INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA AND PACIFIC OFFICE

ASIA/PAC
Technical Specification
of the
Air Traffic Services
Message Handling System
(AMHS)

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ABSTRACT

This document is the ASIA/PAC Specification for the ATS Message Handling System (AMHS). The objective is to define precise means of compliance to the essential AMHS requirements to ensure interoperability of AMHS systems in the Asia/Pacific Region. Implementations that comply with the mandatory provisions of this specification will be compliant to the essential requirements for AMHS endorsed by APANPIRG.

EXECUTIVE SUMMARY

This document is the ASIA/PAC Specification for the Air Traffic Services Message Handling System (AMHS). It has been developed by the ATNICG Working Group under APANPIRG. The objective is to define precise means of compliance to the essential AMHS requirements to ensure interoperability of AMHS systems in the Asia/Pacific Region. Implementations that comply with the mandatory provisions of this specification will be compliant to the essential requirements for AMHS endorsed by APANPIRG. This ASIA/PAC Specification refines and augments the detailed technical specifications for AMHS in ICAO Annex 10 and associated ICAO technical manuals.   This ASIA/PAC Specification is based on the EUROCONTROL Specification for the Air Traffic Services Message Handling System (AMHS). The goal is to enable support of specific profiles of Basic and Extended service of the ATS Message Handling Service (ATSMHS), as defined by ICAO. The Extended service includes:

     a) support for binary information transfer,

     b) use of standard message heading extensions to convey Air Traffic Services (ATS) header information,

     c) migration to the use of an on-line X.400 based directory at a future date if required.

          Note. – ASIA/PAC will use an off-line directory (AMC).

     d) migration to the use of digitally signed secure messages at a future date if required.

An initial transition step supporting migration from the AFTN to the Basic ATSMHS level of service is anticipated.

The anticipated next step is to add support for binary information transfer and use of heading extensions.

Longer term, ASIA/PAC may migrate to use of Directory and support for Security.

The specific timing for this migration strategy will be developed in coordination with APANPIRG as part of the overall ATN Implementation strategy.

The provisions of this ASIA/PAC Specification are applicable to air navigation service providers (ANSPs) in the Asia/Pacific Region. Specifically, the provisions apply to the parts of an ANSP's organization responsible for providing, directly or by outsourcing, data messaging services to end users both within and between States.

Compliance with this ASIA/PAC Specification is achieved once implementations comply with all requirements of the normative Annexes.

1. INTRODUCTION

1.1 Document Structure

1.1.1 This ASIA/PAC Specification is organized as a number of Chapters and Annexes. The chapters in the main body of the document provide contextual guidance and explanatory material and point to the annexes which contain the normative requirements. The main body is structured as follows:

- The present Chapter includes introductory material describing the purpose and scope of the ASIA/PAC Specification, its structure, and a description of the document conventions, abbreviations, definitions and the interoperability target.

- Chapter 2 describes the basic level of interoperability for the Air Traffic Services Message Handling Service (ATSMHS) in the Asia/Pacific Region.

- Chapter 3 contains explanatory material concerning the Extended ATSMHS functionality.

- Chapter 4 describes additional requirements relating to implementation options, testing and validation.

- Chapter 5 describes some of the transition and coexistence issues.

- Chapter 6 contains a list of documents which are referenced from the main body and annexes by means of reference numbers contained in square brackets.

1.1.2 Detailed interoperability and compliance requirements are specified in Annexes, which form an integral part of this ASIA/PAC Specification:

• Annex A (normative) contains detailed requirements for the Air Traffic Services (ATS) Message Handling functionality at the level of the Basic ATSMHS. It identifies the systems that are deployed in order to provide those services, the system level requirements, and the external standards and documents applicable to each system.

• Annex B (normative) contains detailed requirements for the ATS Message Handling functionality at the Extended ATSMHS level of service, requiring support of Functional Groups (FG) for the Basic ATSMHS (Basic FG), use of file transfer body parts for binary data exchange (FTBP FG), use of interpersonal messaging heading extensions (IHE FG). Use of Directory (DIR FG) and support of AMHS Security (SEC FG) is foreseen in the future.

1.1.3 Under the X.400 standards compliance requirements are provided where possible in the form of protocol implementation conformance statement (PICS) tables giving a detailed statement of functional and protocol compliancy. These tables are generally contained in ICAO standards and the base standards and ISPs referenced from this ASIA/PAC Specification.

1.2   Purpose

1.2.1 This ASIA/PAC Specification on the Air Traffic Services Message Handling System (AMHS) is developed to ensure interoperability among AMHS implementing systems.

1.2.2 This ASIA/PAC Specification is organized as a number of chapters and normative annexes. Therefore compliance with this ASIA/PAC Specification is achieved once implementations comply with all requirements of the normative Annexes.

1.3   Background Context

1.3.1 The exchange of ATS messages, as part of the Aeronautical Fixed Service (AFS) defined in ICAO Annex 10 Volume II [3] is an essential function to the safety of air navigation and to the regular, efficient and economical operation of ATS provision.

1.3.2 The Aeronautical Fixed Telecommunications Network (AFTN) has provided an effective store-and-forward messaging service for the conveyance of text messages, using character-oriented procedures, for many years. However AFTN technology is now becoming obsolescent, and is not sufficiently flexible to support messaging functions found in modern messaging systems (such as transfer of binary information.)

1.3.3 It is intended that existing AFTN users and systems will transition to the architecture of the Aeronautical Telecommunication Network (ATN), and this is enabled in part by the ATSMHS application, which has been defined by ICAO to replace the AFTN telegraphic style of working with a modern store-and-forward Message Handling System based on international Standards.

1.3.4 Standards and Recommended Practices (SARPs) for the ATSMHS application are specified in ICAO Annex 10 to the Convention on International Civil Aviation. These SARPs refer to detailed specifications in the relevant technical Manual (ICAO Doc 9705, superseded by ICAO Doc 9880 Part IIB [5].

1.3.5 The technical provisions in ICAO Doc 9880 Part II [5] define two fundamental levels of service within the ATSMHS; the Basic ATSMHS and the Extended ATSMHS. Additionally, ICAO Doc 9880 (Part II, section 3.4) outlines various subsets of the Extended ATSMHS, to which conformance can be claimed.

1.3.6 The Basic ATSMHS performs an operational role similar to the AFTN with a few enhancements, while the Extended ATSMHS provides more advanced features. The Extended level of service includes the Basic level of service capability; in this way it is ensured that users with Extended Service capabilities can interoperate, at a basic level, with users having Basic Service capabilities and vice-versa.

1.3.7 The ATSMHS is provided by a set of ATN End Systems, which collectively comprise the ATS Message Handling System (AMHS), and which co-operate to provide users (human or automated) with a data communication service.

The AMHS network is composed of interconnected ATS Message Servers that perform message switching at the application layer (Layer 7 in the basic reference model for open systems interconnection (OSI)). Direct users connect to ATS Message Servers by means of ATS Message User Agents. An ATS Message User Agent supporting the Extended level of service will use the Basic level of service to allow communication with users who only support the Basic ATSMHS. To support the transition from AFTN, AFTN/AMHS Gateways provide interfaces between the AMHS and the AFTN. The AMHS network makes use of an underlying network infrastructure that allows data interchange to be performed.

1.3.8 Implementation of the Extended ATSMHS implies the existence of various support functions, which are not necessarily exclusively dedicated to messaging. These include optional on-line Directory support and (if secure messaging is implemented) public key management functions.

1.4 Scope

1.4.1 The scope of this document covers the Basic and Extended levels of the ATSMHS. Specifically, support for functional groups Basic, FTBP, and IHE is specified. Functional groups DIR and SEC are outlined as an indication of future requirements.

1.4.2 This ASIA/PAC Specification is intended to provide the requirements for AMHS systems. As such, for each external standard, it identifies the baseline version of that standard and the changes to those standards that are required. Each identified change that is incorporated into this specification includes the original reference.

