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Technical Specifications for ATN using ISO/OSI Standards and Protocols

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Part II – Ground-Ground Applications — Air Traffic Services Message Handling Services (ATSMHS)

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Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocols

Part II — Ground-Ground Applications — Air Traffic Services Message Handling Services (ATSMHS)

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FOREWORD[1]

This manual contains the detailed technical specifications for the ATN based on relevant standards and protocols established for open systems interconnection (OSI) by the International Organization for Standardization (ISO) and the Telecommunication Standardization Sector of the International Telecommunication Union (ITU-T). A separate manual, the *Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocols* (Doc 9896), addresses detailed technical specifications for the ATN based on standards developed for the IPS by the Internet Society (ISOC). Standards and Recommended Practices (SARPs) for the ATN/IPS are contained in Annex 10 — *Aeronautical Telecommunications,* Volume III — *Communication Systems*.

Editorial practices in this manual are as follows:

- The detailed technical specifications in this manual that include the operative verb “shall” are essential to be implemented to secure proper operation of the ATN.

- The detailed technical specifications in this manual that include the operative verb “should” are recommended for implementation in the ATN. However, particular implementations may not require this specification to be implemented.

- The detailed technical specifications in this manual that include the operative verb “may” are optional.

This manual is published in the following parts:

Part I: Air-Ground Applications (replaces Doc 9705, Sub-volume II)

Part II: Ground-Ground Applications — Air Traffic Services Message Handling Services (ATSMHS) (replaces Doc 9705, Sub-volume III)

Part III: Upper Layer Communications Service (ULCS) and Internet Communications Service (ICS) (replaces Doc 9705, Sub-volume IV and Sub-volume V)

Part IV: Directory Services, Security Services and Systems Management (replaces Doc 9705, Sub-volumes I, VI, VII, VIII and IX)

The ATSMHS shall be implemented in conformity with Part II, which is structured as follows:

Chapter 1 INTRODUCTION contains the overview, a summary of the functionalities offered by the ATSMHS and the terminology applied

Chapter 2 SYSTEM LEVEL PROVISIONS, provides a high-level specification of the application and the environment in which it operates

Chapter 3 ATS MESSAGE HANDLING SERVICE SPECIFICATION, provides the detailed specification of the service and protocol requirements for each type of ATN End System (ATS message

[1] The first edition of this manual amended and replaced the third edition of the *Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN) (*Doc 9705).

user agent and ATS message server) implementing the ATSMHS

Chapter 4 AFTN/AMHS GATEWAY SPECIFICATION, provides the detailed specification of an AFTN/AMHS gateway and of the related functional requirements such as conversion

ACRONYMS

The acronyms used in this manual are defined as follows:

ACSE	Association control service element
ADMD	Administration management domain
AF	AFTN-form (address)
AFTN	Aeronautical fixed telecommunication network
AMHS	ATS message handling system
ASN.1	Abstract syntax notation One
ASP	Signature generation primitive
ATN	Aeronautical telecommunication network
ATS	Air traffic services
ATSMHS	ATS message handling services
AU	Access unit
AVP	Signature verification primitive
BC	Business class (functional group)
BER	Basic encoding rules
CAAS	Common AMHS addressing scheme
CCITT	Consultative Committee of International Telegraph and Telephone
CIDIN	Common ICAO data interchange network
COTP	Connection-oriented transport protocol
CR	Carriage return
CRL	Certificate revocation list
DAP	Directory access protocol
DER	Distinguished encoding rule
DIR	Use of directory (functional group)
DL	Distribution list
DUA	Directory user agent
ECDSA	Elliptic curves digital signature algorithm
FG	Functional group
FT	Filing time
FTBP	File transfer body part
IA-5	International Alphabet No. 5
IA5IRV	International Alphabet No. 5 International Reference Version
ICS	Internet communications service
IEC	International Electrotechnical Commission
IETF	Internet Engineering Task Force
IHE	IPM heading extension
IPM	Interpersonal message
IPN	Interpersonal notification
IPS	Internet protocol suite
ISO	International Organization for Standardization
ISP	International standardized profile
ISPICS	ISP implementation conformance statement
IPv4	Internet protocol version 4
IPv6	Internet protocol version 6
ITA-2	International Telegraph Alphabet No. 2

ITU	International Telecommunication Union
ITU-T	International Telecommunication Union — Telecommunications Standards
LF	Line feed
MD	Management domain
MF	MHS-form (address)
MHS	Message handling system
MOTIS	Message-oriented text interchange system
MS	Message store
MT	Message transfer
MTA	Message transfer agent
MT-EoS	Message transfer elements of service
MTS	Message transfer service
OHI	Optional heading info
OID	Object identifier
OR, O/R	Originator/recipient
PDAI	Predetermined distribution addressee indicator
PRL	Profile requirement list
PRMD	Private management domain
RFC	Request for change (issued by the IETF)
RER	Residual error rate
RN	Receipt notification
RTSE	Reliable transfer service element
SEC	Security (functional group)
SHA	Secure hash algorithm
SOH	Start of header
STX	Start of text
S0C	System 0 condition
TCP	Transmission control protocol
TSAP	Transport service access point
UA	User agent
UTC	Coordinated universal time
XF	Translated-form (address)
XMIB	Cross-domain management information base

Chapter 1

INTRODUCTION

1.1 OVERVIEW

1.1.1 The ATSMHS application, formerly known as the ATS message service, allows ATS messages to be exchanged between service users.

1.1.2 The ATSMHS application aims to provide generic message services over the ATN internet. It may in turn be used as a communication system by user-applications communicating over the ATN. This may be achieved, for instance, by means of application programme interfaces with the ATSMHS.

1.1.3 The ATSMHS is provided by the implementation over the ATN internet communication services of the message handling systems specified in ISO/IEC 10021 and CCITT or ITU-T X.400, complemented by the additional requirements specified in this manual. The ISO/IEC MOTIS international standards and the CCITT X.400 series of recommendations (1988 or later) are in principle aligned with each other. However, there are a small number of differences between these international standards and ISPs where applicable. Where necessary, for example, for reasons of interworking or to point out differences, reference is also made to the relevant X.400 recommendations.

1.1.4 Two levels of service are defined within the ATSMHS:

a) the basic ATSMHS; and

b) the extended ATSMHS.

1.1.5 The basic ATSMHS is based on the first version of the ISO/IEC ISPs, published in 1994 and based on the ISO/IEC 10021:1990 set of standards. The extended ATSMHS is based on the third version of the ISO/IEC ISPs, published in 2003 and based on the ISO/IEC 10021:2003 set of standards.

1.1.6 Both levels of service are compatible with one another. The extended ATSMHS is functionally a superset of the basic ATSMHS and is backward compatible with the basic ATSMHS.

1.1.7 The basic ATSMHS meets the basic requirements of the message handling systems profiles published by ISO/IEC as ISPs and incorporates additional features to support the service offered by the AFTN. The extended ATSMHS includes supplementary functions to provide a secure message service to allow for the use of the ATN directory. The ATSMHS is further specified in Chapter 3, including which ISPs apply in this context.

1.1.8 It is intended that the extended ATSMHS will eventually be supported by all ATSMHS users, so that the basic ATSMHS will no longer be required. However, the latter may be maintained for transition purposes as long as required.

1.2 END SYSTEMS PROVIDING THE ATSMHS

1.2.1 The set of end systems providing the ATSMHS is collectively denominated as the AMHS.

1.2.2 Three types of ATN end systems are defined in this manual:

a) the ATS message server;

b) the ATS message user agent; and

c) the AFTN/AMHS gateway.

1.2.3 Connections may be established over the ATN ICS or using the IPS between any pair constituted of these ATN end systems and listed in Table 1-1.

Table 1-1. Communications between ATN end systems implementing the ATSMHS

ATN end system 1	*ATN end system 2*
ATS message server	ATS message server
ATS message server	AFTN/AMHS gateway
ATS message server	ATS message user agent
AFTN/AMHS gateway	AFTN/AMHS gateway

1.2.4 The CIDIN/AMHS gateway defined in earlier ATN technical provisions can be implemented by means of an AFTN/AMHS gateway when the CIDIN is used in support of the AFTN application only. For this reason, the specification of the CIDIN/AMHS gateway has been removed from this manual.

1.3 TERMINOLOGY

1.3.1 The following terminology applies in this manual:

AFTN acknowledgement message. An AFTN service message acknowledging the receipt of an AFTN message, of which priority indicator has the value “SS”.

Direct AMHS user. An ATSMHS user who engages in the ATSMHS at an ATS message user agent. A direct AMHS user may belong to two subgroups as follows:

Human users who interact with the ATSMHS by means of an ATS message user agent connected to an ATS message server.

Host users which are computer applications running on ATN end systems and interacting with the ATSMHS by means of application programme interfaces.

Indirect AMHS user. An ATSMHS user at an AFTN station using an AFTN/AMHS gateway to communicate with other ATSMHS users.

Subject AFTN message. An AFTN message which causes an AFTN service message or an AMHS report to be generated.

Subject AMHS message. An AMHS message which causes an AFTN service message or an AMHS report to be generated.

Subject IPM. The IPM which is the content of an AMHS message and which causes an AMHS RN to be generated.

Unknown address AFTN service message. An AFTN service message requesting correction by the originator of a message received with an unknown addressee indicator.

1.3.2 The classifications defined in the ISPs apply for expressing conformance requirements (i.e. static capability) in this manual. The ISP classifications refine the ISO/IEC 9646-7 classification to include different levels of mandatory support, depending on the level of functionality to be supported by the considered message handling system. These classifications include the following elements, for which the complete definition may be found in each referenced ISP:

a) **mandatory (full) support** (M);

b) **mandatory minimal support** (M-);

c) **mandatory O/R name minimal support** (M1) (see ISO/IEC ISP 12062-2);

d) **optional support** (O);

e) **conditional support** (C);

f) **out of scope** (I); and

g) **not applicable** (-).

1.3.3 The following classification applies for expressing dynamic behaviour requirements (i.e. the action performed by the ATN end system) related to parameters or elements in PRLs included in Chapter 4 for the specification of the AFTN/AMHS gateway:

a) **generated** (G): used to describe the generation of an AMHS or AFTN information object. It means that the element is generated by the AFTN/AMHS gateway. The value of the element is based on parameters related to the AFTN/AMHS gateway itself or takes a pre-determined value and does not depend on the value of an element of the information object received by the AFTN/AMHS gateway which caused the current generation of an information object. If an element comprises several components, then the element is classified as generated if at least one of its components is generated, and the others are either generated or excluded. The generation of message handling system parameters applies to abstract-values and does not constrain the ASN.1 encoding. In particular, elements generated with ASN.1 DEFAULT abstract-values may, but need not, be encoded;

b) **optionally generated** (G1): used with the same meaning as generated (G), with the exception that the generation of the element is optional, the decision being a matter of policy local to the management domain operating the AFTN/AMHS gateway;

c) **conditionally generated** (G2): used only to describe the generation of an AMHS report or RN element. It means, for a report generation, that the element is generated in the report or RN based on some condition related to the subject AMHS message being true. If the element is generated, it takes

a value derived from elements present in the received AMHS information object which caused the generation of the report or RN;

d) **translated** (T): used to describe either the generation of an AMHS or AFTN information object or the use of a received information object. It means that the element is translated by the AFTN/AMHS gateway, using a dependence relationship between the value of an element of the received information object and the value of the translated element in the generated information object. If an element comprises several components, then the element is classified as translated if at least one of its components is translated, and the others are either generated or excluded in generation, discarded or out of scope in reception;

e) **conditionally translated** (T1): used with the same meaning as translated (T), with the exception that the translation of the element is subject to some condition being true, e.g. the presence of an optional element in the received information object;

f) **discarded** (D): used to describe the use of a received AMHS or AFTN information object. It means that the value of the element is not used by the message transfer and control unit when generating the elements of the information object converted from the received information object, and that the semantic information conveyed in the element is discarded during the process of conversion in the AFTN/AMHS gateway. However, the presence or value of the element may be used by the message transfer and control unit for purposes other than conversion, such as report generation and logging;

g) **excluded** (X): used to describe either the generation of an AMHS or AFTN information object or the use of a received information object. Upon generation of an information object, it means that the element is not used or present in the generated information object. Upon reception of an AMHS information object, it means that the presence of the element causes rejection of the information object and generation of an AMHS non-delivery report;

h) **out of scope** (I) or **not-applicable** (-): used to describe the use of a received information object, when the element is either a format element which cannot be processed in any way or an element which is not in the scope of the section, but which presence is included in the ISPICS serving as a basis for the mapping specification.

Chapter 2

SYSTEM LEVEL PROVISIONS

2.1 ATSMHS USERS

2.1.1 Direct AMHS users shall use either the basic ATSMHS or the extended ATSMHS at an ATS message user agent.

2.1.2 Indirect AMHS users shall use only that part of the ATSMHS which corresponds to AFTN functionalities by using the interworking capability provided by an AFTN/AMHS gateway as specified in Chapter 4.

2.2 AMHS MODEL

2.2.1 AMHS functional model

2.2.1.1 Model components

2.2.1.1.1 The systems comprising the AMHS shall themselves be comprised of the following functional objects, the general role of which is described in ISO/IEC 10021-2 and ISO/IEC 9594-2:

a) message transfer agent(s) (MTA);

b) user agent(s) (UA);

c) message store(s) (MS);

d) access unit(s) (AU); and

e) directory user agent(s) (DUA).

2.2.1.1.2 The ISO/IEC 10021 elements of service and protocols used by these functional objects are specified in Chapters 3 and 4.

2.2.1.1.3 The ISO/IEC 9594 services and protocols used by these functional objects are specified in Part IV.

2.2.1.1.4 The DUA is an intrinsic part of the extended ATSMHS. However, they also belong to the ATN directory as specified in Part IV.

2.2.1.2 ATS message server

2.2.1.2.1 An ATS message server shall include an MTA and optionally one or several MS, as specified in 3.2.2 to 3.2.4.

2.2.1.2.2 For the support of the extended ATSMHS, an ATS message server shall include a DUA as specified in 3.2.5.

2.2.1.3 ATS message user agent

2.2.1.3.1 An ATS message user agent shall include a UA as specified in 3.1.2 to 3.1.4.

2.2.1.3.2 For the support of the extended ATSMHS, an ATS message user agent shall include a DUA as specified in 3.1.5.

2.2.1.4 AFTN/AMHS gateway

2.2.1.4.1 An AFTN/AMHS gateway shall include an MTA, which is part of the ATN component of the AFTN/AMHS gateway, and an AU, as specified in Chapter 4. The AU is the message transfer and control unit of the AFTN/AMHS gateway.

2.2.1.4.2 For the support of the extended ATSMHS, an AFTN/AMHS gateway shall include a DUA as specified in 4.2.7.

2.2.2 AMHS information model

2.2.2.1 The following three categories of AMHS information objects shall be used:

a) messages;

b) probes; and

c) reports.

2.2.2.2 *Messages.* In the basic ATSMHS, each AMHS message shall correspond unequivocally to an ATS message.

Note.— The provisions in Chapters 3 and 4 concerning ISO/IEC 10021 envelopes apply to transfer envelopes only.

2.2.2.3 *Probes.* Only direct AMHS users shall be able to submit AMHS probes.

2.2.2.4 *Reports.* AMHS reports shall be delivered only to direct AMHS users.

2.2.3 Security model

2.2.3.1 In the basic ATSMHS, security should be obtained by procedural means rather than by technical features inherent to the AMHS. In the basic ATSMHS, the security for each AMHS System is deemed a local issue to be addressed by the authority in charge of the system.

2.2.3.2 In the extended ATSMHS, a general AMHS security policy shall be implemented from ATS message user agent to ATS message user agent and provide the following security services:

a) message origin authentication;

b) content integrity; and

c) message sequence integrity.

2.2.3.3 The general AMHS security policy aims to protect ATS message exchanges against the identified threats which are masquerade, modification and replay.

2.2.3.4 The general AMHS security policy is aligned with the general ATN security framework as defined in Part IV Chapter 3.

2.2.3.5 The general AMHS security policy is a common minimum which does not prevent specific communities of AMHS users from implementing more stringent security policies in case of additional user requirements.

2.2.3.6 The use of AMHS security services shall apply to:

a) communications between direct AMHS users supporting the extended ATSMHS; and

b) communications from direct AMHS users to AFTN/AMHS gateways supporting the extended ATSMHS.

2.2.3.7 The use of an asymmetric algorithm makes it possible to use security with indirect AMHS users in the direction from AMHS to AFTN only. Asymmetric signature mechanisms cannot be originated at an intermediate device such as a gateway.

2.2.3.8 The AMHS security policy shall make use of the ECDSA as specified in Part IV Chapter 3.

Note.— Part IV Chapter 3 is under development and this provision may need to be updated accordingly.

2.2.4 Management model

2.2.4.1 The scope of this manual for AMHS management is limited to the logging provisions which are defined for the ATS message user agent, the ATS message server and the AFTN/AMHS gateway. Storage, retrieval and exchange of any other management information is deemed a local issue to be addressed by the authority in charge of the system.

2.3 ORGANIZATION OF THE AMHS

2.3.1 The AMHS shall be organizationally composed of AMHS management domains.

2.3.2 An AMHS management domain may elect to operate as either an ADMD or a PRMD, depending on the national telecommunications regulation in force in the State(s) in which it operates and on its relationships with other management domains.

2.3.3 A PRMD which is subordinate to one or several AMHS ADMDs may qualify as AMHS management domain if it satisfies the provisions of this manual.

2.4 AMHS MANAGEMENT DOMAIN CONFIGURATIONS

2.4.1 Minimum set of systems

2.4.1.1 The minimum set of systems implemented and operated by an AMHS management domain shall be:

a) an ATS message server and one or several ATS message user agents;

b) an AFTN/AMHS gateway; or

c) any combination of a) and b).

2.4.2 Interconnection between two AMHS management domains

2.4.2.1 An interconnection between two AMHS management domains shall be implemented as a connection between:

a) two ATS message servers;

b) an ATS message server and an AFTN/AMHS gateway; or

c) two AFTN/AMHS gateways.

2.5 NAMING AND ADDRESSING PRINCIPLES

2.5.1 AMHS naming and addressing

2.5.1.1 AMHS O/R names

2.5.1.1.1 For the support of the basic ATSMHS, the O/R name of an AMHS user shall comprise:

a) the O/R address of the AMHS user (called an MF-address); and

b) optionally the directory name of the AMHS user, if the policy of the AMHS management domain, to which the AMHS user belongs, includes the local support of directory-names.

2.5.1.1.2 With regard to 2.5.1.1.1 b), as a matter of policy local to an AMHS management domain, the directory name component of an O/R name may be used by the implementation of the optional DIR FG.

2.5.1.1.3 For the support of the extended ATSMHS, the O/R name of an AMHS user shall comprise:

a) the O/R address of the AMHS user (called an MF-address); and

b) the directory name of the AMHS user.

2.5.1.2 Structure of an MF-address

The MF-address (MHS-form address) of an AMHS user shall comprise:

a) a set of attributes, as specified in ⁋2.5.1.3, identifying the AMHS management domain of which the AMHS user, either direct or indirect, is a service user; and

b) a set of attributes, as specified in ⁋2.5.1.4, uniquely identifying the AMHS user within the AMHS management domain, and in compliance with its declared addressing scheme. The attributes may include any standard or domain-defined attribute among those specified in ISO/IEC 10021-2, Section 18 other than *country-name*, *administration-domain-name* and *private-domain-name*.

2.5.1.3 AMHS management domain identifier

2.5.1.3.1 The attributes identifying an AMHS management domain shall include the following standard attributes as specified in ISO/IEC 10021-2, Section 18.3:

a) *country-name*, taking the value “XX” as authorized by ITU-T to ICAO under the regime of Recommendation X.666 for international registered organizations,

b) *administration-domain-name*, taking the value “ICAO” as registered by ITU-T for ICAO under the same regime,

c) *private-domain-name*.

2.5.1.3.2 An AMHS management domain identifier shall be unique and declared to ICAO for insertion in the ICAO Register of AMHS Management Domains, by the State or organization in which the management domain operates.

2.5.1.3.3 The ICAO Register of AMHS Management Domains shall include at least one record, for each ICAO State, composed of the following attribute-values to be used in case no other AMHS management domain identifier has been declared by the State:

a) *country-name*, taking the value “XX”,

b) *administration-domain-name*, taking the value “ICAO”, and

c) *private-domain-name*, taking one of the following values:

1) the one or two nationality letters specified in Index to Nationality Letters for Location Indicators in Doc 7910 — *Location Indicators* if there is a one-to-one relationship between the nationality letters and the State;
2) one of the pairs of nationality letters as specified in the Index in Doc 7910, uniquely allocated by the Secretariat if there are several pairs of nationality letters allocated to the State; or

3) an ICAO designator composed of two to four letters, comprising the nationality letters and zero to two additional letters allocated by Secretariat to create a unique identifier.

2.5.1.3.4 To ensure the applicability of ⁋2.5.1.3.3, *private-domain-name* values corresponding to nationality letters specified in Doc 7910 shall be reserved for potential use by an AMHS management domain operating in the State, or in one of the States, identified by the nationality letters.

2.5.1.3.5 The declaration of an AMHS management domain identifier shall:

a) take precedence over the attribute-values specified in 2.5.1.3.3 provided that it does not contradict 2.5.1.3.4,

b) cause overriding of the attribute-values specified in 2.5.1.3.3 by the declared attribute-values in the ICAO Register of AMHS Management Domains.

2.5.1.4 MF-addressing schemes

General provisions

2.5.1.4.1 It is a matter of policy local to an AMHS management domain to implement either an MF-addressing scheme, a locally defined AMHS addressing scheme or a combination of these. The two MF-addressing schemes defined in this manual are the common AMHS addressing scheme and the XF-addressing scheme. Additional MF-addressing schemes may be defined in the future.

2.5.1.4.2 Aeronautical industry X.400 addressing schemes are defined in appropriate aeronautical industry standards.

2.5.1.4.3 Each AMHS addressing scheme includes the set of attributes identifying the AMHS management domain as specified in 2.5.1.3.3.

2.5.1.4.4 An AMHS management domain should implement the common AMHS addressing scheme at the earliest opportunity to allocate MF-addresses to AMHS users within its domain of responsibility.

2.5.1.4.5 An AMHS management domain should avoid deviating from the common AMHS addressing scheme and refrain from implementing a locally defined AMHS addressing scheme unless specific unavoidable constraints (e.g. regulatory) apply to the AMHS management domain.

2.5.1.4.6 When an ICAO contracting State has not declared its use of the common AMHS addressing scheme, nor of a locally defined AMHS addressing scheme, then use of the XF-addressing scheme shall be assumed for indirect and direct AMHS users in this State.

XF-addressing scheme

2.5.1.4.7 An XF-address (translated-form address) is a particular MF-address of which the attributes identifying the user within an AMHS management domain (i.e. those attributes other than country-name, administration-domain-name and private-domain-name) may be converted by an algorithmic method to and from an AF-address (AFTN-form address). The algorithmic method requires the additional use of look-up tables which are limited, i.e. which include only a list of AMHS management domains rather than a list of individual users, to determine the full MF-address of the user.'

2.5.1.4.8 No distinction is made between upper case and lower case in an XF-address.

2.5.1.4.9 The XF-address of a direct or indirect AMHS user shall be composed exclusively of:

a) an AMHS management domain identifier as specified in 2.5.1.3.3, composed of the attribute-values found for the State or organization of the user in the ICAO Register of AMHS Management Domains, using one of the following character combinations extracted from the user's AF-address, with an increasing order of preference from 1) to 3) in the case of multiple matches:

1) two-letters identifying a State as specified in Doc 7910 (characters 1 and 2 of the AF-address);

2) four-letters identifying a location as specified in Doc 7910 (characters 1 to 4 of the AF-address), and identifying a State if there is one single location in the State;

3) a combination of either 1) or 2) above and a three-letter designator specified in *Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services* (Doc 8585) identifying an organization within a State or at a location.

b) an *organization-name* attribute:

1) as specified in ISO/IEC 10021-2, Section 18.3,

2) taking the four-character value “AFTN”, and

3) encoded as a printable string; and

c) an *organizational-unit-names* attribute:

1) as specified in ISO/IEC 10021-2, Section 18.3,

2) comprising a sequence of one single element, which takes the 8-character alphabetical value of the AF-address (AFTN-form address) of the user, and

3) encoded as a printable string.

Common AMHS addressing scheme

2.5.1.4.10 The MF-address of a direct or indirect AMHS user complying with the common AMHS addressing scheme shall be composed exclusively of:

a) an AMHS management domain identifier as specified in 2.5.1.3.3, composed of the attribute-values found for the State or organization of the user in the ICAO Register of AMHS Management Domains, using the following character combinations extracted from the user’s AF-address, with an increasing order of preference from 1) to 3) in case of multiple matches:

1) two-letters identifying a State as specified in Doc 7910 (characters 1 and 2 of the AF-address);

2) four-letters identifying a location as specified in Doc 7910 (characters 1 to 4 of the AF-address), and identifying a State if there is one single location in the State;

3) a combination of either 1) or 2) above and a three-letter designator specified in *Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services* (Doc 8585) identifying an organization within a State or at a location; and

b) an *organization-name* attribute specified in ISO/IEC 10021-2, Section 18.3 taking a value representing a geographical unit;

c) an *organizational-unit-names* attribute specified in ISO/IEC 10021-2, Section 18.3 comprising a sequence of a single element which takes the four-character alphabetical value of the location indicator included in the AF-address of the user; and

d) a *common-name* attribute specified in ISO/IEC 10021-2, Section 18.3 which takes the eight-character alphabetical value of the AF-address of the user.

2.5.1.4.11 No distinction is made between upper case and lower case in a MF-address complying with CAAS.

2.5.1.4.12 The *organization-name* attribute-values selected by an AMHS management domain shall be supplied to ICAO for publication in the ICAO Register of AMHS Management Domains, along with the ICAO location indicators included in the geographical unit represented by each *organization-name* attribute value.

2.5.1.5 AMHS naming schemes

For the support of the extended ATSMHS, the directory name of an AMHS user shall comply with the provisions of Part IV.

