



International Civil Aviation Organization

**SIXTEENTH MEETING OF THE
COMMUNICATIONS/NAVIGATION/SURVEILLANCE AND
METEOROLOGY SUB-GROUP (CNS/MET SG/16) OF APANPIRG**

Bangkok, Thailand, 23 – 27 July 2012

Agenda Item 3: Aeronautical Fixed Service (AFS):

- 1) review report of the Seventh Meeting of the ATN Implementation Coordination Group (ATNICG/7)

**REPORT ON THE SEVENTH MEETING OF
AERONAUTICAL TELECOMMUNICATION NETWORK
IMPLEMENTATION COORDINATION GROUP (ATNICG/7)**

(Presented by the Secretariat)

SUMMARY

Seventh Meeting of Aeronautical Telecommunication Network Implementation Coordination Group (ATNICG/7) along with AMHS/SWIM Workshop was held from 5 to 9 March 2012 in Chiang Mai, Thailand. This paper presents outcome of the meeting for review.

This paper relates to -

Strategic Objectives:

C: Environmental Protection and Sustainable Development of Air Transport -
Foster harmonized and economically viable development of international civil aviation that does not unduly harm the environment

Global Plan Initiative:

GPI-22 Communication infrastructure

1. Introduction

1.1 Seventh Meeting of Aeronautical Telecommunication Network Implementation Co-ordination Group of APANPIRG (ATNICG/7) and the ATS Message Handling System (AMHS)/System Wide Information Management (SWIM) Workshop were held in Chiang Mai, Thailand from 5 to 9 March 2012. Both the meeting and the workshop were hosted by Aeronautical Radio of Thailand (AEROTHAI).

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1.2 This paper discusses briefly the outcome of the meeting. Full report of the meeting along with other meeting documents is available on ICAO APAC Office website and can be accessed at the following address:

http://www.bangkok.icao.int/cns/meeting.do?method=MeetingDetail&meeting_id=119 .

2. Discussion

2.1 Seventh meeting of Aeronautical Telecommunication Network Implementation Coordination Group (ATNICG/7) reviewed the outcome of AMHS/SWIM Workshop held prior to the meeting at the same venue. Meeting noted that though System Wide Information Management (SWIM) had been included in Block 1 of ASBU, but it had a close relation with B0-30 in a time frame from now to 2017 and hence the implementation may start sooner than 2018. Workshop recommended that States of Asia/Pacific region should develop a regional approach in planning for the implementation of SWIM. Workshop also agreed about the need for a study to identify an appropriate network to support SWIM including the possibility of using public internet and/or using a common network service provider. It was recommended to list study of an IP based network in order to support SWIM implementation as one of the tasks for ATNICG. An ad-hoc group led by USA with members from Japan, New Zealand, Australia, ICAO Secretariat, Hong Kong China, Thailand, Republic of Korea, Singapore, Indonesia and India met to develop a proposal for incorporating SWIM into ATN/AMHS infrastructure. Report of the ad-hoc group is placed at **Attachment 1** to this paper).

2.2 Meeting reviewed outcome of APANPIRG/22 meeting held in September 2011 and discussed issues raised in ATNICG WG/10 meeting held in Jaipur, India from 26 to 29 September, 2011. ATNICG agreed with Working Group views on the following issues:

- i) noted that Aeronautical Communication Panel was attaching importance to the implementation of VoIP, whereas in Asia/Pacific Region AIDC was taking precedence over voice coordination;
- ii) ATNICG recommended that AFTN based AIDC be implemented using AMHS/AFTN gateway and between direct MTA/MTA switching in addition to over dedicated circuits. It was recommended that this comment may be required to be reflected in the consolidated Pan-regional ICD for AIDC. Chairman emphasized the need to include telecommunication experts in the ad-hoc Task Force that may be established to finalize the Pan Regional ICD for AIDC;
- iii) it was agreed that ACP proposal to relegate ATN/OSI as Recommended Practices should not be supported in view of the fact that ATN/OSI is still being used in the region and also because it will predominantly be used for air-ground communication; and
- iv) meeting recommended use of a common network service provider or network manager to cut down the implementation time and to avoid complexities of security implementation.

2.3 Meeting, discussing the outcome of ACP WG-I/14 and WG-M/18 meetings, stressed on the benefits of acquiring a common address block. Benefits and issues related to the adoption of DNS and SWIM were also discussed in light of ACP meeting outcome.

2.4 Australia, Bangladesh, China, Hong Kong China, Macao China, India, Indonesia, Japan, Laos PDR, New Zealand, Philippines, Singapore and Thailand presented status of ATN/AMHS implementation in their administrations. Information on the status of implementation in other ICAO regions was also provided to the meeting.

2.5 AEROTHAI requested States to consider the wild card (*) character proposal of AMC and incorporate appropriate changes as deemed fit. ATNICG was of the view that it would be more appropriate for ICAO (relevant regional offices) to notify States through a State Letter for this amendment and change. ATNICG also agreed to update the regional document accordingly. States were requested to update information in respect of their administrations using the prescribed forms.

2.6 Issues involved in implementing VoIP by the States not participating in a common network were identified. ATNICG was of the opinion that a strategy should be developed to address whether the regional priority should be to have a common super network or should the priority be assigned to developing solutions around discrete networks that already exist in the region. It was decided that the next Working Group meeting should be tasked to develop a draft strategy on this subject.