1.4.3 The specification applies to the following Asia/Pacific systems:

• Ground communication and display systems, including user interfaces and end systems concerned with message submission, transfer, delivery and (in the case of AFTN interworking) conversion;

• Ground data logging and recording systems, which, in general, will be an integral part of the communication subsystems.

1.4.4 Compliance with this ASIA/PAC Specification would be mandated in a call for tender for an AMHS End System. However, this ASIA/PAC Specification is not intended to be a complete system specification sufficient for procurement purposes.

1.4.5 Topics addressed by this ASIA/PAC Specification include:

• The interoperability aspects between implementations of the Basic ATSMHS, with its functional components, and implementations conforming to the provisions of this ASIA/PAC Specification;

• The interoperability aspects of AFTN/AMHS gateways within the transition phase from AFTN to AMHS;

1.5 Conventions

1.5.1 Only the minimum subset of requirements necessary for the correct and harmonized implementation of the ASIA/PAC Specification is specified. Mandatory items within the ASIA/PAC Specification are clearly separated from non-mandatory items.

1.5.2 Every requirement and recommendation in this specification is preceded by a structured identifier which can be used to reference uniquely the requirement / recommendation from associated documents and traceability tools. Such identifiers have the form:

AMHS-[Fn]-[Ann]

where:

[Fn]: is a sequence of characters to identify the operational procedure or category to which the requirement applies.

[Ann]: is the Annex identifier followed by a number, unique within a given [Fn].

1.5.3 Conventions for denoting requirements in the normative Annexes A and B are as follows:

• 'Shall' - indicates a statement of specification, the compliance with which is mandatory to achieve the implementation of the ASIA/PAC Specification. It indicates a requirement which must be satisfied by all systems claiming conformity to the specification. Such requirements are intended to be testable and their implementation auditable.

• 'Should' - indicates a recommendation or best practice, whose use is encouraged, but which may or may not be satisfied by all systems claiming conformity to the specification.

• 'May' – indicates an optional feature.

• 'Will' – is meant in its normal English usage to indicate a forward-looking statement or statement of intent.

1.6   Abbreviations and Definitions

1.6.1   Abbreviations

The following abbreviations are used throughout this Main Body and associated Annexes:

84IW	1984 Interworking (MHS functional group)
ACP	ICAO Aeronautical Communications Panel
ACSE	Association Control Service Element
ADEXP	ASIA/PAC Standard for ATS Data Exchange Presentation
AF-Address	AFTN-form address
AFS	Aeronautical Fixed Service
AFSG	Aeronautical Fixed Service Group (ICAO EUR Regional group)
AFTN	Aeronautical Fixed Telecommunication Network
AIRAC	Aeronautical Information Regulation And Control
AMC	ATS Messaging Management Centre
AMHS	ATS Message Handling System
AMHxx	Application profile for MHS standards
ANSP	Air Navigation Service Provider
API	Application Programming Interface
ASN.1	Abstract Syntax Notation One
ATM	Air Traffic Management
ATN	Aeronautical Telecommunication Network
ATS	Air Traffic Services
ATSMHS	ATS Message Handling Service
AU	Access Unit
BC	Business Class

CA	Certificate Authority
CAAS	Common AMHS Addressing Scheme
CFMU	Central Flow Management Unit
CIC	Content Integrity Check
CIDIN	Common ICAO Data Interchange Network
CLNP	Connectionless Network Protocol
CNS/ATM	Communications Navigation and Surveillance / Air Traffic Management
COM	Communication
COTS	Commercial-off-the-Shelf
CSV	Comma Separated Values
CV	Conversion
DAP	Directory Access Protocol
DAP/CSP	Directorate ATM Programmes / Communications Systems and Programmes
DIB	Directory Information Base
DIR	Directory
DISP	Directory Information Shadowing Protocol
DIT	Directory Information Tree
DL	Distribution List
DMD	Directory Management Domain
DMZ	De-militarized Zone
DN	Distinguished (Directory) Name
Doc	ICAO Document
DOP	Directory Operational Binding Protocol
DSA	Directory System Agent
DSP	Directory System Protocol
DUA	Directory User Agent
EANPG	ICAO European Air Navigation Planning Group
EATMN	European Air Traffic Management Network
EC	European Community
ED	EUROCAE Document
EIT	Encoded Information Type
ER	Exempted Recipients (MHS context)
ER	Essential Requirement (SES context)
ETSI	European Telecommunications Standards Institute
EU	European Union
EUR	ICAO European Region
EUROCAE	The European Organization for Civil Aviation Equipment
FG	Functional Group
FHA	Functional Hazard Assessment
FIPS	Federal Information Processing Standard
FTBP	File Transfer Body Part
HMI	Human-Machine Interface
IA5	International Alphabet Number 5
ICAO	International Civil Aviation Organisation
ICS	Implementation Conformance Statement
Id	Identifier
IEC	International Electro-technical Commission
IETF	Internet Engineering Task Force
IHE	IPM Heading Extension
IP	Internet Protocol
IPM	Interpersonal Message

IPN	Interpersonal Notification
IPS	Internet Protocol Suite
IPsec	Internet Protocol Security (RFC 4301)
IPv4	Internet Protocol version 4 (RFC 791)
IPv6	Internet Protocol version 6 (RFC 2460)
ISO	International Organization for Standardization
ISP	International Standardized Profile
ITU-T	International Telecommunication Union – Telecommunications Sector
LD	Latest Delivery
LDAP	Lightweight Directory Access Protocol
LDIF	LDAP Data Interchange Format (RFC 2849)
MD	Management Domain
MF-Address	MHS-form address
MHS	Message Handling System
MS	Message Store
MTA	Message Transfer Agent
MTCU	Message Transfer and Control Unit
MTS	Message Transfer Service
NAT	ICAO North Atlantic Region
NATO	North Atlantic Treaty Organisation
NB	Notified Body
NIST	USA National Institute of Standards and Technology
NOTAM	Notice to Airmen
NRN	Non-Receipt Notification
O/R	Originator / Recipient
OHI	Optional Heading Information
OID	Object Identifier
OSI	Open Systems Interconnection
OU1	Organizational Unit One (in AMHS address)
P1	MHS Protocol for message transfer
P2	MHS Protocol for interpersonal messaging
P3	MHS Protocol for message submission and retrieval between UA and MTA
P7	MHS Protocol for message indirect submission and retrieval from MS
PD	Physical Delivery
PDR	Proposed Defect Report (on ICAO Doc 9705)
PICS	Protocol Implementation Conformance Statement
PKI	Public Key Infrastructure
PRL	Profile Requirements List
QoS	Quality of Service
RCP	Required Communication Performance
RDN	Relative Distinguished Name
RED	Redirection
RFC	Request For Comments (IETF)
RN	Receipt Notification
RoC	Return Of Content
ROSE	Remote Operations Service Element
RTSE	Reliable Transfer Service Element
SARPs	ICAO Standards and Recommended Practices
SDG	Specification Drafting Group
SEC	Security
SNMP	Simple Network Management Protocol (RFC 1157)

SV	Sub-Volume of ICAO Doc 9705
TCP/IP	Transmission Control Protocol / Internet Protocol
TP0 ISO	Transport Protocol Class 0
TP4 ISO	Transport Protocol Class 4
UA	User Agent
WAN	Wide Area Network
X.400	ITU-T message handling recommendations
X.500	ITU-T Directory recommendations
X.509	ITU-T Recommendation defining public key certificate format
XF-Address	Translated-form address
XMIB	Cross-Domain Management Information Base

1.6.2   Definitions

This section defines the terms specific to this document, as well as some common terms which are included for ease of reference. Other definitions may be included by reference to other documents.

AMHS - The set of end systems providing the ATSMHS. In this document, "AMHS" refers only to that part of the global AMHS which is implemented unless otherwise stated, including the interfaces at boundaries with third countries. The AMHS comprises a set of ATN End Systems of type:
- ATS Message Server, which includes an MTA and optionally one or more MS(s);
- ATS Message User Agent which includes a UA;
- AFTN/AMHS Gateway which includes an MTA, and an AU.

