreement may also be required for some governance. The global perspective would also include regional consideration from region's perspective.

2.9.3   ROK expressed concerns that individual domestic development on the governance would create difficulties for harmonization later in order to achieve interoperability. It was recommended to conduct SWIM study at both global and at national level simultaneously in the initial stage.

AMHS and IP Implementation Status in the APAC and other Regions

2.10   Status in the various Regions was presented by the Secretariat (WP/8). The meeting noted AMHS planning and implementation status in other regions and issues identified by task force or working groups of the other regions. It was encouraged to see AMHS implementations taking place in the last few years and much more to be implemented by 2015 at the global level.   Chair clarified that some statements in the other regional reports regarding APAC AMHS implementation function do not fully reflect the implementation status and the requirements for the APAC Region.

Updates on the implementation status from States

2.11   A number of States provided updates on the AMHS implementation status as follows:

Myanmar (IP/2)

2.11.1   Myanmar informed the meeting that DCA installed AFTN from Nippon Electronic Corporation NEC at Yangon airport control tower in 2000 which has been used since then till 2011. AMHS was purchased from Thales (France) and the installation of AFTN/AMHS gateway was successfully done in November 2011.   DCA. Myanmar is also planning to form a SWIM committee for further implementation.

Thailand (IP/8)

2.11.2   Thailand presented s comprehensive report of their AMHS system implementation status. Their AMHS implementation was done in July 2011.   Following the Kick-off meeting with connected BBIS states, Singapore, India and Hong Kong China in 2012, Thailand has performed the Inter-Operability Test (IOT) with connected BBIS states.   In 2013, Thailand initiated two additional links testing with India and Singapore, in order to perform Pre-Operational test with their systems. In addition, in 2012, AEROTHAI has contacted a number of BIS States and has performed IOT with them. Up to date, Thailand had performed IOT with Cambodia and LAO PDR. The detailed summary of ATN/AMHS IOT with all concerned parties was provided in the paper.

China (IP/11)

2.11.3   China provided an update on ATN/AMHS implementation status in China. The ATN/AMHS system was initially installed in Beijing NCC (Network Control Center) in 2008. The AMHS connection between Beijing and Seoul was put into operation in June, 2011. The AMHS testing between Beijing and Mumbai started in March 2011 using a 64 Kbps landline. Some problems identified during   the test such as message conversion have been resolved through the coordinated efforts made by the two States and their system vendors. The inter-operability test was successfully completed in August 2012.   The pre-operational test was commenced 24 July and successfuly completed on 26 July 2013. The messages between China and India now are exchanged parallely through the new AMHS connection.   China is now coordinating with India for a commissioning date of AMHS. China is upgrading the existing ATN/AMHS system to support ATN/IPS. IP routers and network security equipements will be included in the upgraded system. The update is scheduled to be completed by December 2013 when AMHS testing with other States using IP connection can be conducted.

India (IP/12)

2.11.4   A summary of the current ATN/AMHS implementation status/ operational activities/issues in India was presented to the meeting.   India implemented the AMHS with dual stacks ATN Router in Mumbai (BBIS site) in April 2008 and the AMHS operation with Singapore commenced from 23 March 2011.   AMHS implementation with States concerned is as follows:

a)   **Mumbai-Beijing:** The Pre-Operational Trials between India (Mumbai) and China (Beijing) were successfully completed in July 2013. Both States have planned to sign the TMC and commission the circuit tentatively in the 1st week of September 2013;

b)   **Mumbai-Bangkok:** The Pre-Operational Trials on AMHS between India (Mumbai) and Thailand (Bangkok) were successfully completed in middle of July 2013. Both States have planned to sign the TMC and commission the circuit tentatively in the 1st week of September 2013;

c)   **Mumbai-Karachi:** Despite successful completion of IOT in November 2010, Pre-operational trials on AMHS between India and Pakistan (Karachi) could not be carried out pending AMC table updates in the Pakistan AMHS system; and

d)   **Mumbai-Muscat:** The circuit is presently operated on AFTN over TCP/IP through AMHS gateway. India is ready to migrate on AMHS and however response from Oman Civil Aviation Authorities is awaited.