2.5.2 Upper layer naming and addressing

Application process titles

2.5.2.1 The application process title of an ATS message server should be as specified in Part III.

2.5.2.2 The application process title of an AFTN/AMHS gateway should be as specified Part III.

2.5.2.3 The application process title of an ATS message user agent should be as specified in Chapter 4 of Part III.

Application entity qualifiers

2.5.2.4 The application entity qualifier of an ATS message server should be “AMS” (integer value 7).

2.5.2.5 The application entity qualifier of an AFTN/AMHS gateway should be “GWB” (integer value 8).

2.5.2.6 The application entity qualifier of an ATS message user agent should be “AUA” (integer value 9).

Transport, session and presentation addresses

2.5.2.7 The TSAP of an ATS message server or of an ATS message user agent shall comply with the provisions of Part III.

2.5.2.8 The assignment of a transport selector value is a matter of policy local to an AMHS management domain.

2.5.2.9 The format and encoding of a session selector in the AMHS is specified in ISO/IEC ISP 11188-1, Section 9.3.

2.5.2.10 The assignment and administration of session selectors is a matter of policy local to an AMHS management domain.

2.5.2.11 The format and encoding of a presentation selector in the AMHS is specified in ISO/IEC ISP 11188-1, Section 7.2.

2.5.2.12 The assignment and administration of presentation selectors is a matter of policy local to an AMHS management domain.

2.6 AMHS ROUTING AND RE-ROUTING

2.6.1 The definition of AMHS routing shall be subject to multilateral agreement.

2.6.2 The MTA implemented by an AMHS management domain shall be collectively able to route on *country-name*, *ADMD-name*, *PRMD-name*, *organization-name* and *organizational-units-name* attributes.

2.7 AMHS TRAFFIC LOGGING UPON ORIGINATION

2.7.1 An AMHS management domain shall be responsible for long-term logging of all messages in their entirety which are originated by its direct AMHS users for a period of at least thirty days.

2.7.2 This requirement implies the logging of the entire BER-encoded ASN.1 messages.

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Chapter 3

ATSMHS SPECIFICATION

3.1 ATS MESSAGE USER AGENT SPECIFICATION

3.1.1 Overview of the specification

3.1.1.1 For the support of the basic ATSMHS, an ATS message user agent complies with:

a) the UA profile specified in 3.1.2, based on profile AMH21 as specified in ISO/IEC ISP 12062-2:1995 (1st or later Edition) and supporting 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; and

b) the provisions related to traffic logging as specified in 3.1.3.

3.1.1.2 For the support of the extended ATSMHS, an ATS message user agent additionally complies with:

a) the specifications in 3.1.4.2 which mandate the support of the IPM BC FG as specified in ISO/IEC ISP 12062-2:2003 (3rd Edition) and file-transfer body parts, in addition to the message content profile specification defined for the basic ATSMHS;

b) the UA profile specified in 3.1.4.3, based on one of the following profiles, and depending on the inclusion of an MS in the attachment ATS message server and the application-contexts supported by the attachment ATS message server:

1) AMH23 (MTS access – P3) as specified in ISO/IEC ISP 12062-4:2003;

2) AMH25 (MTS 94 access – P3) as specified in ISO/IEC ISP 12062-4:2003;

3) AMH24 (enhanced MS access – P7) as specified in ISO/IEC ISP 12062-5:2003; or

4) AMH26 (enhanced MS 94 access – P7) as specified in ISO/IEC ISP 12062-6:2003;

c) the DUA profile specified in 3.1.5.

3.1.2 UA profile specification in support of the basic ATSMHS

3.1.2.1 In the basic ATSMHS, there is no profile specification for the ATS message user agent at the level of the access protocol, i.e. at the level of the communication with the associated ATS message server, as this is considered to be a matter of policy local to each AMHS management domain. If it is desired to use standard ISO/IEC 10021 protocols for this communication, then profile AMH23 (for P3) or profile AMH24 (for P7) as specified in ISO/IEC ISP 12062-4:1995 (or a later edition) or ISO/IEC ISP 12062-5:1995 (or a later edition), respectively, may be implemented.

3.1.2.2 Message content profile specification

3.1.2.2.1 In an ATS message user agent, the content of the IPMs conveyed in support of the basic ATSMHS shall conform to the basic requirements of profile AMH21 as specified in Clause A.1 of ISO/IEC ISP 12062-2:1995 (or a later edition), Annex A and to the additional requirements described in Table 3-1 which are specific to the basic ATSMHS.

3.1.2.2.2 Table 3-1 specifies the additional requirements in the form of a PRL expressing restrictions to a set of rows of the profile AMH21, which are referred to using their reference in ISO/IEC ISP 12062-2. The specified requirements imply the use of interpersonal messaging as specified in 1988 version or later.

Table 3-1. Requirements specific to the basic ATSMHS in addition to profile AMH21

Ref	*Element*	*Origination*		*Reception*		*Basic ATSMHS support*	*Doc 9880 reference*	*ISP 12062-2 notes/ references*
		Base	*ISP*	*Base*	*ISP*			
Part 1: AMH21/A.1.3 IPM body								
1	ia5-text	O	O	O	M	O/M		
1.2	data	M	M	M	M	M/M	3.3.3	
Part 2: AMH21/A.1.3.1 Extended body part support								
1	ia5-text-body-part	O	O	O	M	O/M		see AMH21/ A.1.3/1
11	general-text-body-part	O	M	O	M	M/M	3.3.3 and Part IV, Table 3-1	
Part 3: AMH21/A.1.5 Common data types								
1	RecipientSpecifier							
1.2	notification-requests	O	O	M	M	M/M	3.3.6	
1.2.1	rn	O	O	O	O	M/M	3.3.6	
1.2.2	nrn	O	O	M	M	M/M		
2	ORDescriptor							
2.1	formal-name	M	M1	M	M1	M1/M1	3.3.2	
Part 4: AMH21/A.1.3.2 General text repertoire support								
1	Basic (ISO 646) (repertoire identifiers {1, 6})	M	M	M	M	M/M		Repertoire Group A
2	Basic-1 (ISO 8859-1) (repertoire identifiers {1, 6, 100})	O	M	O	M	O/O		Repertoire Group B
M = mandatory support M1 = mandatory O/R name minimal support O = optional support								

3.1.2.3 Additional requirements for MT elements of service at an ATS message user agent

3.1.2.3.1 For the support of the basic ATSMHS, the *priority* element of an AMHS message generated at an ATS message user agent shall take the value “urgent” if, and only if, the value of the priority indicator in the ATS message priority as specified in 3.3.3.7.2 is “SS”.

3.1.2.3.2 For the support of the basic ATSMHS, the *priority* element of an AMHS message generated at an ATS message user agent shall take the value “urgent” only if it is ascertained that the MF-addresses identifying the message recipients do not specify a DL-name. Failure to meet this dynamic behaviour requirement may result in the absence of receipt-notification, even if the message has been properly delivered to the DL.

3.1.2.3.3 In the basic ATSMHS, the method for determining that an MF-address does not specify a DL-name is considered a local matter.

3.1.2.4 Interpretation of UTC time values

When generating and interpreting UTC time values, an ATS message user agent shall associate dates up to ten years prior to the current time and up to forty years ahead of the current time with the corresponding century, with the interpretation of the remaining 49 years being implementation dependent. This requirement is aligned with the convention used in ISO 10021-4:1997/Cor. 1:1998 and in ISO 10021-7:1997/Cor. 1:1998 for equivalent purposes.

3.1.3 Traffic logging requirements at an ATS message user agent

3.1.3.1 The requirement in 2.7 may be implemented in the ATS message user agent.

3.1.4 Additional UA profile specification in support of the extended ATSMHS

3.1.4.1 An ATS message user agent supporting the extended ATSMHS also needs to maintain the basic ATSMHS capability. Therefore the requirements in this section are in addition to those in 3.1.2.

3.1.4.2 Message content profile specification

3.1.4.2.1 An ATS message user agent supporting the extended ATSMHS shall conform to:

a) the requirements of 3.1.2.2;

b) the requirements additional to AMH21, described in Clause A.2.5 of ISO/IEC ISP 12062-2:2003 for the support of the IPM BC FG; and

c) the additional requirements described in Table 3-2.

3.1.4.2.2 Table 3-2 specifies the additional requirements in the form of a PRL expressing restrictions to a set of rows of profile AMH21, which are referred to using their reference in ISO/IEC ISP 12062-2:2003.

3.1.4.2.3 The use of the bilaterally-defined body part as specified in Table 3-2/AMH21/A1.3.1 enables the exchange of unstructured binary data. In accordance with ISO/IEC 10021-7, 7.3.10 and the subsequent note, its use is now discouraged.

3.1.4.2.4 The use of the file-transfer body part as specified in Table 3-2/AMH21/A1.3.1 is the preferred means of conveying unstructured binary data in IPMs exchanged between ATS message user agents.

3.1.4.2.5 The requirements in 3.1.4.2.1 imply the use of interpersonal messaging as specified in the 1988 version or later.

Table 3-2. Requirements specific to the extended ATSMHS in addition to the basic ATSMHS

Ref	*Element*	*Origination*		*Reception*		*Extended ATSMHS support*	*Doc 9880 reference*	*ISP 12062-2 notes/ references*
		Base	*ISP*	*Base*	*ISP*			
Part 1: AMH21/A.1.2 IPM heading fields								
17	extensions	M	M	M	M	M/M	3.3.4.1	
17.6	authorization-time	O	O	O	O	M/M	3.3.4.2	
17.12	originators-reference	O	O	O	O	M/M	3.3.4.3	
17.13	precedence-policy-identifier	O	O	O	O	M/M	3.3.4.5, 3.3.4.6 and 3.3.4.7	
Part 2: AMH21/A.1.3 IPM body								
10	bilaterally-defined	O	O	O	M	O/M	3.3.5	
Part 3: AMH21/A.1.3.1 Extended body part support								
9	bilaterally-defined-body-part	O	O	O	O	O/M	3.3.5.1	
12	file-transfer-body-part	O	O	O	O	M/M	3.3.5.1 and 3.3.5.2	AMH21/ A.1.3.3
Part 4: AMH21/A.1.5 common data types								
1	RecipientSpecifier							
1.4	recipient-extensions	O	M	O	M	M/M	3.3.4.1	
1.4.3	precedence	O	O	O	O	M/M	3.3.4.8	
M = mandatory support M1 = mandatory O/R name minimal support O = optional support								

3.1.4.2.6 For the encoding of a file-transfer-body-part, the octet-aligned EXTERNAL encoding shall be used as specified in ISO/IEC ISP 12062-2:2003. Only one EXTERNAL component shall be used. When the file to be conveyed contains a compound structure, this may be represented as a SEQUENCE OF EXTERNALS; the primary data shall be placed in the first EXTERNAL. Receiving systems may ignore all but the first EXTERNAL in the SEQUENCE.

3.1.4.3 Requirements for MT elements of service at an ATS message user agent

3.1.4.3.1 For the support of the extended ATSMHS, an ATS message user agent shall support one of the following, depending on the inclusion of an MS in the attachment ATS message server and the application-contexts supported by the attachment ATS message server:

a) a profile based on profile AMH23 (MTS access – P3), as specified in ISO/IEC ISP 12062-4:2003, conforming to the:

1) basic requirements of profile AMH23, as specified in Clause B.1 of the referenced ISP;

2) additional requirements described in Clause B.2.7 of the referenced ISP for support of the IPM SEC FG implementing Security-Class S0; and

3) additional requirements described in Clause B.2.8 of the referenced ISP for the support of the IPM DIR FG;

b) a profile based on profile AMH25 (MTS 94 access – P3), as specified in ISO/IEC ISP 12062-4:2003, conforming to the:

1) basic requirements of profile AMH25 as specified in Clause B.1 of the referenced ISP;

2) additional requirements described in Clause B.2.7 of the referenced ISP for support of the IPM SEC FG implementing Security-Class S0; and

3) additional requirements described in Clause B.2.8 of the referenced ISP for support of the IPM DIR FG;

c) a profile based on profile AMH24 (enhanced MS access – P7) as specified in ISO/IEC ISP 12062-5:2003, conforming to the:

1) basic requirements of profile AMH24 as specified in Clauses A.1 and B.1 of the referenced ISP for an MS-user;

2) additional requirements described in Clause B.2.7 of the referenced ISP for support by an MS-user of the IPM SEC FG implementing Security-Class S0;

3) additional requirements described in Clause B.2.8 of the referenced ISP for support by an MS-user of the IPM DIR FG; and

4) the additional requirements described in Clause B.2.9 of the referenced ISP for support by an MS-user of the IPM BC FG; or

d) a profile based on profile AMH26 (enhanced MS 94 access – P7) as specified in ISO/IEC ISP 12062-6:2003 conforming to the:

1) basic requirements of profile AMH26 as specified in Clauses A.1 and B.1 of the referenced ISP for an MS-user;

2) additional requirements described in Clause B.2.7 of the referenced ISP for support by an MS-user of the IPM SEC FG implementing Security-Class S0;

3) additional requirements described in Clause B.2.8 of the referenced ISP for support by an MS-user of the IPM DIR FG; and

4) the additional requirements described in Clause B.2.13 of the referenced ISP for the support by an MS-user of the IPM BC FG.

3.1.4.3.2 Due to the structure of ISO/IEC ISPs, 3.1.4.3.1 implicitly places requirements concerning the P3 or P7 implementation for the support of the:

a) basic requirements of profiles AMH12, AMH13, AMH14 or AMH15 specified for common messaging in Annex A.1 of ISO/IEC ISPs 10611-4:2003, 10611-5:2003, 10611-4:2003 or 10611-6:2003, respectively;

b) additional requirements specified for the common messaging SEC FG (implementing Security-Class S0) in Annex A.2 of these ISPs for an MTS-user or MS-user, as appropriate; and

c) additional requirements specified for the common messaging DIR FG in Annex A.2 of these ISPs for an MTS-user or MS-user, as appropriate.

Security requirements

3.1.4.3.3 For the support of security in the context of the extended ATSMHS, an ATS message user agent shall make use of the ECDSA as specified in Part IV Chapter 3 for the signature algorithm.

Note.— Part IV Chapter 3 is under development and this provision may need to be updated accordingly.

3.1.4.3.4 For the generation of a secure AMHS message in compliance with the AMHS security policy defined in 2.2.3.2, an ATS message user agent supporting the extended ATSMHS shall include in the *per-recipient-extensions* of the message envelope, for each intended recipient, a message token:

a) generated as specified in Table 3-3; and

b) with a *criticality* field of the extension element taking the abstract-value “non-critical”.

3.1.4.3.5 Table 3-3 specifies the generation of the message token in the form of a PRL expressing requirements on both static support and dynamic use of the message token components. The rows, references and ISP requirements are extracted from the AMH12 – MTS access (P3) profile, as specified in ISO/IEC ISP 10611-4:2003. The specification applies identically if the ATS message user agent implements another P3 or P7 profile, since the message token description is common to all P3/P7 profiles.

3.1.4.3.6 In a secure AMHS message, the *token-type-identifier* element shall take the abstract-value “asymmetric-token”.

3.1.4.3.7 In a secure AMHS message, each *asymmetric-token* element shall be computed as specified in ISO/IEC 10021-4 by application of an ASN.1 SIGNED macro using DER as specified in ISO/IEC 9594-8/X.509, where the signature is generated by application of the ATN ASP specified in Part IV Chapter 3. There is no requirement to encode the full message using DER, but for the ASN.1 SIGNED and SIGNATURE macros, the use of encoding rules providing canonicity is mandated by X.509.

3.1.4.3.8 In a secure AMHS message, the *signature-algorithm-identifier* element of each *message-token* shall contain the algorithm OID value corresponding to the ATN signature scheme (“ecdsa-with-SHA1”), as specified in Part IV Chapter 3, and NULL parameters.

Note.— Part IV Chapter 3 is under development and the provisions above may need to be updated accordingly.

3.1.4.3.9 The *name* element of each *message-token* shall contain either the MF-address or the directory name of the intended recipient.

3.1.4.3.10 The *time* element of each *message-token* shall contain the time at which the message was generated.

3.1.4.3.11 The *content-integrity-check* extension element of each *message-token* shall contain:

a) a digital signature applied to the concatenation of the OID value corresponding to the ATN signature scheme and the *message-content;* and

b) a *criticality* field of the extension element taking the abstract-value “non-critical”.

3.1.4.3.12 Upon reception of an AMHS message containing security elements, an ATS message user agent supporting the extended ATSMHS shall make use of a valid originator’s certificate to decode and verify the contained security elements by application of the ATN AVP specified in Part IV Chapter 3.

Note.— See note under 3.1.4.3.8.

3.1.4.3.13 The originator’s certificate may be obtained from the ATN directory, from the subject AMHS message itself if the originator included its certificate as a per-message-extension field of the message envelope, or from a local source.

3.1.4.3.14 The validity of the originator’s certificate may be checked using the mechanisms defined in Part IV which may include the use of ATN CRLs.

3.1.4.3.15 The verification of the digital signature may require DER re-encoding of the elements in clear which had been signed prior to the application of the hashing function for verification.

Table 3-3. Use of security elements (message token) in the extended ATSMHS

Ref	*Element*	*Static support requirements*			*Dynamic action upon generation of a secure message*	*ATN reference*
		Base	*ISP (with support of SEC S0 FG)*	*Extended ATSMHS*		
Part 1: AMH12/A.1.9/4 Extension data types (message token)						
4	MessageToken	O	M	M	G	
4.1	token-type-identifier	M	M	M	G	3.1.4.3.6
4.2	asymmetric-token	M	M	M	G	3.1.4.3.7
4.2.1	signature-algorithm-identifier	M	M	M	G	3.1.4.3.8
4.2.2	Name	M	M	M	G	3.1.4.3.9
4.2.3	Time	M	M	M	G	3.1.4.3.10
4.2.4	signed-data	O	M	M	G	
4.2.4.1	content-confidentiality-algorithm-identifier	O	C1	O	O	see Note
4.2.4.2	content-integrity-check	O	M	M	G	3.1.4.3.11
4.2.4.3	message-security-label	O	O	O	O	see Note
4.2.4.4	proof-of-delivery-request	O	O	O	O	see Note
4.2.4.5	message-sequence-number	O	O	O	O	see Note
4.2.5	encryption-algorithm-identifier	O	O	O	O	see Note
4.2.6	encrypted-data	O	O	O	O	see Note
4.2.6.1	content-confidentiality-key	O	O	O	O	see Note
4.2.6.2	content-integrity-check	M	M	M	O	see Note
4.2.6.3	message-security-label	O	O	O	O	see Note
4.2.6.4	content-integrity-key	O	O	O	O	see Note

Ref	Element	Static support requirements			Dynamic action upon generation of a secure message	ATN reference
		Base	ISP (with support of SEC S0 FG)	Extended ATSMHS		
4.2.6.5	message-sequence-number	O	O	O	O	see Note

C1 = if S0C then M else O
G = generated
M = mandatory support
O = optional support

Note.— This element is not required as part of the AMHS security policy.

3.1.5 ATS message user agent DUA profile

3.1.5.1 For the support of the extended ATSMHS, an ATS message user agent shall include a DUA:

a) supporting the DAP profile specified in Part IV; and

b) supporting the DUA object classes and attribute types specified in Part IV.

3.1.5.2 The communication and interworking between the message handling service UA and the DUA included in an ATS message user agent are considered to be a local implementation matter, and as such they are not specified in this manual.

3.2 ATS MESSAGE SERVER SPECIFICATION

3.2.1 Overview of the specification

3.2.1.1 For the support of the basic ATSMHS, an ATS message server shall comply with:

a) the profile specification expressed in 3.2.2; and

b) the provisions related to traffic logging as specified in 3.2.3.

3.2.1.2 For the support of the extended ATSMHS, an ATS message server shall additionally comply with:

a) one or several of the MTS-access and/or MS-access profiles specified in 3.2.4, based on the following profiles, depending on the inclusion of an MS in the ATS message server, and on the application-contexts supported by the ATS message server:

1) AMH12 (MTS access – P3) as specified in ISO/IEC ISP 10611-4:2003;

2) AMH14 (MTS 94 access – P3) as specified in ISO/IEC ISP 10611-4:2003;

3) AMH13 (enhanced MS access – P7) as specified in ISO/IEC ISP 10611-5:2003; and

4) AMH15 (enhanced MS 94 access – P7) as specified in ISO/IEC ISP 10611-6:2003.

b) the DUA profile specified in 3.2.5.

3.2.2 Profile specification in support of the basic ATSMHS

3.2.2.1 P1 and upper layer requirements

3.2.2.1.1 In an ATS message server, the message transfer (P1) implementation of the IPM service in support of the basic ATSMHS shall conform to:

a) the basic requirements of profile AMH22 as specified in Clause B.1 of ISO/IEC ISP 12062-3:1995, Annex B; and

b) the additional requirements described in Clause B.2.2 for the support of the IPM DL FG.

3.2.2.1.2 The specification in 3.2.2.1 implicitly places the following requirements on the P1 implementation:

a) the basic requirements of profile AMH11 specified for common messaging in Annex A.1 of ISO/IEC ISP 10611-3:1994 implying mandatory support of profile AMH111 implementing the MTS-transfer application context; and

b) the additional requirements specified for the common messaging DL FG in Annex A.2.2 of ISO/IEC ISP 10611-3:1994.

3.2.2.1.3 As a consequence of ⁋3.2.1.2, the optional implementation of MS in an ATS message server, being related to the access protocol from an ATS message user agent to an ATS message server, is a matter of policy local to an AMHS management domain.

3.2.2.1.4 The additional support by an ATS message server of profile AMH112 as specified in ISO/IEC ISP 10611-3:1994 for conformance to CCITT X.400, in order to interconnect with public ADMDs, is a matter of policy local to an AMHS management domain.

3.2.2.1.5 For the use of the ACSE by an AMHS application, the application-context name which is used as a parameter in an A-ASSOCIATE is defined in the base standards (see ISO/IEC 10021-6).

3.2.2.1.6 The specification in ⁋3.2.2.1 places no requirements of the RTSE or ACSE other than conformance with ISO/IEC ISP 10611-2:1994 in accordance with the P1 application-context(s) for which conformance is claimed.

3.2.2.1.7 The specification in ⁋3.2.2.1 places no requirements on the presentation and session layers other than conformance with ISO/IEC ISP 10611-2:1994 in accordance with the P1 application-context(s) for which conformance is claimed.

3.2.2.2 Use of the transport service

3.2.2.2.1 The basic ATSMHS shall make use of the connection mode transport service in either or both of the following configurations:

a) provided by the ATN ICS as generally specified in Part III with the additional specifications in ⁋3.2.2.2.3 to 3.2.2.2.6; or

b) provided by the IPS as generally specified Doc 9896, with the additional specifications in ⁋3.2.2.2.7, ⁋3.2.2.2.8 and ⁋3.2.2.2.9.

3.2.2.2.2 For the support of the basic ATSMHS, the use of the expedited data option at the establishment of the transport connection is a local matter which may depend on the implemented application-context.

Transport service over the ATN ICS

3.2.2.2.3 For the support of the basic ATSMHS over the ATN ICS, the connection mode transport service provided by the ATN COTP as specified in Part III shall be used.

3.2.2.2.4 For the support of the basic ATSMHS, transport connections shall be established over the ATN transport service between systems belonging to the AMHS using the RER abstract-value “high”.

3.2.2.2.5 For the support of the basic ATSMHS, transport connections shall be established over the ATN transport service between systems belonging to the AMHS using the transport connection priority abstract-value “6” which corresponds to the message category “flight regularity communications”.

3.2.2.2.6 For the support of the basic ATSMHS, transport connections shall be established over the ATN transport service between systems belonging to the AMHS using the value of the ATN security label as specified in Part III which corresponds to:

a) the ATN traffic type “ATN operational communications”;

b) the subtype “air traffic services communications”; and

c) “no traffic type policy preference”.

Transport service over the ATN IPS

3.2.2.2.7 For the support of the basic ATSMHS over the ATN IPS, the connection mode transport service provided by the IPS TCP shall be used.

3.2.2.2.8 When the IPv4 protocol version is used, the connection mode transport service over TCP shall be provided as specified in RFC1006.

3.2.2.2.9 When the IPv6 protocol version is used, the connection mode transport service over TCP shall be provided as specified in RFC2126.

3.2.2.3 Interpretation of UTC time values

When generating and interpreting UTC time values, an ATS message server shall associate dates up to ten years prior to the current time and up to forty years ahead of the current time with the corresponding century, with the interpretation of the remaining forty-nine years being implementation dependent. This requirement is aligned with the convention used in ISO 10021-4:1997/Cor. 1:1998 for equivalent purposes.

3.2.3 Traffic logging requirements at an ATS message server

3.2.3.1 The ATS message server shall perform a long-term logging, for a period of at least thirty days, of the actions taken with respect to every message received at the ATS message server, whether from an ATS message user agent or from another ATS message server, and to every report received or generated at the ATS message server.

3.2.3.2 For the long-term logging of information related to a message submitted to or received by an ATS message server, the following parameters related to the message shall be logged:

a) *message-identifier*;

b) *priority*;

c) *content-type*;

d) *originator-name*;

e) *recipient-name* elements on responsibility list, which identifiy recipients whose *per-Recipient-Indicator responsibility* bit has the abstract-value “responsible”;

f) message-content-size;

g) last element of the *trace-information* (if any);
h) *arrival-time* or *submission-time*;

i) transfer destination (if any);

j) transfer time (if any);

k) *this-recipient-name* (if message delivery is performed by the ATS message server);

l) *delivery-time* (if any);

m) delivery and/or non-delivery reports generated (if any); and

n) event date/time.

3.2.3.3 For the long-term logging of information related to a report generated or received by an ATS message server, the following parameters related to the report shall be logged:

a) *report-identifier*;

b) *subject-identifier*;

c) *actual-recipient-name* elements;

d) *report-type* elements;

e) *report-destination-name*;

f) last element of the *trace-information* (if any);

g) *arrival-time* in the ATS message server or generation time;

h) transfer destination (if any);

i) transfer time (if any);

j) *OR-name* of the report recipient (if report delivery is performed by the ATS message server);

k) *delivery-time* (if any); and

l) event date/time.