AMHS Component - One of the functional objects identified in ICAO Doc 9880 Part II [5] which form part of an AMHS End System; i.e. an MTA, UA, MS, or AU.

AMHS End System - An ATN End System participating in the provision of the ATSMHS; an ATS Message Server, ATS Message User Agent or AFTN/AMHS Gateway.

ANSP (Air Navigation Service Provider) - A body that manages flight traffic on behalf of a company, region or country. It is a provider of air traffic control services.

ATN End System - A computer system that supports one of the ATN applications identified in ICAO Annex 10 Volume III Part I Chapter 3 [26] "Aeronautical Telecommunication Network".

ATSMHS - The air traffic services message handling service (ATSMHS) application aims at providing generic messaging services over the Aeronautical Telecommunication Network (ATN). Two levels of service are defined within the ATSMHS:

- The Basic ATSMHS;

- The Extended ATSMHS.

1.7 Interoperability Target

1.7.1 In a generic specification such as this it is impossible to foresee all possible messaging configurations. The actual environment will have to be elaborated as part of the detailed specification for each individual implementation.

1.7.2 The functional environment specification includes:

- Required gateway functionality;

- Messaging systems that are to be interconnected;

- Available communications and network infrastructure.

1.7.3 A messaging system in terms of this ASIA/PAC Specification may be required to interwork with:

•ATS Message Servers within a State or in other States, implementing the
ATSMHS over ATN/IPS transport services;

•ATS Message User Agents, for the local submission and delivery of messages by "direct" ATSMHS users;

• AFTN/AMHS Gateways, for the transition of AMHS messages into the
AFTN, and vice-versa;

1.7.4 Possible interworking with other message handling systems is a local matter,outside the scope of this ASIA/PAC Specification.

1.7.5 To ensure seamless operation, there are interoperability requirements at a number of distinct levels:

- Geographical
    The ATSMHS is applicable within and between countries. The ATS Message Server topology needs to be optimized for efficient routing in this context.

- Procedural
    The ATSMHS must be used in a consistent way to ensure a seamless service. Procedures must be specified for day-to-day configuration and operation of the message handling service, as well as for orderly transition from legacy systems.

- Human-machine interface (HMI)
    For direct AMHS users in the human user subgroup, the HMI must offer the required input capabilities and display the required information. However, human factors / ergonomics are out of scope of this ASIA/PAC Specification.

- Communication protocols
    Ground end systems must interwork at the technical level. End systems must interwork with logically adjacent end systems (e.g. an ATS Message User Agent must interwork with an ATS Message Server for message submission and delivery) as well as with peer end systems (i.e. interworking between AMHS users, both direct and indirect). The end system includes:

-Application entities (e.g. MTA, MS, UA, DUA, DSA)
-Upper Layers (above transport layer)
-Lower Layers (transport layer and below)

1.7.6 Figure 1 illustrates the interoperability target for AMHS.
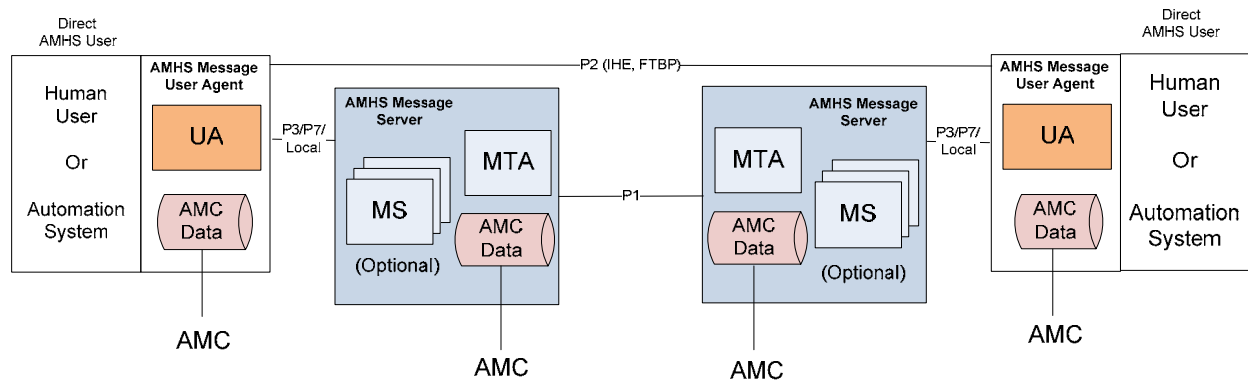
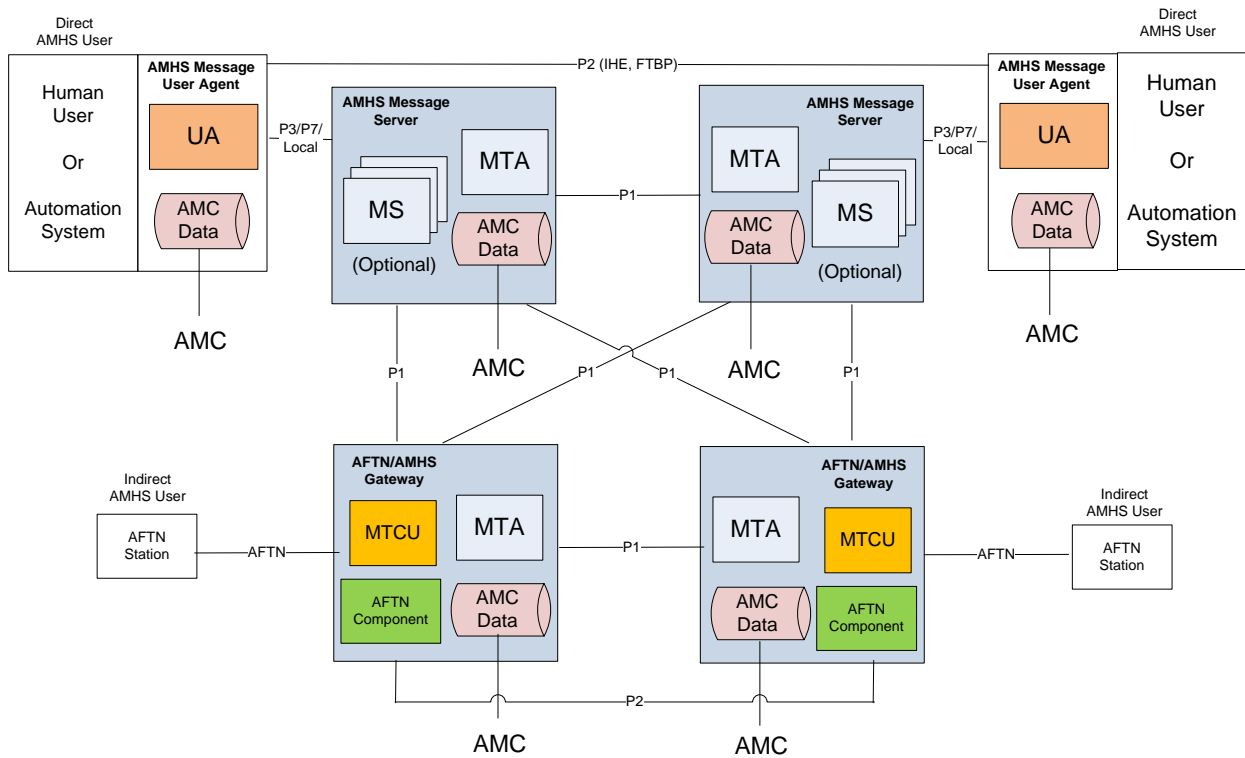**Figure 1: AMHS Interoperability Target**

1.7.7 The ATS Message User Agent is a logical component that may or may not be physically identifiable in an implementation. It may be either logically collocated or remote from the ATS Message Server with which it is associated. When logically remote from the ATS Message Server, it will use the P7 protocol if using a Message Store (MS), or the P3 protocol if communicating directly with the Message Transfer Agent (MTA). The MS is an optional component of the ATS Message Server.