2.11.5   Status of AMHS implementation with other states is listed below:

      a)   Nepal and Bangladesh have already procured a COMSOFT AMHS system. Efforts are made to finalize the testing plan to commence IOT;

      b)   Sri Lanka has recently contacted India for AMHS implementation. Details of connectivity requirements have been communicated to Sri Lanka;

      c)   Kenya has initially planned their implementation in July 2013. However, implementation plan is still awaited from Kenya; and

      d)   AMHS implementation plan from Bhutan is awaited.

EDS Introduction (IP/10)

2.12   COMSOFT presented an update on the European Directory Service (EDS) for AMHS system. The presentation reviewed the concept of EDS and explained the relation and its integration and synchronization consideration with AMC.   The meeting was informed that AFSG/16 approved CP-AMHSM-12-002 to include the Operational Concept of the European Directory Service (EDS) into the EUR AMHS Manual. AFSG/17 approved the introduction of Appendix G "European Directory Service (EDS)" into the EUR AMHS Manual. (v.1.0 – 08.03.13) More information about the manual is provided at the following webpage:
http://www.paris.icao.int/documents_open/show_file.php?id=585)
It was further informed that EDS would take another 8-9 months before it is put into normal operation.

Update on the APAC Interim AMHS Database and AMC (IP/9)

2.13   Thailand informed the meeting about AMC data updates. Since the ATNICG/8 meeting held in Jakarta Indonesia, AEROTHAI received some updated information from Cambodia, China and Vientiane. All information has been updated in the AMC Database following the AIRAC cycle.

2.13.1   As requested from The AFSG meeting to update AMC AMHS addresses based on MTA (excluding states using UA), AEROTHAI has already prepared the updated those information and will be sent to Australia, Fiji, New Zealand and United States for verification before distribution to other States and updates in the AMC. Mrs. Jitima of AEROTHAI is the contact point for this matter whose email address is: tima14@aerothai.co.th or jittima.as@aerothai.co.th.

Update FASID CNS Tables based on MTA

2.14   The meeting reviewed and updated FASID CNS tables CNS 1B and CNS 1C based on MTA concept (WP/9).   Current tables were amended in August 2012 based on APANPIRG Conclusion 22/17.   It has been observed that a significant development has taken place since then. It was considered necessary to review these tables based on MTA to MTA connection. While reviewing the FASID Table 1B,   the meeting agreed to amend the title of the Table to Aeronautical Telecommunication OSI and IPS Router plan from Aeronautical Telecommunication Network (ATN) Router Plan. The meeting also considered necessary to add remarks for some terms used into the Explanation of the Table for Column 7.   The updated tables are provided in **Appendix B** and **Appendix C** to this Report.   These updated tables are expected to be further reviewed and updated at the first meeting of ACSICG before Proposal for Amendment (PfA) to these tables can be processed.

Update Task List

2.15   The meeting reviewed the list of Action Items and task list presented through WP/5. Considering next meeting working group meeting will be the first one under new name of ACSICG, a consolidated new list of Action Items was created, based on the information provided in the paper and discussion during the meeting.   The meeting proposed to continue the work of the working group to facilitate progressing the assigned tasks to the ACSICG by APANPIRG. The need to closely coordinate with the newly established Task Force on the common IP based VPN for APAC Region was identified.

2.15.1   The meeting reviewed action items of the working group and identified few more items into the list. The updated task and action items are provided in the **Appendix D** to this Report.

2.15.2   The meeting also reviewed a DRAFT revised Strategy for Implementation of Communications Systems to support ATM operation in the Asia Pacific Regions as presented to the ATNICG/9 meeting . Considering time constraints, the meeting asked Airservices Australia and Airways New Zealand to look into the draft and prepare a Working Paper in coordination with members of the working group by December 2013 for consideration by the first meeting of ACSICG/1 to be held in Republic of Korea in May 2014.