2.7 ATNICG/7 reviewed the recommendation of ATNICG WG/10 regarding endorsement of ATN Ground-Ground Router Internet Protocol (IP) Sub-Network Dependent Convergence Function (SNDCF) Interface Control Document (ICD) presented by USA. The IP SNDCF specified in ICAO Doc 9880 is meant for a completely meshed network. As of now, when implementation is on point-to-point basis in the Asia/Pacific Region, there may not be a requirement of some parameters like Quality of Service etc. specified in Doc 9880. The proposed document has profiled out such requirement and hence is expected to be much simpler for implementation. Meeting, after discussing the document agreed that ICD should be recommended for adoption by APANPIRG and formulated following draft Conclusion:

Draft Conclusion 16/xx – Asia/Pacific IP SNDCF ICD

That, the Asia/Pacific Internet Protocol (IP) Sub-Network Dependent Convergence Function (SNDCF) Interface Control Document (ICD) provided in **Attachment 2** to this paper be adopted as regional guidance material.

2.8 ATNICG was presented information on the option of conveying XML-based data over AMHS making use of the File Transfer Body Parts (FTBP) an element contained in Extended ATSMHS. After discussion on the other options available in Extended AMHS, it was agreed that meeting could consider adopting Basic ATSMHS plus FTBP option of Extended AMHS for the region. It was also agreed that a consensus approach on this issue should be developed between AFSG (EUR/NAT Region) and ATNICG (Asia/Pacific Region). Meeting was informed about European Directory Service (EDS) adopted by EUROCONTROL.

2.9 Meeting reviewed and updated the Performance Framework Form (Asia/Pacific Regional Object 8) and requirement was identified for the AMC to make a provision through which the States can identify recent changes and effectively access updated information. Following draft Conclusion was formulated based on above:

Draft Conclusion 16/xx – More Efficient Functioning of AMC

That, EUROCONTROL AMC be invited to consider the provision of more efficient function to enable the States to identify recent changes from the previous AIRAC Cycle and to develop means of automation for providing updated AMHS Address Information.

2.10 To progress the comparative analysis of the Asia/Pacific AMHS Technical Specifications against ICAO Doc 9880, validation tasks were assigned and included in the updated ATNICG Subject/Tasks list placed at **Attachment 3** to this paper.

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2.11 Meeting developed a sample Technical Memorandum of Cooperation (TMC) for ATN/AMHS Trials for facilitating the States in reaching an agreement about conducting trials required to evaluate the basic connectivity, interoperability, functionality and integrity of the ATN G/G Router. Meeting agreed to recommend the TMC for adoption by APANPIRG as a regional guidance material through the following draft Conclusion.

Draft Conclusion 16/xx – Sample TMC for ATN/AMHS Interconnection Trials

That, the sample Technical Memorandum of Cooperation for ATN/AMHS interconnection trial between States, provided in the **Attachment 4** to this paper be adopted as regional guidance material for reference by the States.

2.12 ATNICG Working Group/11 meeting is scheduled to be held in ICAO APAC Office, Bangkok from 26 to 28 September, 2012. It was decided that the Eighth meeting of ATNICG will be held from 19 to 22 March 2013. Meeting venue will be decided and informed to the ATNICG members in due course of time.

2.13 ATNICG expressed its appreciation and gratitude to AEROTHAI for the excellent arrangements made for the workshop and the meeting including all the secretariat support provided and activities organized.

3. Action by the Meeting

3.1 The meeting is invited to:

- i) note the outcome of AMHS/SWM Workshop and the Seventh meeting of ATN Implementation Coordination Group; and
- ii) recommend draft Conclusions developed by ATNICG/7 for adoption by APANPIRG/23.

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BRIEF REPORT ON THE OUTCOME OF SWIM AD-HOC GROUP MEETING

The ATNICG SWIM Ad-Hoc Sub-group met to define the activities which should be performed to incorporate SWIM into the AMHS/ATN infrastructure. Mr. Patel, USA, had developed a preliminary list of ATNICG SWIM activities. The sub-group used this as the basis for discussion. The sub-group agreed with the preliminary list and made several suggestions for extending the list. There was a discussion on the scope of activities which tried to define what part of SWIM in general the sub-group would address. The sub-group added an activity to define the Terms of Reference for the SWIM Sub-group and agreed that the TOR would define the scope. There was a suggestion to coordinate with other groups which were working in the AIS, AIM, Weather, and related areas. This would include reviewing the US and EUROCONTROL SWIM programmes, the sub-groups developing information standards (AIXM, WXXM, FIXM), the Open Geospatial Consortium (OGC) standards and aviation study groups, and the ICAO AIS-AIM study group. This was added to the activities list. There was a discussion that the SWIM Concept of Operations should be examined to place the SWIM sub-group's activity in the appropriate context. The group finally agreed that the activities should be placed in priority. The updated activities lists are as follows.

ATNICG SWIM ACTIVITIES

NO.	LIST OF ACTIVITIES
1	TOR for SWIM Sub-group
2	Evaluate CONOPS
3	Coordinate with study groups such as OGC, AIM, AIS etc. (TORs, Scope)
4	Prioritize the activities
5	Current AFTN and AMHS architectures
6	Types of information: Flight plans, weather, NOTAMS etc.
7	SOA Standards required for the region
8	SWIM Architecture definition for the region

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No.	List of Activities
9	Identify SWIM Core services a) Develop core services definitions and component description b) Security Management Service c) Data Registry and Directory services d) Messaging Service i) Pub/sub services ii) Req/Reply
10	Develop Regional documents - Policy, IRDs, Guidance, SOA conformance and Governance material
11	Gateway requirements development
12	Service Adaptors
13	Conduct Prototyping Trade Study Plan & develop Scenarios
14	Validation of function & performance - Evaluation of Industry Technologies and Products

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International Civil Aviation Organization
Asia and Pacific Office

ASIA/PACIFIC
INTERFACE CONTROL DOCUMENT
FOR
AERONAUTICAL TELECOMMUNICATION NETWORK
GROUND-GROUND ROUTER
IP SNDCE

Draft First Edition – September 2011

EXECUTIVE SUMMARY

The Aeronautical Telecommunication Network (ATN) is a global inter-network that provides digital communications to satisfy the increasing telecommunication demands of air traffic service communication, aeronautical operational control, aeronautical administrative communication, and aeronautical passenger communication.