1.7.8 If end-to-end message security services are implemented, the user agent (UA) components would need additional functionality for generating and verifying the content integrity check and digital signature, and there would need to be additional infrastructure to support the management of public key certificates.
Note that there are also security measures applied to ATS Message Servers and DSAs, as well as link level security.

1.7.9 The AMC Database provides supporting functions such as address lookup and enabling a message originator to determine the capability of an intended recipient (direct AMHS user) before initiating the message exchange.

1.7.10 During the transition phase, which may take a number of years, legacy AFTN systems and terminals will need to be supported, both within States and between States. A State which has an operational AMHS may still support legacy AFTN users within that State (indirect AMHS users), and will also need to interwork with States that do not have operational AMHS deployments.

1.7.11 The goal is for interoperability between end users. Clearly, the degree of interoperability possible will depend upon the capability of the end user's system. For example, an AFTN terminal would not be expected to interoperate with an ATS Message User Agent for the exchange of binary encoded weather maps. However, basic interoperability at the level of ATS message exchange (textual rendition of flight plan, etc. messages) would be supported, and would be achieved through the use of an AFTN/AMHS gateway.

Figure 2: AMHS Interoperability Target (transitional phase)

1.7.12 Figure 2 illustrates the elements which are needed for transition, and represents the initial Interoperability Target.

1.7.13 At a future date, when the transition from AFTN is complete, and no legacy AFTN stations remain, the AFTN/AMHS Gateways will no longer be required. The ultimate interoperability target for AMHS is for all end users to become Direct AMHS users.

2.   AMHS INTEROPERABILITY – BASIC ATSMHS

2.1   General

2.1.1 This chapter contains guidance and explanatory material for the AMHS Interoperability requirements in Annex A, which apply to the Basic ATSMHS level of service as defined in ICAO Doc 9880 Part II [5].

2.2   Standards Baseline

2.2.1 The standards baseline in Annex A defines the standards which through reference constitute part of the ASIA/PAC Specification.

2.2.2 The approach is to reference ICAO material where available, noting deviations where required and specifying additional functionality where necessary.

2.2.3 ICAO Annex 10 Volume III refers to the detailed technical specifications for the ATSMHS in ICAO Doc 9880 Part II [5]. These provisions in turn make reference to International Standardized Profiles (ISPs) published by the International Organization for Standardization (ISO).

2.2.4 In the MHS base standards (ISO/IEC 10021 and ITU-T X.400), a subset of the OSI Upper Layer protocols (ROSE, RTSE, ACSE, Presentation and Session layers) is used to support communications between the MHS components (MTA, UA, AU and MS). The use of OSI upper layers is specified in a common ISP applicable to each MHS component.

2.2.5 The referenced ISPs also include profiles for common messaging and for inter-personal messaging (IPM).

2.2.6 However, there remain some options and implementation choices in the AMHS technical specifications in ICAO Doc 9880 Part II [5]. These include support of the Extended and/or Basic ATSMHS, support for different body part types, message size constraints, etc.

2.2.7 The Asia/Pacific Region has adopted the ATS Messaging Management Center (AMC).

2.3   Network Support

2.3.1 This section describes interoperability between the AMHS components (MTA, UA, etc.) and the supporting network infrastructure. In general, there will be network level security features such as firewalls to control access to the infrastructure. Security protocols such as IPsec can be used to ensure that only named servers can connect to one another. However, these are not specific to the messaging system and are not described further.

2.3.2 As specified in ICAO Doc 9880 Part II [5], an AMHS End System can make use of the connection mode transport service provided by either or both of the ATN/OSI or the ATN/IPS. In the former case, it operates over the ATN internet communications service, based on a TP4/CLNP protocol stack, while in the latter case it operates over a TCP/IP protocol stack.

2.3.3 Implementations by ANSPs in the Asia/Pacific Region will make use of a backbone ground-ground network infrastructure based on TP4/CLNP.

2.3.4 TP4/CLNP is specified for interconnections between Backbone MTAs of different ANSP international COM Centers within the Asia/Pacific Region; however, the TCP/IP lower layer profile may be used within an ANSP's local systems or to connect to Non-Backbone MTAs or to MTAs in other regions.

2.4   Message Transfer Service Interoperability

2.4.1 This section is concerned with MTA-to-MTA interoperability requirements.

2.4.2 The Message Transfer Service (MTS) is provided by MTAs communicating via the message transfer protocol P1. The profile requirements for MTAs in the Asia/Pacific Region shall be as specified in ICAO Doc 9880, Part II B [5], section 3.2.2

2.4.3 A backup ATS Message Server may be specified to take over from an international ATS Message Server if the primary system becomes unavailable.

2.5   End-to-End Interoperability of Direct AMHS Users

2.5.1 This section is concerned with UA-to-UA interoperability requirements.

2.5.2 A direct AMHS user is a human or automated system that uses an ATS Message User Agent for message submission and delivery.

2.5.3 The ATSMHS is based on the standards for the interpersonal messaging protocol (P2), i.e. ISO/IEC 10021-7 | ITU-T Recommendation X.420, using message content type 22.

2.5.4 Users of the Basic ATSMHS are able to send and receive simple text messages using a single ia5-text body part containing a structured ATS Message Header.

2.6   Interoperability between AFTN and AMHS

2.6.1 This section is concerned with AFTN/AMHS Gateway requirements.

2.6.2 During the transition phase from AFTN to the AMHS, the interoperability between AFTN and AMHS is achieved by the use of AFTN/AMHS gateways.

2.6.3 Interconnection between the AFTN and the AMHS in the Asia/Pacific Region will be by means of AFTN/AMHS Gateways directly interfacing with the AFTN application supported by ASIA/PAC COM Centers.

2.6.4 Technical provisions for the AFTN/AMHS gateway are specified in ICAO Doc. 9880 Part II [5], section 4.

2.7 Ground Recording of Messages

2.7.1 Annex A elaborates on the information required to be recorded by AMHS End Systems, in accordance with ICAO recording requirements. These are minimum requirements for recording the message exchanges for audit and incident investigation purposes.

2.8 Naming and Addressing

2.8.1 Annex A includes requirements for specifying, maintaining and disseminating unambiguous name and address information required for safe and efficient operation of the communications system.

2.8.2 ICAO Doc 9880 Part II [5] section 2.5.1.4 requires each AMHS management domain to implement an AMHS addressing scheme policy. The management domain may implement either a MHS-form (MF) addressing scheme, or a locally defined addressing scheme, or a combination of both. Two alternative MF-addressing schemes are defined: the Common AMHS Addressing Scheme (CAAS) and the Translated-form (XF) addressing scheme.

2.8.3 Adoption of the ASIA/PAC AMHS Naming Plan will simplify address management and hence aid seamless operations. Under the AMHS Naming Plan the CAAS is recommended for the Asia/Pacific Region. This is consistent with ICAO Doc 9880 Part II, section 2.5.1.4.1.5.

2.8.4 However, for interoperability purposes, all components of Basic and Extended ATSMHS systems must support all of the AMHS address formats identified in ICAO Doc 9880, including XF-addresses. This does not require any form of address translation by an ATS User Agent or an ATS Message Server.

2.9 Interoperability with Systems External to ASIA/PAC

2.9.1 Within the ASIA/PAC Backbone, AMHS communication will be based on ATN/OSI lower layers. Elsewhere in the world, it is possible that AMHS communication could be based on ATN/IPS lower layers. ICAO Annex 10 Volume III requires that regional air navigation agreements will specify the area in which the communication standards for the ATN/OSI or the ATN/IPS are applicable.

2.9.2 The decoupling that exists in an AMHS End System between upper layers and lower layers (transport and network services) allows an ATS Message Server to communicate using different lower layers with different adjacent MTAs. Such lower layer stacks can include ATN/OSI and ATN/IPS protocol stacks.