2.15.3   The meeting considered useful to keep the information of AMHS vendors selected by Administrations in the APAC Region. Such information may be useful for discussions on technical testing between the Administrations. Such information collected during the meeting is provided in **Appendix E** to this Report.

Future Work Programme

2.16   The meeting also discussed the future programme of the working group under the new structure of ACSICG and its relationship with the new Task Force. **The group reconfirmed their willingness to continue the working group to support ACSICG.** The proposed dates for the next working group meeting are in the third week of August or early September 2014.   The working group meeting would be three days if no associated event organized. It would be four days event if a workshop or seminar or other event is organized in conjunction with the meeting.

3.   Action by the Meeting

3.1   The meeting is invited to:

    a)   note the information provided in this paper;

    b)   discuss **File Transfer Body Parts (FTBP)** related issue;

    c)   review and updated the CNS Table 1B and 1C in Appendices (Appendix B and C the ATNICG WG/12 report);

    d)   review Strategy for Implementation of Communications Systems to support ATM operation in the Asia Pacific Regions to be presented by Australia and New Zealand;

    e)   note and update information in the Table of AMHS vendors selected by APAC Administrations (Appendix E to the WG/12 report);

    f)   discuss the necessity of ACSICG Working Group as proposed by the ATNICG WG/12 (Appendix D to the WG/12 report) and dates   and venue of the first meeting of the WG.

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IV-CNS 1B-1

TABLE CNS 1B

**AERONAUTICAL TELECOMMUNICATION NETWORK (ATN) <u>/ INTERNET PROTOCOL
SUITE (IPS)</u> ROUTER PLAN**

EXPLANATION OF THE TABLE

Column

1	Administration – the name of the Administration, State or Organization responsible for management of the router
2	Location of Router
3	Type of Router:

> BBIS - Backbone Boundary Intermediate System
> BIS - Boundary Intermediate System

4	Type of Interconnection:

> Inter - Regional - Connection provided with stations in other ICAO regions
> Intra - Regional - Connection provided between BBIS stations
> Sub - Regional - Connection provided between a BBIS station and a BIS station

5	Interconnection, Connected to router of: name of the location of the correspondent router
6	Link Speed - Speed requirements of the interconnecting link
7	Link Protocol - Protocol requirements for the interconnecting link

<u>"X.25" – Connectionless Network Protocol (CLNP) over X.25</u>

<u>"IP-SNDCF" – CLNP over Internet Protocol (IP) (SNDCF - Sub-Network Dependent
      Convergence Function)</u>