3.2.4 Additional profile specification in support of the extended ATSMHS

3.2.4.1 An ATS message server supporting the extended ATSMHS also needs to maintain the basic ATSMHS capability. Therefore, the profile requirements in this section are in addition to those in 3.2.2.

Additional requirements for the P1 profile

3.2.4.2 For the support of the extended ATSMHS, an ATS message server shall conform to the additional requirements described in Clause A.2.8 of ISO/IEC ISP 10611-3:1994 (or a later edition), for the support by an MTA of the DIR FG.

MTA profile specification for MTS-access

3.2.4.3 For the support of the extended ATSMHS, an ATS message server shall support one or two profiles based on profiles AMH12 and/or AMH14 as specified in ISO/IEC ISP 10611-4:2003, conforming to:

a) the basic requirements of profiles AMH12 and/or AMH14, as specified in Clause A.1 of the referenced ISP for an MTA;

b) the additional requirements described in Clause A.2.7 of the referenced ISP for an MTA, for the support by an MTA of the SEC FG, implementing Security-Class S0; and

c) the additional requirements described in Clause A.2.8 of the referenced ISP for an MTA, for the support by an MTA of the DIR FG.

MS profile specification for MS-access

3.2.4.4 For the support of the extended ATSMHS, if it includes one or several MS, an ATS message server shall support one or two profiles based on profile AMH13 as specified in ISO/IEC ISP 10611-5:2003 and/or profile AMH15 as specified in ISO/IEC ISP 10611-6:2003 conforming to:

a) the basic requirements of AMH13 and/or AMH15, as specified in Clause A.1 of the referenced ISPs for an MS;

b) the additional requirements described in Clause A.2.5 of the referenced ISPs for the support by an MS of the SEC FG, implementing Security-Class S0; and

c) the additional requirements described in Clause A.2.6 of the referenced ISPs for the support by an MS of the DIR FG.

3.2.5 ATS Message server DUA

3.2.5.1 For the support of the extended ATSMHS, an ATS message server shall include a DUA:

a) supporting the DAP profile specified in Part IV; and

b) supporting the DUA object classes and attribute types specified in Part IV.

3.2.5.2 The communication and interworking between the MTA and the DUA included in an ATS message server are considered to be a local implementation matter, and as such they are not specified in this manual.

3.3 PARAMETERS

3.3.1 General characteristics

3.3.1.1 The parameters used upon creation of an IPM depend upon:

a) the level of service (basic or extended) supported by the originator;
b) the nature of data (text or binary) which is intended to be exchanged; and

c) the level of service (basic or extended) supported by the intended recipients.

3.3.1.2 A direct AMHS user may determine from the information stored in the AMHS directory what level of service is supported by the intended recipients of the message.

3.3.2 AMHS addresses

3.3.2.1 In the AMHS, the O/R address of a direct AMHS user belonging to an AMHS management domain shall be an MF-address.

3.3.3 Text

3.3.3.1 IA-5-text body or body parts shall be used only for IPMs in support of textual data exchange.

3.3.3.2 The body of an IPM shall comprise a single body part carrying IA-5 characters and structured as depicted in Table 3-4.

Table 3-4. Structure of an IPM IA-5-text body part in the ATSMHS

Ref	*Element*	*Basic ATSMHS support*		*Value*	*IA-5 encoding*
		Orig	*Rec*		
1	ATS-message-Header	M	M	see 3.3.3.3	
1.1	start-of-heading	M	M	(SOH)	(0/1)
1.2	ATS-message-Priority	M	M		
1.2.1	priority-prompt	M	M	PRI:(single space)	(5/0)(5/2)(4/9)(3/10)(2/0)
1.2.2	priority-indicator	M	M	see 3.3.3.7.2	see 3.3.3.7.2
1.2.3	priority-separator	M	M	(CR)(LF)	(0/13)(0/10)
1.3	ATS-message-Filing-Time	M	M		

Ref	*Element*	*Basic ATSMHS support*		*Value*	*IA-5 encoding*
1.3.1	filing-time-prompt	M	M	FT:(single space)	(4/6)(5/4)(3/10)(2/0)
1.3.2	filing-time	M	M	see 3.3.3.7.3	see 3.3.3.7.3
1.3.3	filing-time-separator	M	M	(CR)(LF)	(0/13)(0/10)
1.4	ATS-message-Optional-Heading-Info	O	M		
1.4.1	OHI-prompt	M	M	OHI:(single space)	(4/15)(4/8)(4/9)(3/10)(2/0)
1.4.2	optional-heading-information	M	M	see 3.3.3.7.4	see 3.3.3.7.4
1.4.3	OHI-separator	M	M	(CR)(LF)	(0/13)(0/10)
1.5	start-of-text	M	M	(STX)	(0/2)
2	ATS-message-Text	M	M	see 3.3.3.8	see 3.3.3.8
M = mandatory support O = optional support					

3.3.3.3 The body part structure of an IPM and its components described in ¶3.3.3 are specific to the basic ATSMHS.

3.3.3.4 Section ¶3.3.3 places no constraint on the implementation of an IPM, which may take place at the level of the user interface.

3.3.3.5 This requirement relates to the static capability of an ATS message user agent to generate such a structured body part.

3.3.3.7 ATS message header

3.3.3.7.1 The ATS message header shall be generated by the originating user if:

a) the originator supports only the basic ATSMHS; or

b) at least one of the intended recipients of the message supports only the basic ATSMHS.

This requirement relates to the dynamic behaviour of the user upon origination.

ATS message priority

3.3.3.7.2 Each message shall be assigned to one of five priority groups which are designated by the priority indicators SS, DD, FF, GG and KK, and are contained in the *priority-indicator* element if the ATS message header is generated by the originating user.

ATS message filing time

3.3.3.7.3 Each message shall include a filing-time element, designated as a date-time group consisting of six numerical characters, the first two digits representing the date of the month and the last four digits the hours and minutes in UTC, if the ATS message header is generated by the originating user.

ATS message optional heading information

3.3.3.7.4 It shall be possible to associate optional heading information with each message, contained in the *optional-heading-information* element, if the ATS message header is generated by the originating user.

3.3.3.7.5 The value of the *optional-heading-information* element shall comprise a character string with a maximum length of either:

a) 53 characters if the message priority differs from “SS”; or

b) 48 characters if the message priority is “SS”.

3.3.3.7.6 The ATS-message-optional-heading-info shall be absent if the optional-heading-information is empty.

3.3.3.8 ATS message text

The ATS-message-text element shall be composed of IA-5 characters with no further restriction.

3.3.4 Use of IPM elements in support of the extended ATSMHS

3.3.4.1 The following IPM heading fields and recipient extensions shall be generated by an originating extended ATSMHS user if all the intended recipients of the message support the extended ATSMHS:

a) *authorization-time;*

b) *originators-reference;*

c) *precedence-policy-identifier;* and

d) *precedence.*

Authorization-time

3.3.4.2 Each message generated by an originating extended ATSMHS user shall include an authorization-time IPM heading field, as specified in ISO/IEC 10021-7:2003, Section A.1.6, whose value will be equivalent to that of a filing time in the basic ATSMHS, if all the intended recipients of the message support the extended ATSMHS.

Originators-reference

3.3.4.3 It shall be possible to associate optional heading information with each message generated by an originating extended ATSMHS user, contained in the *originators-reference* IPM heading field, as specified in ISO/IEC 10021-7:2003, Section A.1.12, if all the intended recipients of the message support the extended ATSMHS.

3.3.4.4 The value of the optional heading information shall comprise a character string with a maximum length of either:

a) 53 characters if the message priority differs from “SS”; or

b) 48 characters if the message priority is “SS”.

Precedence-policy-identifier

3.3.4.5 In support of the extended ATSMHS, a precedence policy, as defined in ISO/IEC 10021-7:2003, shall

apply as follows:

a) the only authorized values for the IPM precedence are those listed in the column “precedence value” of Table 3-5; and

b) the mapping between the IPM precedence and the AFTN priority is as stated in Table 3-5.

Table 3-5. Correspondence between IPM precedence and ATS message priority indicator

ATS message priority indicator	*Precedence value (integer)*
SS	107
DD	71
FF	57
GG	28
KK	14

3.3.4.6 Each message generated by an originating extended ATSMHS user shall include a *precedence-policy-identifier* IPM heading field, as specified in ISO/IEC 10021-7:2003, Section A.1.13, if all the intended recipients of the message support the extended ATSMHS.

3.3.4.7 The *precedence-policy-identifier* IPM heading field shall have the object-identifier value {iso (1) identified-organisation (3) icao (27) atn-amhs (8) parameters (0) amhs-precedence-policy (0)}.

Precedence

3.3.4.8 Each *recipient-specifier* element in a message generated by an originating extended ATSMHS user shall include a *recipient-extensions* field in which the *precedence* recipient extension, as specified in ISO/IEC 10021-7:2003, Section A.2.2 is present and has one of the values specified in Table 3-5, if all the intended recipients of the message support the extended ATSMHS.

3.3.5 Binary data exchanges

3.3.5.1 The use of bilaterally-defined body parts for IPMs in support of binary data exchanges should be avoided.

3.3.5.2 File-transfer body parts shall be used only for IPMs in support of the data exchanges that contain any binary data.

3.3.5.3 For the support of file-transfer body parts, an ATS message user agent shall comply with the requirements of ISO/IEC ISP 12062-2:2003 (AMH21), Section A.1.3.3 (file transfer parameters).

3.3.6 Notification requests

3.3.6.1 The *notification-requests* element in a RecipientSpecifier in an IPM Heading shall take the abstract-value “rn” if, and only if, the value of the priority-indicator is “SS”, and the message is not an acknowledgement message as specified in Annex 10, Volume II, 4.4.10.1.6.1 and 4.4.15.6. This provision places no constraint on its implementation, which takes place at the level of the user interface.

3.4 SUBSETTING RULES

3.4.1 Implementation of an ATS message UA or ATS message server claiming conformance with this manual for either the basic ATSMHS or extended ATSMHS shall support the ATSMHS FGs as shown in Table 3-6.

Table 3-6. Classification of ATSMHS FGs

FG	*Status (basic service)*	*Status (extended service)*	*Associated predicate*
Basic ATSMHS	M	M	Basic
Use of file transfer body parts for binary data exchange	O	M	FTBP
Use of IPM heading extensions	O	M	IHE
AMHS security	O	M	SEC
Use of directory	O	M	DIR
M = mandatory support O = optional support			

3.4.2 Implementation of an ATS message UA or ATS message server claiming conformance with this manual for a subset of the extended ATSMHS shall support one configuration among those defined in Table 3-7.

Table 3-7. Definition of ATSMHS subsets

List of configurations: ATSMHS subsets	*Doc 9880 Status (basic)*	*Doc 9880 Status (extended)*
I. Basic ATSMHS (basic)	M	C.1
II. Basic + FTBP	-	C.1
III. Basic + IHE	-	C.1
IV. Basic + DIR	-	C.1
V. Basic + DIR + FTBP	-	C.1
VI. Basic + DIR + IHE	-	C.1
VII. Basic + DIR +SEC	-	C.1
VIII. Basic + IHE + DIR + SEC	-	C.1
IX. Basic + IHE + DIR + FTBP	-	C.1
X. Basic + IHE + DIR + FTBP + SEC	-	C.1
C.1 = Only one configuration must be supported. M = Mandatory support		

Chapter 4

AFTN/AMHS GATEWAY SPECIFICATION

4.1 GENERAL

4.1.1 An AFTN/AMHS gateway shall provide for interworking between the AFTN and the ATN such that communication with other AFTN/AMHS gateways and with ATS message servers is possible.

4.1.2 An AFTN/AMHS gateway shall consist of the following logical components:

a) AFTN component;

b) ATN component;

c) message transfer and control unit;

d) control position; and

e) DUA, if the gateway supports the extended ATSMHS.

4.1.2.1 This division into logical components is a convenient way of specifying functions of a gateway. There is no requirement for an AFTN/AMHS gateway to be implemented according to this structure.

4.1.3 An AFTN/AMHS gateway shall be able to perform actions upon receipt of any category of AMHS information object by its ATN component.

4.1.4 An AFTN/AMHS gateway shall be able to perform actions upon receipt of any type of AFTN message by its AFTN component.

4.1.5 An AFTN/AMHS gateway supporting the extended ATSMHS shall be able to retrieve information about AMHS users from ATN directory system agents.

4.2 AFTN/AMHS GATEWAY COMPONENTS

4.2.1 AFTN component

4.2.1.1 The AFTN component shall handle the interface to the AFTN and provide an interface to the message transfer and control unit implementing:

a) all the applicable requirements of Annex 10, Volume II in a manner so as to be externally indistinguishable from an operational AFTN station by the AFTN centre to which the gateway is connected; and

b) additional requirements which are necessary due to the AFTN component pertaining to an AFTN/AMHS gateway.

4.2.1.2 If an AFTN/AMHS gateway is connected to an AFTN centre which is capable of using only ITA-2 format, the AFTN component shall convert messages to/from the IA-5 format. This allows the message transfer and control unit to use IA-5 characters internally, as specified in 4.2.3.2.

4.2.1.3 The AFTN component shall incorporate an AFTN procedure handler providing for all AFTN functions prescribed for the interface to the AFTN.

4.2.1.4 When received by the AFTN component, AFTN service messages as generally specified in Annex 10, Volume II, 4.4.1.1.9 and subparagraphs shall be handled by the AFTN component of the gateway in one of four mutually exclusive manners, depending on the category of the service message:

a) transfer to the message transfer and control unit to be processed as specified in 4.4 if the service message is an AFTN acknowledgement message, as specified in Annex 10, Volume II, 4.4.10.1.6.1 and 4.4.15.6;

b) transfer to the message transfer and control unit to be processed as specified in ¶4.4 if the service message is an AFTN service message requesting correction of a message received with an unknown addressee indicator as specified in Annex 10, Volume II, 4.4.11.13.3;

c) processing as specified in 4.2.1.12 if the service message is an AFTN service message requesting from the originator repetition of an incorrectly received message when it is detected that a message has been mutilated, as specified in Annex 10, Volume II, 4.4.11.1 and 4.4.16.2.2;

d) processing in compliance with the provisions of Annex 10, Volume II, if the service message belongs to any other category of AFTN service message and is addressed to the AFTN/AMHS gateway; or

e) forwarding the service message to the message transfer and control unit in any other case.

4.2.1.5 When received by an AFTN/AMHS gateway, AFTN channel-check transmissions as specified in Annex 10, Volume II, 4.4.9.3 and 4.4.15.5 shall:

a) be handled by the AFTN component in compliance with the provisions of Annex 10, Volume II; and

b) be prevented from being passed to the message transfer and control unit.

4.2.1.6 The AFTN component shall pass all messages, other than those referred to in ¶4.2.1.4 c) and d), and in ¶4.2.1.5, received from the AFTN to the message transfer and control unit for processing as specified in ¶4.4, and provided that the conditions of ¶4.2.1.7 are met.

4.2.1.7 The processing by the AFTN component shall ensure that all messages and service messages received from the AFTN and passed to the message transfer and control unit for further processing by the AFTN/AMHS gateway are constructed in strict accordance with the provisions of Annex 10, Volume II, 4.4.15.1 through 4.4.15.3.12 and 4.4.15.6.

4.2.1.8 The AFTN component shall perform short-term retention of all messages transmitted towards the AFTN in a manner equivalent to that specified for an AFTN communication centre in Annex 10, Volume II, 4.4.1.7.

4.2.1.9 The AFTN component shall perform long-term retention of the heading, address and origin parts of all messages received from the AFTN, with the message receipt-time and the action taken thereon, for a period of at least thirty days.

4.2.1.10 The AFTN component shall perform long-term retention of all AFTN messages that it generates, in their entirety, for a period of at least thirty days.

4.2.1.11 The AFTN component shall perform long-term retention of the heading, address and origin parts of all messages received from the message transfer and control unit and the action taken thereon for a period of at least thirty days.

4.2.1.12 Upon reception by an AFTN/AMHS gateway of an AFTN service message requesting repetition by the originator of an incorrectly received message as specified in Annex 10, Volume II, 4.4.11.1 or 4.4.16.2.2, the AFTN component shall perform one of the following actions:

a) forward the service message to the message transfer and control unit if the referenced subject AFTN message did not pass through the gateway or if the AFTN component is not in possession of an unmutilated copy of the subject AFTN message; or

b) reassume responsibility for the mutilated message and repeat the message in compliance with the provisions of Annex 10, Volume II, 4.4.11.3 if the mutilated message is detected as having passed through the gateway and if the AFTN component is in possession of an unmutilated copy of the message.

The determination whether the AFTN component is in possession of an unmutilated copy of the message may require the assistance of a control position.

4.2.1.13 If, for any reason, the message transfer and control unit is unable to accept AFTN messages passed by the AFTN component, the AFTN component shall handle this situation in compliance with the provisions of Annex 10, Volume II, 4.4.1.5.2.3. Such a condition may be caused by the inability of the message transfer and control unit to pass AMHS messages to the ATN component.

4.2.1.14 The AFTN component shall ensure that all information objects constructed by the message transfer and control unit for transmission over the AFTN are handled in accordance with the AFTN procedure in the application of ⁋4.2.1.3.

4.2.1.15 If the AFTN component is unable to handle an AFTN service message or an AFTN channel-check transmission in compliance with the provisions of Annex 10, Volume II, as specified in ⁋4.2.1.4 d) or ⁋4.2.1.5, the error condition shall be logged and reported to a control position.

4.2.1.16 An AFTN address shall be allocated to the AFTN component.

4.2.2 ATN component

4.2.2.1 The ATN component shall allow the AFTN/AMHS gateway to function as an end system on the ATN.

4.2.2.2 The ATN component shall handle the interface to the AMHS and provide an interface to the message transfer and control unit as specified in ⁋4.2.4, implementing an MTA complying with the profile specification included in ⁋3.2.2, and with the additional profile specification included in ⁋3.2.4 if the gateway supports the extended ATSMHS, so as to be externally indistinguishable from an ATS message server by the ATS message server(s) or other gateway(s) to which it is connected.

4.2.2.3 If, for any reason, the message transfer and control unit is unable to accept messages or probes passed by the ATN component, ATN component shall:

a) attempt to reroute the message or probe as specified in ISO/IEC 10021-4, 14.3.4.4; and

b) if no alternate route is available in the MTA routing tables or none of such routes can be successfully used, reject the message for all the message recipients, whose *responsibility* element in the *per-recipient-indicator* has the abstract-value “responsible” in the received message, with the *non-delivery-reason-code* and *non-delivery-diagnostic-code* elements of the non-delivery report taking the abstract-values specified in the base standards (ISO/IEC 10021-4, 14.3.4.4,1).

4.2.2.3.1 Such a condition may be caused by the inability of the message transfer and control unit to pass AFTN messages to the AFTN component.

4.2.2.4 If the AMHS management domain operating an AFTN/AMHS gateway desires to implement message handling system optional FGs in addition to the specification in ¶4.2.2.2, this shall be performed in the ATN component. This applies in particular to the redirection FG. If implemented, redirection may be performed by the ATN component, in response to a failure situation as envisaged in ¶4.2.2.3, for example.

4.2.2.5 The ATN component shall ensure that all information objects constructed by the message transfer and control unit for transfer in the AMHS are handled in accordance with the procedures specified in the base standards for a relaying MTA implementing the profile specified in ¶3.2.2, in application of ¶4.2.2.2.

4.2.2.6 The ATN component shall implement a traffic logging function identical to that of the MTA included in an ATS message server as specified in ¶3.2.3.

4.2.2.7 The ATN component shall ensure that all AMHS information objects passed to the message transfer and control unit comply with the base standards.

4.2.2.8 In an AFTN/AMHS gateway supporting the extended ATSMHS, the ATN component should interface with the DUA component to perform DL-expansion using the ATN directory service, for the implementation of the DL FG.

4.2.3 Message transfer and control unit

4.2.3.1 The message transfer and control unit in an AFTN/AMHS gateway shall provide a bi-directional conversion facility between the AFTN component and the ATN component, consisting of:

a) a set of general functions as specified in ¶4.3; and

b) AFTN/AMHS conversion functions specified in ¶4.4 for the AFTN to AMHS conversion and in ¶4.5 for the AMHS to AFTN conversion, respectively.

4.2.3.2 The message transfer and control unit shall use IA-5 characters internally.

4.2.3.3 The message transfer and control unit in an AFTN/AMHS gateway shall pass all the AMHS information objects which it constructs in application of ¶4.4 and ¶4.5.6 to the ATN component of the gateway, for further conveyance in the AMHS.

4.2.3.4 For the generation of AMHS messages and reports and the processing of received AMHS messages, probes and reports, the message transfer and control unit shall have the capability to interpret the semantics and to perform actions related to the ISO/IEC 10021 elements of service which are part of the basic requirements of the MT

service as specified in ISO/IEC ISP 12062-3:1995 (or a later edition).

4.2.3.5 The message transfer and control unit in an AFTN/AMHS gateway shall pass all the AFTN messages which it constructs in application of Section 4.5 and ¶4.4.2.1.4.2 to the AFTN component of the AFTN/AMHS gateway, for further conveyance in the AFTN.

4.2.3.6 The message transfer and control unit shall ensure that all the AMHS information objects which it constructs comply with Section 7 (for IPMs) and Section 8 (for RNs) of ISO/IEC 10021-7, complemented by the additional requirements included in ¶3.3, and with the Section 12.2.1.1 of ISO/IEC 10021-4 (for messages) and Section 12.2.1.3 of ISO/IEC 10021-4 (for reports).

4.2.3.7 The message transfer and control unit shall ensure that all the AFTN information objects which it constructs comply with Annex 10, Volume II, 4.4.15.

4.2.3.8 The message transfer and control unit of an AFTN/AMHS gateway supporting the extended ATSMHS shall interface with the DUA component of the gateway to:

a) determine the level of ATSMHS supported by the intended recipients of the AMHS IPMs which it constructs; and

b) allow retrieval of security information from the ATN directory.

4.2.3.9 The message transfer and control unit of an AFTN/AMHS gateway supporting the extended ATSMHS shall have the capability to interpret the semantics and perform actions related to the ISO/IEC 10021 security elements of service forming part of the AMHS security policy as specified in ¶2.2.3.2 and ¶3.1.4.3.3 to 3.1.4.3.15.

4.2.3.10 The message transfer and control unit of an AFTN/AMHS gateway supporting the extended ATSMHS should interface with the DUA component of the gateway to allow retrieval of address information from the ATN directory for the purpose of address conversion.

4.2.4 Interface between the ATN component and the message transfer and control unit

4.2.4.1 The ATN component shall exchange information objects with the message transfer and control unit via its MTA transfer port as specified in ISO/IEC 10021-4, Section 12.2.

4.2.4.2 The ATN component shall invoke the message-transfer, report-transfer and probe-transfer abstract operations, respectively, to pass AMHS messages, reports and probes to the message transfer and control unit.

4.2.4.3 The message transfer and control unit shall invoke the message-transfer and report-transfer abstract operations, respectively, to pass AMHS messages and reports to the ATN component.

4.2.5 Interface between the AFTN component and the message transfer and control unit

4.2.5.1 An AFTN message or service message passed by the AFTN component to the message transfer and control unit in application of ¶4.2.1.4 a) and b), ¶4.2.1.6 and ¶4.2.1.7 shall be:

a) transferred according to the table of priorities specified in Annex 10, Volume II, 4.4.1.2.1; and

b) passed as received by the AFTN component from the adjacent AFTN centre, with the possible

exception of an ITA-2 to IA-5 conversion performed in application of ¶4.2.1.2, and including the unaltered AFTN heading if present in the received message.

4.2.5.2 An AFTN message or service message passed by the message transfer and control unit to the AFTN component in application of ¶4.2.3.5 shall be:

a) transferred according to the table of priorities specified in Annex 10, Volume II, 4.4.1.2.1; and
b) passed as constructed by the message transfer and control unit, and thus without message heading as specified in Annex 10, Volume II, 4.4.15.1.1.

4.2.5.3 The AFTN component shall return to the message transfer and control unit, as the result of the transfer operation described in ¶4.2.5.2, the transmission identification, if any, constructed by the AFTN component for the transmission of the message or service message over the AFTN.

4.2.6 AFTN/AMHS gateway control position

4.2.6.1 The AFTN/AMHS gateway control position shall be used as the place where errors which occurred in the AFTN/AMHS gateway and certain non-deliveries which occurred in the AMHS are reported for appropriate action.

4.2.6.2 The appropriate action to be undertaken on reporting of an error or a non-delivery to an AFTN/AMHS gateway control position shall be either:

a) a matter of policy which is local to the AMHS management domain operating the AFTN/AMHS gateway; or

b) subject to multilateral agreements.

4.2.6.2.1 For some categories of error situations, this manual specifies the actions to be taken, e.g. message rejection and generation of an appropriate service message (to the AFTN) or non-delivery report (to the AMHS). The specified actions aim to minimize the assistance of the control position. However, it may be a matter of policy local to the AMHS management domain operating the AFTN/AMHS gateway to try to reduce the occurrence of message rejection with the assistance of the control position.

4.2.6.3 When the action chosen to handle an error situation includes the generation of an AMHS information object, the category of information object used for this purpose shall be an IPM conveying appropriate service information. The service information to be conveyed may be derived, for example, from an AFTN service message. The presentation of the service information is a matter of local policy.

4.2.6.4 In an AFTN/AMHS gateway supporting the extended ATSMHS, the control position should interface with the DUA component to allow the control position to access the ATN directory service.

4.2.7 DUA component

4.2.7.1 The DUA component in an AFTN/AMHS gateway supporting the extended ATSMHS shall comply with the ATN DUA specification as included in Part IV.

4.2.7.1.1 The interface between the DUA component and other gateway components (ATN component, message transfer and control unit, control position) is a matter of implementation outside of the scope of this manual.

4.2.7.2 The DUA component in an AFTN/AMHS gateway supporting the extended ATSMHS shall be used for the:

a) determination of the level of ATSMHS supported by AMHS users; and

b) retrieval of AMHS security information.

4.2.7.3 The DUA component in an AFTN/AMHS gateway supporting the extended ATSMHS should be used to retrieve information from the ATN directory in support of address conversion.