2.9.3 The ability to implement AMHS end systems with multiple lower layer stacks may be used if needed to ensure global interoperability at the application layer. In this model, one ATS Message Server could be nominated as the boundary system for interfacing the ASIA/PAC AMHS to the AMHS in third countries.

2.9.4 In such a case, the requirements applicable to AMHS End Systems within the ASIA/PAC may not be applicable to those system elements responsible for interfacing with external systems, e.g. in terms of performance or protocol support.

2.9.5 Provisions for AMHS interworking at boundaries with countries external to ASIA/PAC will normally be concentrated in Boundary ATS Message Servers. If the external systems support only ATN/IPS lower layer protocols, the implementation of dual stacks can be proposed as the interworking solution. Other solutions may also be possible, but are outside the scope of this ASIA/PAC Specification.

2.9.6 The ASIA/PAC AMHS Backbone will make use of an ISO TP4 transport service implemented over a CLNP stack. If needed, boundary ATS Message Servers in selected boundary COM centers will implement dual stack systems to allow interconnection with ATN/IPS AMHS systems external to the ASIA/PAC.

2.9.7 It is envisaged that such boundary ATS Message Servers will be implemented as a Common Facility for the benefit of the whole ASIA/PAC network, to provide AMHS connectivity towards other countries.

3. EXTENDED ATSMHS

3.1 General

3.1.1 This section contains explanatory material for the requirements in Annex B concerning the Extended ATSMHS.

3.1.2 The Extended ATSMHS is an enabler for ATS operational improvements. It will provide significant operational benefits, improvement of ATS capacity and performance.

3.1.3 The requirements for Extended ATSMHS are in addition to those for Basic ATSMHS.

3.2 Standards Baseline

3.2.1 The standards baseline in Annex B defines the standards which through reference constitute part of the ASIA/PAC Specification concerned with the Extended ATSMHS.

3.3 Extended ATSMHS Functionality

3.3.1 All AMHS End Systems supporting the Extended ATSMHS must conform to the relevant requirements of the Basic ATSMHS.

3.3.2 In addition, implementations which support the Extended ATSMHS include functionality which can conveniently be described in terms of the following functional groups:

> a) Use of File Transfer Body Parts (FTBP). This functional group enables the transfer of binary data between direct AMHS users. When binary files can be transferred it is important to include virus protection in the architecture, associated with the ATS Message Server and/or ATS Message User Agent; however this is out of scope of this ASIA/PAC Specification.

> b) Use of IPM Heading Extensions (IHE). This functional group uses standard message fields instead of the AMHS-specific ATS Message Header which is required in the Basic ATSMHS.

> c) AMHS Security (SEC). This functional group enables support of the AMHS security policy, providing message origin authentication and content integrity assurance between direct AMHS users.

> d) Use of Directory (DIR). This functional group enables support of the ATN Directory through the use of a DUA included in the AMHS End System.

3.3.3 An implementation of an ATS Message User Agent or of an ATS Message Server claiming full conformance to ICAO Doc 9880 Part II [5] for the Extended ATSMHS is required to support all of these functional groups.

3.3.4 ICAO Doc 9880 Part II [5] also allows an implementation of an ATS Message User Agent or of an ATS Message Server to claim conformance for a subset of the Extended ATSMHS.

3.3.5 If different AMHS End Systems in ASIA/PAC were to support different combinations of functional groups this would be detrimental to full functional interoperability and seamless operations (although interoperability would be possible at least at the Basic ATSMHS level).

3.3.6 Conformance to this ASIA/PAC Specification for the Extended ATSMHS requires implementation of a configuration of the Basic, IHE, and FTBP functional groups.

3.3.7 Note that the future migration to support the DIR and SEC functional groups may be foreseen, but is not currently required for compliance with this ASIA/PAC Specification.

3.3.8 For the AFTN/AMHS Gateway, ICAO Doc 9880 Part II does not specify any distinct functional groups; an implementation may or may not support the Extended ATSMHS as a whole. In practice, FTBP is not relevant for an AFTN/AMHS Gateway; if an AMHS message containing an FTBP body part were received it would unconditionally be rejected by the gateway according to ICAO Doc 9880 Part II, paragraph 4.5.2.1.4.b). SEC would be applicable in the AMHS-to-AFTN direction. IHE and DIR would be supported by an AFTN/AMHS Gateway that supports the Extended ATSMHS.

3.4   End-to-End Interoperability of Direct AMHS Users

3.4.1 Users of the Extended ATSMHS have access to advanced features that are not available to users of the Basic ATSMHS. These include binary data transfer using file transfer body part. The profile requirements for UAs in ASIA/PAC are as specified in ICAO Doc 9880 [5].

3.4.2 Interoperability issues may arise when a user supporting the Extended ATSMHS wishes to communicate with a user supporting the Basic ATSMHS. In such cases, interoperability will only be possible at the Basic ATSMHS level of service.

3.4.3 For example, if a direct user wishes to send a file transfer body part, this will only be meaningful if all of the addressed recipients can process such body part types correctly, i.e., they support the FTBP Functional Group of the Extended ATSMHS. For the sake of robustness, even an ATS Message User Agent supporting only the Basic level of service is expected to be able to receive a message containing unsupported body parts without aborting or malfunctioning.

3.5   Naming and Addressing

3.5.1 In the Extended ATSMHS, the O/R name of an AMHS user is required to comprise both the MF-address (O/R address) and the directory name (distinguished name form) of the AMHS user (see ICAO Doc 9880 Part II [5] section 2.5.1.1.2).

3.5.2 This implies conveyance of both MF-address and directory name in the message envelope and IPM heading. In practice, a UA, MTA, or Gateway receiving a message has no use for the received directory names, as it never needs to look anything up in the directory (except possibly a user's certificate, if secure messaging is implemented). Theoretically, support for IPM Use of Directory requires a UA to be able to display the directory component in a received O/R Name (ISO ISP 12062-1 A.2.3).

4.   ADDITIONAL AMHS REQUIREMENTS

4.1   Testing and Verification

4.1.1 The ASIA/PAC AMHS Manual specifies a set of testing requirements, conformance, interoperability and pre-operational tests covering the Basic ATSMHS requirements. There is the need to augment the test coverage in such a way as to include the additional functionality of the relevant elements of the Extended ATSMHS.

5.   TRANSITION / COEXISTENCE ISSUES

5.1   AFTN to AMHS Transition

5.1.1 As a first step, the Basic ATSMHS can be deployed in ASIA/PAC simply to replace AFTN. Subsequently, it is envisaged that ANSPs will continue to implement other elements of the Extended ATSMHS.

5.1.2 As aging AFTN switches are replaced with ATS Message Servers, AFTN end users will become AMHS indirect users, supported by the AFTN/AMHS Gateway.

5.1.3 The ultimate goal is to phase out the AFTN terminal equipment in favor of ATS Message User Agents. At this stage, all users will be AMHS direct users. The AFTN/AMHS Gateways can only be decommissioned when all indirect users connected to the switch (terminals and applications) are migrated to AMHS. Note that such decommissioning depends also on the migration of all communicating ASIA/PAC countries from AFTN to AMHS.

5.1.4 Systems sending and receiving AFTN messages must be considered. As long as these systems expect AFTN formatted messages, the AFTN/AMHS Gateways will have to remain.

5.1.5 There are a number of transition steps to achieving this end state. Timescales for migration and transition are outside the scope of this ASIA/PAC Specification.

5.1.6 The migration from AFTN to AMHS requires the development of AMHS Operational Procedures, to ensure that transition steps are performed smoothly and without service disruption.

5.1.7 Common facilities, and specifically the routing management function, are of utmost importance to the performance of these AMHS Operational Procedures. It is one of the main goals of the AMC to provide support to the transition to AMHS.

5.1.8 During transition from AFTN to AMHS, existing AFTN routes will be "concatenated" with direct AMHS routes in AMHS Gateways at the borders between the remaining AFTN and the growing AMHS islands.