 <u>"IPS" - Internet Protocol Suite</u>

8	Target Date of Implementation - date of implementation of the router

TBD - To be determined

9	Remarks

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Afghanistan	Kabul	BIS	Sub-Regional	Pakistan	64000bps	IPS	2013	Intra-domain
		BIS	Inter-Regional	Iran	9600 bps	IPS	2013	
American Samoa	Pago Pago			United States			2013	Intra-domain
Australia	Brisbane	BBIS	Intra-Regional	Fiji	64000 bps	CLNP/IP-SNDCF	2011	
		BIS	Sub-Regional	Indonesia	64000 bps	IPS	2015	Not implemented
		BBIS	Intra-Regional	Japan	64000 bps	IPS/SNDCF	TBD	Not implemented
				Nauru		IPS	2013	Intra-domain
		BIS	Sub-Regional	New Zealand	64000 bps	IPS	2013	Implemented
				Papua New Guinea	64000 bps	IPS	2013	Intra-domain/Implemented
		BBIS	Intra-Regional	Singapore	64000 bps	CLNP/IP-SNDCF	2014	
		BBIS	Inter-Regional	South Africa	64000 bps	TBD	TBD	Not implemented
				Solomon Islands		IPS	2012	Intra-domain
				Timor Leste		IPS	2013	Intra-domain
				Vanuatu		IPS	2010	Intra-domain
		BBIS	Inter-Regional	United States	64000 bps	IPS/SNDCF	2015	
Bangladesh	Dhaka	BIS	Sub-Regional	India	64000 bps	IPS	TBD	
		BIS	Sub-Regional	Thailand	9600 bps	X.25	2013	
Bhutan	Paro	BIS	Sub-Regional	India	9600 bps	IPS	TBD	
Brunei Darussalam	Brunei	BIS	Sub-Regional	Malaysia	64000 bps	X.25	2013	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
		BIS	Sub-Regional	Singapore	9600 bps	X.25	2013	Circuit implemented
Cambodia	Phnom Penh	BIS	Sub-Regional	Thailand	9600 bps	X.25	2013	
China	Beijing	BIS	Sub-Regional	DPR Korea	9600 bps	X.25	2013	Router Implemented
		BBIS	Intra-Regional	Hong Kong, China	64000 bps	X.25	2012	Router Implemented
		BBIS	Intra-Regional	India	64000 bps	IPS	2013	
		BBIS	Intra-Regional	Japan	64000 bps	IPS/SNDCF	TBD	
		BBIS	Inter-Regional	Kuwait	64000 bps	X.25	2013	Router Implemented
		BIS	Sub-Regional	Macau, China	64000 bps	X.25	2012	Implemented
		BIS	Sub-Regional	Mongolia	9600 bps	X.25	2013	Router Implemented
		BIS	Sub-Regional	Myanmar	9600 bps	IPS	2015	Router Implemented
		BIS	Sub-Regional	Nepal	9600 bps	X.25	2013	Router Implemented
		BIS	Sub-Regional	Pakistan	64000 bps	X.25	2013	Router Implemented
		BIS	Sub-Regional	Republic of Korea	64000 bps	X.25	2011	Implemented
		BBIS	Inter-Regional	Russian Federation	64000 bps	X.25	2012	Router Implemented
		BBIS	Intra-Regional	Thailand	64000 bps	X.25	2014	Router Implemented
		BIS	Sub-Regional	Vietnam	9600 bps	X.25	2013	
	Taibei	BIS	Sub-Regional	Hong Kong, China	64000 bps	X.25	2012	
		BIS	Sub-Regional	Japan	64000 bps	IPS/SNDCF	TBD	
Hong Kong, China	Hong Kong	BBIS	Intra-Regional	China	64000 bps	X.25	2012	
		BIS	Sub-Regional	Macau, China	64000 bps	X.25	2009	Implemented
		BBIS	Intra-Regional	Japan	64000 bps	IPS/SNDCE	TBD	
		BIS	Sub-Regional	Philippines	64000 bps	X.25/IPS	2015	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
		BBIS	Sub-Regional	Taibei	64000 bps	X.25	2012	
		BBIS	Intra-Regional	Thailand	64000 bps	X.25	2003	Router Implemented
		BIS	Sub-Regional	Viet Nam	64000 bps	X.25	2013	
Macau, China	Macau	BIS	Sub-Regional	China	64000 bps	X.25	2012	Implemented
		BIS	Sub-Regional	Hong Kong, China	64000 bps	X.25	2009	Implemented
Cook Islands	Rarotonga			New Zealand	9600 bps	IPS	2013	Intra-domain
DPR Korea	Pyongyang	BIS	Sub-Regional	China	9600 bps	X.25	2013	
Fiji	Nadi	BBIS	Intra-Regional	Australia	64000 bps	CLNP/IP-SNDCF	2011	
				Kiribati	64000 bps	IPS	2014	Intra-domain
		BIS	Sub-Regional	New Caledonia			2013	Intra-domain
				Tuvalu		IPS	2011	Intra-domain
		BBIS	Inter-Regional	United States	9600 bps	X.25	2011	Circuit implemented
				Wallis Islands			2013	Intra-domain
French Polynesia	Papeete			New Zealand	9600 bps	IPS	2013	Intra-domain
India	Mumbai	BIS	Sub-Regional	Bangladesh	64000 bps	IPS	TBD	
		BIS	Sub-Regional	Bhutan	9600 bps	IPS	TBD	
		BBIS	Intra-Regional	China	64000 bps	IPS	2013	
		BIS	Inter-Regional	Kenya	9600 bps	TBD	TBD	
		BIS	Sub-Regional	Nepal	64000 bps	IPS	2014	
		BIS	Inter-Regional	Oman	9600 bps	IPS	2012	Interoperability trials in Q2/2012
		BIS	Sub-Regional	Pakistan	64000 bps	IPS	2013	Interoperability test