The ATN is composed of a network infrastructure and applications that provide the global communication for ground-ground (G/G) and air-ground services. The ATN network infrastructure includes ATN backbone communication links, ATN routers, and end systems. The ATN applications include among others context management (CM), controller-pilot data link communication (CPDLC) and air traffic service message handling service (ATSMHS).

The Asia/Pacific region is implementing an ATN network to support regional and global ATN services. This Interface Control Document (ICD) specifies the IP sub-network interface requirements for ATN G/G Boundary Intermediate Systems that form nodes of the Asia/Pacific ATN regional backbone network and/or have inter-State connectivity, to ensure interoperability between States. This ICD applies to point-to-point IP sub-network connections between Boundary Intermediate Systems.

1.0 Introduction

1.1 Purpose and Scope

This document provides Interface Control Document guidelines for IP sub-network connections used to communicate between the ATN Ground-Ground Routers that form nodes of the Asia/Pacific regional network Backbone and/or have inter-State/Organization connectivity within the Asia/Pacific region, to assure interoperability.

The scope of this ICD and its relationship to the ATN Router ICD and IP ICD is shown in Figure 1-1. This ICD addresses the sub-network layer of the ATN G/G router using the IP SND CF specified in ICAO Doc 9880.

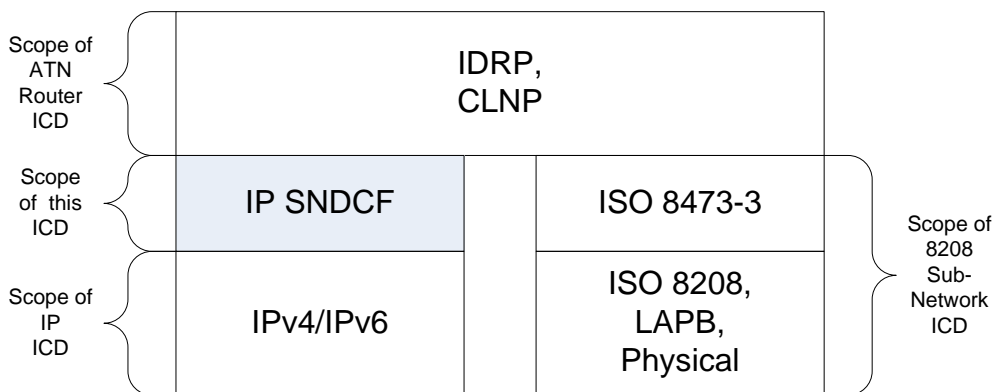


Figure 1-1: ATN Router Protocol Stack and Scope of this Document

1.3 Reference Documents

1.3.1 ICAO

[1] ICAO Doc 9880-AN/466 – Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part III Chapter 3 – Internet Communications Service

1.3.2 ASIA/PAC

[2] ASIA/PAC Interface Control Document for Aeronautical Telecommunication Network Ground-Ground Router, Second Edition, April 2005

[3] ASIA/PAC Interface Control Document for Aeronautical Telecommunication Network Ground-Ground Router ISO/IEC 8208 Sub-Network, First Edition, April 2005

[4] ASIA/PAC Interface Control Document for the Internet Protocol, To Be Developed (TBD)

1.3.3 IETF

[5] RFC 1791, Internet Protocol – DARPA Internet Program Protocol Specification, September 1981

[6] RFC 2460, Internet Protocol, Version 6 (IPv6) Specification, December 1998

[7] RFC 2474, Definition of Differentiated Services Field (DS Field) in IPv4 and IPv6 Headers, December 1998

1.3.4 ISO/IEC

[8] ISO/IEC 8473-1, Information Technology – Protocol for providing the connectionless-mode network service: Protocol specification, 1994

[9] ISO/IEC 9542, Information processing systems – Telecommunications and information exchange between systems – End system to Intermediate system routing exchange protocol for use in conjunction with the Protocol for providing the connectionless-mode network service (ISO/IEC 8473), 1988

[10] ISO/IEC 10747, Information processing systems – Telecommunications and information exchange between systems – Protocol for exchange of inter-domain routing information among intermediate systems to support forwarding of ISO 8473 PDUs, 1994

2.0 IP SNDCF

The purpose of a Subnetwork Dependent Convergence Function (SNDCF) is to provide the connectionless SN-Service assumed by the ATN Internet Protocols over real sub-networks.

The ATN Internet Protocols which use the Subnetwork Service (SN-Service) provided by an SNDCF are the ISO/IEC 8473 Internetwork Protocol [8] and the ISO/IEC 9542 End System to Intermediate System Protocol [9] entities.

The Subnetwork Service (SN-Service) provided by an SNDCF as specified in this ICD is provided directly to the ISO/IEC 8473 Internetwork Protocol entity and indirectly to the ISO/IEC 10747 Inter-Domain Routing Protocol [10] entity.

Table 2-1 identifies the Subnetwork Services and Associated Parameters used Asia/Pac entities.

Table 2-1 SN-Services and Associated Parameters

Parameter	SN-UNITDATA Request	SN-UNITDATA Indication
SN-Source-Address	Mandatory	Mandatory
SN-Destination-Address	Mandatory	Mandatory
SN-Priority	Optional	Optional
SN-Quality-of-Service	Optional	Optional
SNS-Userdata	Mandatory	Mandatory

Asia/Pac is planning to use the IP SNDCF on a point-to-point basis and so requirement that might otherwise apply to an IP sub-network such as Priority and QOS do not apply. Table 2-2 contains a Point-to-Point Profile for the IP SNDCF.