4.3 GENERAL FUNCTIONS

4.3.1 Traffic logging

4.3.1.1 The message transfer and control unit shall perform long-term logging as specified in this section for a period of at least thirty days, of information related to the following exchanges of information objects with the ATN component and the AFTN component:

a) AMHS message transfer out (to the ATN component);

b) AMHS report transfer out (to the ATN component);

c) AMHS message transfer in (from the ATN component);

d) AMHS report transfer in (from the ATN component);

e) AFTN message conveyance out (to the AFTN component);

f) AFTN message conveyance in (from the AFTN component);

g) AFTN service message indicating an unknown addressee indicator conveyance in (from the AFTN component); and

h) AFTN service message indicating an unknown addressee indicator conveyance out (to the AFTN component).

4.3.1.2 For the long-term logging of information related to an AMHS message transfer in and AFTN message conveyance out, the following parameters relating to the messages shall be logged by the message transfer and control unit:

a) input *message-identifier*;

b) *IPM-identifier*, if any;

c) *common-fields* and either *receipt-fields* or *non-receipt-fields* of the IPN, if any;

d) action taken thereon (reject with *non-delivery-reason-code* and *non-delivery-diagnostic-code*, convert as AFTN message, convert as AFTN acknowledgement message, splitting due to number of recipients or message length, delivery report generation);

e) event date/time;

f) origin line of converted AFTN message or service message, if any; and

g) transmission identification of AFTN message(s) or service message(s) if returned by the AFTN component.

4.3.1.3 For the long-term logging of information related to AFTN message conveyance in and AMHS message transfer out, the following parameters relating to the messages shall be logged by the message transfer and control unit:

a) origin line of AFTN message (or AFTN acknowledgement message);

b) transmission identification of AFTN message or service message, if any;

c) action taken thereon (reject with rejection cause, convert as IPM, convert as RN, AFTN service message indicating an unknown addressee indicator generation);

d) event date/time;

e) *MTS-identifier*, if any; and

f) *IPM-identifier*, if any.

4.3.1.4 For the long-term logging of information related to an AMHS message report in, and/or AFTN service message indicating an unknown addressee indicator conveyance out, the following parameters relating to the report and/or service message shall be logged by the message transfer and control unit:

a) *report-identifier* (if report in);

b) *subject-identifier* (if report in);

c) action taken thereon if report in (discard, convert into AFTN service message);

d) event date/time;

e) origin line of converted AFTN service message (if service message out);

f) origin line of subject AFTN message (if service message out and no report in); and

g) transmission identification of AFTN message or service message, if any.

4.3.1.5 For the long-term logging of information related to an AFTN service message indicating an unknown addressee indicator conveyance in, and/or to an AMHS message report out, the following parameters relating to the service message and/or report shall be logged by the message transfer and control unit:

a) origin line of converted AFTN service message (if service message in);

b) origin line of subject AFTN message (if service message in);

c) transmission identification of AFTN message or service message, if any;

d) action taken thereon if AFTN service message in (discard, convert into AMHS report, convert into IPM);

e) *report-identifier* (if report out);

f) *subject-identifier* (if report out);

g) MTS-identifier of resulting message, if the AFTN service message was converted into an IPM; and

h) event date/time.

4.3.2 Address look-up tables

4.3.2.1 The message transfer and control unit shall include look-up tables used for address conversion, covering three aspects:

a) an MD look-up table as specified in ⁋4.3.2.2 for the determination of an AMHS management domain based on elements of an AF-address;

b) a CAAS look-up table as specified in ⁋4.3.2.3 for the construction of a CAAS-compliant address based on elements of an AF-address; and

c) a user address look-up table of individual users as specified in ⁋4.3.2.4 for the conversion of an AF-address to and from an MF-address of any AMHS addressing scheme.

4.3.2.1.1 This description aims to provide a conceptual model of the relationships between address information elements which need to be exploited for address conversion in the message transfer and control unit. In this context, the term “look-up table” refers to a set of entries, each of them representing an individual correlation between information elements in the AFTN and AMHS address spaces. The way in which these tables are practically structured and stored in the message transfer and control unit is an implementation matter not constrained by the present provisions.

4.3.2.1.2 The way in which these tables are populated and maintained up to date is an organizational matter.

4.3.2.1.3 The way in which the ATN directory can be used to support address conversion and look-up tables for an AFTN/AMHS gateway supporting the extended ATSMHS is an implementation matter which is described for guidance purposes in the *Comprehensive Aeronautical Telecommunication Network (ATN) Manual* (Doc 9739).

4.3.2.2 MD look-up tables

4.3.2.2.1 The MD look-up table maintained in the message transfer and control unit shall include a list of entries identifying an organizational entity which is or intends to be an AMHS management domain, or collectively uses or intends to use the services of a given AMHS management domain, each entry comprising:

a) a string of characters identifying one of the following:

1) a country (two-letter designator specified in Doc 7910);

2) a location (four-letter designator as specified in Doc 7910), or a State if this is the single location in the State;

3) an organization within a country (combination of 1) above with a three-letter designator specified in Doc 8585); or

4) an organization at a location (combination of 2) above with a three-letter designator specified in Doc 8585); and

b) if present, the set of attributes identifying either the AMHS management domain implemented by the organizational entity (alone or collectively) defined in a), if existing, or the AMHS management domain intended to be implemented, this set of attributes being composed of:

1) *country-name*;
2) *administration-domain-name*; and

3) *private-domain-name* (if any).

4.3.2.2.2 As an implementation matter, “wild cards” may be used to optimize the amount of information stored as item a). A “wild card” character is a character that can be replaced by any alphabetical character.

4.3.2.2.3 It shall be possible to unambiguously derive a set of attributes in ¶4.3.2.2.1 b) from any character string in ¶4.3.2.2.1 a) by a search operation in the MD look-up table.

4.3.2.2.4 The MD look-up table maintained by in the message transfer and control unit shall include at least one entry for each AMHS management domain registered in the ICAO Register of AMHS Management Domains.

4.3.2.2.5 For each AMHS management domain identified in the MD look-up table, a reference to the type of addressing scheme declared in the ICAO Register of AMHS Management Domains shall be maintained in the MD look-up table.

4.3.2.3 CAAS look-up tables

4.3.2.3.1 The CAAS look-up table maintained in the message transfer and control unit shall include a list of entries providing the correspondence between the *organization-name* and *organizational-unit-names* address attributes in each AMHS management domain having selected the CAAS and having provided this information through the ICAO Register of AMHS Management Domains, each such entry comprising:

a) a location indicator specified in Doc 7910, identifying a location within the AMHS management domain, which contains the first four characters of the AF-address and is identical to the *organizational-unit-names* attribute value for all AMHS direct and indirect users with CAAS addresses in this location; and

b) the *country-name*, *administration-domain-name*, *private-domain-name* and *organization-name* attribute values for all AMHS direct and indirect users with CAAS addresses in the location identified by a).

4.3.2.3.2 The CAAS look-up table maintained in the message transfer and control unit shall include at least one entry for each location indicator listed in Doc 7910 and in the ICAO Register of AMHS Management Domains.

4.3.2.3.3 As an implementation matter, “wild cards” may be used to optimize the amount of information stored. A “wild card” character is a character that can be replaced by any alphabetical character.

4.3.2.3.4 The presence in the CAAS look-up table of multiple entries including the same value for the location indicator in 4.3.2.3.1 a) shall be permitted only when the contents of the MD look-up table defined in ¶4.3.2.2 includes several management domain entries allowing to unambiguously derive a single item of ¶4.3.2.3.1 b) for the considered AF-address.

4.3.2.3.5 It shall be possible to unambiguously derive a single item b) from an AF-address by a search in the CAAS look-up table, combined if necessary with a search in the MD look-up table as described in ¶4.3.2.2.2 in case of multiple entries for the location indicator in application of ¶4.3.2.3.4.

4.3.2.3.6 There is a many-to-one relationship between organizational-unit-names attribute values (location indicator) and the combination of AMHS management domain identifier and organization-name attribute values. Each organizational-unit-names is associated with precisely one organization-name within an AMHS management domain. In case of multiple possible associations due to multiple AMHS management domains operating in a single location, the MD look-up table is used to differentiate between AMHS management domains.

4.3.2.4 User address look-up tables

4.3.2.4.1 The user address look-up table maintained by the message transfer and control unit shall include a list of entries, each of them comprising:

a) the AF-address of either an indirect AMHS user who also has an MF-address, or a direct AMHS user who has an AF-address for communication with indirect AMHS users; and

b) the MF-address of that AMHS user, either direct or indirect, including all its address attributes.

4.3.2.4.2 It shall be possible to derive unambiguously 4.3.2.4.1 b) from 4.3.2.4.1 a), and vice-versa, by a searching operation in the user address look-up table.

4.3.2.4.3 In order not to restrict the potential form of an MF-address, a user address look-up table shall support in the attributes included under 4.3.2.4.1 b) all the general attribute types authorized in ISO/IEC 10021-2, Section 18.5, Table 10.

4.4 AFTN TO AMHS CONVERSION

Note.— This section specifies the actions to be performed by an AFTN/AMHS gateway upon reception of messages from the AFTN for conveyance in the AMHS, after the accomplishment of the AFTN-related procedures by the AFTN component as specified in 4.2.1.

4.4.1 Control function

4.4.1.1 Upon reception by the message transfer and control unit of a message passed from the AFTN component, as the result of the provisions of ¶4.2.1.4 a) and b), and ¶4.2.1.6, the received message shall be processed in one of three mutually exclusive manners depending on the message category:

a) processing as specified in ¶4.4.3, if the received message is an AFTN acknowledgement message as

specified in Annex 10, Volume II, 4.4.15.6;

b) processing as specified in ¶4.4.4, if the received message is an AFTN service message requesting correction by the originator of a message received with an unknown addressee indicator as specified in Annex 10, Volume II, 4.4.11.13.3; or

c) processing as specified in ¶4.4.2, if the received message is other than those referred to in a) and b) above.

4.4.1.2 Upon completion of the processing specified in ¶4.4.1.1, the following shall take place:

a) transfer of the resulting AMHS information object, if any, to the ATN component for conveyance in the AMHS; and

b) transfer of the resulting AFTN service message, if any, to the AFTN component for conveyance over the AFTN.

4.4.1.3 If, for any reason, the processing specified in ¶4.4.1.1 and ¶4.4.1.2 cannot be properly achieved, the procedure shall unsuccessfully terminate, resulting in:

a) logging of the error situation and reporting to a control position; and

b) storage of the AFTN message for appropriate action at the control position.

4.4.2 Conversion of AFTN messages

Upon reception by the message transfer and control unit of an AFTN message passed from the AFTN component to be conveyed over the AMHS, this AFTN message shall be converted into an IPM conveyed with a message transfer envelope to be transferred and delivered in the AMHS in compliance with the following:

a) the specification of how the components of the AFTN message are used for mapping onto the AMHS message parameters, as included in 4.4.2.1, depending on:

1) the level of ATSMHS supported by the AFTN/AMHS gateway; and

2) the level of ATSMHS supported by the intended recipients of the IPM;

b) the specification of how the IPM is generated, as included in 4.4.2.2, depending on:

1) the level of ATSMHS supported by the AFTN/AMHS gateway; and

2) the level of ATSMHS supported by the intended recipients of the IPM; and

c) the specification of how the message transfer envelope elements are generated, as included in 4.4.2.3.

4.4.2.1 Use of AFTN message components

4.4.2.1.1 Each component of an AFTN message shall be processed as specified in the column “action” of Table 4-1. These components, which are classified as “T” or “T1” in the column “action” shall be translated into the AMHS parameter specified in the column “AMHS parameter” and according to the specification in the provision referred to in the column “mapping”.

Table 4-1. Use of AFTN message components

AFTN message part	*Component*	*Action*	*AMHS parameter*	*Mapping*
Heading	Start-of-Heading Character	-	-	-
	Transmission Identification	D	-	-
address	Alignment Function	-	-	-
	Priority Indicator	T	ATS-message-Priority (see Table 4-3/Part 5/1.2) or precedence (see Table 4-3/Part 4/1.4.3) priority (see Table 4-4/Part 1/1.1.6)	see ¶4.4.2.1.2
	addressee Indicator(s)	T	primary-recipients (see Table 4-3/Part 2/4) recipient-name (see Table 4-4/Part 1/1.2.1)	see ¶4.4.2.1.4.2
	Alignment Function	-	-	“
Origin	Filing Time	T	ATS-message-Filing-Time (see Table 4-3/Part 5/1.3) or authorization-time (see Table 4-3/Part 2/17.6)	see ¶4.4.2.1.5
	Originator Indicator	T	originator (see Table 4-3/Part 2/2) this-IPM (see Table 4-3/Part 2/1) originator-name (see Table 4-4/Part 1/1.1.2)	see ¶4.4.2.1.4.1
	Priority Alarm	D	-	-
	Optional Heading Information	T1	ATS-message-Optional-Heading-Info (see Table 4-3/Part 5/1.4) or originators-reference (see Table 4-3/Part 2/17.12)	see ¶4.4.2.1.6 or ¶4.4.2.1.7
	Alignment Function	-	-	-
	Start-of-Text Character	-		-
Text		T	ATS-message-Text (see Table 4-3/Part 5/2)	see ¶4.4.2.1.8
Ending	Alignment Function	-	-	-
	Page-feed sequence	-	-	-
	End-of-Text Character	-	-	-

D = discarded
T = translated
T1 = conditionally translated
- = not applicable

4.4.2.1.2 The value of the priority indicator of an AFTN message shall:

a) be mapped into the abstract-value of the *priority* element of the message transfer envelope of the converted AMHS message as specified in the second column of Table 4-2; and

b) either

1) be conveyed as the value of the priority indicator in the ATS-message-Priority element of the IPM text of the converted AMHS message as specified in the third column of Table 4-2, if the AFTN/AMHS gateway, or at least one of the intended recipients of the message, supports only the basic ATSMHS; or

2) be mapped into one of the authorized values of the precedence element of the recipient-extensions element of the recipient-specifier, as specified in the fourth column of Table 4-2, if the AFTN/AMHS gateway and all the intended recipients of the message support the extended ATSMHS.

Table 4-2. Mapping of AFTN priority indicator

AFTN priority indicator	*AMHS message transfer envelope priority*	*AMHS ATS-message-priority priority-indicator*	*AMHS IPM precedence*
SS	Urgent	SS	107
DD	Normal	DD	71
FF	Normal	FF	57
GG	Non-urgent	GG	28
KK	Non-urgent	KK	14

4.4.2.1.3 The transport priority used for the conveyance of AMHS messages is specified in ¶3.2.2.2.5.

4.4.2.1.4 The value of an AFTN address included in an AFTN message shall be converted into an MF-address as respectively specified in ¶4.4.2.1.4.1 and ¶4.4.2.1.4.2 depending whether it is an originator indicator or an addressee indicator.

Note.— The way in which the ATN directory can be used to support address conversion and look-up tables for an AFTN/AMHS gateway supporting the extended ATSMHS is an implementation matter described for guidance purposes in Doc 9739.

4.4.2.1.4.1 The following actions shall be performed to translate the originator indicator of an AFTN message into the MF-address included in the *originator-name* of the converted AMHS message:

a) translation into the single MF-address exactly matching the AF-address of the originator, if such an MF-address can be determined from the user address look-up table maintained in the message transfer and control unit; or

b) if a) cannot be achieved, translation into the MF-address derived from the AF-address of the originator as follows:

1) determination of the country-name, administration-domain-name and private-domain-name address attributes belonging to the single AMHS management domain, if any, among the entries of the MD look-up table exactly matching the following character substrings of the AF-address and selected, if several matches are found, on the basis of a decreasing order of precedence from i) to iv):

i) characters 1 to 7,

ii) characters 1, 2, 5, 6 and 7,

iii) characters 1, 2, 3 and 4,

iv) characters 1 and 2; and

2) determination of the other address attributes according to either of the following methods, depending on the addressing scheme declared by the AMHS management domain determined as in item 1) above, and found in the MD look-up table as a result of 4.3.2.2.5:

i) if the AMHS management domain has selected the common AMHS addressing scheme, allocation of the AF-address to the *common-name* attribute value, determination of the *organizational-unit-names* attribute value by extraction of the location indicator from the AF-address, and determination of the single *organization-name* attribute value, if any, matching the location indicator in the CAAS look-up table for the considered AMHS management domain; or

ii) if the AMHS management domain has selected the XF-addressing scheme, allocation of the AF-address to the *organizational-unit-names* attribute value and allocation of the string "AFTN" to the *organization-name* attribute value; or

c) if the procedure defined in b) above cannot be achieved, or does not unambiguously result in a single MF-address, unsuccessful termination of the procedure resulting in:

1) logging of the error situation and reporting to a control position; and

2) storage of the AFTN message for appropriate action at the control position.

Note.— The specification above does not constrain the search algorithm provided that the expected result is achieved.

4.4.2.1.4.2 Each addressee indicator of an AFTN message shall be translated into the MF-address included in a *recipient-name* of the converted AMHS message in the same way as an originator indicator, with the exception that the unsuccessful termination for one or several addressee indicators additionally results in the generation, in compliance with the provisions of Annex 10, Volume II, 4.4.11.13.3, of an AFTN service message requesting correction by the originator of a message received with an unknown addressee indicator, the unknown addressee indicator(s) included in item 8) of the text message taking the value of these addressee indicators for which the translation process failed.

Note.— A PDAI included in the addressee indicator(s) of an AFTN message is translated into an MF-address in the same way as any addressee indicator.

4.4.2.1.5 The value of the filing time of an AFTN message shall be either:

a) conveyed as the value of the filing-time element in the ATS-message-Filing-Time element of the IPM text of the converted AMHS message if the AFTN/AMHS gateway, or at least of one the intended recipients of the message, supports only the basic ATSMHS; or

b) converted into the value of the *authorization-time* heading field extension of the IPM, which is of ASN.1 type GeneralizedTime, if the AFTN/AMHS gateway and all the intended recipients of the message support the extended ATSMHS, as the result of the following:

1) generation by the message transfer and control unit of the four figures identifying the year in the *authorization-time* element;

2) generation by the message transfer and control unit of the two figures identifying the month in the *authorization-time* element;

3) mapping of the first two figures of the date-time group into the value of the two figures identifying the day in the *authorization-time* element;

4) mapping of the value of the four last figures of the date-time group into the value of the four figures identifying the hours and minutes in the *authorization-time* element; and

5) addition by the message transfer and control unit of a final character in the *authorization-time* element taking the value "Z".

4.4.2.1.6 The ATS-message-Optional-Heading-Info element of the IPM text in the converted AMHS message shall either:

a) convey the value of the optional heading information of the AFTN message as the value of its optional-heading-information element, if the optional heading information element is present in the AFTN message and if the AFTN/AMHS gateway, or at least one of the intended recipients of the message supports only the basic ATSMHS; or

b) be omitted in the converted AMHS message, if the optional heading information element is not present in the AFTN message.

4.4.2.1.7 The originators-reference IPM heading field extension in the converted AMHS message shall either:

a) convey the value of the Optional Heading Information of the AFTN message if the optional heading information element is present in the AFTN message and if the AFTN/AMHS gateway and all the intended recipients of the message support the extended ATSMHS; or

b) be omitted in the converted AMHS message if the optional heading information element is not present in the AFTN message.

4.4.2.1.8 The content of the text of an AFTN message, shall be conveyed in its entirety as the value of the ATS-message-Text element in the IPM text of the converted AMHS message.

4.4.2.2 Generation of IPM

4.4.2.2.1 Each of the elements composing the IPM resulting from the conversion of an AFTN message in the message transfer and control unit shall be processed as specified in the column "action" of Table 4-3. These elements, which are classified as "G", "G1", "T" or "T1" in the column "action", shall be either generated or translated according to the specification in the provision referred to in the column "mapping".

4.4.2.2.2 Table 4-3 is structured as a PRL derived from the profile specification included in Section 3 of this manual and consequently from the ISPICS pro forma included in ISO/IEC ISP 12062-2 (AMH21) as well as from Table 3-4. The columns "base" and "ISP" under "origination" are extracted from ISO/IEC ISP 12062-2 and the column "ATSMHS" specifies the static capability of an IPM AU supporting the ATSMHS, i.e. the ability to generate the element as part of an IPM carrying an ATS message. The references to the ISP profile are indicated in the part titles as AMH21/ref, where appropriate. The references in column "ref" are those of the ISP.

Table 4-3. IPM generation

Ref	Element	Origination			Action	Mapping/Notes
		Base	ISP	ATSMHS		
Part 1: AMH21/A.1.1 Supported information objects						
1	IPM	M	M	M	T	see Part 1/1.1 and 1.2
1.1	Heading	M	M	M	T	see Part 2
1.2	Body	M	M	M	T	see Part 3
2	IPN	M	M	M	-	out of the scope of this provision
Part 2: AMH21/A.1.2 IPM heading fields						
1	this-IPM	M	M	M	T	see Part 4/3
2	Originator	M	M	M	T	see ¤4.4.2.2.3 and Part 4/2
3	authorizing-users	O	O	O	X	-
4	primary-recipients	M	M	M	T	see ¤4.4.2.2.4 and Part 4/1
5	copy-recipients	M	M	M	X	-
6	blind-copy-recipients	O	O	O	X	-
7	replied-to-IPM	M	M	M	X	-
8	obsoleted-IPMs	O	O	O	X	-
9	related-IPMs	O	O	O	X	-
10	Subject	M	M	M	X	-
11	expiry-time	O	O	O	X	-
12	reply-time	O	O	O	X	-
13	reply-recipients	O	O	O	X	-
14	Importance	O	O	O	X	-
15	Sensitivity	O	O	O	X	-
16	auto-forwarded	O	O	O	X	-
17	Extensions	C1	C1		T1	see ¤4.4.2.2.10
17.1	incomplete-copy	O	O	O	X	-
17.2	Languages	O	O	O	X	-
17.3	auto-submitted	O	O	O	X	-
17.4*	body-part-signatures	O	O	O	X	
17.5*	ipm-security-label	O	O	O	X	
17.6*	authorization-time	O	O	M	T1	see ¤4.4.2.1.5
17.7*	circulation-list-recipients	O	O	O	X	
17.8*	distribution-codes	O	O	O	X	
17.9*	extended-subject	M	M	M	X	
17.10*	information-category	O	O	O	X	
17.11*	manual-handling-instructions	O	O	O	X	

Ref	*Element*	*Origination*			*Action*	*Mapping/Notes*
		Base	*ISP*	*ATSMHS*		
17.12*	originators-reference	O	O	M	T1	see ¶4.4.2.1.7
17.13*	precedence-policy-identifier	O	O	M	G2	see ¶4.4.2.2.11
Part 3: AMH21/A.1.3 IPM body						
1	ia5-text	O	O	M	T	see Part 3/1.1 and 1.2
1.1	Parameters	M	M	M	G	see Part 3/1.1.1
1.1.1	Repertoire	O	O	O	G	see ¶4.4.2.2.5
1.2	Data	M	M	M	T	see Part 5
2	Voice	I	I	I	X	-
3	g3-facsimile	O	O	O	X	-
4	g4-class-1	O	O	O	X	-
5	Teletex	O	O	O	X	-
6	videotext	O	O	O	X	-
7*	Encrypted	O	O	O	X	-
8	message	O	O	O	X	-
9	mixed-mode	O	O	O	X	-
10	bilaterally-defined	O	O	O	X	-
11	nationally-defined	O	O	O	X	-
12	externally-defined/extended	C1	M	M	X	-
Part 4: AMH21/A.1.5 common data types						
1	RecipientSpecifier					
1.1	Recipient	M	M	M	T	see ¶4.4.2.2.6 and Part 4/2
1.2	notification-requests	O	O	M	T	see Part 4/1.2.1-1.2.3
1.2.1	Rn	O	O	M	T	see ¶4.4.2.2.7
1.2.2	Nrn	O	O	M	T	see ¶4.4.2.2.7
1.2.3	ipm-return	O	O	O	X	-
1.3	reply-requested	O	O	O	X	-
1.4*	recipient-extensions	O	M	M	T1	see 4.4.2.2.10
1.4.1*	recipient-security-request	O	O	O	X	
1.4.2*	circulation-list-indicator	O	O	O	X	
1.4.3*	Precedence	O	O	M	T1	see 4.4.2.1.2 and 4.4.2.1.3
2	ORDescriptor					
2.1	formal-name	M	M1	M	T	see 4.4.2.2.8
2.2	free-form-name	O	O	O	X	-
2.3	telephone-number	O	O	O	X	-
3	IPMIdentifier					
3.1	User	M	M	M	T	see ¶4.4.2.2.9

Ref	Element	Origination			Action	Mapping/Notes
		Base	ISP	ATSMHS		
3.2	user-relative-identifier	M	M	M	G	-
Part 5: IPM Support of the basic ATSMHS						
1	ATS-message-Header	-	-	M	T1	see Part 5/1.1-1.6 and 4.4.2.2.12
1.1	start-of-heading	-	-	M	G	see 3.3.3
1.2	ATS-message-Priority	-	-	M	T	see Part 5/1.2.1-1.2.3
1.2.1	priority-prompt	-	-	M	G	see 3.3.3
1.2.2	priority-indicator	-	-	M	T	see 4.4.2.1.2 and 4.4.2.1.3
1.2.3	priority-separator	-	-	M	G	see 3.3.3
1.3	ATS-message-Filing-Time	-	-	M	T	see Part 5/1.3.1-1.3.3
1.3.1	filing-time-prompt	-	-	M	G	see 3.3.3
1.3.2	filing-time	-	-	M	T	see 4.4.2.1.5
1.3.3	filing-time-separator	-	-	M	G	see 3.3.3
1.4	ATS-message-Optional-Heading-Info	-	-	O	T1	see Part 5/1.4.1-1.4.3
1.4.1	OHI-prompt	-	-	M	G	see 3.3.3
1.4.2	optional-heading-information	-	-	M	T	see 4.4.2.1.6
1.4.3	OHI-separator	-	-	M	G	see 3.3.3
1.5	start-of-text	-	-	M	G	see 3.3.3
2	ATS-message-Text	-	-	M	T	see 4.4.2.1.8

C1 = if the AFTN/AMHS gateway supports the extended ATSMHS then M else O
G = generated
G2 = conditionally generated
I = out of scope
M = mandatory support
M1 = mandatory O/R name minimal support
O = optional support
T = translated
T1 = conditionally translated
X = excluded (not used)
* = requirement applicable only if the AFTN/AMHS gateway supports the extended ATSMHS
- = not applicable

4.4.2.2.3 The *originator* heading field shall:

a) identify the indirect AMHS user who originated the AFTN message; and

b) be structured as specified in Table 4-3/Part 4/2.