5.2   Basic ATSMHS to Extended ATSMHS Transition

5.2.1 The Basic ATSMHS may be implemented as a transition step to full Extended ATSMHS. ICAO Doc 9880 Part II [5] notes: It is intended that eventually the Extended ATS Message Handling Service will be supported by all ATS Message Handling Service users, so that the Basic ATS Message Handling Service

will not be required anymore. However the latter may be maintained for transition purposes as long as required.

5.2.2 Coexistence between the two levels of service is facilitated by the use of the AMC service by users to determine the capabilities of intended message recipients.

5.3 **Deployment of Directory**

5.3.1 Updates to ASIA/PAC ATS messaging configuration and addressing information are published each AIRAC cycle and distributed by the AMC.

6.   LIST OF REFERENCES

[1] ASIA/PAC ATN Ground-Ground Transition Plan, 2nd Edition (March 2004)

[2] ASIA/PAC AMHS MTA Routing Policy, 1st Edition (April 2005)

[3] ICAO Convention on International Civil Aviation, Annex 10 - Aeronautical Telecommunications, Volume II — Communication Procedures including those with PANS status, Sixth edition – October 2001, incorporating Amendment 83 (20/07/2008)

[4] ICAO Convention on International Civil Aviation, Annex 11 – Air Traffic Services, Thirteenth edition - July 2001, incorporating Amendment 45 (16/07/2007)

[5] ICAO Doc. 9880-AN/466 Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part II – Ground-Ground Applications – ATS message handling service (ATSMHS), 1st edition, 2010

[6] [ATN SEC] ICAO Doc. 9705-AN/956 – Manual of Technical Provisions for the Aeronautical Telecommunications Network (ATN) Third Edition (2002), Sub-Volume VIII – ATN Security.

[7] [ATN DIR] ICAO Doc 9880-AN/466 – Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IV – Directory Services, 1st edition, 2010

[8] ASIA/PAC AMHS Manual, Version 3.0 (September 2009)

[9] ASIA/PAC AMHS Naming Plan, 3rd Edition (April 2005)

[10] ASIA/PAC System Management Policy, 1st Edition (April 2005)

[11] ASIA/PAC ATN System Security Policy, 2nd Edition (September 2008)

ANNEX A – SPECIFICATION OF AMHS BASIC INTEROPERABILITY REQUIREMENTS

A.1   EXPLANATORY MATERIALS

This normative Annex is an integral part of this ASIA/PAC Specification. It specifies requirements for AMHS End Systems that support the Basic ATSMHS as defined in ICAO Doc 9880 Part II [5].

This Annex must be read in conjunction with the Main Body of this ASIA/PAC Specification, which provides definitions, document references, and contextual information. References given in square brackets are defined in section 6 of the Main Body.

The Basic ATSMHS is intended as a transition step providing interoperability with existing AFTN equipment and supporting the migration from AFTN to AMHS technology. As such, it supports existing data flows and concepts of operation for applications based on the interchange of ATS messages.

The Basic ATSMHS provides only for the exchange of simple text messages, including a formatted ATS Message Header field. It does not support new concepts of operation requiring the general exchange of binary data or files and does not provide strong authentication or data integrity services. Further, the Basic ATSMHS does not benefit from a standardized directory function, which in the Extended ATSMHS can be used to enhance seamless operation by ensuring the up-to-date dissemination of address and configuration information.

This Annex is structured such that requirements common to all AMHS End Systems are specified in section A.2.1, followed by requirements specific to each AMHS End System type. Compliance is conditional upon the type of AMHS End System under consideration (e.g. section A.2.2 on ATS Message Server is not applicable when considering requirements for ATS Message User Agents).

A.2   REQUIREMENTS

A.2.1   Common Requirements

A.2.1.1 Standards Baseline

[AMHS-BAS-A03] AMHS End Systems shall comply with the requirements specified in ICAO Doc 9880 Part II [5] applicable to the Basic ATSMHS, except where explicitly stated otherwise.

[AMHS-BAS-A04] In the event of conflicting requirements not explicitly identified, the specification in ICAO Doc 9880 Part II [5] shall take precedence.

[AMHS-BAS-A05] Due account shall be taken of any published defect resolutions relating to the ICAO AMHS documentation.

Note. Any outstanding defect reports and/or amendment proposals need to be analyzed when preparing an ANSP's system specification. Any that affect interoperability would be required to be implemented in the supplied system.

[AMHS-BAS-A07] Compatibility with the current version of referenced standards and any relevant corrigenda should be taken into account.

A.2.1.2 General Requirements

[AMHS-GEN-A01] The AMHS shall enable the exchange of messages between the following types of users:

- Direct AMHS user to Direct AMHS user;

- Direct AMHS user to Indirect AMHS user;

- Indirect AMHS user to Direct AMHS user;

- Indirect AMHS user to Indirect AMHS user.

[AMHS-GEN-A02] AMHS Backbone Systems shall be able to communicate using the ATN/OSI Transport Service, as specified in ICAO Doc 9880 Part II [5], section 3.2.2.2

[AMHS-GEN-A04] Wherever possible, AMHS Component implementations should make use of common and standardized interfaces.

Note: Such interfaces are specified for example in IETF RFCs.

[AMHS-GEN-A05] Specifically, standardized interfaces where available for message submission, transfer and delivery, system management, etc. shall be used as a means of enhancing Interoperability between system components.

[AMHS-GEN-A07] AMHS End Systems shall be capable of interworking with independent implementations of AMHS End Systems in accordance with the permissible combinations listed in ICAO Doc 9880 Part II [5], section 1.2.

Note: Such interworking includes correct interoperation representing the services explicitly and implicitly requested by either end user.

[AMHS-GEN-A08] AMHS End Systems supporting the Basic ATSMHS should be designed to accommodate the evolution to support the Extended ATSMHS, e.g. by including well-defined interfaces and software hooks in areas where future extensions are foreseen.

A.2.1.3 Performance Requirements

[AMHS-PER-A08] AMHS End Systems should be capable of supporting the peak rate hour's performance, which corresponds to at least 20% of the daily traffic requirements for that AMHS End System.

A.2.1.4 Naming and Addressing

[AMHS-NAM-A01] AMHS End Systems shall support the ASIA/PAC AMHS Naming Plan [9]

A.2.1.5 Logging

[AMHS-LOG-A01] Data exchanges using the ATSMHS shall be recorded in accordance with the following ICAO standards applicable to the ground-based recording function of data link communications:

- Section 3.5.1.5 of ICAO Annex 10 Volume II [3];

- Section 6.2 of ICAO Annex 11 [4].

[AMHS-LOG-A03] AMHS End Systems shall support the relevant requirements for traffic logging as described in sections 2.7, 3.2.3 and 4.3.1 of ICAO Doc 9880 Part II [5].

[AMHS-LOG-A04] All operator inputs shall be recorded and traceable for a configurable period (e.g. 30 days).

A.2.1.6 Availability, Reliability, Maintainability

A.2.1.6.1 Availability

[AMHS-ARM-A04] Precise constraints for the restart time are dependent on the configuration of the system and specific modes of failure, but for guidance a target restart time of less than 5 minutes should be assumed.

[AMHS-ARM-A06] AMHS End Systems shall be designed such that processing of messages during recovery does not overload the system or degrade the performance below the performance targets.

A.2.1.6.2 Reliability

[AMHS-ARM-A07] AMHS End Systems shall be designed to minimize the effect of a failure of an AMHS End System or component thereof on the function of the entire system.

Note: This requires an audit of design documentation to ensure that factors such as redundancy of components, alternative routings, etc. have been considered.

[AMHS-ARM-A08] AMHS End Systems and their functional components shall be designed to avoid loss of messages.

A.2.1.6.3 Maintainability

[AMHS-ARM-A09] Commercial Off-the-Shelf (COTS), industry standard software, should be used as widely as possible, in order to enable an upward compatible growth path.