Table 2-2 Point-to-Point Profile for the IP SND CF

Item	Function	Doc 9880 Reference	G-G Router Support
Title	Provision of the SN-UNITDATA.Request Service Element	3.7.10.3	
Title	Service Element Parameters	3.7.10.3.1	
	For IPv4, the SN-Source-Address and SN-Destination-Address parameters shall be 32-bit IP Addresses.	3.7.10.3.1.1	Yes
	For IPv6, the SN-Source-Address and SN-Destination-Address parameters shall be 16-octet IP Addresses.	3.7.10.3.1.2	Yes
	As a local matter, the SN-Source-Address shall either be used to indicate the SNPA from which the encapsulated PDU is to be sent, or set to a null value.	3.7.10.3.1.3	Either
	As a local matter, the SN-Quality-of-Service subparameters, if present, other than priority shall either be ignored by the IP SND CF, or used to determine the Differential Service Requirements for the encapsulating IP Packet header.	3.7.10.3.1.4	Ignored
	The priority subparameter of the SN-Quality-of-Service service parameter shall be used to determine the value of the Differentiated Service field indicated in the encapsulating IP Packet header as described in the procedures below.	3.7.10.3.1.5	No
	The SN-Userdata shall be an unconstrained octet-string (e.g. an encoded CLNP PDU including the CLNP header and user data).	3.7.10.3.1.6	Yes
Title	Procedures	3.7.10.3.2	N/A
Title	IPv4 Subnetworks	3.7.10.3.2.1	N/A
	When the IP SND CF SN-UNITDATA.Request service element is invoked, an IPv4 datagram shall be constructed with the SN-Userdata as the data portion of the datagram (the payload).	3.7.10.3.2.1.1	Yes
	The IP datagram header shall be constructed according to RFC 1791 [5]	3.7.10.3.2.1.2	Yes
	The protocol shall be set to decimal 80	3.7.10.3.2.1.2.a	Yes

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	The source address shall be the IP Address assigned to the interface from which the packet is sent.	3.7.10.3.2.1.2.b	Yes																		
	The destination address shall be the SN-Destination-Address.	3.7.10.3.2.1.2.c	Yes																		
	The Time to Live shall be set to a locally specified value, which shall be configurable.	3.7.10.3.2.1.2.d	No																		
	<p>The 3 topmost bits of the Differentiated Service Code Point (DSCP, former precedence subfield) of the Type of Service (TOS) field shall be set depending on the value of the priority subparameter of the SN-Quality-of-Service service parameter, as follows:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">IP Precedence</th> <th style="text-align: left;">CLNP Priority</th> </tr> </thead> <tbody> <tr> <td>000</td> <td>0,1,2,3,4,5</td> </tr> <tr> <td>001</td> <td>6,7</td> </tr> <tr> <td>010</td> <td>8,9</td> </tr> <tr> <td>011</td> <td>10</td> </tr> <tr> <td>100</td> <td>11,12,13</td> </tr> <tr> <td>101</td> <td>14</td> </tr> <tr> <td>110</td> <td>N/A</td> </tr> <tr> <td>111</td> <td>N/A</td> </tr> </tbody> </table>	IP Precedence	CLNP Priority	000	0,1,2,3,4,5	001	6,7	010	8,9	011	10	100	11,12,13	101	14	110	N/A	111	N/A	3.7.10.3.2.1.2.e	No
IP Precedence	CLNP Priority																				
000	0,1,2,3,4,5																				
001	6,7																				
010	8,9																				
011	10																				
100	11,12,13																				
101	14																				
110	N/A																				
111	N/A																				
	As a local matter, the remaining Differentiated Service bits shall be set to correspond to the SN-Quality-of-Service parameter or to a locally specified default value.	3.7.10.3.2.1.2.f	No																		
	The last two bits of the TOS field (i.e. bits 6 and 7), shall be set to zero.	3.7.10.3.2.1.2.g	No																		
	The resulting IP datagram shall be forwarded to its addressed destination on the IP Network.	3.7.10.3.2.1.3	Yes																		
Title	IPv6 Subnetworks	3.7.10.3.2.2																			
	When the IP SNDCEF SN-UNITDATA.Request service element is invoked, an IPv6 header shall be constructed with the SN-Userdata as the payload of the complete datagram.	3.7.10.3.2.2.1	Yes																		
	The IP datagram header shall be constructed according to RFC 2460 [6]	3.7.10.3.2.2.2	Yes																		
	The Next Header field shall be set to decimal 80 unless extension headers are present, when the Next Header field of the final header shall be set to decimal 80.	3.7.10.3.2.2.2.a	Yes																		

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	The source address shall be the IP Address assigned to the interface from which the packet is sent.	3.7.10.3.2.2.2.b	Yes
	The destination address shall be the SN-Destination-Address.	3.7.10.3.2.2.2.c	Yes
	The Hop Limit shall be set to a locally specified value, which shall be configurable.	3.7.10.3.2.2.2.d	No
	The Flow Label shall be set to zeroes.	3.7.10.3.2.2.2.e	Yes
	The Traffic Class shall be set according to RFC 2474 [7]. The value of the first six bits (the DSCP) shall be set to the value xxx000, where the bits 'xxx' are set depending on the value of the priority subparameter of the SN-Quality-of-Service service parameter and according to Doc 9880 (i.e. they are set to the value of the precedence bits in Doc 9880).	3.7.10.3.2.2.2.f	No
	The last two bits of the Traffic class shall be set to zero.	3.7.10.3.2.2.2.g	No
Title	SN-UNITDATA.Indication Service Element	3.7.10.4	
Title	IPv4 Subnetworks	3.7.10.4.1	
	The system shall be configured such that IP packets with a protocol id of 80 are passed to the IP SNDCEF.	3.7.10.4.1.1	Yes
	All IP Datagrams passed to the IPv4 SNDCEF by the IP Network Service provider shall result in an SN-UNITDATA.Indication, constructed as follows	3.7.10.4.1.2	Yes
	The SN-Source-Address shall be set to the value of the source address field of the IP Datagram header.	3.7.10.4.1.2.a	Yes
	The SN-Destination-Address shall be set to the value of the destination address field of the IP Datagram header.	3.7.10.4.1.2.b	Yes
	The SN-Userdata shall be the data portion of the IP datagram.	3.7.10.4.1.2.c	Yes
	No SN-Quality-of-service parameter shall be present.	3.7.10.4.1.2.d	No
Title	IPv6 Subnetworks	3.7.10.4.2	
	The system shall be configured such that IP packets with a next header byte for the payload set to 80 are passed to the IP SNDCEF.	3.7.10.4.2.1	Yes
	All IP Datagrams passed to the IPv6 SNDCEF by the IP Network Service provider shall result in an SN-UNITDATA.Indication, constructed as follows	3.7.10.4.2.2	Yes