4.4.2.2.4 The *primary-recipients* heading field shall:

a) include the identification of the recipient(s) of the AFTN message; and

b) be structured as specified in Table 4-3/Part 4/1.

4.4.2.2.5 The element *repertoire* shall take its default abstract-value “ia5”.

4.4.2.2.6 The element(s) *recipient* in the *primary-recipients* heading field shall:

a) identify the recipient(s) of the AFTN message; and

b) be structured as specified in Table 4-3/Part 4/2.

4.4.2.2.7 The values “rn” and “nrn” shall be taken simultaneously by the element *notification-requests* if, and only if the element *priority-indicator* included in the message, as specified Table 4-3/Part 5/1.2.2, has the value “SS” and the message is not an acknowledgement message to be converted into an IPM as the result of ¶4.4.3.1.1 or ¶4.4.3.1.2.

4.4.2.2.8 The element *formal-name* shall:

a) take the form of an MF-address; and

b) be converted as specified in ¶4.4.2.1.4.

4.4.2.2.9 The element *user* in the *this-IPM* heading field shall:

a) be the MF-address of the indirect AMHS user who originated the AFTN message; and

b) be converted as specified in ¶4.4.2.1.4.1.

4.4.2.2.10 The IPM heading fields and recipient extensions specified in 3.3.4.1 shall be conditionally generated by translation of AFTN message elements, if the AFTN/AMHS gateway and all the intended recipients of the message support the extended ATSMHS.

4.4.2.2.11 The element *precedence-policy-identifier* of the IPM heading field extensions shall:

a) be conditionally generated if the AFTN/AMHS gateway and all the intended recipients of the message support the extended ATSMHS;

b) if present, take the object-identifier value specified in ¶3.3.4.7.

4.4.2.2.12 The ATS-message-Header shall be conditionally generated by translation of AFTN message elements, if the AFTN/AMHS gateway or at least one of the intended recipients of the message supports only the basic ATSMHS.

4.4.2.3 Generation of message transfer envelope

4.4.2.3.1 Each of the elements composing the message transfer envelope conveyed with an IPM resulting from the conversion of an AFTN message shall be processed as specified in the column “action” of Table 4-4. These elements, which are classified as “G”, “G1” and “T” in the column “action”, shall be handled according to the specification in the provision referred to in the column “mapping”.

4.4.2.3.2 Table 4-4 is structured as a PRL derived from the ISPICS pro forma included in ISO/IEC ISP 10611-3. The columns “base” and “ISP” are extracted from ISO/IEC ISP 10611-3, and the column “ATSMHS” specifies the static capability of an AU for the MT-elements of service, i.e. the ability to convey, handle and act in relation to the element. The references to the ISP profile are indicated in the part titles as AMH11/ref, where appropriate.

Table 4-4. Message transfer for conveyance of an IPM

Ref	*Element*	*Base*	*ISP*	*ATSMHS*	*Action*	*Mapping/Notes*
Part 1: AMH11/A.1.4.2 Message transfer						
1	MessageTransferEnvelope	M	M	M	T	see Part 1/1.1 and 1.2
1.1	(per message fields)					
1.1.1	message-identifier	M	M	M	G	see Part 2/1
1.1.2	originator-name	M	M	M	T	see ¶4.4.2.3.3
1.1.3	original-encoded-information-types	M	M-	M-	G	see ¶4.4.2.3.4 and Part 2/3
1.1.4	content-type	M	M-	M-	G	see ¶4.4.2.3.5 and Part 2/8
1.1.5	content-identifier	M	M	M	G1	see ¶4.4.2.3.6
1.1.6	Priority	M	M	M	T	see 4.4.2.1.2 and ¶4.4.2.1.3
1.1.7	per-message-indicators	M	M	M	G	see Part 2/4
1.1.8	deferred-delivery-time	O	M-	M-	X	-
1.1.9	per-domain-bilateral-information	O	M-	M-	G1	see ¶4.4.2.3.7 and Part 2/5
1.1.10	trace-information	M	M	M	G	see Part 2/6
1.1.11	Extensions	M	M	M	G	see ¶4.4.2.3.8 and Part 3/1
1.1.11.1	recipient-reassignment-prohibited	O	M	M	X	-
1.1.11.2	dl-expansion-prohibited	O	M	M	X	-
1.1.11.3	conversion-with-loss-prohibited	O	M	M	X	-
1.1.11.4	latest-delivery-time	O	M-	M-	X	-
1.1.11.5	originator-return-address	O	M-	M-	X	-
1.1.11.6	originator-certificate	O	M-	M-	X	-
1.1.11.7	content-confidentiality-algorithm-identifier	O	M-	M-	X	-
1.1.11.8	message-origin-authentication-check	O	M-	M-	X	-
1.1.11.9	message-security-label	O	M-	M-	X	-
1.1.11.10	content-correlator	M	M	M	G1	see ¶4.4.2.3.6
1.1.11.11	dl-expansion-history	M	M-	M-	X	see ¶4.4.2.3.2.2
1.1.11.12	internal-trace-information	M	M	M	G	see Part 3/5
1.1.11.13*	certificate-selectors	O	M-	M-	X	-
1.1.11.14*	multiple-originator-certificates	O	M-	M-	X	-
1.1.11.15*	dl-exempted-recipients	O	M-	M-	X	-
1.1.11.16*	PrivateExtensions	O	O	O	X	-
1.2	per-recipient-fields	M	M	M	T	see Part 1/1.2.1-1.2.5
1.2.1	recipient-name	M	M	M	T	see ¶4.4.2.3.9
1.2.2	originally-specified-recipient-number	M	M	M	G	see ¶4.4.2.3.10
1.2.3	per-recipient-indicators	M	M	M	G	see ¶4.4.2.3.11
1.2.4	explicit-conversion	O	M-	M-	X	-
1.2.5	Extensions	M	M	M	X	-

Ref	*Element*	*Base*	*ISP*	*ATSMHS*	*Action*	*Mapping/Notes*
2	Content	M	M	M	T	see ¶4.4.2.2
Part 2: AMH11/A.1.5 Common data types						
1	MTSIdentifier					
1.1	global-domain-identifier	M	M	M	G	see ¶4.4.2.3.12 and Part 2/2
1.2	local-identifier	M	M	M	G	see ¶4.4.2.3.13
2	GlobalDomainIdentifier					
2.1	country-name	M	M	M	G	see ¶4.4.2.3.14
2.2	administration-domain-name	M	M	M	G	see ¶4.4.2.3.15
2.3	private-domain-identifier	M	M	M	G	see ¶4.4.2.3.16
3	EncodedInformationTypes					
3.1	built-in-encoded-information-types	M	M	M	G	see ¶4.4.2.3.4
3.2	(non-basic parameters)	O	M-	M-	X	-
3.3	extended-encoded-information-types	M	M	M	X	-
4	PerMessageIndicators					
4.1	disclosure-of-other-recipients	M	M	M	G	see ¶4.4.2.3.17
4.2	implicit-conversion-prohibited	M	M	M	G	see ¶4.4.2.3.18
4.3	alternate-recipient-allowed	M	M	M	G	see ¶4.4.2.3.19
4.4	content-return-request	O	M-	M-	X	see ¶4.4.2.3.20
4.5	Reserved	O	M-	M-	X	-
4.6	bit-5	O	M-	M-	X	-
4.7	bit-6	O	M-	M-	X	-
4.8	service-message	O	M-	M-	X	-
5	PerDomainBilateralInformation					
5.1	country-name	M	M-	M-	G1	see ¶4.4.2.3.21
5.2	administration-domain-name	M	M-	M-	G1	see ¶4.4.2.3.21
5.3	private-domain-identifier	O	M-	M-	G1	see ¶4.4.2.3.21
5.4	bilateral-information	M	M-	M-	G1	see ¶4.4.2.3.22
6	TraceInformation					
6.1	TraceInformationElement	M	M	M	G	see Part 2/6.1.1 and 6.1.2
6.1.1	global-domain-identifier	M	M	M	G	see ¶4.4.2.3.23 and Part 2/2
6.1.2	domain-supplied-information	M	M	M	G	see Part 2/6.1.2.1-6.1.2.4
6.1.2.1	arrival-time	M	M	M	G	see ¶4.4.2.3.24
6.1.2.2	routing-action	M	M	M	G	see Part 2/6.1.2.2.1 and 6.1.2.2.2
6.1.2.2.1	Relayed	M	M	M	G	see ¶4.4.2.3.25
6.1.2.2.2	Rerouted	O	C1	C1	X	see ¶4.4.2.3.2.3
6.1.2.3	attempted-domain	O	C1	C1	X	see ¶4.4.2.3.2.3
6.1.2.4	(additional actions)					

Ref	*Element*	*Base*	*ISP*	*ATSMHS*	*Action*	*Mapping/Notes*
6.1.2.4.1	deferred-time	M	C2	C2	X	-
6.1.2.4.2	converted-encoded-information-types	O	M-	M-	X	-
6.1.2.4.3	other-actions	O	M-	M-	X	-
6.1.2.4.3.1	Redirected	O	M-	M-	X	see ¶4.4.2.3.2.4
6.1.2.4.3.2	dl-operation	O	M-	M-	X	see ¶4.4.2.3.2.2
8	ContentType					
8.1	built-in	M	M-	M-	G	see ¶4.4.2.3.5
8.2	Extended	O	M-	M-	X	-
Part 3: AMH11/A.1.6 Extension data types						
1	ExtensionField					
1.1	Type	M	M	M	G	see Part 3/1.1.1 and 1.1.2
1.1.1	standard-extension	M	M	M	G	see ¶4.4.2.3.8
1.1.2	private-extension	O	M-	M-	X	-
1.2	Criticality	M	M	M	G	see ¶4.4.2.3.8
1.3	Value	M	M	M	G	see ¶4.4.2.3.8
5	InternalTraceInformation					
5.1	global-domain-identifier	M	M	M	G	see ¶4.4.2.3.23
5.2	mta-name	M	M	M	G	see ¶4.4.2.3.26
5.3	mta-supplied-information	M	M	M	G	see Part 3/5.3.1-5.3.4
5.3.1	arrival-time	M	M	M	G	see ¶4.4.2.3.24
5.3.2	routing-action	M	M	M	G	see Part 3/5.3.2.1-5.3.2.2
5.3.2.1	Relayed	M	M	M	G	see ¶4.4.2.3.25
5.3.2.2	Rerouted	O	C1	C1	X	see ¶4.4.2.3.2.3
5.3.3	Attempted	O	C1	C1	X	see ¶4.4.2.3.2.3
5.3.4	(additional actions)					
5.3.4.1	deferred-time	M	C2	C2	X	-
5.3.4.2	converted-encoded-information-types	O	M-	M-	X	-
5.3.4.3	other-actions	O	M-	M-	X	-
5.3.4.3.1	Redirected	O	M-	M-	X	see ¶4.4.2.3.2.4
5.3.4.3.2	dl-operation	O	M-	M-	X	see ¶4.4.2.3.2.2

C1 = if re-routing is supported then M else M-
C2 = if deferred delivery is supported then M else M-
G = generated
G1 = optionally generated
I = out of scope
M = mandatory support
M- = mandatory minimal support
O = optional support
T = translated
X = excluded (not used)
* = requirement applicable only if the AFTN/AMHS gateway supports the extended ATSMHS
- = not applicable

4.4.2.3.2.2 The DL-expansion capability of an AFTN/AMHS gateway is implemented in the ATN component rather than in the message transfer and control unit.

4.4.2.3.2.3 The rerouting capability of an AFTN/AMHS gateway, if any, is implemented in the ATN component rather than in the message transfer and control unit.

4.4.2.3.2.4 The redirection capability of an AFTN/AMHS gateway, if any, is implemented in the ATN component rather than in the message transfer and control unit.

4.4.2.3.3 The value of the element *originator-name* shall:

a) be the address of the indirect AMHS user who originated the AFTN message;

b) take the form of an MF-address; and

c) be converted as specified in 4.4.2.1.4.1.

4.4.2.3.4 The element *original-encoded-information-types* shall:

a) take the abstract-value “ia5-text”, which is a value of type BuiltInEncodedInformationTypes; and

b) be formed as specified in Table 4-4/Part 2/3.

4.4.2.3.5 The element *content-type* shall:

a) take the abstract-value “interpersonal-messaging-1988”, which is a value of type BuiltInContentType; and

b) be formed as specified in Table 4-4/Part 2/8.

4.4.2.3.6 The generation of this element shall be optional, as a matter of policy local to the AMHS management domain operating the AFTN/AMHS gateway.

4.4.2.3.7 The element *per-domain-bilateral-information* shall be:

a) optionally generated, as a matter of policy local to the AMHS management domain operating the AFTN/AMHS gateway; and

b) if present, structured as specified in Table 4-4/Part 2/5.

4.4.2.3.8 The only extensions used shall:

a) belong to the type “standard-extension”;

b) contain the following elements:

1) *content-correlator*, if used; and

2) *internal-trace-information*;

c) take a criticality value as specified in ISO/IEC 10021-4, Figure 2; and

d) take values as specified in 4.4.2.3.6 and Table 4-4/Part 3/5, respectively.

4.4.2.3.8.1 The non-use of the elements *recipient-reassignment-prohibited*, *dl-expansion-prohibited* and *conversion-with-loss-prohibited* implies, in compliance with ISO/IEC 10021-4, that they are assumed to take their default abstract-values, which are "recipient-reassignment allowed", "DL-expansion-allowed" and "conversion-with-loss-allowed", respectively.

4.4.2.3.9 The value of the element *recipient-name* in each of the *per-recipient-fields* elements shall:

a) be the address of each addressee indicated in the AFTN message, respectively;

b) take the form of an MF-address; and

c) be converted as specified in 4.4.2.1.4.2.

4.4.2.3.10 The value of the element *originally-specified-recipient-number* in each of the *per-recipient-fields* elements shall be generated by the message transfer and control unit as specified in ISO/IEC 10021-4, 12.2.1.1.1.5.

4.4.2.3.11 The components of the element *per-recipient-indicators* in each of the *per-recipient-fields* elements shall be generated taking the following abstract-values:

a) "responsible" for the *responsibility* element;

b) "non-delivery-report" for the *originating-MTA-report-request* element; and

c) "non-delivery-report" for the *originator-report-request* element.

4.4.2.3.12 The element *global-domain-identifier* in the *MTS-identifier* shall:

a) identify the AMHS management domain operating the AFTN/AMHS gateway; and

b) be composed as specified in Table 4-4/Part 2/2.

4.4.2.3.13 The element *local-identifier* in the *MTS-identifier* shall be generated locally so as to ensure that it distinguishes the message from all other messages, probes or reports generated in the AMHS management domain operating the AFTN/AMHS gateway.

4.4.2.3.14 The element *country-name* in the *global-domain-identifier* element of the *MTS-identifier* and of the first *trace-information* element shall be the *country-name* element of the identifier of the AMHS management domain operating the AFTN/AMHS gateway as specified in 2.5.1.3.

4.4.2.3.15 The element *administration-domain-name* in the *global-domain-identifier* element of the *MTS-identifier* and of the first *trace-information* element shall be the *administration-domain-name* element of the identifier of the AMHS management domain operating the AFTN/AMHS gateway as specified in 2.5.1.3.

4.4.2.3.16 The element *private-domain-identifier* in the *global-domain-identifier* element of the *MTS-identifier* and of the first *trace-information* element shall be the *private-domain-identifier* element of the identifier part of the identification of the AMHS management domain operating the AFTN/AMHS gateway as specified in 2.5.1.3.

4.4.2.3.17 The element *disclosure-of-other-recipients* shall take its default abstract-value, which is "disclosure-of-other-recipients-prohibited".

4.4.2.3.18 The element *implicit-conversion-prohibited* shall take its default abstract-value, which is "implicit-conversion-allowed".

4.4.2.3.19 The element *alternate-recipient-allowed* shall take the abstract-value “alternate-recipient-allowed”.

4.4.2.3.20 The element *content-return-request* shall take its default abstract-value, which is “content-return-not-requested”.

4.4.2.3.21 The elements *country-name*, *administration-domain-name* and *private-domain-identifier* shall together identify the AMHS management domain for which the bilateral-information is intended if, and only if, the element *bilateral-information* as specified in 4.4.2.3.22 is present.

4.4.2.3.22 The generation of this element shall be optional, as a matter of bilateral agreement between the AMHS management domain operating the AFTN/AMHS gateway and another AMHS management domain.

4.4.2.3.23 The element *global-domain-identifier* in the *trace-information* or in the *internal-trace-information* shall:

a) identify the AMHS management domain operating the AFTN/AMHS gateway; and

b) be composed as specified in Table 4-4/Part 2/2.

4.4.2.3.24 The element *arrival-time* in the first element of *trace-information* or of *internal-trace-information* shall take the semantic value of the time when the message was received by the message transfer and control unit for conveyance in the AMHS.

4.4.2.3.25 The element *routing-action* in the first element of *trace-information* or of *internal-trace-information* shall take the abstract-value “relayed”.

4.4.2.3.26 The element *mta-name* in the first element of *internal-trace-information* shall be the mta-name assigned to the message transfer and control unit included in the AFTN/AMHS gateway.

4.4.2.3.26.1 The structure of the mta-name of the message transfer and control unit included in an AFTN/AMHS gateway within an AMHS management domain is a matter of policy internal to the AMHS management domain.

4.4.3 Conversion of AFTN acknowledgement messages

4.4.3.1 Initial processing of AFTN acknowledgement message

4.4.3.1.1 Upon reception by the message transfer and control unit of an AFTN acknowledgement message, passed from the AFTN component to be conveyed in the AMHS, the received message shall be processed in one of the following manners depending on whether or not the subject AFTN message previously passed through the message transfer and control unit:

a) processing as specified in 4.4.3.1.2, if exactly one subject AMHS message can be identified which previously passed through the message transfer and control unit, where it was converted into an AFTN SS message as identified in the AFTN acknowledgement message; or

b) in all other cases, processing as follows:

1) logging of the error situation and reporting to a control position; and

2) conversion of the AFTN acknowledgement message into an IPM conveyed with a message transfer envelope as specified in 4.4.3.1.5.

4.4.3.1.2 If the subject AFTN message previously passed through the message transfer and control unit, the AFTN acknowledgement message shall then be processed in one of the following manners depending on whether the subject IPM was received from the AMHS without or with *receipt-notification-request*:

a) processing as follows, if the subject IPM was received from the AMHS without *receipt-notification-request*:

1) conversion into an IPM conveyed with a message transfer envelope as specified in 4.4.3.1.5; and

2) logging of the error situation and reporting to a control position; or

b) processing as specified in 4.4.3.1.3, if the subject IPM was received from the AMHS with *receipt-notification-request.*

4.4.3.1.3 If the subject IPM had been received from the AMHS with *receipt-notification-request*, the AFTN acknowledgement message shall be converted by the AFTN/AMHS gateway into an IPN taking the form of an RN, conveyed with a message transfer envelope generated in compliance with the provisions of ⁋4.4.3.1.4.

4.4.3.1.4 When the provisions of ⁋4.4.3.1.3 apply, the generation of the RN and of the message transfer envelope shall be performed in compliance with the following:

a) the specification of how the components of the AFTN service message are used, as included in ⁋4.4.3.2;

b) the specification of how the RN is generated, as included in ⁋4.4.3.3; and

c) the provisions of ⁋4.4.2.3 concerning the generation of the message transfer envelope, with the exception of the differences specified in ⁋4.4.3.4.

4.4.3.1.5 When an acknowledgement message is converted into an IPM as the result of ⁋4.4.3.1.1 or ⁋4.4.3.1.2, the specification of ⁋4.4.2 shall apply with two exceptions:

a) the *subject* element in the IPM heading fields, initially specified in Table 4-3/Part 2/10, which is then generated and takes the value “AFTN service information”; and

b) the element(s) *notification-requests* within the *primary-recipients* heading field which neither takes the value “rn” nor the value “nrn”.

4.4.3.2 Use of AFTN service message components

4.4.3.2.1 Each component of an AFTN acknowledgement message shall be processed for the generation of an RN as specified in the column “action” of Table 4-5.

4.4.3.2.2 These components which are classified as “T” or “T1” in the column “action” of Table 4-5 shall be translated into the AMHS parameter specified in the column “AMHS parameter” of Table 4-5 and according to the specification in the provision referred to in the column “mapping”.

Table 4-5. Use of AFTN service message components

AFTN message part	*Component*	*Action*	*AMHS parameter*	*Mapping*
Heading	Start-of-Heading Character	-	-	-
	Transmission Identification	D	-	-
address	Alignment Function	-	-	-
	Priority Indicator	T	priority (see Table 4-7/Part 1/1.1.6)	see 4.4.3.4.2
	addressee Indicator	T	recipient-name (see Table 4-7/Part 1/1.2.1)	see 4.4.3.4.3
	Alignment Function	-	-	-
Origin	Filing Time	T	receipt-time (see Table 4-6/Part 2/7.1)	see 4.4.3.2.4
	Originator Indicator	T	ipn-originator (see Table 4-6/Part 2/2) originator-name (see Table 4-4/Part 1/1.1.2)	see 4.4.3.2.3 see 4.4.2.1.4.1
	Priority Alarm	D	-	-
	Optional Heading Information	D	-	-
	Alignment Function	-	-	-
	Start-of-Text Character	-	-	-
Text		D	-	-
Ending	Alignment Function	-	-	-
	Page-feed sequence	-	-	-
	End-of-Text Character	-	-	-

D = discarded
T = translated
- = not applicable

4.4.3.2.3 Upon generation of an RN as the result of the receipt of an AFTN acknowledgement message by the message transfer and control unit, the originator indicator element of the AFTN acknowledgement message shall be translated into the *ipn-originator* element of the RN.

4.4.3.2.4 Upon generation of an RN as the result of the receipt of an AFTN acknowledgement message by the message transfer and control unit, the filing time of the AFTN acknowledgement message shall be converted into the *receipt-time* element, which is of ASN.1 type UTCTime, as the result of the following:

a) generation by the message transfer and control unit of the YY figures identifying the year (characters 1 and 2 of the string) in the *receipt-time* element;

b) generation by the message transfer and control unit of the MM figures identifying the month (characters 3 and 4 of the string) in the *receipt-time* element;

c) mapping of the value of the first two figures of the date-time group into the value of the DD figures identifying the day (characters 5 and 6 of the string) in the *receipt-time* element;

d) mapping of the value of the four last figures of the date-time group, which together represent the hours and minutes, into the value of the hhmm figures (characters 7 to 10 of the string) in the *receipt-time* element; and

e) addition by the message transfer and control unit of an eleventh and last character in the string composing the *receipt-time* element taking the value “Z”.

4.4.3.3 Generation of RN

4.4.3.3.1 Each of the elements composing the RN resulting from the receipt of an AFTN acknowledgement message in the message transfer and control unit shall be processed as specified in the column “action” of Table 4-6. These elements, which are classified as “G” or “T” in the column “action”, shall be either generated or translated according to the specification in the provision referred to in the column “mapping”.

Table 4-6. RN generation

Ref	*Element*	*Origination*			*Action*	*Mapping/Notes*
		Base	*ISP*	*Basic ATSMHS*		
Part 1: AMH21/A.1.1 Supported information objects						
1	Interpersonal message (IPM)	M	M	M	-	out of the scope of this provision
2	Interpersonal notification (IPN)	M	M	M		see Part 2
Part 2: AMH21/A.1.4 IPN fields						
1	subject-ipm	M	M	M	G	see §4.4.3.3.3
2	ipn-originator	O	M	M	T	see §4.4.3.2.3 and Part 3/2
3	ipm-preferred-recipient	M	M	M	G2	see §4.4.3.3.4
4	conversion-eits	O	O	O	G2	see §4.4.3.3.5
5	notification-extensions	O	I	I	X	-
6	non-receipt-fields	M	M	M	X	-
7	receipt-fields	O	O	O	T	see Part 2/7.1-7.4
7.1	receipt-time	M	M	M	T	see §4.4.3.2.4
7.2	acknowledgment-mode	O	O	O	G	see §4.4.3.3.6
7.3	suppl-receipt-info	O	O	O	X	-
7.4	rn-extensions	O	I	I	X	-
8	other-notification-type-fields	O	I	I	X	-
Part 3: AMH21/A.1.5 Common data types						
2	ORDescriptor					
2.1	formal-name	M	M1	M	T	see 4.4.3.3.7
2.2	free-form-name	O	O	O	X	
2.3	telephone-number	O	O	O	X	

G = generated
G2 = conditionally generated
I = out of scope
M = mandatory support
M1 = mandatory O/R name minimal support
O = optional support
T = translated
X = excluded (not used)

4.4.3.3.2 Table 4-6 is structured as a PRL derived from the profile specification included in Section 3 of this manual and consequently from the ISPICS pro forma included in ISO/IEC ISP 12062-2 (AMH21). The columns “base” and “ISP”

under “origination” are extracted from ISO/IEC ISP 12062-2, and the column “basic ATSMHS” specifies the static capability of an IPM AU supporting the basic ATSMHS, i.e. the ability to generate the element as part of an IPN in the AMHS. The references to the ISP profile are indicated in the part titles as AMH21/ref, where appropriate. The references in column “ref” are those of the ISP.

4.4.3.3.3 The element *subject-ipm* shall be an IPM Identifier composed of the *user* and *user-relative-identifier* elements of the *this-IPM* heading field of the subject IPM.

4.4.3.3.3.1 The *user* element of the *IPM-identifier* (*this-IPM*) is an MF-address, so its case is insignificant. Although discouraged, this case may be modified when constructing the element *subject-ipm* from the elements of the subject IPM.