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
								completed in 2010. Trial operations in progress.
		BBIS	Intra-Regional	Singapore	64000 bps	X.25	2011	Circuit Implemented
		BIS	Sub-Regional	Sri Lanka	9600 bps	IPS	TBD	
		BBIS	Intra-Regional	Thailand	64000 bps	X. 25	2013	Trials Commence from Q2/2012
Indonesia	Jakarta	BIS	Sub-Regional	Australia	64000bps	IPS	2015	
		BIS	Sub-Regional	Singapore	64000 bps	IPS	2013	Circuit implemented
Japan	Tokyo	BBIS	Intra-Regional	Australia	64000 bps	IPS/SNDCF	TBD	Not implemented
		BBIS	Intra-Regional	China	64000 bps	IPS/SNDCF	TBD	
		BBIS	Intra-Regional	Hong Kong, China	64000 bps	IPS/SNDCF	TBD	
		BBIS	Inter-Regional	Europe	64000 bps	IPS/SNDCF	TBD	
		BIS	Sub-Regional	Republic of Korea	64000 bps	X .25	TBD	
		BBIS	Inter-Regional	Russia Federation	64000 bps	IPS/SNDCF	TBD	
		BBIS	Intra-Regional	Singapore	64000 bps	IPS/SNDCF	TBD	
		BIS	Sub-Regional	Taibei	64000 bps	IPS/SNDCF	TBD	
		BBIS	Inter-Regional	United States	64000 bps	IPS/SNDCF	2015	Circuit implemented
Kiribati	Tarawa	BIS	Sub-Regional	Fiji	64000 bps	IPS	2014	Intra-domain
Lao PDR	Vientiane	BIS	Sub-Regional	Thailand	64000 bps	IPS	2013	VSAT
		BIS	Sub-Regional	Viet Nam	9600 bps	X.25	2013	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Malaysia	Kuala Lumpur	BIS	Sub-Regional	Brunei	64000 bps	X.25	2013	
		BIS	Sub-Regional	Singapore	64000 bps	IPS	2007	Circuit implemented
		BIS	Sub-Regional	Thailand	64000 bps	IPS	2013	VSAT
Maldives	Male	BIS	Sub-Regional	Sri Lanka	64000 bps	X.25	2013	
Marshall Islands	Majuro			United States			2006	Intra-domain
Micronesia Federated State of	Chuuk			United States			2006	Intra-domain
	Kosrae			United States			2006	Intra-domain
	Ponapei			United States			2006	Intra-domain
	Yap			United States			2006	Intra-domain
Mongolia	Ulaanbaatar	BIS	Sub-Regional	China	9600 bps	X.25	2013	
Myanmar	Yangon	BIS	Sub-Regional	China	9600 bps	IPS	2015	
		BIS	Sub-Regional	Thailand	9600 bps	IPS	2015	
Nauru	Nauru			Australia			2013	Intra-domain
Nepal	Kathmandu	BIS	Sub-Regional	China	9600bps	X.25	2013	
		BIS	Sub-Regional	India	64000 bps	IPS	2014	
New Caledonia	Noumea			Fiji			2013	Intra-domain
New Zealand	Christchurch	BIS	Sub-Regional	Australia	64000 bps	IPS	2013	
				Cook Is.	24000 bps	IPS	2013	Intra-domain
				French Polynesia	9600 bps	IPS	2013	Intra-domain
				Samoa	2400 bps	IPS	2013	Intra-domain
				Tonga	85000 bps	IPS	2013	Intra-domain