[AMHS-ARM-A10] AMHS End System implementations should be modular in nature and by using a series of industry standard interfaces provide a flexible and expandable combination of communication services.

A.2.1.7 System Management

[AMHS-SYM-A01] AMHS End Systems shall support ASIA/PAC System Management Policy. [10]

A.2.1.8 Security Management

[AMHS-SCM-A01] AMHS End Systems shall support the ASIA/PAC ATN System Security Policy. [11]

A.2.2   ATS Message Server Requirements

An ATS Message Server supporting the Basic ATSMHS includes an MTA and optionally one or more MSs, as specified in ICAO Doc 9880 Part II [5] sections 3.2.2 to 3.2.4.

[AMHS-AMS-A01] An ATS Message Server shall route, store and forward ATS Messages, taking into account the applicable performance requirements and routing configuration.

[AMHS-AMS-A02] An ATS Message Server shall be able to support the routing of messages according to a non-hierarchical addressing plan, as well as the MF-Addressing Schemes specified in ICAO Doc 9880 Part II [5] section 2.5.1.4.

[AMHS-AMS-A03] An ATS Message Server should have the capability to import data from the AMC.

[AMHS-AMS-A04] MTAs shall implement the P1 MTS transfer profile as specified in ICAO Doc 9880 Part II [5](profile AMH11 plus AMHS-specific features) for communication with other ATS Message Servers.

[AMHS-AMS-A05] MTAs shall implement the P1 IPM requirements profile as specified in ICAO Doc 9880 Part II [5] (profile AMH22 plus AMHS-specific features) for IPM communication with other ATS Message Servers.

[AMHS-AMS-A07] The ATS Message Server should support a common and standardized interface for the submission and delivery of messages.

[AMHS-AMS-A09] MTAs may support the Distribution List (DL) and Exempted Recipients (ER) functional group as a local matter.

Note: The DL+ER (Exempted Recipients) class of the DL functional group is outside the scope of this ASIA/PAC Specification. It may be supported according to local requirements.

[AMHS-AMS-A10] It is recommended that the ATS Message Server should have the capability to open multiple associations between each pair of communicating MTAs

Note: This means that there is no guarantee that messages are transferred in their received order, only that the start of transfer is independent of message size.

A.2.2.1 ASIA/PAC Boundary Requirements

[AMHS-AMS-A12] ASIA/PAC boundary ATS Message Servers shall additionally have the capability to communicate with ATS Message Servers external to ASIA/PAC, subject to bilateral agreement.

A.2.3 ATS Message User Agent Requirements

In the AMHS architecture defined in ICAO Doc 9880 Part II [5], each direct AMHS user is provided with an ATS Message User Agent to access the message transfer service. ATS Message User Agents include a UA to perform submission of messages to the message transfer service and delivery of messages from the message transfer service.

The logical architecture includes an optional AMHS Message Store component for storing, on behalf of local direct AMHS users, messages received from other users as well as other information objects such as reports.

The ATSMHS uses the Inter-Personal Messaging (IPM) protocol P2 for communication between UAs. ICAO Doc 9880 Part II [5] specifies the relevant IPM Content Type profile.

In the Basic ATSMHS, each IPM message contains a single ia5-text or general-text body part.

[AMHS-AMU-A01] ATS Message User Agents shall comply with the requirements specified in section 3.1 of ICAO Doc 9880 Part II [5] for the support of the Basic ATSMHS, summarized as the following requirements:

- A UA profile based on AMH21 as specified in ISO/IEC ISP 12062-2;

- The requirements of Repertoire Group A, for messages including a body part whose type is an Extended Body Part Type of general-text-body-part type;

- Provisions related to traffic logging.

[AMHS-AMU-A02] It is recommended that standard ISO/IEC 10021 protocols P3 and/or P7 should be used for message submission and delivery.

Note: In the Basic ATSMHS, a UA can communicate with the MTS using P3, P7 or proprietary access protocols, as an implementation choice local to the AMHS MD. The above recommendation is intended to foster seamless operation and enable a smooth transition to the Extended ATSMHS.

[AMHS-AMU-A03] The maximum message-text length supported by the UA shall be a configurable parameter value.

[AMHS-AMU-A04] A UA shall be capable of accepting and processing a maximum received message-text length of at least 64 kByte and be capable of handling messages longer than the maximum length without system malfunction.

Note. It is a local implementation matter how to handle received messages longer than the maximum supported message length.

[AMHS-AMU-A05] If a user application is co-located with an MTA on a common platform, then the interface between the application's (logical) UA and the message transfer service shall provide equivalent functionality to the MT-Access abstract service as defined for the P3 access protocol specified in ISO/IEC 10021-6.

[AMHS-AMU-A06] If "forced" delivery to a UA is required (e.g. for reception of urgent, high priority messages) then either the P3 protocol or (in the case of MS) P7 with Alerts configured should be used.

[AMHS-AMU-A07] It should be possible for direct AMHS users to request confirmation of delivery and to receive delivery reports.

A.2.4   Message Store Requirements

The MS is Optional in the AMHS logical architecture. It is a local decision whether MS functionality is required. The local options of the MS that are appropriate to the MS user's intended task need to be specified when procuring an ATS Message Server.

[AMHS-MST-A01] It is recommended that, when an MS is included in the ATS Message Server, standard ISO/IEC 10021 protocol P3 should be used between the MS and MTA for message submission and delivery.

Note: In the Basic ATSMHS, an MS can communicate with the MTS using P3 or proprietary access protocols, as an implementation choice local to the AMHS MD. The above recommendation is intended to foster seamless operation and enable a smooth transition to the Extended ATSMHS.

[AMHS-MST-A02] It is recommended that the standard ISO/IEC 10021 protocol P7 should be used between MS and UA for message retrieval and indirect submission.

Note: In the Basic ATSMHS, a UA can communicate with the MS using P7 or proprietary access protocols, as an implementation choice local to the AMHS MD. The above recommendation is intended to foster seamless operation and enable a smooth transition to the Extended ATSMHS.

[AMHS-MST-A04] MS implementations may support the Distribution List (DL) functional group.

Note: The DL Exempted Recipients class (DL+ER) is an Optional functional group in profiles AMH13 and AMH15. It is only needed if support of dl-exempted-recipients is required in the message submission envelope.

A.2.5   AFTN/AMHS Gateway Requirements

An AFTN/AMHS Gateway supporting the Basic ATSMHS includes an MTA and an Access Unit (the Message Transfer and Control Unit – MTCU), as specified in ICAO Doc 9880 Part II [5] chapter 4.

[AMHS-GWY-A01] Where interworking with AFTN end systems is required, a gateway between the AMHS and AFTN message services shall be implemented in conformance with ICAO Doc 9880 Part II [5] chapter 4.

[AMHS-GWY-A02] An AFTN/AMHS Gateway supporting the Basic ATSMHS shall implement all elements which are applicable to the Basic ATSMHS and which are marked as "M" in the "ATS Messaging Service" column of ICAO Doc 9880 Part II Table 4-3.

[AMHS-GWY-A03] The AFTN/AMHS Gateway shall support address conversion of O/R addresses belonging to a non-hierarchical addressing plan, as well as the MF-Addressing Schemes specified in ICAO Doc 9880 Part II [5] section 2.5.1.4.

[AMHS-GWY-A04] The AFTN/AMHS Gateway shall support address conversion and routing for all currently assigned ICAO eight-letter addressee indicators (AF-addresses).

ANNEX B – SPECIFICATION OF AMHS EXTENDED INTEROPERABILITY REQUIREMENTS

B.1 EXPLANATORY MATERIALS

This normative Annex is an integral part of this ASIA/PAC Specification. It specifies requirements for AMHS End Systems that support the Extended ATSMHS as defined in ICAO Doc 9880 Part II [5].

This Annex must be read in conjunction with the Main Body of this ASIA/PAC Specification, which provides definitions, document references and contextual information.

References given in square brackets are defined in section 6 of the Main Body. Reference is also made to Annex A of this ASIA/PAC Specification for the definition of the Basic ATSMHS details.