4.4.3.3.4 The element *ipm-preferred-recipient* shall:

a) be present if, and only if:

1) it would be different from the *ipn-originator* specified in 4.4.3.2.3; and

2) it would not be the result of a DL-expansion;

b) if present, identify the recipient of the subject IPM which caused the receipt of the AFTN acknowledgement message by the message transfer and control unit (as a result of the receipt by its addressee of the subject AFTN message); and

c) if present, be the *ORDescriptor* of the recipient of the subject IPM.

4.4.3.3.5 The element *conversion-eits* shall:

a) be present if, and only if, this encoded-information-types is different of the *originally-encoded-information-types* included in the subject IPM; and

b) if present, take the value of the encoded-information-types of the subject IPM received by the message transfer and control unit.

4.4.3.3.6 The element *acknowledgement-mode* shall take the abstract-value “manual”, which is its default value.

4.4.3.3.7 The element *formal-name* in an *ORDescriptor* shall take the form of an O/R address and be converted from the originator indicator of the AFTN acknowledgement message as specified in ⁋4.4.2.1.4.1.

4.4.3.4 Differences in the generation of message transfer envelope

4.4.3.4.1 The elements composing the message transfer envelope which is conveyed with an RN resulting from the receipt of an AFTN acknowledgement message by the message transfer and control unit which are different from the specification of ⁋4.4.2.3 shall be processed according to the specification in the provision referred to in the column “mapping” of Table 4-7. An element subject to these provisions shall be processed as specified in the column “action” and in accordance with the specification referred to in the column “mapping”.

Note.— Table 4-7 is structured as an extract of Table 4-4. The references used in the part titles and in the column “ref” are those of Table 4-4.

Table 4-7. Message transfer envelope generation for conveyance with an RN (differences with Table 4-4)

Ref	*Element*	*Base*	*ISP*	*Basic ATSMHS*	*Action*	*Mapping*
Part 1: AMH11/A.1.4.2 Message transfer						
1	MessageTransferEnvelope	M	M	M	T	see Part 1/1.1 and 1.2
1.1	(per-message-fields)					
1.1.3	original-encoded-information-types	M	M-	M-	X	—
1.1.6	Priority	M	M	M	G	see ¶4.4.3.4.2
1.1.7	per-message-indicators	M	M	M	G	see Part 2/4
1.2	per-recipient-fields	M	M	M	T	see Part 1/1.2.1 and 1.2.3
1.2.1	recipient-name	M	M	M	T	see ¶4.4.3.4.3
1.2.3	per-recipient-indicators	M	M	M	G	see ¶4.4.3.4.4
2	Content	M	M	M	T	see ¶4.4.3.3
Part 2: AMH11/A.1.5 common data types						
4	PerMessageIndicators					
4.2	implicit-conversion-prohibited	M	M	M	G	see ¶4.4.3.4.5

G = generated
M = mandatory support
M- = mandatory minimal support
T = translated
X = excluded (not used)

4.4.3.4.2 The element *priority* shall take the abstract-value “urgent”.

4.4.3.4.3 The element *recipient-name* shall:

a) identify the originator of the subject IPM; and

b) take the form of an MF-address.

4.4.3.4.4 The components of the element *per-recipient-indicators* shall be generated taking the following abstract-values:

a) “responsible” for the *responsibility* element;

b) “non-delivery-report” for the *originating-MTA-report-request* element; and

c) “no-report” for the *originator-report-request* element.

4.4.3.4.5 The element *implicit-conversion-prohibited* shall take the abstract-value “implicit-conversion-prohibited”.

4.4.4 Conversion of AFTN service messages related to unknown addressee indicators

4.4.4.1 Upon reception by the message transfer and control unit of an unknown address AFTN service message, passed from the AFTN component to be conveyed in the AMHS, the received message shall be converted into an IPM as specified in 4.4.2, with the exception of the *subject* element in the IPM heading fields, initially specified in Table 4-3/Part2/10, which is then generated and takes the value “AFTN service information”.

4.5 AMHS TO AFTN CONVERSION

Note.— This section specifies the actions to be performed by an AFTN/AMHS gateway upon reception of information objects from the AMHS for conveyance over the AFTN, after the accomplishment of the AMHS-related procedures by the ATN component as specified in ¶4.2.2.

4.5.1 Control Function

4.5.1.1 Upon reception by the message transfer and control unit of an AMHS message passed by the ATN component, the received message shall be processed in one of the following manners, depending on the abstract-value of the *content-type* element in the message transfer envelope:

a) processing as specified in ¶4.5.1.2 if the abstract-value of the element is “interpersonal-messaging-1988”; or

b) if the abstract-value of the element is not “interpersonal-messaging-1988”:

1) rejection of the message for all the message recipients for which the *responsibility* element of the *per-recipient-indicators* had the abstract-value “responsible”; and

2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values:

i) “unable-to-transfer” for the *non-delivery-reason-code*; and

ii) “content-type-not-supported” for the *non-delivery-diagnostic-code*.

4.5.1.1.1 The message recipients towards which the message transfer and control unit conveys the message are those identified by a recipient-name element in the per-recipient-fields element of the message transfer envelope, and for which the responsibility element in the per-recipient-indicators element has the abstract-value “responsible”. In ¶4.5 the term “message recipient” refers to such a recipient.

4.5.1.2 Upon reception by the message transfer and control unit of an AMHS message whose *content-type* is “interpersonal-messaging-1988” passed from the ATN component, the message shall be processed for conversion into an AFTN message in one of three mutually exclusive manners, depending on the nature of the content:

a) processing for conversion into an AFTN message as specified in 4.5.2, if the content is an IPM;

b) processing for conversion into an AFTN service message as specified in ¶4.5.3, if the content is an IPN which is an RN; or

c) unsuccessful termination of the procedure, if the content is an IPN but not an RN, resulting in:

1) logging of the error situation and reporting to a control position; and

2) storage of the message for appropriate processing at the control position.

4.5.1.3 Upon reception by the message transfer and control unit of an AMHS non-delivery report passed from the ATN component, the report shall be processed as specified in 4.5.4.

4.5.1.4 Upon reception by the message transfer and control unit of an AMHS probe passed by the ATN component, the received probe shall be processed in one of the following manners, depending on the abstract-value of the *content-type* element in the probe transfer envelope:

a) processing for conveyance test as specified in 4.5.5 if the abstract-value of the element is "interpersonal-messaging-1988"; or

b) if the abstract-value of the element is not "interpersonal-messaging-1988":

1) rejection of the probe for all the probe recipients for which the *responsibility* element of the *per-recipient-indicators* had the abstract-value "responsible"; and

2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values:

i) "unable-to-transfer" for the *non-delivery-reason-code*; and

ii) "content-type-not-supported" for the *non-delivery-diagnostic-code*.

4.5.1.5 Upon reception by the message transfer and control unit of an ISO/IEC 10021 information object other than those referred to in ⁋4.5.1.1 to ⁋4.5.1.4 above, the processing by the message transfer and control unit shall unsuccessfully terminate, resulting in:

a) logging of the error situation and reporting to a control position; and

b) storage of the information object for appropriate processing at the control position.

4.5.1.6 Upon completion by the message transfer and control unit of the processing specified in 4.5.1.1 to ⁋4.5.1.4 above, the resulting AFTN message(s) or AFTN service message(s), if any, shall be passed to the AFTN component, for conveyance over the AFTN.

4.5.1.7 If the generation of a report is required in relation with the result of the processing specified in 4.5.1.1 to ⁋4.5.1.4 above, either due to message rejection or probe test failure by the message transfer and control unit, or due to a delivery-report request in the subject AMHS message or probe, an appropriate AMHS report shall be generated as specified in ⁋4.5.6.

4.5.2 AMHS IPM Conversion

Upon reception by the message transfer and control unit of an IPM conveyed with a message transfer envelope passed from the ATN component to be conveyed over the AFTN, this message shall be converted into an AFTN message in compliance with the specification of:

a) the initial processing to be performed by the message transfer and control unit to determine the ability to convert the message and to split it into individually convertible messages, as included in ¶4.5.2.1;

b) how the AFTN message is generated and how the AFTN message components are mapped from AMHS parameters, as included in ¶4.5.2.2;

c) how the elements of the received IPM are handled, as included in ¶4.5.2.3; and

d) how the message transfer envelope elements are handled, as included in ¶4.5.2.4.

4.5.2.1 Initial processing of AMHS messages

4.5.2.1.1 Upon reception by the message transfer and control unit of an IPM, the received message shall be processed in one of the following manners, depending on the abstract-value of the current encoded-information-types, determined as either the abstract-value of the latest *converted-encoded-information-types*, if existing, in the *trace-information* element, or as the abstract-value of the *original-encoded-information-types* element if the previous does not exist:

a) processing as specified in 4.5.2.1.2 if the abstract-value of the current encoded-information-types is “unspecified” or includes exclusively one or several of the following values:

1) basic “ia5-text”;

2) externally-defined “ia5-text”, which corresponds to OID {id-eit-ia5-text} as specified in ISO/IEC 10021-4 Annex A;

3) OID {id-cs-eit-authority 1}, identifying the C0 control character set ISO-IR 0, as described in ISO/IEC 10021-7;

4) OID {id-cs-eit-authority 2}, identifying the G0 graphical character set ISO-IR 2 (known as International Reference Version of ISO 646), as described in ISO/IEC 10021-7;

5) OID {id-cs-eit-authority 6}, identifying the G0 graphical character set ISO-IR 6 (known as US Version of ISO 646), as described in ISO/IEC 10021-7; or

6) OID {id-cs-eit-authority 100}, identifying the G1 graphical character set ISO-IR 100 (ISO 8859-1, Latin Alphabet No. 1), as described in ISO/IEC 10021-7; or

b) if the abstract-value includes any value different from the values indicated in a) above:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) “unable-to-transfer” for the *non-delivery-reason-code*; and

ii) “encoded-information-types-unsupported” for the *non-delivery-diagnostic-code.*

4.5.2.1.2 A message which was not rejected as the result of 4.5.2.1.1 shall be processed in one of the following manners:

a) processing as specified in 4.5.2.1.3 if the abstract-value of the *implicit-conversion-prohibited* in the *per-message-indicators* element in the message transfer envelope differs from "prohibited", or if the abstract-value of the current encoded-information-types does not include the OID value {id-cs-eit-authority 100}; or

b) if the abstract-value of the element is "prohibited" and if the abstract-value of the encoded-information-types includes OID {id-cs-eit-authority 100}:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) "conversion-not-performed" for the *non-delivery-reason-code*;
ii) "implicit-conversion-prohibited" for the *non-delivery-diagnostic-code*; and

iii) "unable to convert to AFTN" for the *supplementary-information*.

4.5.2.1.3 A message which was not rejected as the result of ¶4.5.2.1.2 shall be processed in one of the following manners:

a) processing as specified in ¶4.5.2.1.4 if there is a single body part in the IPM body; or

b) if there are multiple body parts in the IPM body:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) "unable-to-transfer" for the *non-delivery-reason-code*;

ii) "content-syntax-error" for the *non-delivery-diagnostic-code*; and

iii) "unable to convert to AFTN due to multiple body parts" for the *supplementary-information*.

4.5.2.1.4 A message which was not rejected as the result of ¶4.5.2.1.3 shall be processed in one of the following manners:

a) processing as specified in ¶4.5.2.1.5 if the body part type is one of the following:

1) a basic body part type "ia5-text";

2) a standard extended body part type "ia5-text-body-part";

3) a standard extended body part type "general-text-body-part" of which the repertoire set description is Basic (ISO 646); or

4) a standard extended body part type "general-text-body-part" of which the repertoire set description is Basic-1 (ISO 8859-1), if and only if the local policy of the AMHS management

domain is to support the conversion of this repertoire set into IA5IRV characters according to locally defined conversion rules; or

b) if the body part type is different from the body part types 1) to 3) under a) above, or if the body part corresponds to type 4) under a) above and the local policy of the AMHS management domain is not to support the conversion of the ISO 8859-1 repertoire set:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery report as specified in ¶4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) "unable-to-transfer" for the *non-delivery-reason-code*;

ii) "content-syntax-error" for the *non-delivery-diagnostic-code*; and
iii) "unable to convert to AFTN due to unsupported body part type" for the *supplementary-information*.

Note.— The locally defined conversion rules mentioned in 4.5.2.1.4 a) 4) above may be for example CCITT Recommendation X.408.

4.5.2.1.5 A message not rejected as the result of ¶4.5.2.1.4 shall then be processed in one of the following manners:

a) processing as specified in ¶4.5.2.1.6 if the text element in the body part includes an ATS message header as specified in ¶3.3.3.3, or if the IPM includes IPM heading fields and recipient extensions as specified in ¶3.3.4; or

b) if the text does not include an ATS message header as specified in ¶3.3.3.3 and the IPM does not include IPM heading fields and recipient extensions as specified in ¶3.3.4:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery report as specified in ¶4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) "unable-to-transfer" for the *non-delivery-reason-code*;

ii) "content-syntax-error" for the *non-delivery-diagnostic-code*; and

iii) "unable to convert to AFTN due to ATS-message-Header or Heading Fields syntax error" for the *supplementary-information*.

4.5.2.1.5.1 The compliance requested to meet the condition of item a) includes the requirement that the ATS Message Header element is present and has a value which is syntactically valid for the priority indicator, i.e. a value among SS, DD, FF, GG and KK, and for the filing time, i.e. a value in which the first six figures in the sequence build a valid date-time group, or that the IPM Heading Fields and recipient extensions are present, that the precedence-policy-identifier has the value specified in 3.3.4.7, and that the IPM precedence has a value authorized by Table 3-5.

4.5.2.1.5.2 In case of absence of optional-heading-information in the ATS-Message-Header, both cases of either the ATS-Message-Optional-Heading-Info as a whole being absent, or the ATS-Message-Optional-Heading-Info consisting of only an OHI-prompt and OHI-separator, are considered as meeting the requirements of 3.3.3.7 as requested in item

4.5.2.1.5 0 a).

4.5.2.1.6 A message not rejected as the result of 4.5.2.1.5 shall be processed in one of five mutually exclusive manners:

a) processing as specified in 0 if the abstract-value of the *conversion-with-loss-prohibited* element in the *extensions* of the per message fields is"allowed";

b) if the abstract-value of the element *conversion-with-loss-prohibited* is "prohibited" and at least one line in the message exceeds 69 characters:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) “conversion-not-performed” for the *non-delivery-reason-code*; and

ii) “line-too-long” for the *non-delivery-diagnostic-code*;

c) if the abstract-value of the element *conversion-with-loss-prohibited* is “prohibited” and at least one punctuation symbol in the text is not authorized in Annex 10, Volume II, 4.1.2:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:
i) “conversion-not-performed” for the *non-delivery-reason-code*; and

ii) “punctuation-symbol-loss” for the *non-delivery-diagnostic-code*;

d) if the abstract-value of the element *conversion-with-loss-prohibited* is “prohibited” and at least one alphabetical character in the text is not authorized in Annex 10, Volume II, 4.1.2:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) “conversion-not-performed” for the *non-delivery-reason-code*; and

ii) “alphabetical-character-loss” for the *non-delivery-diagnostic-code*; or

e) if several of the conditions under b) to d) above are simultaneously met:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) “conversion-not-performed” for the *non-delivery-reason-code*; and

ii) "multiple-information-loss" for the *non-delivery-diagnostic-code*.

4.5.2.1.7 A message which was not rejected as the result of ¶4.5.2.1.6 shall be processed in one of three mutually exclusive manners:

a) if the length of the ATS-message-Text element exceeds 1800 characters, and if, due to system resource limitation, the procedure proposed in Annex 10, Volume II, Attachment C cannot be properly achieved by the AFTN/AMHS gateway:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery report as specified in 4.5.2.1.8 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) "unable-to-transfer" for the *non-delivery-reason-code*;

ii) "content-too-long" for the *non-delivery-diagnostic-code*; and

iii) "unable to convert to AFTN due to message text length" for the *supplementary-information*.

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b) if the length of the ATS-message-Text element exceeds 1800 characters, and if the procedure proposed in Annex 10, Volume II, Attachment C is applied in the AFTN/AMHS gateway:

1) splitting of the message, internally to the message transfer and control unit, into several messages in accordance with the aforementioned Annex 10 procedure:
i) each of the resulting messages having for conversion purposes the same message transfer envelope, the same IPM Heading and the ATS-message-Header, if present, as the message subject to the splitting; and

ii) only the ATS-message-Text element varying between the different resulting messages; and

2) processing of each of these messages as specified in ¶4.5.6; or

c) processing as specified in 4.5.2.1.8 if the length of the ATS-message-Text element does not exceed 1800 characters.

Note.— If the capability of the AFTN connected to the AFTN/AMHS Gateway is extended in message text length then the procedures described in a) to c) may be adapted in accordance with the extended AFTN message text length, provided that a message which cannot be transferred in AFTN remains subject to NDR generation with the relevant non-delivery-reason-code*,* non-delivery-diagnostic-code *and* supplementary-information *element values.*

4.5.2.1.8 A message resulting from the situations in ¶4.5.2.1.7 b) and c) shall be processed in one of three manners, depending on the number of message recipients towards which the message transfer and control unit is responsible for conveyance of the message:

a) if this number exceeds 21 message recipients and does not exceed 512 recipients:

1) splitting of the message, internally to the message transfer and control unit, into several messages, each with no more than 21 message recipients:

i) each of the resulting messages having for conversion purposes the same *per-message-fields* in the message transfer envelope, and the same content as the message subject to the splitting; and

ii) only the *per-recipient-fields* elements in the message transfer envelope varying between the different resulting messages; and

2) processing of each of these messages as specified in ¶4.5.2.2 to ¶4.5.2.4;

b) if this number exceeds 512 message recipients:

3) rejection of the message for all the message recipients; and

4) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) "unable-to-transfer" for the *non-delivery-reason-code*;

ii) "too-many-recipients" for the *non-delivery-diagnostic-code*; and

iii) "unable to convert to AFTN due to number of recipients" for the *supplementary-information*; or

c) processing as specified in 4.5.2.2 to ¶4.5.2.4, if this number does not exceed 21 message recipients.

4.5.2.1.9 In the processing defined in 4.5.2.1.8 a), the *per-recipient-fields* related to a particular recipient remain unchanged by the splitting. This applies in particular to the *originally-specified-recipient-number*, which is not altered by the processing specified in this provision.

4.5.2.1.10 The combination of ¶4.5.2.1.7 and ¶4.5.2.1.8 may result in a very high number of AFTN messages being generated from one single AMHS message. The specification in ¶4.5.2.1.7 a) may, as a local matter, be used under such circumstances.

4.5.2.2 Generation of AFTN message

4.5.2.2.1 Each message resulting from the processing specified in ¶4.5.2.1 shall be converted by the message transfer and control unit into an AFTN message composed of elements as specified in Table 4-8. Those components, which are classified as "G" in the column "action", shall be generated in compliance with the provisions of Annex 10, Volume II referred to in the column "mapping". Components which are classified as "T" or "T1" in the column "action" shall be converted from the AMHS parameter specified in the column "converted from AMHS parameter" and according to the specification in the provision referred to in the column "mapping".

Table 4-8. AFTN message generation

AFTN message part	*Component*	*Action*	*Converted from AMHS parameter*	*Mapping*
Heading	Start-of-Heading Character	X	—	—

AFTN message part	*Component*	*Action*	*Converted from AMHS parameter*	*Mapping*
	Transmission Identification	X	—	see ¶4.5.2.2.2
address	Alignment Function	G	—	see Annex 10, Vol. II, 4.4.15.2.1
	Priority Indicator	T	ATS-message-Priority (see Table 4-9/Part 6/1.2) or precedence (see Table 4-9/Part 5/1.4.3)	see ¶4.5.2.2.3 and 4.5.2.2.4
	addressee Indicator(s)	T	recipient-name (see Table 4-10/Part 1/1.2.1)	see ¶4.5.2.2.7
	Alignment Function	G	—	see Annex 10, Vol. II, 4.4.15.2.1
Origin	Filing Time	T	ATS-message-Filing-Time (see Table 4-9/Part 6/1.3) or authorization-time (see Table 4-9/Part 2/17.6)	see ¶4.5.2.2.9
	Originator Indicator	T	originator-name (see Table 4-10/Part 1/1.1.2)	see ¶4.5.2.2.6
	Priority Alarm	G	—	see Annex 10, Vol. II, 4.4.15.2.2
	Optional Heading Information	T1	ATS-message-Optional-Heading-Info (see Table 4-9/Part 6/1.4) or originators-reference (see Table 4-9/Part 2/17.12)	see ¶4.5.2.2.10
	Alignment Function	G	—	see Annex 10, Vol. II, 4.4.15.2.2
	Start-of-Text Character	G	—	see Annex 10, Vol. II, 4.4.15.2.2
Text		T	ATS-message-Text (see Table 4-9/Part 6/2)	see ¶4.5.2.2.11
Ending	Alignment Function	G	—	see Annex 10, Vol. II, 4.4.15.3.12
	Page-feed sequence	G	—	see Annex 10, Vol. II, 4.4.15.3.12
	End-of-Text Character	G	—	see Annex 10, Vol. II, 4.4.15.3.12

G = generated
T = translated
T1 = conditionally translated
X = excluded (not used)

4.5.2.2.2 As specified in ¶4.5.2.3, the element transmission identification shall be:

a) generated by the AFTN component rather than by the message transfer and control unit; and

b) returned to the message transfer and control unit as the result of the operation transferring the generated AFTN message from the message transfer and control unit to the AFTN component.

4.5.2.2.3 The value of the priority indicator of the converted AFTN message shall be:

a) mapped from the *precedence* element in the *recipient-extensions* in any of the *RecipientSpecifier* included in the IPM, in compliance with the mapping specified in Table 3-5, if all the following conditions are met:

1) the AFTN/AMHS gateway supports the extended ATSMHS; and

2) the *precedence* element is present in at least one of the *RecipientSpecifier* included in the IPM; or

b) the value of the priority-indicator in the ATS-message-priority element of the AMHS message, if any of the following conditions is met:

1) the AFTN/AMHS gateway supports only the basic ATSMHS;

2) the ATS-message-priority element is present in the ATS-message-Header, and the *precedence* element is not present in the IPM.

4.5.2.2.4 The use of the IPM heading fields and recipient extensions, in support of the extended ATSMHS, takes precedence over the ATS-message-Header if both are present.

4.5.2.2.5 The value of an AF-address included in the converted AFTN message shall be converted from an MF-address as respectively specified in ¶4.5.2.2.6 and ¶4.5.2.2.7 depending whether it is an originator MF-address or a recipient MF-address.

4.5.2.2.6 The originator MF-address included in an AMHS message shall be processed for translation into the originator indicator of the converted AFTN message in one of four mutually exclusive manners, depending on the MF-address format, after preliminary conversion of the value of all AMHS address attributes from lower case IA5IRV characters, if any, to upper case IA5IRV characters:

a) determination of an AF-address matching exactly the MF-address of the originator in the user address look-up table maintained in the message transfer and control unit if such an exact match can be found; or

b) if a) cannot be achieved, and the MF-address to be converted is a CAAS-compliant address as specified in 2.5.1.4.10 to 2.5.1.4.12 including a *common-name* attribute value which is a syntactically valid AF-address, processing as follows:

1) allocation of the AF-address found as the *common-name* attribute value to the originator indicator of the converted AFTN message; and

2) analysis of consistency between the originator MF-address and the result of the backwards conversion of the AF-address determined in b) 1) into an MF-address as specified in 4.4.2.1.4.1 using the contents of the gateway look-up tables, resulting in:

i) no further action if the originator MF-address and the MF-address resulting from the conversion of the AF-address are identical; or

ii) logging of the error situation and reporting to a control position if the originator MF-address and the MF-address resulting from the conversion of the AF-address are not identical; or

c) if a) cannot be achieved, and the MF-address to be converted is an XF-address as specified in 2.5.1.4.7 to 2.5.1.4.9 including an *organizational-unit-names* attribute value which is a syntactically valid AF-address, processing as follows:

1) allocation of the AF-address found as *organizational-unit-names* attribute value to the originator indicator of the converted AFTN message, and

2) analysis of consistency between the originator XF-address and the result of the backwards conversion of the AF-address determined in c) 1) into an MF-address as specified in 4.4.2.1.4.1 using the contents of the gateway look-up tables, resulting in:

i) no further action if the originator XF-address and the MF-address resulting from the conversion of the AF-address are identical; or

ii) logging of the error situation and reporting to a control position if the originator XF-address and the MF-address resulting from the conversion of the AF-address are not identical; or

d) if none of the conditions in a), b) and c) can be met, failure to translate the MF-address resulting in:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery-report as specified in 4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) “unable-to-transfer” for the *non-delivery-reason-code*;

ii) “invalid-arguments” for the *non-delivery-diagnostic-code*; and

iii) “unable to convert to AFTN due to unrecognized originator O/R address” for the *supplementary-information*.

4.5.2.2.7 To build the address part of the converted AFTN message as specified in Annex 10, Volume II, 4.4.15.2.1, each of the recipient MF-addresses included in an AMHS message, whose *responsibility* element in the *per-recipient-indicators* has the abstract-value “responsible”, shall be processed for translation into an addressee indicator of the converted AFTN message in one of four mutually exclusive manners, depending on the MF-address format, after preliminary conversion of the value of all AMHS address attributes from lower case IA5IRV characters, if any, to upper case IA5IRV characters:

a) determination of an AF-address matching exactly the MF-address of the recipient in the user address look-up table maintained in the message transfer and control unit, if such an exact match can be found; or

b) if a) cannot be achieved, and the MF-address to be converted is a CAAS-compliant address as specified in 2.5.1.4.10 to 2.5.1.4.12 including a *common-name* attribute value which is a syntactically valid AF-address, processing as follows:

1) allocation of the AF-address found as the *common-name* attribute value to the addressee indicator of the converted AFTN message; and

2) analysis of consistency between the recipient MF-address and the result of the backwards conversion of the AF-address determined in b) 1) into an MF-address as specified in 4.4.2.1.4.1 using the contents of the gateway look-up tables, resulting in:

i) no further action if the recipient MF-address and the MF-address resulting from the conversion of the AF-address are identical; or

ii) logging of the error situation and reporting to a control position if the recipient MF-address and the MF-address resulting from the conversion of the AF-address are not identical; or

c) if a) cannot be achieved, and the MF-address to be converted is an XF-address as specified in 2.5.1.4.7 to 2.5.1.4.9 including an *organizational-unit-names* attribute value which is a syntactically valid AF-address, processing as follows:

1) allocation of the AF-address found as *organizational-unit-names* attribute value to the addressee indicator of the converted AFTN message; and

2) analysis of consistency between the recipient XF-address and the result of the backwards conversion of the AF-address determined in c) 1) into an MF-address as specified in ¶4.4.2.1.4.1 using the contents of the gateway look-up tables, resulting in:

i) no further action if the recipient XF-address and the MF-address resulting from the conversion of the AF-address are identical; or

ii) logging of the error situation and reporting to a control position if the recipient XF-address and the MF-address resulting from the conversion of the AF-address are not identical; or

d) if none of the conditions in a), b) and c) can be met, failure to translate the MF-address resulting in:

1) rejection of the message for the considered message recipient; and

2) generation of a non-delivery-report as specified in ¶4.5.6 with the following elements taking the following abstract-values in the *per-recipient-fields* of the report, for the considered recipient:

i) “unable-to-transfer” for the *non-delivery-reason-code*; and

ii) “unrecognised-OR-name” for the *non-delivery-diagnostic-code*.