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
		BIS	Inter-Regional	USA	64000 bps	IPS	2015	
Pakistan	Karachi	BIS	Sub-Regional	Afghanistan	64000 bps	IPS	2013	
		BIS	Sub-Regional	China	64000 bps	X.25	2013	
		BIS	Sub-Regional	India	64000 bps	IPS	2013	Interoperability test completed in 2010. Trial operations in progress.
		BIS	Inter-Regional	Oman	64000 bps	-	2013	
		BIS	Inter-Regional	Iran	64000 bps	-	2013	
		BIS	Inter-Regional	Kuwait	64000 bps	-	2013	
Palau	Koror			United States			2006	Intra-domain
Papua New Guinea	Port Moresby			Australia	64000 bps	IPS	2013	Intra-domain
Philippines	Manila	BIS	Sub-Regional	Hong Kong, China	64000 bps	X.25/IPS	2015	Circuit Implemented
		BIS	Sub-Regional	Singapore	64000 bps	X.25	2015	
Republic of Korea	Seoul	BIS	Sub-Regional	China	64000 bps	X.25	2011	Implemented
		BIS	Sub-Regional	Japan	64000 bps	X.25	TBD	
Samoa	Faleolo			New Zealand	2400 bps	IPS	2013	Intra-domain

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Singapore	Singapore	BBIS	Intra-Regional	Australia	64000 bps	CLNP/IP-SNDCF	2014	
		BBIS	Inter-Regional	Bahrain	64000 bps	IPS	2014	
		BIS	Sub-Regional	Brunei	9600 bps	X.25	2015	
		BBIS	Intra-Regional	India	64000 bps	X.25	2011	Implemented
		BIS	Sub-Regional	Indonesia	64000 bps	IPS	2013	
		BBIS	Intra-Regional	Japan	64000 bps	IPS/SNDCF	TBD	
		BIS	Sub-Regional	Malaysia	64000 bps	IPS	2013	Circuit implemented
		BIS	Sub-Regional	Philippines	64000 bps	IPS	2015	
		BIS	Sub-Regional	Sri Lanka	64000 bps	X.25	2014	
		BBIS	Intra-Regional	Thailand	64000 bps	X.25	2013	
		BBIS	Inter-Regional	United Kingdom	64000 bps	IPS	2012	Implemented
		BIS	Sub-Regional	Viet Nam	9600 bps	X.25	2015	
Solomon Islands	Honiara			Australia		IPS	2012	Intra-Domain
Sri Lanka	Colombo	BIS	Sub-Regional	India	9600 bps	IPS	TBD	
		BIS	Sub-Regional	Maldives	64000 bps	X.25	2013	
		BIS	Sub-Regional	Singapore	64000 bps	X.25	2013	
Thailand	Bangkok	BIS	Sub-Regional	Bangladesh	9600 bps	IPS	2013	VSAT
		BIS	Sub-Regional	Cambodia	9600 bps	X.25	2013	VSAT
		BBIS	Intra-Regional	China	64000 bps	X.25	2014	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
		BBIS	Intra-Regional	Hong Kong, China	64000 bps	X.25	2013	~~Implemented~~
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
		BBIS	Intra-Regional	India	64000 bps	X.25	2013	
		BBIS	Inter-Regional	Italy	64000 bps	X.25	2014	Circuit implemented
		BIS	Sub-Regional	Lao PDR.	TBD	IPS	2013	VSAT
		BIS	Sub-Regional	Malaysia	TBD	IPS	2013	VSAT
		BIS	Sub-Regional	Myanmar	9600 bps	IPS	2013	VSAT
		BBIS	Intra-Regional	Singapore	64000 bps	X.25	2013	
		BIS	Sub-Regional	Viet Nam	9600 bps	X.25	2015	
Timor Leste	Dili			Australia		IPS	2013	Intra-domain
Tonga	Tongatapu			New Zealand	9600 bps	IPS	2013	Intra-domain
Tuvalu	Funafuti			Fiji		IPS	2011	Intra-domain
United States	Salt Lake City	BBIS	Inter-Regional	Australia	64000 bps	IPS/SNDCF	2015	
				American Samoa			2013	Intra-domain
		BBIS	Inter-Regional	Fiji	9600 bps	X.25	2011	Circuit implemented
		BBIS	Inter-Regional	Japan	64000 bps	IPS/SNDCF	2015	Circuit implemented
				Marshall Islands			2006	Intra-domain
				Micronesia, Federated State of			2006	Intra-domain
		BIS	Inter-Regional	New Zealand	64000 bps	IPS	2015	Circuit Implemented
				Palau			2006	Intra-domain
Vanuatu	Port Vila			Australia		IPS	2010	Intra-domain