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	The SN-Source-Address shall be set to the value of the source address field of the IPDatagram header.	3.7.10.4.2.2.a	Yes
	The SN-Destination-Address shall be set to the value of the destination address field of the IPDatagram header.	3.7.10.4.2.2.b	Yes
	The SN-Unitdata shall be the payload of the IP datagram.	3.7.10.4.2.2.c	Yes
	No SN-Quality-of-service parameter shall be present.	3.7.10.4.2.2.d	No
Title	ICMP Message Handling	3.7.10.5	
	If a “Destination Unreachable” or “Time Exceeded” ICMP message is received by the IP SNDCEF, this should be reported to a layer management function indicating the destination IP Address for which the problem is reported, so that appropriate action may taken.	3.7.10.5.1.1	Yes
	An ICMP message indicating a “Parameter Problem” may indicate a software or configuration error and this should be notified to layer management so that the error is noted and fixed by a network manager.	3.7.10.5.1.2	Yes
Title	Resilient Operation	3.7.10.6	
	When it has more than one interface to an IP network, an ATN system implementing the IP SNDCEF shall rely upon the configuration, topology and management of an underlying IP Subnetwork, including IP functions implemented by the ATN system itself, in order to support resilient operation.	3.7.10.6.1	Yes
	Even if the ATN system has more than one interface to the IP network, a single IP address shall be used to support an adjacency with a given remote BIS.	3.7.10.6.2	Yes

No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/6 Update	
1	ATN Implementation Coordination	D. Efficiency	GPI-17,GPI-19, GPI-22	(1) Review of implementation problems and develop co-ordinated solutions (2) Coordinate / compile the regional implementation schedule (3) Monitor Implementation	Expedite implementation activities, ensure system compatibility through out the region	(1) Co-ordination Report (2) Waterfall schedule (3) Monitor AMHS Implementation Planner	(1)On-going /Semi-annually (2) Schedule 09/2009 (3) On- going	Kapoor (India) Kong	Hong	All members	(1)Updated the information in the ATN Router and AMHS planning tables and the implementation status (2) Completed, maintain the AMHS Implementation Planner.
2	ATN Operational Procedures	D. Efficiency	GPI-17,GPI-19, GPI-22	(1) Development of Interim Database for Directory Services	Make available real time and quality assurance addresses for ATN message delivery	(1) Interim Database	(1) (2007)	Robert Hallman (USA)	Thailand, Hong Kong China, Japan	Completed. The database was demonstrated. Aerothai will maintain the database on behalf of the regional ICAO Office. Aerothai will serve as POC for AMC coordination between ASIA/PAC States and Eurocontrol. ATN Operational Procedures is completed and adopted.	
				(2) Develop the operational database management procedures		(2) Operational Procedures	(2) (2007)				Completed.

No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/6 Update
3	ATN Certification & Validation Process	D. Efficiency	GPI-17, GPI-19, GPI-22	(1) Develop conformance procedures and checklist for AMHS and ATN routers	Expedite implementation activities, ensure global system compatibility	(1) Checklist	(1) (2007)	Sin Hie Sng (Singapore)	China, Hong Kong China, Indonesia,ROK, USA,	Completed
				(2) Develop validation process document		(2) Conformance Document	(2) 2007			Completed and forward to CNS/MET SG and APANPIRG/20 for review and adoption
						(3) Update to Conformance Document	(3) Ongoing until 2010			Completed
4	(1) ATN Documentation (2) Review all documents adopted by ATNICG and ATNTTF	D. Efficiency	GPI-17,GPI-19, GPI-22	(1) Study DIR objects / attributes proposed in ACP and follow development within other groups (2) Update document tree / establish tracking table for suspended dates (3) Standardized Report form and Guidance Material	Expedite implementation activities, ensure global system compatibility	(1) Directory Report (2) Tracking table/Updated documentation tree (3) AMC report (4)Report Form and Report Guidance	(1) Annually (2) Periodically (3) 2010	Chonlawit B. (Thailand)	USA	Update the database. AMC mandated by ICAO. Training completed. Directory Service will be implemented in coordination with ACP and phases will be developed
				(2) Development AIDC documentation (including ICD) and follow development within other groups		(2) AFTN AIDC / ATN Gateway Specification ATN AIDC ICD	(2) 2008 (ACP-dependent)			(Thailand)