4.5.2.2.8 Although the potential generation of a non-delivery report is mentioned for each recipient-name which cannot be properly translated into an AF-address, a single report with different per-recipient-fields may be generated for all recipient-names which cannot be translated.

4.5.2.2.9 The value of the filing time of a converted AFTN message shall be:

a) a date-time group as specified in Annex 10, Volume II, 4.4.15.2.2.1 taking the value of the six characters between the seventh and twelfth position from the *authorization-time* element in the IPM heading extensions adjusted by the optionally indicated time differential, if all the following conditions are met:

1) the AFTN/AMHS gateway supports the extended ATSMHS; and

2) the *authorization-time* element is present in the IPM heading extensions; or

b) the value of the filing-time component in the ATS-message-Filing-Time element of the AMHS message, if any of the following conditions is met:

1) the AFTN/AMHS gateway supports only the basic ATSMHS;

2) the ATS-message-Filing-Time element is present in the ATS-message-Header, and the *authorization-time* element is not present the IPM.

4.5.2.2.10 The optional heading information of a converted AFTN message shall either:

a) take the value of the *originators-reference* IPM heading extension if this element is present and the AFTN/AMHS gateway supports the extended ATSMHS;

b) take the value of the optional-heading-information in the ATS-message-Optional-Heading-Info element if this element is present and the AFTN/AMHS gateway supports only the basic ATSMHS or if this element is present and the *originators-reference* element is absent; or

c) be omitted in the converted AFTN message if the ATS-message-Optional-Heading-Info element and the *originators-reference* element are absent from the AMHS message.

4.5.2.2.11 The content of the text part of a converted AFTN message shall be derived from the value of the ATS-message-Text element of the IPM text of the AMHS message, in compliance with the following procedure:

a) conversion of each character which is not in the IA5IRV character repertoire into an IA5IRV character according to the locally defined conversion rules;

b) conversion of each IA5IRV character, if it is in lower case, into the equivalent upper case character;

c) replacement by question-marks (“?”) of all characters or character sequences in the text, if any, of which the use is not authorized in Annex 10, Volume II, 4.1.2;

d) folding of any line longer than 69 characters; and

e) allocation of the result of a) to d) above to the text part of the converted AFTN message.

Note.— If the capability of the AFTN connected to the AFTN/AMHS Gateway is extended in character set and/or line length then the procedures described in a) to d) may be suspended or adapted in accordance with the extended AFTN capabilities, provided that a message which cannot be transferred in AFTN remains subject to NDR generation with the relevant non-delivery-reason-code*,* non-delivery-diagnostic-code *and* supplementary-information *element values.*

4.5.2.2.12 The locally defined conversion rules mentioned in 4.5.2.2.11 a) may be, for example, CCITT Recommendation X.408, if support of the ISO 8859-1 character set is a local policy of the AMHS management domain.

4.5.2.2.13 A lower case IA5IRV character is one whose position is between 6/1 and 6/15 or 7/0 and 7/10. The corresponding upper case IA5IRV characters have positions extending from 4/1 to 4/15 and 5/0 to 5/10.

4.5.2.3 Use of IPM elements

4.5.2.3.1 Each of the elements composing the IPM in an AMHS message to be converted into an AFTN message in

the message transfer and control unit shall be processed as specified in the column “action” of Table 4-9. The elements composing the IPM shall be used according to the specification in the provision referred to in the column “mapping”.

4.5.2.3.2 Table 4-9 is structured as a PRL derived from the profile specification included in Chapter 3 and consequently from the ISPICS pro forma included in ISO/IEC ISP 12062-2 as well as from Table 3-4. The columns “base” and “ISP” under “reception” are extracted from ISO/IEC ISP 12062-2 and the column “basic ATSMHS support” specifies the static capability of an IPM AU supporting the basic ATSMHS, i.e. the ability to handle in reception the element as part of an IPM carrying an ATS message. The references to the ISP profile are indicated in the part titles as AMH21/ref where appropriate. The references in column “ref” are those of the ISP.

4.5.2.3.3 All body part types other than basic “ia5-text”, extended “ia5-text-body-part” and extended “general-text-body-part” are excluded as the result of 4.5.2.1.4.

4.5.2.3.4 This body part type may be either excluded or translated, depending on whether or not it is a standard extended body part type, and if yes, depending on the type of extended body part type, as specified in Part 4 of Table 4-9 and as the result of 4.5.2.1.4.

4.5.2.3.5 If the priority-indicator of a received AMHS message has the value “SS” and if the *responsibility* element of the corresponding *per-recipient-fields* of the message transfer envelope has the value “responsible”, then an error situation shall be logged and reported to a control position for appropriate action if any of the following situations, or both, occurs:

a) if the *notification-requests* element of either a *primary-recipient*, or a *copy-recipient*, or a *blind-copy-recipient* element has an abstract-value different from “rn” and the ATS-message-Text does not contain the text of an AFTN acknowledgement message as specified in Annex 10, Volume II, 4.4.10.1.6.1 and 4.4.15.6; or

b) if the *priority* element of the message transfer envelope has an abstract-value different from “urgent”.

4.5.2.3.6 The message transfer and control unit generates RNs only for SS priority messages, since they are the only messages for which an end-to-end acknowledgement is possible in the AFTN. A receipt-notification-request included in a message with another priority is ignored, considering that the message transfer and control unit cannot ensure the actual reception of the message by the end-user.

4.5.2.3.7 The error situation specified in 4.5.2.3.5 does not cause message rejection.

4.5.2.3.8 The components of a general-text body part shall be used as follows for the conversion of the IPM body into the text of the AFTN message:

a) the parameters component identify the character set used for the message, as specified in ISO/IEC 10021-7, B.2; and

b) the data component of a general-text body part is used for the generation of the converted AFTN message as specified in Part 6 of Table 4-9.

Table 4-9. Use of IPM elements

Ref	*Element*	*Reception*			*Action*	*Mapping*
		Base	*ISP*	*Basic ATSMHS support*		
Part 1: AMH21/A.1.1 Supported information objects						
1	Interpersonal message (IPM)	M	M	M	T	see Part 1/1.1 and 1.2
1.1	heading	M	M	M	T	see Part 2
1.2	body	M	M	M	T	see Part 3
2	Interpersonal notification (IPN)	O	M	M	-	out of the scope of this provision
Part 2: AMH21/A.1.2 IPM heading fields						
1	this-IPM	M	M	M	D	-
2	originator	M	M	M	D	-
3	authorizing-users	M	M	M	D	-
4	primary-recipients	M	M	M	D	see ¤4.5.2.3.5 and Part 5/1
5	copy-recipients	M	M	M	D	see ¤4.5.2.3.5 and Part 5/1
6	blind-copy-recipients	M	M	M	D	see ¤4.5.2.3.5 and Part 5/1
7	replied-to-IPM	M	M	M	D	-
8	obsoleted-IPMs	M	M	M	D	-
9	related-IPMs	M	M	M	D	-
10	subject	M	M	M	D	-
11	expiry-time	M	M	M	D	-
12	reply-time	M	M	M	D	-
13	reply-recipients	M	M	M	D	-
14	importance	M	M	M	D	-
15	sensitivity	M	M	M	D	-
16	auto-forwarded	M	M	M	D	-
17	extensions	M	M	M	D	-
17.1	incomplete-copy	O	M	M	D	-
17.2	languages	M	M	M	D	-
17.3	auto-submitted	O	I	I	D	-
17.4*	body-part-signatures	O	O	O	D	-
17.5*	ipm-security-label	O	O	O	D	-
17.6*	authorization-time	O	O	M	T1	see ¤4.5.2.2.9
17.7*	circulation-list-recipients	M	M	M	D	-
17.8*	distribution-codes	O	O	M	D	-
17.9*	extended-subject	M	M	M	D	-
17.10*	information-category	O	O	M	D	-
17.11*	manual-handling-instructions	O	O	M	D	-

Ref	Element	Reception			Action	Mapping
		Base	ISP	Basic ATSMHS support		
17.12*	originators-reference	O	O	M	T1	see ¶4.5.2.2.10
17.13*	precedence-policy-identifier	O	O	M	D	-
Part 3: AMH21/A.1.3 IPM body						
1	ia5-text	O	M	M	T	see Part 3/1.1 and 1.2
1.1	parameters	M	M	M	D	-
1.1.1	repertoire	M	M	M	D	-
1.2	data	M	M	M	T	see Part 6
2	voice	I	I	I	X	see ¶4.5.2.3.3
3	g3-facsimile	O	O	O	X	see ¶4.5.2.3.3
4	g4-class-1	O	O	O	X	see ¶4.5.2.3.3
5	teletex	O	O	O	X	see ¶4.5.2.3.3
6	videotex	O	O	O	X	see ¶4.5.2.3.3
7	encrypted	O	O	O	X	see ¶4.5.2.3.3
8	message	O	M	M	X	see ¶4.5.2.3.3
9	mixed-mode	O	O	O	X	see ¶4.5.2.3.3
10	bilaterally-defined	O	O	C1	X	see ¶4.5.2.3.3
11	nationally-defined	O	O	O	X	see ¶4.5.2.3.3
12	extended	M	M	M	X/T	see ¶4.5.2.3.4 and Part 4
Part 4: AMH21/A.1.3.1 Extended body part support						
1	ia5-text-body-part	O	M	M	T	see Part 3/1
2	g3-facsimile-body-part	O	O	O	X	see ¶4.5.2.3.3
3	g4-class1-body-part	O	O	O	X	see ¶4.5.2.3.3
4	teletex-body-part	O	O	O	X	see ¶4.5.2.3.3
5	videotex-body-part	O	O	O	X	see ¶4.5.2.3.3
6	encrypted-body-part	O	O	O	X	see ¶4.5.2.3.3
7	message-body-part	O	M	M	X	see ¶4.5.2.3.3
8	mixed-mode-body-part	O	O	O	X	see ¶4.5.2.3.3
9	bilaterally-defined-body-part	O	O	O	X	see ¶4.5.2.3.3
10	nationally-defined-body-part	O	O	O	X	see ¶4.5.2.3.3
11	general-text-body-part	O	M	M	T/X	see ¶4.5.2.1.4, ¶4.5.2.3.8 and Part 6
12	file-transfer-body-part	O	O	O	X	see ¶4.5.2.3.3
13	voice-body-part	O	O	O	X	see ¶4.5.2.3.3
14	oda-body-part	O	O	O	X	see ¶4.5.2.3.3
15*	report-body-part	O	M	M	X	see ¶4.5.2.3.3
16*	notification-body-part	O	M	M	X	see ¶4.5.2.3.3
17*	content-body-part	O	M	M	X	see ¶4.5.2.3.3

Ref	*Element*	*Reception*			*Action*	*Mapping*
		Base	*ISP*	*Basic ATSMHS support*		
18*	pkcs7-body-part	O	O	O	X	see ¶4.5.2.3.3
Part 5: AMH21/A.1.5 Common data types						
1	RecipientSpecifier					
1.1	recipient	M	M	M	D	-
1.2	notification-requests	M	M	M	D	see Part 5/1.2.1-1.2.3
1.2.1	rn	O	O	O	D	see ¶4.5.2.3.5
1.2.2	nrn	M	M	M	D	-
1.2.3	ipm-return	O	O	O	D	-
1.3	reply-requested	M	M	M	D	-
1.4*	recipient-extensions	O	M	M	T1	see Part 5/1.4.3
1.4.1*	recipient-security-request	O	O	O	D	-
1.4.2*	circulation-list-indicator	O	O	O	D	-
1.4.3*	precedence	O	O	M	T1	see ¶4.5.2.2.3
Part 6: IPM support of the basic ATSMHS						
1	ATS-message-Header	-	-	M	T1	see Part 6/1.1-1.6
1.1	start-of-heading	-	-	M	-	-
1.2	ATS-message-Priority	-	-	M	T	see Part 6/1.2.1-1.2.3
1.2.1	priority-prompt	-	-	M	-	-
1.2.2	priority-indicator	-	-	M	T	see ¶4.5.2.2.3 and ¶4.5.2.3.5
1.2.3	priority-separator	-	-	M	-	-
1.3	ATS-message-Filing-Time	-	-	M	T	see Part 6/1.3.1-1.3.3
1.3.1	filing-time-prompt	-	-	M	-	-
1.3.2	filing-time	-	-	M	T	see ¶4.5.2.2.9
1.3.3	filing-time-separator	-	-	M	-	-
1.4	ATS-message-Optional-Heading-Info	-	-	M	T1	see Part 6/1.4.1-1.4.3
1.4.1	OHI-prompt	-	-	M	-	-
1.4.2	optional-heading-information	-	-	M	T	see ¶4.5.2.2.10
1.4.3	OHI-separator	-	-	M	-	-
1.5	start-of-text	-	-	M	-	-
2	ATS-message-Text	-	-	M	T	see ¶4.5.2.2.11

D = discarded
I = out of scope
M = mandatory support
O = optional support
T = translated
T1 = conditionally translated
X = excluded (not used)
* = requirement applicable only if the AFTN/AMHS gateway supports the extended ATSMHS
- = not applicable

4.5.2.4 Use of message transfer envelope parameters

4.5.2.4.1 Each of the elements composing the message transfer envelope of an AMHS message to be converted into an AFTN message in a message transfer and control unit shall be processed as specified in the column “action” of Table 4-10. The elements composing the message transfer envelope shall be handled according to the specification in the provisions referred to in the column “mapping”.

4.5.2.4.2 Table 4-10 is structured as a PRL derived from the ISPICS pro forma included in ISO/IEC ISP 10611-3. The columns “Base” and “ISP” are extracted from ISO/IEC ISP 10611-3 and the column “basic ATSMHS” specifies the static capability of an AU in relation with the MT-EoS, i.e. the ability to convey, handle and act in relation with the element. The references to the ISP profile are indicated in the part titles as AMH11/ref, where appropriate.

4.5.2.4.3 Although not used for mapping, some elements may generate specific actions for the gateway in the handling of the considered message.

4.5.2.4.4 Some elements may have two classifications, e.g. D/X, where certain values of the element may cause message rejection, while other values are simply discarded when the AMHS message is converted into an AFTN message.

4.5.2.4.5 The elements *alternate-recipient-allowed* and *originator-requested-alternate-recipient* shall be discarded by the message transfer and control unit, since the optional redirection FG, if implemented in an AFTN/AMHS gateway, is supported by the ATN component and not by the message transfer and control unit.

4.5.2.4.6 The element *deferred-delivery-time* shall be discarded by the message transfer and control unit, since this functionality, if implemented in an AFTN/AMHS gateway, is supported by the ATN component and not by the message transfer and control unit.

4.5.2.4.7 For mapping purposes the whole *per-domain-bilateral-information* element shall be discarded.

4.5.2.4.8 If the elements country-name, administration-domain-name and private-domain-identifier in an element of the per-domain-bilateral-information together identify the AMHS management domain operating the AFTN/AMHS gateway, the use made of the bilateral-information element is a local matter.

4.5.2.4.9 If any extension-field is present in the *extensions* of the message transfer envelope and not semantically understood, or not supported by the message transfer and control unit, then the element shall either:

a) cause the following actions to be performed if its criticality is set to “CRITICAL FOR TRANSFER” or to “CRITICAL FOR DELIVERY”:

   1) message rejection of the message for either:

      i) all the message recipients if the extension is part of the *per-message-fields*; or

      ii) the considered message recipient if the extension is part of the *per-recipient-fields*; and

   2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in the appropriate *per-recipient-fields* of the report:

      i) “unable-to-transfer” for the *non-delivery-reason-code*; and

      ii) “unsupported-critical-function” for the *non-delivery-diagnostic-code*; or

b) be simply discarded if there is no criticality given.

Table 4-10. Use of the message transfer envelope

Ref	*Element*	*Base*	*ISP*	*Basic ATSMHS*	*Action*	*Mapping*
Part 1: AMH11/A.1.4.2 Message transfer						
1	MessageTransferEnvelope	M	M	M	T	see Part 1/1.1 and 1.2
1.1	(per message fields)					
1.1.1	message-identifier	M	M	M	D	-
1.1.2	originator-name	M	M	M	T	see ¶4.5.2.2.6
1.1.3	original-encoded-information-types	M	M-	M-	D/X	see ¶4.5.2.1.1
1.1.4	content-type	M	M-	M-	D/X	see ¶4.5.1.1
1.1.5	content-identifier	M	M	M	D	-
1.1.6	Priority	M	M	M	D	-
1.1.7	per-message-indicators	M	M	M	D	see Part 2/4
1.1.8	deferred-delivery-time	O	M-	M-	D	see ¶4.5.2.4.6
1.1.9	per-domain-bilateral-information	O	M-	M-	D	see ¶4.5.2.4.7 and Part 2/5
1.1.10	trace-information	M	M	M	D	see Part 2/6
1.1.11	Extensions	M	M	M	D/X	see ¶4.5.2.4.9 and Part 3/1
1.1.11.1	recipient-reassignment-prohibited	O	M	M	D	see ¶4.5.2.4.5
1.1.11.2	dl-expansion-prohibited	O	M	M	D	see ¶4.5.2.4.10
1.1.11.3	conversion-with-loss-prohibited	O	M	M	D/X	see ¶4.5.2.1.6
1.1.11.4	latest-delivery-time	O	M-	M-	D/X	see ¶4.5.2.4.11
1.1.11.5	originator-return-address	O	M-	M-	D	-
1.1.11.6	originator-certificate	O	M-	M-	D	see ¶4.5.2.4.16, 4.5.2.4.17 and 4.5.2.18
1.1.11.7	content-confidentiality-algorithm-identifier	O	M-	M-	X	¶4.5.2.4.12
1.1.11.8	message-origin-authentication-check	O	M-	M-	D/X	see ¶4.5.2.4.19
1.1.11.9	message-security-label	O	M-	M-	D/X	see ¶4.5.2.4.9
1.1.11.10	content-correlator	M	M	M	D	-
1.1.11.11	dl-expansion-history	M	M-	M-	D	-
1.1.11.12	internal-trace-information	M	M	M	D	-
1.2	per-recipient-fields	M	M	M	T	see Part 1/1.2.1-1.2.5
1.2.1	recipient-name	M	M	M	T	see ¶4.5.2.2.7
1.2.2	originally-specified-recipient-number	M	M	M	D	-
1.2.3	per-recipient-indicators	M	M	M	D	-
1.2.4	explicit-conversion	O	M-	M-	D	-
1.2.5	Extensions	M	M	M	D/X	see ¶4.5.2.4.9 and Part 3/1
1.2.5.1	originator-requested-alternate-recipient	O	M-	M-	D	¶4.5.2.4.5
1.2.5.2	requested-delivery-method	O	M-	M-	D	see ¶4.5.2.4.13 and 4.5.2.5.14

Ref	Element	Base	ISP	Basic ATSMHS	Action	Mapping
1.2.5.3	physical-forwarding-prohibited	O	M-	M-	X	see §4.5.2.4.15
1.2.5.4	physical-forwarding-address-request	O	M-	M-	X	see §4.5.2.4.15
1.2.5.5	physical-delivery-modes	O	M-	M-	X	see §4.5.2.4.15
1.2.5.6	registered-mail-type	O	M-	M-	X	see §4.5.2.4.15
1.2.5.7	recipient-number-for-advice	O	M-	M-	X	see §4.5.2.4.15
1.2.5.8	physical-rendition-attributes	O	M-	M-	X	see 4.5.2.4.15
1.2.5.9	physical-delivery-report-request	O	M-	M-	X	see §4.5.2.4.15
1.2.5.10	message-token	O	M-	M-	D	see Part 3 and §4.5.2.4.20
1.2.5.11	content-integrity-check	O	M-	M-	D/X	see §4.5.2.4.19
1.2.5.12	proof-of-delivery-request	O	M-	M-	D/X	see §4.5.2.4.9
1.2.5.13	redirection-history	M	M-	M-	D	-
2	Content	M	M	M	T	see §4.5.2.3
Part 2: AMH11/A.1.5 Common data types						
4	PermessageIndicators					
4.1	disclosure-of-other-recipients	M	M	M	D	-
4.2	implicit-conversion-prohibited	M	M	M	D/X	see §4.5.2.1.2
4.3	alternate-recipient-allowed	M	M	M	D	see §4.5.2.4.5
4.4	content-return-request	O	M-	M-	D	-
4.5	Reserved	O	M-	M-	D	-
4.6	bit-5	O	M-	M-	D	-
4.7	bit-6	O	M-	M-	D	-
4.8	service-message	O	M-	M-	D	-
5	PerDomainBilateralInformation					
5.1	country-name	M	M-	M-	D	see §4.5.2.4.7
5.2	administration-domain-name	M	M-	M-	D	see §4.5.2.4.7
5.3	private-domain-identifier	O	M-	M-	D	see §4.5.2.4.7
5.4	bilateral-information	M	M-	M-	D	see §4.5.2.4.7
6	TraceInformation					
6.1	TraceInformationElement	M	M	M	D	-
6.1.1	global-domain-identifier	M	M	M	D	-
6.1.2	domain-supplied-information	M	M	M	D	-
6.1.2.1	arrival-time	M	M	M	D	-
6.1.2.2	routing-action	M	M	M	D	-
6.1.2.2.1	Relayed	M	M	M	D	-
6.1.2.2.2	Rerouted	O	C1	C1	D	-
6.1.2.3	attempted-domain	O	C1	C1	D	-

Ref	*Element*	*Base*	*ISP*	*Basic ATSMHS*	*Action*	*Mapping*
6.1.2.4	(additional actions)				D	-
6.1.2.4.1	deferred-time	M	C2	C2	D	-
6.1.2.4.2	converted-encoded-information-types	O	M-	M-	D	see ¶4.5.2.1.1
6.1.2.4.3	other-actions	O	M-	M-	D	-
6.1.2.4.3.1	Redirected	O	M-	M-	D	-
6.1.2.4.3.2	dl-operation	O	M-	M-	D	-
Part 3: AMH11/A.1.6 Extension data types						
1	ExtensionField					
1.1	Type	M	M	M	D/X	see Part 3/1.1.1 and 1.1.2
1.1.1	standard-extension	M	M	M	D/X	see ¶4.5.2.4.9
1.1.2	private-extension	O	M-	M-	D/X	see ¶4.5.2.4.9
1.2	Criticality	M	M	M	D/X	see ¶4.5.2.4.9
1.3	Value	M	M	M	D	-
4	MessageToken	O	M	M	D/X	see ¶4.5.2.4.20
4.1	token-type-identifier	M	M	M	D/X	see ¶4.5.2.4.21
4.2	asymmetric-token	M	M	M	D	see ¶4.5.2.4.21
4.2.1	signature-algorithm-identifier	M	M	M	D	see ¶4.5.2.4.21
4.2.2	Name	M	M	M	D	see ¶4.5.2.4.21
4.2.3	Time	M	M	M	D	see ¶4.5.2.4.21
4.2.4	signed-data	O	M	M	D	see ¶4.5.2.4.21
4.2.4.1	content-confidentiality-algorithm-identifier	O	C3	O	X	see ¶4.5.2.4.21
4.2.4.2	content-integrity-check	O	M	M	D	see ¶4.5.2.4.21
4.2.4.3	message-security-label	O	O	O	D/X	see ¶4.5.2.4.22
4.2.4.4	proof-of-delivery-request	O	O	O	D/X	see ¶4.5.2.4.22
4.2.4.5	message-sequence-number	O	O	O	D	see ¶4.5.2.4.22
4.2.5	encryption-algorithm-identifier	O	O	O	X	see ¶4.5.2.4.21
4.2.6	encrypted-data	O	O	O	X	see ¶4.5.2.4.21

C1 = if re-routing is supported then M else M-
C2 = if deferred delivery is supported then M else M-
C3 = if S0C then M else O
D = discarded
M = mandatory support
M- = mandatory minimal support
O = optional support
T = translated
X = excluded (not used)

4.5.2.4.10 The element *dl-expansion-prohibited* shall be discarded by the message transfer and control unit, since the DL-expansion capability of an AFTN/AMHS gateway is supported by the ATN component and not by the message transfer and control unit.

4.5.2.4.11 If the *latest-delivery-time* element is present, and if, when the AMHS message is handled by the message transfer and control unit, the current time exceeds the value of the *latest-delivery-time*, then the following actions shall be performed:

a) message rejection for all the message recipients; and

b) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in the appropriate *per-recipient-fields* of the report:

1) either “transfer-failure” or “unable-to-transfer” for the *non-delivery-reason-code*; and

2) “maximum-time-expired” for the *non-delivery-diagnostic-code*.

4.5.2.4.12 The message transfer and control unit does not implement content confidentiality security elements of service. Thus, if any extension-field related to content-confidentiality is present in the *extensions* of the message transfer envelope, the following actions shall be performed:

a) message rejection of the message for either:

1) all the message recipients if the extension is part of the *per-message-fields*; or

2) the considered message recipient if the extension is part of the *per-recipient-fields*; and

b) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in the appropriate *per-recipient-fields* of the report:

1) “unable-to-transfer” for the *non-delivery-reason-code*; and

2) “unsupported-critical-function” for the *non-delivery-diagnostic-code*.