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Viet Nam	Ho Chin Minh/Hanoi	BIS	Sub-Regional	China	9600 bps	X.25	2013	
		BIS	Sub-Regional	Hong Kong, China	64000 bps	X.25	2013	
		BIS	Sub-Regional	Lao PDR.	9600 bps	X.25	2013	
		BIS	Sub-Regional	Singapore	9600 bps	X.25	2013	
		BIS	Sub-Regional	Thailand	9600 bps	X.25	2015	
Wallis Islands	Wallis			Fiji			2013	Intra-domain

Table CNS 1C

AMHS ~~ROUTING~~ PLAN

EXPLANATION OF THE TABLE

Column

1	Administration – the name of the Administration, State or Organization responsible for management of the facility
2	Location of Facility
3	Facility Type:

> AMHS
>
> UA (Location of AMHS)

4	Target Date of Implementation – date of implementation of the ATSMHS

TBD – To be determined

5	Remarks

Note: *AMHS – ATS Message Handling System which may include Message Transfer Agents and AFTN/AMHS gateways services.*

Administration	Location of Facility	Facility Type	Target Date of Implementation	Remarks
Afghanistan	Kabul	AMHS	2013	
American Samoa	Pago Pago	UA (Salt Lake City)	2013	
Australia	Brisbane	AMHS	2006	Implemented
Bangladesh	Dhaka	AMHS	2013	
Bhutan	Paro	UA (Mumbai)	2013	
Brunei Darussalam	Brunei	AMHS	2013	
Cambodia	Phnom Penh	AMHS	2013	
China	Beijing	AMHS	2011	Implemented
	Taibei	AMHS	2010	
Hong Kong, China	Hong Kong	AMHS	2009	Implemented
Macau, China	Macau	AMHS	2009	Implemented
Cook Island	Rarotonga	UA (Christchurch)	2013	Implemented
DPR Korea	Pyongyang	AMHS	2013	
Fiji	Nadi	AMHS	2010	Implemented
French Polynesia	Papeete	AMHS	2013	
India	Mumbai	AMHS	2011	Implemented
Indonesia	Jakarta	AMHS	2009	Implemented
	Ujung Pandang	AMHS	2010	
	NOTAM Office DGCA	AMHS	2012	
Japan	Fukuoka	AMHS	2006	Implemented
Kiribati	Tarawa	UA (Nadi)	2011	
Lao PDR	Vientiane	AMHS	2013	

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Administration	Location of Facility	Facility Type	Target Date of Implementation	Remarks
Malaysia	Kuala Lumpur	AMHS	2013	
Maldives	Male	AMHS	2013	
Marshall Island	Majuro	UA (Salt Lake City)	2006	UA Implemented
Micronesia Federated State of	Chuuk	UA (Salt Lake City)	2006	UA Implemented
	Kosrai	UA (Salt Lake City)	2006	UA Implemented
	Ponapei	UA (Salt Lake City)	2006	UA Implemented
	Yap	UA (Salt Lake City)	2006	UA Implemented
Mongolia	Ulaanbaatar	AMHS	2013	
Myanmar	Yangon	AMHS	2013	
Nauru	Nauru	UA (Brisbane)	2013	
Nepal	Kathmandu	AMHS	2013	
New Caledonia	Noumea	AMHS	2013	
New Zealand	Christchurch	AMHS	2013	
Niue Is.	Niue	UA (Christchurch)	2013	
Pakistan	Karachi	AMHS	2009	Implemented. 50 UA implemented in Pakistan and all International traffic through AFTN/AMHS Gateway.
Palau	Koror	UA (Salt Lake City)	2006	UA Implemented
Papua New Guinea	Port Moresby	UA (Brisbane)	2013	
Philippines	Manila	AMHS	2015	
Republic of Korea	Seoul	AMHS	2010	Implemented
Samoa	Faleolo	UA (Christchurch)	2013	
Singapore	Singapore	AMHS	2007	Implemented