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No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/6 Update
				(3) Update of AMHS ICD to comply with SARPs 3rd Edition		(1) Report differences between existing ICD and requirements for Edition 3 of Doc 9705 (2) Updated AMHS ICD	(1) Sept 2011 (2) (2007)	USA	Japan	Ad-hoc group formed to develop AMHS ICD to be presented to CNS/MEG SG/15.
				Managing PDR	Update ICAO Documents (9880 /9896)	PDR filing and tracking	On-going	USA	All the Member States	Additional Task proposed in ATNICG/5. PDR filing procedure already circulated.
5	ATN Performance	D. Efficiency	GPI-17,GPI-19, GPI-22	(1) Develop/establish/adapt/monitor/identify/analyse performance indicators	Assure QOS, service continuity, timely delivery of services	(1) AMHS performance report	(1) Annually until (2010)	Japan	Republic of Korea, India	Final Draft of the Document complete. Will be presented.
6	ATN Service Enhancements	D. Efficiency	GPI-17,GPI-19, GPI-22	(1) Review the impact of the implementation of Directory Services in the Region	Enhancing the service	(1) Report on directory	(1) Annually	Fiji	USA, Thailand New Zealand Japan Australia	Complete. AMC has been adopted by ICAO. Aerothai has been designed as POC for ASIA/PAC region.
				(2) Directory Service - Implementation Strategy	Enhancing the operation	Requirement Analysis Report & Implementation Strategy	(1) 2011 (2) 2012	Thailand		Closed in view of the implementation of AMC

ATNICG/7
Appendix G to the Report

No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/6 Update
				ATN/IPS Implementation Plan	Inter-regional and intra regional network compatibility	(1) ATN/IPS router ICD (2) IPS addressing plan (3) ATN/OSI - ATN/IPS Transition Plan (4) ATN/IPS routing policy (5) Update FASIS Tables to accommodate IPS (6) IDRPs over IP subnet - ICD	(1) 2011 (2) 2011 (3) 2011 (4) 2012 (5) 2011 (6) 2011	USA	Australia, China, India, Fiji, Hong Kong, China, Japan, and USA	Proposed an additional task 1) ongoing 2) IPv4 addressing plan has been adopted
				Providing support for emerging requirements of OPMET, AIS/AIM, AIDC etc.	Enhancing the service	Task Report on XML based messages over AMHS platform	2011	USA	Hong Kong China,	Additional Task proposed in ATNICG/5
				(5) Study for transition of AFTN-based AIDC as an alternative to ATN based AIDC to ATN environment	Improving the service and lowering the operating cost	(5) Report on the impact of transition of AFTN-AIDC to ATN-AIDC AFTN AIDC/ATN Gateway Specification	(5) (2008)	Thailand	India, Indonesia, New Zealand, USA,	A Draft specification of AFTN AIDC/ATN Gateway was presented. Completed. Task closed in view of removal of provision from Doc 9880

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Appendix G to the Report

No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/6 Update
		D. Efficiency	GPI-17,GPI-19, GPI-22	Analyze Common Address Prefix Proposal	Improving the service and routing efficiency	Report on common prefix based analysis conducted	End of 2008	Mark Brown (Japan)	Australia, Fiji, Hong Kong, China, New Zealand and USA	Completed. Action Items developed at ATNICG/2 for follow-up at WG meetings.

No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/6 Update
7	Security	B. Security	GPI-17,GPI-19, GPI-22	(1) Develop ATN System Security policy	Safe and Secure Inter and Intra Regional Communication and service infrastructure	(1) Policy Document	(1) Annually until (2010)	Vidyut Patel (USA)	Australia, Hong Kong China	Adopted by APANPIRG/19
				(2) Develop ATN System Security Guidance		(2) Guidance Document	(2) (2011)			On-Going review and update
				(3) Develop ATN System Security Solution for Initial and Enhanced Services		(3) Security, Technical, Management and Operational Control	(3) (2008)			Completed
				(4) Co-ordinate and monitor ACP working group and other regions including Directory Service, PDRs		(4) Report	(4) Semi-Annually		Thailand	On-Going review and update
				(5) Develop IPS Security Policy and update the relevant guidance documents		Policy and updated guidance documents	2011			Proposed additional task to facilitate ATN/IPS
				(6) Develop ATN System Security Check List based on Security Control and Regional Incident Response Plan and Contingency Plan		(5) Check List, Regional Incident Response Plan and Contingency Plan	(5) (2009)			Forward to CNS/MET SG and APANPIRG for review and adoption

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Appendix G to the Report

No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/6 Update
8	ATN Service Enhancements (supporting amended ICAO Flight Plan and ATS Message Formats)	D- Efficiency	GPI-17,GPI-19, GPI-22	(1) Review the impact of the implementation of Amendment 1 to 15th Edition of Doc 4444 effective 15 Nov. 2012 (PANS ATM Chapter 4 and Appendix 3 relating to the ICAO Flight Plan and associated ATS Message formats to the AFS	Enhancing the service	(1) Report on capability of existing and planned AFS systems to the revised ICAO Flight Plan and ATS Message Format	(1) Annually until 2011	USA	Fiji, India Hong Kong, China New Zealand Singapore USA	Pending result from ICAO Flight Plan and ATS Message TF. Monitor the developments.
				(2) Identify the new requirements for AMHS/AFTN to support new message format	Enhancing the operation	(2) Report on impact of New ATS message format in AMHS	(2) 2010	Thailand	Fiji, India Hong Kong, China New Zealand Singapore USA	Completed
					Enhancing the operation	Develop Voice over IP point-to-point ICD	2012	USA, Japan, India		Task created in ATNICG/6

No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/6 Update
				(3) Identify the link control procedure using the AMHS to support the revised ATS message format to the ATC automation system	Enhancing the service	(3) Report whether special link control procedure is required	(3) 2010	Thailand	Fiji, India Hong Kong New Zealand Singapore USA	Completed. No special link envisaged.
<p>The ATN PERFORMANCE OBJECTIVE</p> <p>The APAC ATN ground-to-ground infrastructure will be fully operational 53 percent at 23 locations by December 2007.</p> <p>(GPI-22) COMMUNICATION NETWORK INFRASTRUCTURE</p> <p>Related ATM objectives: AMSS; HF data; VHF data; SSR Mode S; ATN</p> <p>Scope: To evolve the aeronautical mobile and fixed communication infrastructure, supporting both voice and data communications, accommodating new functions as well as providing the adequate capacity and quality of service to support ATM requirements.</p> <p>(GPI-19) METEOROLOGICAL SYSTEMS</p> <p>Objective: To improve the availability of meteorological information in support of a seamless global ATM system.</p> <p>(GPI-17) IMPLEMENTATION OF DATA LINK APPLICATIONS</p> <p>Scope: Increase the use of data link applications</p> <p>Related ATM objectives: Application of data link; Functional integration of ground systems; with airborne systems; ATS inter-facility data communication (AIDC)</p>										