The Extended ATSMHS is functionally a superset of the Basic ATSMHS, and is backward compatible with it, in that the ability to downgrade to the Basic ATSMHS level of service is required. AMHS End Systems claiming compliance with the requirements in this Annex must also be compliant with the requirements in Annex A.

This Annex is structured such that requirements common to all AMHS End Systems supporting the Extended ATSMHS are specified in section B.2.1, followed by requirements specific to each AMHS End System type. Compliance is conditional upon the type of AMHS End System under consideration (e.g. section B.2.2 on ATS Message Server is not applicable when considering requirements for ATS Message User Agents).

B.2 REQUIREMENTS

B.2.1 Common Requirements

B.2.1.1 Standards Baseline

[AMHS-BAS-B01] AMHS End Systems shall comply with the standards identified in Annex A of this ASIA/PAC Specification unless stated otherwise.

[AMHS-BAS-B02] AMHS End Systems conforming to this Annex shall comply with the requirements specified in ICAO Doc 9880 Part II [5], including those requirements specific to the support of the Extended ATSMHS, unless explicitly stated otherwise in this Annex.

[AMHS-BAS-B03] In the event of conflicting requirements not explicitly identified, the specification in ICAO Doc 9880 Part II [5] shall take precedence.

Note: ICAO Doc 9880 Part II [5] paragraph 2.2.4.1.b) requires the storage of management information about ATS Message Servers and AFTN/AMHS Gateways in the ATN cross-domain management information base (XMIB). This is not required for conformance to this ASIA/PAC Specification.

B.2.1.2 General Requirements

[AMHS-GEN-B01] ATS Message Servers and ATS Message User Agents shall support the functional groups Basic, IHE, and FTBP.

Note: Migration to AMHS functional groups DIR and SEC may be foreseen at some time in the future, but is not currently required for compliance with this ASIA/PAC Specification.

[AMHS-GEN-B03] AMHS End Systems shall support the implementation of advanced, agreed and validated concepts of operation by providing managed access to the messaging system for new end-user applications via well-defined interfaces.

Note: The basic recommendation for the use of standardized interfaces wherever possible also applies to AMHS components supporting the Extended ATSMHS. However, it is noted that the Open Group APIs are not fully compliant with extended service requirements such as support for the Business Class (BC) functional group, so some customization may be necessary.

B.2.1.3 Naming and Addressing

There are no ASIA/PAC specific requirements for Naming and Addressing.

B.2.1.4 Performance Requirements

There are no additional performance requirements specified in this Annex. The performance requirements specified in Annex A are fully applicable to elements of the Extended ATSMHS. However, it should be noted that the use of binary attachments will tend to result in larger message sizes. Unless the number of messages with file transfer body parts is very small, there will be an impact on performance. Also, the use of security will increase the submission time and also the time to open a message.

B.2.2 ATS Message Server Requirements

B.2.2.1 General

An ATS Message Server supporting the Extended ATSMHS includes an MTA, a DUA and optionally one or more MSs, as specified in ICAO Doc 9880 Part II [5] sections 3.2.2 to 3.2.5.

B.2.2.2 P1 Message Transfer

[AMHS-AMS-B01] MTAs shall implement the P1 MTS transfer profile AMH11 as specified in Annex A of this ASIA/PAC Specification.

B.2.2.3 P3 Message Access

[AMHS-AMS-B03] MTAs supporting direct message submission and delivery should support P3 access.

B.2.3   ATS Message User Agent Requirements

B.2.3.1 General

An ATS Message User Agent supporting the Extended ATSMHS includes an IPM UA as specified in ICAO Doc 9880 Part II [5] sections 3.1.2 to 3.1.5.

The UA in the Extended ATSMHS supports the P3 protocol to access the MTA in an ATS Message Server and/or the P7 protocol to access the MS in an ATS Message Server, where available.

Note: In the Extended ATSMHS, each IPM message may contain a combination of ia5text, general text and file transfer body parts. Use of the Bilaterally Defined body part type is prohibited for sending, though it must be supported for reception for backwards compatibility – see ICAO Doc 9880 Part II [5] paragraph 3.1.4.2.1.2.

[AMHS-AMU-B01] An ATS Message User Agent supporting the Extended ATSMHS shall comply with the requirements specified in section 3.1 of ICAO Doc 9880 Part II [5] for the support of the Extended ATSMHS, summarized as the following requirements;

> • A UA profile based on Profile AMH21;

> • The requirements of Repertoire Group A, for messages including a body part whose type is an Extended Body Part Type of general-text-body-part type;

> • Support of the IPM Business Class (BC) functional group;

> • Support of the file-transfer body part;

> • UA access profile based on Profiles AMH23 or AMH25 for P3 access to the MTS, or based on Profiles AMH24 or AMH26 for P7 access to the MS;

> •The additional provisions relating to parameters generated at an ATS Message User Agent, as specified for the Extended ATSMHS;

> • Provisions related to traffic logging.

B.2.3.2 IPM Content

[AMHS-AMU-B02] A UA in an ATS Message User Agent supporting the Extended ATSMHS shall conform to MHS Profile AMH21 as specified in Doc 9880 Part II [5].

[AMHS-AMU-B03] A UA in an ATS Message User Agent shall be prohibited from sending messages containing a Bilaterally Defined body part.

 [AMHS-AMU-B05] The values of the precedence field in the per-recipient heading fields of a message shall be the same for all recipients, as this field corresponds to AFTN Priority.

B.2.3.3 P3 Access

[AMHS-AMU-B06] A UA supporting P3 access shall conform to the profile AMH12 and optionally profile AMH14 in ICAO Doc 9880 Part II [5].

[AMHS-AMU-B07] A UA supporting P3 access shall conform to the profile AMH23 and/or AMH25 in ICAO Doc 9880 Part II [5], section 3.1.4.3.1.

B.2.3.4 P7 Access

[AMHS-AMU-B10] A UA supporting P7 access shall conform to the profile AMH13 or AMH15 ICAO Doc 9880 Part II [9].

[AMHS-AMU-B11] A UA supporting P7 access shall conform to the profile AMH24 or AMH26 in ICAO Doc 9880 Part II [5], section 3.1.4.3.1.

B.2.4 Message Store Requirements

B.2.4.1 General

The MS is an optional functional object in the AMHS logical architecture. For an MS in an ATS Message Server supporting the Extended ATSMHS, the access profiles are prescribed in ICAO Doc 9880 Part II [5].

B.2.4.2 MS Access to MTA

[AMHS-MST-B01] An MS which supports P3 access in an ATS Message Server supporting the Extended ATSMHS shall conform to the profile AMH12 and optionally profile AMH14 in ICAO Doc 9880 Part II [5].

[AMHS-MST-B02] An MS which supports P3 access in an ATS Message Server supporting the Extended ATSMHS shall conform to Profiles AMH23 and/or AMH25 in ICAO Doc 9880 Part II [5].

B.2.4.3 P7 Access

[AMHS-MST-B06] An MS in an ATS Message Server supporting the Extended ATSMHS shall conform to the Profile AMH13 or AMH15 in ICAO Doc 9880 Part II [5].

[AMHS-MST-B07] An MS in an ATS Message Server supporting the Extended ATSMHS shall conform to the profile AMH24 or AMH26 in ICAO Doc 9880 Part II [5].

B.2.5 AFTN/AMHS Gateway Requirements

B.2.5.1 General

An AFTN/AMHS Gateway supporting the Extended ATSMHS includes an MTA and an Access Unit (the Message Transfer and Control Unit – MTCU), as specified in ICAO Doc 9880 Part II [5] chapter 4.

[AMHS-GWY-B02] It is recommended that AMC information in an AFTN/AMHS Gateway supporting the Extended ATSMHS should be used to retrieve information in support of address and content conversion.

Note: The retrieval of AMC information can be used by the MTCU to facilitate address conversion. The MTCU also requires further information on the level of service supported by the intended AMHS recipients.