Administration	Location of Facility	Facility Type	Target Date of Implementation	Remarks
Solomon Is.	Honiara	UA (Brisbane)	2012	
Sri Lanka	Colombo	AMHS	2013	
Thailand	Bangkok	AMHS	2011	
Timor Leste	Dili	UA (Brisbane)	2013	
Tonga	Tongatapu	UA (Christchurch)	2013	
Tuvalu	Funafuti	UA (Nadi)	2011	
United States	Salt Lake City	AMHS	2005	Implemented
Vanuatu	Port Vila	UA (Brisbane)	2010	Implemented
Viet Nam	Ho Chi Minh	AMHS	2013	
Wallis Is.	Wallis	AMHS	2013	

List of Task/Action Items for ACSICG Working Group

No.	Item	Status	Led by
1.	All issues requiring justification in ATN implementation like security of network etc. should be adequately reflected in the strategy.	Strategy being reviewed.	Australia and New Zealand
2.	Usage of 3 bits next to the /32 address block acquired by Europe for inclusion of 7 ICAO regions and ICAO HQ amongst the planned usage of this space by Europe.	On-going - coordinate with ACP for IPv6 address assignment for the region.	USA
3.	States required providing implementation status for reflection in the ATN/AMHS implementation planner developed.	On-going - information made available at ATNICG WG/12 should be included in the updated planner	India
4.	Asia Pacific ATN AMHS adopted IPv4 address assignment proposed by CAR/SAM region as an interim measure and will transit to IPv6 after the related implementation issues are resolved.	Coordinate with ACP WG-I for transition guidance from IPv4 to IPv6.	USA
5.	Currency of the documents linking Doc. Tree required to be confirmed.	On-going Documentation to be reviewed by USA and report result of review by May 2014.	USA
6.	Determine the sunset of X.25. Strategy to phase out X.25 network protocol and implementation of point to point IP.	On-going. Include in the ICD for ATN over IP at subnet level, material supporting migration from X.25 to point to point IP.	None/ whole WG
7.	Information provided in Chapter 3 of the Pan Inter-regional Interface Control Document (ICD) for AIDC need to be further reviewed and comments on the same may be conveyed to ICAO APAC Office for onward transmission to Pan Inter-regional AIDC Task Force	Mr. Chonlawit to develop ATNICG WG view for onward transmission by December 2013.	Thailand
8.	USA to investigate/analyze current and future applications of ATN/AMHS including XML coded based traffic.	On-going	USA
9	Experience on SWIM study exchanged and coordinate for development of initial regional roadmap for SWIM to include in the strategy to develop CONOPS and governance documents. Coordinate these activities with ACP WG-I.	On-going	USA, ROK and Japan

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ADMINISTRATIONS AND ASSOCIATED AMHS VENDORS

STATES/ADMINISTRATIONS	AMHS VENDORS
AUSTRALIA	Comsoft
CAMBODIA	Avitech
CHINA	In-House
HONG KONG, CHINA	Comsoft
MACAU, CHINA	Comsoft
FIJI	Comsoft
INDIA	Comsoft
INDONESIA	ELRA
JAPAN	TBA
LAO	Thales
MALAYSIA	Frequentis
MYANMAR	Thales
NEPAL	Comsoft
NEW ZEALAND	Comsoft
PAKISTAN	Comsoft
THE PHILIPPINES	Comsoft
REPUBLIC OF KOREA	Samsung
SINGAPORE	Comsoft
SRI LANKA	IDS
THAILAND	IDS
USA	In-House
VIET NAM	In-House

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