SAMPLE TMC ON ATN/AMHS TESTING

TECHNICAL MEMORANDUM OF COOPERATION

BETWEEN

[To be filled in (Organisation 1)]

AND

[To be filled in (Organisation 2)]

ATN/AMHS

**BETWEEN [To be filled in (State 1)] AND [To be filled in (State
2)]**

[To be filled in (Date of TMC)]

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TECHNICAL MEMORANDUM OF COOPERATION (TMC)

THIS AGREEMENT is made between the [To be filled in (Organisation 1)] and [To be filled in (Organisation 2)] as two air navigation services providers, hereinafter collectively referred to as “Parties” and individually as “Party”.

WHEREAS the Parties wish to jointly establish an Air Traffic Service Message Handling Service (AMHS) between [To be filled in (State 1)] and [To be filled in (State 2)] in support of the International Civil Aviation Organisation (ICAO) Aeronautical Telecommunication Network (ATN)/AMHS implementation plans for the Asia/Pacific Region.

AND WHEREAS the Parties have successfully completed the ATN/AMHS Trial hereinafter described in preparation for a smooth ATN/AMHS implementation.

NOW THEREFORE the Parties AGREE as follows:

ARTICLE 1 - CITATION

- 1.1 This Agreement will hereinafter be referred to as the ATN/AMHS Technical Memorandum of Cooperation (TMC).
- 1.2 For avoidance of doubt, this TMC (including its annexes and appendices) supersedes all prior draft versions of the TMC.

ARTICLE 2 – PURPOSE

- 2.1 This TMC defines the scope of the ATN/AMHS between [To be filled in (State 1)] and [To be filled in (State 2)] which the Parties are establishing on the terms of this TMC.
- 2.2 This TMC also sets out the ATN/AMHS Trial which the Parties have completed to enable the establishment of the ATN/AMHS between [To be filled in (State 1)] and [To be filled in (State 2)].

ARTICLE 3 – FINANCIAL TERMS

3.1 Each Party will be responsible respectively for all the costs and expenses arising from the ATN/AMHS connection from its local terminal to the international connection points provided by its telecom carriers and all equipment, software and associated costs required for the ATN/AMHS operation.

ARTICLE 4 – SCOPE OF ATN/AMHS

4.1 The ATN/AMHS will be based on the ATN Standards and Recommended Practices (SARPs) contained in ICAO Annex 10 Volume III Part 1 Chapter 3 and the Technical Provisions contained in ICAO Doc 9705 Volume III and/or ICAO Doc 9880 Part II.

4.2 The ATN/AMHS connection will be based on the existing ICAO AFTN routing directory for the Asia/Pacific Region and will be between the connection points in [To be filled in (State 1)] and [To be filled in (State 2)].

4.3 The AMHS traffic to be routed via this ATN/AMHS connection will be as follows:

<u>From</u> <u>(Originating/Relaying</u> <u>Station)</u>	<u>To</u> <u>(Connection Point)</u>	<u>For</u> <u>(Intended destination of AMHS traffic)</u>
[To be filled in (State 1)]	[To be filled in (State 2)]	[To be filled in by State 1]
[To be filled in (State 2)]	[To be filled in (State 1)]	[To be filled in by State 2]

4.4 If amendments to the ICAO AFTN/ATN routing plan are made by ICAO Regional Office, the Parties may agree to revise the intended destinations for AMHS traffic set out in paragraph 4.3 to allow for the consequent change in the AMHS traffic or destinations.

ARTICLE 5 – CONTINGENCY ARRANGEMENTS

- 5.1 The Parties will ensure that fallback procedures in the event of circuit or other failure affecting the flow of AHMS traffic between them are established and supported by their respective routing partners:

	Routing Partners
[To be filled in (State 1)]	[To be filled in by State 1]
[To be filled in (State 2)]	[To be filled in by State 1]

- 5.2 The Parties will, through regular meetings and other appropriate means, review and exchange information on their respective procedures and the support arrangements and assist each other to strengthen these contingency arrangements.

ARTICLE 6 – ATN/AMHS TRIAL

- 6.1 The ATN/AMHS Trial to enable the establishment of the AMHS under this TMC was conducted to evaluate the basic connectivity, interoperability, functionality and integrity of the ATN G/G Routers, AMHS systems and AMHS/AFTN Gateway Systems between the Parties.
- 6.2 The ATN/AMHS Trial consisted of the following tests:

Tests	Test Dates
ATN Connectivity Bilateral Tests A. ATN Router Configuration - SNDCF over X.25 B. ATN Router Configuration - SNDCF over IP C. X.400 P1 Configuration – TP0 over TCP/IP	<i>[To be filled in]</i>
ATN/AMHS Inter-Operability Tests	<i>[To be filled in]</i>
ATN/AMHS Pre-Operational Tests	<i>[To be filled in]</i>

6.3 The test cases for the tests conducted under the ATN/AMHS trial are as follows:

I. ATN Connectivity Bilateral Tests

Bilateral Test Procedures	
ATN Router Configuration (SND CF over X.25)	
PTA101	Private X.25 Network Connectivity Test
PTA102	CLNP Connectivity Test
PTA103	IDRP Connectivity Test
PTA104	BIS Disconnection/Re-connection Test
PTA105	Failure/Restoration of Carrier Media/ATN Router
ATN Router Configuration (SND CF over IP)	
PTA201	Private IP Network Connectivity Test
PTA202	CLNP Connectivity Test
PTA203	IDRP Connectivity Test
PTA204	BIS Disconnection/Re-connection Test
PTA205	Failure/Restoration of Carrier Media/ATN Router
X.400 P1 Configuration (X.400 P1 TP0 over TCP/IP)	
PTA301	Private IP Network Connectivity Test
PTA302	Network Disconnection/Re-connection Test
PTA303	Failure/Restoration of Carrier Media

II. ATN/AMHS Inter-Operability Tests

A. Test Cases from Annex E of ICAO Asia/Pacific Guidance for AMHS Conformance Testing (AMHS Manual) version 3.0 Sep 2009

Bilateral Test Procedures	
Submission, Transfer and Delivery Operation (AMHS to AMHS)	
IT101	Submit, transfer and deliver an IPM (UA IUT-A to UA IUT-B)
IT102	Submit, transfer and deliver an IPM (UA IUT-B to UA IUT-A)
Gateway Operations (AFTN to AMHS)	
IT201	Convert an AFTN message to AMHS format (IUT-A)
IT202	Convert an AFTN message to AMHS format (IUT-B)

Bilateral Test Procedures	
Gateway Operations (AMHS to AFTN)	
IT301	Convert an IPM generated by UA of IUT-A to AFTN format (IUT-B)
Gateway Operations (AFTN to AMHS to AFTN)	
IT401	Convert an AFTN message to AMHS and back to AFTN format (IUT-A)
IT402	Convert an AFTN message to AMHS and back to AFTN format (IUT-B)
Gateway Operations – Special case scenarios	
IT501	Distribute an IPM to AMHS and AFTN users
IT502	Expand a DL addressing both AMHS and AFTN users
IT503	Convert an IPM, if the ATS-message-text contains more than 1800 characters
IT504	Split an incoming IPM addressing more than 21 AFTN users
IT505	Probe Conveyance Test
Stress traffic situations	
IT601	Stress load
Trilateral Test procedures – optional	
Submission/Transfer/Delivery and Relay operations	
IT701	Submission/Transfer/Delivery between the partner MTAs
IT702	Relay operations
Test of special situations	
IT801	Alternate MTA routing
IT802	Loop detection

B. Additional selected and bilaterally agreed interoperability tests cases.

III. ATN/AMHS Pre-Operational Tests

A. Test Cases from Annex F of Guidance Document for AMHS Conformance Testing (AMHS Manual) version 3.0 Sep 2009

	Test Function
PRE001	Go-NoGo test Test partner1 to Test partner 2
PRE002	Go-NoGo test Test partner 2 to Test partner 1
PRE003	Exchange of duplicated Operational messages, check of integrity
PRE004	Stress/Load Test (queued data)

B. Additional selected and bilaterally agreed pre-operational tests cases.

- 6.4 The details of the tests and the test procedures for the test cases are set out in **Annex 1**.
- 6.5 The test results for each of the test cases conducted according to the test procedures in **Annex 1** are recorded and compiled in the test report provided in **Annex 2**.
- 6.6 The achievements, problems, and lessons learnt from the tests-related activities are also set out in **Annex 2**.

ARTICLE 7 – COMMITMENT

- 7.1 The Parties will use all reasonable endeavours to carry out their respective responsibilities and will cooperate to ensure the effectiveness and reliability of the ATN/AHMS between [To be filled in (State 1)] and [To be filled in (State 2)] established under this TMC.
- 7.2 In furtherance of this commitment, the Parties will conduct additional tests using additional test cases as may be agreed between them. The details of such additional tests and test cases and their test procedures and test results when agreed to between the Parties may be added to Annexes 1 and 2 as Addenda attachments in sequential running numbers, referencing this TMC as follows;
- (a) “TMC Annex 1 - Addendum No. 1”
- (b) “TMC Annex 2 – Addendum No. 1”, etc.
- 7.3 If a Party assesses that a test or any change in AMHS requirement or service detail is not affordable or not cost effective to implement, that Party may decline to undertake that test or carry out that requirement or service detail but will nevertheless continue to cooperate with the other Party to reach a mutually acceptable outcome.

ARTICLE 8 – AMENDMENTS

- 8.1 This TMC may be amended by agreement of the Parties in writing and in particular to effect any amendment necessitated by changes in ICAO’s recommendations on AMHS requirements or service details.
- 8.2 The agreed amendments in writing will take effect when signed by the duly authorised representatives of the Parties unless otherwise provided for in the written amendments.

ARTICLE 9 – ATN/AMHS COMMENCEMENT DATE

- 9.1 The ATN/AMHS between [To be filled in (State 1)] and [To be filled in (State 2)] under this TMC will commence one (1) month from the date this TMC comes into force under Article 11.1.

ARTICLE 10 - RESOLUTION OF DISAGREEMENTS

- 10.1 Any disagreement regarding the interpretation or application of this TMC or its annexes and appendices shall be resolved in good faith by mutual consultations between the Parties and will not be referred to any court, international tribunal or third party for settlement.

ARTICLE 11 - ENTRY INTO FORCE

- 11.1 This TMC will enter into force on the date of the last signature by the parties named below.

ARTICLE 12 - SIGNATURE IN COUNTERPARTS

- 12.1 To facilitate execution, this TMC and each of its annexes and addenda may be executed in counterparts, each of which will be an original, but all of which together will constitute one and the same agreement.

ARTICLE 13 - AUTHORITY

13.1 The Parties agree to the provisions of this TMC as indicated by the signatures of their duly authorised representatives below.

[To be filled in (State 1/Organisation 1)] Authorised Representative	[To be filled in (State 2/Organisation 2)] Authorised Representative
<hr/> <p>[To be filled in by State 1/Organisation 1]</p> <hr/> <p>Date</p>	<hr/> <p>[To be filled in by State 2/Organisation 2]</p> <hr/> <p>Date</p>