4.5.2.4.13 The element *requested-delivery-method* shall be discarded by the message transfer and control unit.

4.5.2.4.14 The message transfer and control unit handles the message irrespective of the value of this attribute, since it indicates only a preferred delivery method (see Technical Corrigendum 5 to ISO/IEC 10021-4).

4.5.2.4.15 The message transfer and control unit does not implement physical delivery elements of service. Thus, if any physical delivery-related extension-field set to “CRITICAL FOR DELIVERY” is present in the *extensions* of the message transfer envelope, the following actions shall be performed:

a) message rejection of the message for either:

1) all the message recipients if the extension is part of the *per-message-fields*; or

2) the considered message recipient if the extension is part of the *per-recipient-fields*; and

b) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in the appropriate *per-recipient-fields* of the report:

1) “physical-rendition-not-performed” for the *non-delivery-reason-code*; and

2) “unsupported-critical-function” for the *non-delivery-diagnostic-code*.

4.5.2.4.16 If the *originator-certificate* element is present, and if the AFTN/AMHS gateway supports the extended ATSMHS, the element shall be used in accordance with the AMHS security policy for the verification of any digital signature generated by the originator.

4.5.2.4.17 The originator certificate may be obtained by other means, e.g. from the ATN directory. Application of the AMHS security policy implies that the validity of the certificate is checked, e.g. by reference to CRLs.

4.5.2.4.18 Although the information contained in the originator certificate is not used for generation of the resulting AFTN message, and as such is considered as discarded for conversion purposes, the certificate may be stored locally as part of a local implementation choice and/or operational matter for the application of the AMHS security policy.

4.5.2.4.19 If the *message-origin-authentication-check* or the *content-integrity-check* element is present in the *message-extensions* or *recipient-extensions* (not in the *message token*), then either of the following actions shall be performed depending on the support of this optional element by the gateway:

a) handling as specified in ¶4.5.2.4.9 if the element is not semantically understood or not supported, and/or the AFTN/AMHS gateway supports only the basic ATSMHS; or

b) verification of the signature if the element is supported and if a valid originator certificate can be obtained, resulting in either:

1) validation of the message for further conveyance in the AFTN and discarding of the security element if the message originator is successfully authenticated; or

2) rejection of the message for all recipients if the message originator cannot be successfully authenticated, and generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in the appropriate *per-recipient-fields* of the report:

i) “unable-to-transfer” for the *non-delivery-reason-code*; and

ii) “secure-messaging-error” for the *non-delivery-diagnostic-code*.

4.5.2.4.20 If the *message-token* element is present in the *recipient-extensions*, then either of the following actions shall be performed depending on the level of service supported by the gateway:

a) handling as specified in ¶4.5.2.4.9 if the AFTN/AMHS gateway supports only the basic ATSMHS; or

b) processing of the *message-token* element as specified in ¶4.5.2.4.2 if the AFTN/AMHS gateway supports the extended ATSMHS.

4.5.2.4.21 If the *message-token* element is present in the *recipient-extensions* and is supported by the AFTN/AMHS gateway, then either of the following actions shall be performed depending on the sub-elements received as part of the message token:

a) rejection of the message for the considered recipient and generation of a non-delivery report as specified in ¶4.5.6 with the *non-delivery-reason-code* element taking the abstract-value “unable-to-transfer” and the *non-delivery-diagnostic-code* element taking the abstract-value “secure-messaging-error” if any of the following conditions are met:

1) if the *token-type-identifier* element identifies anything else than an asymmetric-token;

2) if the *asymmetric-token* element is not present;

3) if the *signature-algorithm-identifier* differs from the value specified in section 3.1.4.3.8;

4) if the *time* element is not present;

5) if the *signed-data* element is not present;

6) if the *content-integrity-check* is not present in the signed-data;

7) if the *content-confidentiality-algorithm-identifier* is present in the signed-data; or

8) if the *encryption-algorithm-identifier* or *encrypted-data* elements are present; or

b) verification of the signature applying to the *name*, *time* and *signed-data* elements if a valid originator certificate can be obtained, resulting in either:

1) validation of the message for further conveyance in the AFTN and discarding of the *message-token* element if all of the following conditions are met:

i) the message originator is successfully authenticated as can be determined from the successful check of the signature;

ii) the message content is unaltered as can be determined from the successful check of the signature including the *content-integrity-check* element; and

iii) the message has not been repeated as can be determined from the successful check of the signature and from the comparison from the *time* element with the gateway traffic log; or

2) if any of the conditions in b) 1) are not met, rejection of the message for the considered recipient and generation of a non-delivery report as specified with the *non-delivery-reason-code* element taking the abstract-value “unable-to-transfer” and the *non-delivery-diagnostic-code* element taking the abstract-value “secure-messaging-error”.

4.5.2.4.22 If present, this element shall be used only for the verification of the digital signature as specified in ¶4.5.2.4.21 but not interpreted before being discarded.

4.5.3 AMHS RN conversion

Upon reception by the message transfer and control unit of an RN conveyed with a message transfer envelope passed from the ATN component for the acknowledgement of an SS message, this message shall be converted into an AFTN acknowledgement message in compliance with the specification of:

a) the initial processing performed to determine the message transfer and control unit ability to convert the RN, as included in ¶4.5.3.1;

b) how the AFTN service message is generated and how the AFTN service message components are mapped from AMHS parameters, as included in ¶4.5.3.2;

c) how the elements of the received RN are handled, as included in ¶4.5.3.3; and

d) how the message transfer envelope elements are handled, as included in ¶4.5.3.4.

4.5.3.1 Initial processing of AMHS RNs

4.5.3.1.1 Upon reception by the message transfer and control unit of an RN passed from the ATN component to be potentially converted into an AFTN acknowledgement message the received RN shall be processed in one of the following manners:

a) processing as specified in 4.5.3.1.2 if the subject IPM has been previously generated by the message transfer and control unit; or

b) unsuccessful termination of the procedure if the subject IPM has not been previously generated by the message transfer and control unit, resulting in:

1) logging of the error situation and reporting to a control position;

2) storage of the RN for appropriate action at the control position; and

3) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values:

i) “unable-to-transfer” for the *non-delivery-reason-code*;

ii) “invalid-arguments” for the *non-delivery-diagnostic-code*; and

iii) “unable to convert RN to AFTN Ack service message due to misrouted RN” for the *supplementary-information*.

4.5.3.1.2 For an AMHS RN passed from the ATN component to the message transfer and control unit and not rejected as the result of ¶4.5.3.1.1, the received RN shall be processed in one of the following manners:

a) processing as specified in ¶4.5.3.1.3 if the value of the priority indicator of the subject AFTN message was “SS”; or

b) unsuccessful termination of the procedure if the value of the priority indicator was different from “SS”, resulting in:

1) logging of the error situation and reporting to a control position; and

2) storage of the RN for appropriate action at the control position.

4.5.3.1.3 An AMHS RN passed from the ATN component to the message transfer and control unit and not rejected as the result of ¶4.5.3.1.2 shall be processed as specified in ¶4.5.3.2.

4.5.3.2 Generation of the AFTN acknowledgement message

4.5.3.2.1 An AMHS RN received by the message transfer and control unit and not rejected as the result of 4.5.3.1.1 shall be converted into an AFTN acknowledgement message in compliance with:

a) the specification of 4.5.2.2 with the exception of the components listed in Table 4-11; and

b) the classification of the components included in Table 4-11 as specified in the column "action".

4.5.3.2.2 Components classified as "G" shall be generated in compliance with the provision referred to in the column "mapping" of Table 4-11. Components classified as "T" shall be converted from the AMHS parameter specified in the column "converted from AMHS parameter" and according to the specification in the provision referred to in the column "mapping".

Table 4-11. Generation of AFTN acknowledgement message

AFTN message Part	*Component*	*Action*	*Converted from AMHS parameter*	*Mapping*
address	Priority Indicator	G	-	see 4.5.3.2.3
Origin	Filing Time	T	receipt-time (see Table 4-12/Part 1/7.1)	see 4.5.3.2.4
	Optional Heading Information	X	-	-
Text		G	-	see 4.5.3.2.5
G = generated T = translated X = excluded (not used)				

4.5.3.2.3 In an AFTN acknowledgement message, generated as the result of the conversion of an AMHS RN message, the priority indicator component shall take the value SS.

4.5.3.2.4 In an AFTN acknowledgement message, generated as the result of the conversion of an AMHS RN message, the filing time component shall:

a) be a date-time group as specified in Annex 10, Volume II, 4.4.15.2.2.1; and

b) take the value of the six characters between the fifth and tenth position from the *receipt-time* element of the RN, adjusted by the optionally indicated time differential.

4.5.3.2.5 In an AFTN acknowledgement message, generated as the result of the conversion of an AMHS RN message, the value of the text component shall be generated as specified in Annex 10, Volume II, 4.4.15.6 using the origin of the subject AFTN message.

4.5.3.3 Use of RN fields

4.5.3.3.1 Each of the elements composing the RN to be converted into an AFTN acknowledgement message in an AFTN/AMHS gateway shall be processed as specified in the column "action" of Table 4-12. The elements composing the RN shall be handled according to the specification in the provision referred to in the column "mapping" of Table 4-12.

4.5.3.3.2.1 Table 4-12 is structured as a PRL derived from the profile specification included in Section 3 of this manual and consequently from the ISPICS pro forma included in ISO/IEC ISP 12062-2 (AMH21). The columns "base" and "ISP" under "reception" are extracted from ISO/IEC ISP 12062-2, and the column "basic ATSMHS" specifies the static capability of an IPM AU supporting the basic ATSMHS, i.e. the ability to handle in reception the element as part of an RN. The references to the ISP profile are indicated in the part titles as AMH21/ref, where appropriate. The references in column "ref" are those of the ISP.

Table 4-12. Use of RN fields

Ref	*Element*	*Reception*			*Action*	*Mapping/Notes*
		Base	*ISP*	*Basic ATSMHS*		
Part 1: AMH21/A.1.4 IPN fields						
1	subject-ipm	M	M	M	D	-
2	ipn-originator	M	M	M	D	-
3	ipm-preferred-recipient	M	M	M	D	-
4	conversion-eits	M	M	M	D	-
5	notification-extensions	O	I	I	-	-
6	non-receipt-fields	O	M	M	-	out of the scope of this provision
7	receipt-fields	O	M	M	T	see Part 1/7.1-7.4
7.1	receipt-time	M	M	M	T	see 4.5.3.2.4
7.2	acknowledgment-mode	M	M	M	D	-
7.3	suppl-receipt-info	O	O	O	D	-
7.4	rn-extensions	O	I	I	-	-
8	other-notification-type-fields	O	I	I	-	-
D = discarded I = out of scope M = mandatory support O = optional support T = translated - = not applicable						

4.5.3.4 Use of message transfer envelope parameters conveyed with an RN

4.5.3.4.1 The elements composing the message transfer envelope conveyed with an RN to be converted into an AFTN acknowledgement message shall be used in compliance with:

a) the specification of 4.5.2.4 with the exception of those elements included in Table 4-13; and

b) the specification included in the provision referred to in the column “mapping” of Table 4-13.

Note.— Table 4-13 is structured as an extraction of Table 4-10.

4.5.3.4.2 The elements related to the encoded-information-types in the message transfer envelope conveyed with an RN shall be discarded when converting the RN into an AFTN acknowledgement message.

4.5.3.4.3 The *recipient-name* element in the message transfer envelope conveyed with an RN shall be discarded when converting the RN into an AFTN acknowledgement message.

4.5.3.4.4 The message transfer and control unit uses the information contained in the subject AFTN message to construct an AFTN acknowledgement message.

Table 4-13. Use of the message transfer envelope conveyed with an RN (differences from Table 4-10)

Ref	*Element*	*Base*	*ISP*	*Basic ATSMHS*	*Action*	*Mapping*
Part 1: AMH11/A.1.4.2 Message transfer						
1	MessageTransferEnvelope	M	M	M	T	see Part 1/1.1 and 1.2
1.1	(per message fields)					
1.1.3	original-encoded-information-types	M	M-	M-	D	see ¶4.5.3.4.2
1.1.7	per-message-indicators	M	M	M	D	see Part 2/4
1.1.10	trace-information	M	M	M	D	see Part 2/6
1.2	per-recipient-fields	M	M	M	D	see Part 1/1.2.1
1.2.1	recipient-name	M	M	M	D	see ¶4.5.3.4.3
2	Content	M	M	M	T	see ¶4.5.3.3
Part 2: AMH11/A.1.5 Common data types						
4	PerMessageIndicators					
4.2	implicit-conversion-prohibited	M	M	M	D	see ¶4.5.3.4.2
6	TraceInformation					
6.1	TraceInformationElement	M	M	M	D	—
6.1.2	domain-supplied-information	M	M	M	D	—
6.1.2.4	(additional actions)				D	—
6.1.2.4.2	converted-encoded-information-types	O	M-	M-	D	see ¶4.5.3.4.2

M = mandatory support
M- = mandatory minimal support
O = optional support
D = discarded
T = translated

4.5.4 AMHS non-delivery report conversion

Upon reception by the message transfer and control unit of an AMHS non-delivery report passed from the ATN component, this report shall be processed in compliance with the specification of:

a) the initial processing performed to determine the message transfer and control unit ability to convert the report, as included in ¶4.5.4.1;

b) how the AFTN service message is generated, if any, and how the AFTN service message components are mapped from AMHS parameters, as included in ¶4.5.4.2; and

c) how the report transfer envelope elements are handled, as included in ¶4.5.4.3.

4.5.4.1 Initial processing of AMHS non-delivery reports

4.5.4.1.1 Upon reception by the message transfer and control unit of a non-delivery report, passed from the ATN component to be potentially converted into an AFTN service message, the received non-delivery report shall be processed in one of the following manners:

a) processing as specified in 4.5.4.1.2 if the subject AMHS message has been previously generated by the message transfer and control unit; or

b) unsuccessful termination of the procedure if the subject AMHS message has not been previously generated by the message transfer and control unit, resulting in:

1) logging of the error situation and reporting to a control position; and

2) storage of the non-delivery report for appropriate action at the control position.

4.5.4.1.2 A non-delivery report received by the message transfer and control unit, and regarding a subject message which had been generated by the message transfer and control unit, shall be processed by the message transfer and control unit in one of three mutually exclusive manners:

a) processing as specified in 4.5.4.1.3 if there is no *originally-intended-recipient-name* element with a value different of the *actual-recipient-name* in any of the *per-recipient-fields* elements of the report;

b) processing as follows, if at least one *originally-intended-recipient-name* element in one of the *per-recipient-fields* elements has a value different from the value of the *actual-recipient-name*, and if at least one *per-recipient-fields* element in the report does not meet the same condition:

1) logging of the error situation and reporting to a control position;

2) storage of the non-delivery report and of the corresponding *per-recipient-fields* elements for appropriate action at the control position; and

3) processing of the report as specified in 4.5.4.1.3 for the *per-recipient-fields* where there is no *originally-intended-recipient-name* element with a value different of the *actual-recipient-name*; or

c) processing as follows, if all *per-recipient-fields* elements of the report include an *originally-intended-recipient-name* element which has a value different from the value of the *actual-recipient-name*:

1) logging of the error situation and reporting to a control position; and

2) storage of the non-delivery report and of the corresponding *per-recipient-fields* elements for appropriate action at the control position.

4.5.4.1.3 If the non-delivery report did not cause an error situation to be reported, or for the *per-recipient-fields* of the report which did not cause an error to be reported, the report shall be processed by the message transfer and control unit in one of the following manners:

a) conversion of the report into an unknown address AFTN service message as specified in 4.5.4.2 if the *non-delivery-diagnostic-code* has the abstract-value “unrecognised-OR-name”; or

b) processing as follows if the *non-delivery-diagnostic-code* has any abstract-value other than “unrecognised-OR-name”:

1) logging of the non-delivery situation and reporting to a control position; and

2) storage of the non-delivery report for appropriate action at the control position.

4.5.4.2 Generation of unknown address AFTN service message

4.5.4.2.1 An AMHS non-delivery report received by the message transfer and control unit for which the *non-delivery-diagnostic-code* has the abstract-value "unrecognised-OR-name" and which is not stored for action at the control position as the result of ¶4.5.4.1 shall be converted into an AFTN service message to the originator of the subject AFTN message, indicating that an unknown addressee indicator was specified in the subject AFTN message (unknown address AFTN service message) in compliance with:

a) the specification in Annex 10, Volume II, 4.4.11.13.3; and

b) the classification of the components included in Table 4-14, as specified in the column "action" in accordance with the terminology in ¶1.3.3.

4.5.4.2.2 Components classified as "G" shall be generated in compliance with the provisions of Annex 10, Volume II or with the provision referred to in the column "mapping" of Table 4-14. Components classified as "T" shall be converted from the AMHS parameter specified in the column "converted from AMHS parameter" and according to the specification in the provision referred to in the column "mapping".

Table 4-14. Generation of unknown address AFTN service message

AFTN message part	*Component*	*Action*	*Converted from AMHS parameter*	*Mapping*
Heading	Start-of-Heading Character	G	-	see Annex 10, Vol. II, 4.4.15.1.1
	Transmission Identification	G	-	see Annex 10, Vol. II, 4.4.15.1.1
address	Alignment Function	G	-	see Annex 10, Vol. II, 4.4.15.2.1
	Priority Indicator	G	-	see ¶4.5.4.2.4
	addressee Indicator(s)	G	-	see ¶4.5.4.2.5
	Alignment Function	G	-	see Annex 10, Vol. II, 4.4.15.2.1
Origin	Filing Time	G	-	see ¶4.5.4.2.6
	Originator Indicator	G	-	see ¶4.5.4.2.7
	Priority Alarm	G	-	see Annex 10, Vol. II, 4.4.15.2.2
	Optional Heading Information	X	-	-
	Alignment Function	G	-	see Annex 10, Vol. II, 4.4.15.2.2
	Start-of-Text Character	G	-	see Annex 10, Vol. II, 4.4.15.2.2
Text		T	actual-recipient-name (see Table 4-15/ Part 1/2.2.1)	see ¶4.5.4.2.8
Ending	Alignment Function	G	-	see Annex 10, Vol. II, 4.4.15.3.12
	Page-feed sequence	G	-	see Annex 10, Vol. II, 4.4.15.3.12
	End-of-Text Character	G	-	see Annex 10, Vol. II, 4.4.15.3.12

G = generated
T = translated
X = excluded (not used)

4.5.4.2.3 The priority indicator component shall take the value of the priority indicator of the subject AFTN message.

4.5.4.2.4 The addressee indicator(s) component shall contain a single AF-address which is the originator indicator of the subject AFTN message.

4.5.4.2.5 The filing time component, expressed as a date-time group in compliance with Annex 10, Volume II, 4.4.15.2.2.1 shall take the value of the time at which the AFTN service message is generated by the message transfer and control unit.

4.5.4.2.6 The originator indicator shall be the AFTN address of the AFTN component of the AFTN/AMHS gateway, as specified in ¶4.2.1.16.

4.5.4.2.8 The value of the message text component shall be structured as follows:

a) a first line composed as specified in Annex 10, Volume II, 4.4.11.13.3, items 1) to 4) using the origin of the subject AFTN message;

b) a second line composed as specified in Annex 10, Volume II, 4.4.11.13.3, items 5) and 6) using the first address line of the subject AFTN message; and

c) the third and following lines as appropriate composed as specified in Annex 10, Volume II, 4.4.11.13.3, items 7) to 9) using the AF-address(es) translated as specified in ¶4.5.4.2.9 from the *actual-recipient-name* elements of the *per-recipient-fields* of the non-delivery report which were not stored for action at the control position as the result of ¶4.5.4.1.2.

4.5.4.2.9 Each *actual-recipient-name* element used to generate an unknown address AFTN service message as specified in ¶4.5.4.2.8 c) shall be processed for translation into an AF-address as specified in ¶4.5.2.2.6, except for failure to translate the MF-address resulting in:

a) logging of the error situation and reporting to a control position; and

b) storage of the MF-address and of the non-delivery report for appropriate action at the control position.

4.5.4.3 Use of report transfer envelope and content parameters

4.5.4.3.1 Each of the elements composing the report transfer envelope and report transfer content of an AMHS report to be converted into an AFTN service message in the message transfer and control unit shall be processed as specified in the column “action” of Table 4-15. These elements shall be handled according to the specification in the provision referred to in the column “mapping”.

4.5.4.3.2 Table 4-15 is structured as a PRL derived from the ISPICS pro forma included in ISO/IEC ISP 10611-3. The columns “base” and “ISP” are extracted from ISO/IEC ISP 10611-3, and the column “Basic ATSMHS” specifies the static capability of an AU for the MT-EoS, i.e. the ability to convey, handle and act in relation with the element. The references to the ISP profile are indicated in the part titles as AMH11/ref, where appropriate.

Table 4-15. Use of report transfer envelope and content parameters

Ref	*Element*	*Base*	*ISP*	*Basic ATSMHS*	*Action*	*Mapping*
Part 1: AMH11/A.1.4.3 Report transfer						
1	ReportTransferEnvelope	M	M	M	D	-
2	ReportTransferContent	M	M	M	T	see Part 1/2.1 and 2.2
2.1	(per report fields)					
2.1.1	subject-identifier	M	M	M	D	-
2.1.2	subject-intermediate-trace-information	O	M	M	D	-
2.1.3	original-encoded-information-types	M	M	M	D	-
2.1.4	content-type	M	M	M	D	-
2.1.5	content-identifier	M	M	M	D	-
2.1.6	returned-content	O	M-	M-	D	-
2.1.7	additional-information	O	M-	M-	D	-
2.1.8	Extensions	M	M	M	D	-
2.2	per-recipient-fields	M	M	M		
2.2.1	actual-recipient-name	M	M	M	T	see §4.5.4.2.8
2.2.2	originally-specified-recipient-number	M	M	M	D	-
2.2.3	per-recipient-indicators	M	M	M	D	-
2.2.4	last-trace-information	M	M	M	D	-
2.2.5	originally-intended-recipient-name	M	M	M	X	see §4.5.4.1.3
2.2.6	supplementary-information	O	M-	M-	D	-
2.2.7	Extensions	M	M	M	D	-

D = discarded
M = mandatory support
M- = mandatory minimal support
O = optional support
T = translated
X = excluded (not used)

4.5.5 Action upon reception of AMHS probe

4.5.5.1 Upon reception by the message transfer and control unit of an AMHS probe for which content type is “interpersonal-messaging-1988”, the received probe shall be processed in one of the following manners, depending on the abstract-value of the current-encoded-information-types, determined as either the abstract-value of the latest *converted-encoded-information-types*, if existing, in the *trace-information* element, or as the abstract-value of the *original-encoded-information-types* element in the probe transfer envelope if the former does not exist:

a) processing as specified in 4.5.5.2 if the abstract-value of the current encoded-information-types is “unspecified” or includes exclusively one or several of the following values:

1) basic "ia5-text";

2) externally-defined "ia5-text", which corresponds to OID {id-eit-ia5-text} as specified in ISO/IEC 10021-4 Annex A;

3) OID {id-cs-eit-authority 1} identifying the C0 control character set ISO-IR 0 as described in ISO/IEC 10021-7;

4) OID {id-cs-eit-authority 2} identifying the G0 graphical character set ISO-IR 2 known as International Reference Version of ISO 646) as described in ISO/IEC 10021-7;

5) OID {id-cs-eit-authority 6} identifying the G0 graphical character set ISO-IR 6 (known as US Version of ISO 646) as described in ISO/IEC 10021-7; or

6) OID {id-cs-eit-authority 100} identifying the G1 graphical character set ISO-IR 100 (ISO 8859-1, Latin Alphabet No. 1) as described in ISO/IEC 10021-7; or

b) if the abstract-value includes any value different from the values indicated in item a) above, or if it includes OID {id-cs-eit-authority 100} and the *implicit-conversion-prohibited* in the *per-message-indicators* element of the *Probe Transfer Envelope* has the abstract value “prohibited”:

1) rejection of the probe for all the probe recipients; and

2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) “unable-to-transfer” for the *non-delivery-reason-code*; and

ii) “encoded-information-types-unsupported” for the *non-delivery-diagnostic-code*.

4.5.5.2 A probe which was not rejected as the result of ¶4.5.5.1 shall be processed in one of the following manners:

a) processing as specified in ¶4.5.5.3 if the abstract-value of the *implicit-conversion-prohibited* in the *per-message-indicators* element in the probe transfer envelope differs from “prohibited”; or

b) if the abstract-value of the element is “prohibited”:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery report as specified in ¶4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) “conversion-not-performed” for the *non-delivery-reason-code*;

ii) “implicit-conversion-prohibited” for the *non-delivery-diagnostic-code*; and

iii) “unable to convert to AFTN” for the *supplementary-information*.

4.5.5.3 A probe which was not rejected as the result of ¶4.5.5.2 shall be processed in one of three mutually exclusive manners:

a) if, due to system resource limitation, the value of the element *content-length* in the probe transfer envelope exceeds the conversion capability of the message transfer and control unit, then:

1) rejection of the message for all the message recipients; and

2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) "unable-to-transfer" for the *non-delivery-reason-code*; and

ii) "content-too-long" for the *non-delivery-diagnostic-code*; or

b) processing as specified in 4.5.5.4 for further conveyance test if the *content-length* does not exceed the conversion capability of the message transfer and control unit.

4.5.5.3.1 The way to determine the conversion capability of the message transfer and control unit in terms of message length is a matter local to the AMHS management domain operating the AFTN/AMHS gateway.

4.5.5.4 A probe which was not rejected as the result of ¶4.5.5.3 shall be processed in one of three mutually exclusive manners, depending on the number of probe recipients towards which the message transfer and control unit is responsible for conveyance test:

a) if this number exceeds 21 and does not exceed 512 probe recipients:

1) splitting of the probe, internally to the message transfer and control unit, into several probes, each of them with no more than 21 probe recipients:

i) each of the resulting probes having for conveyance test purposes the same *per-probe-fields* in the probe transfer envelope; and

ii) only the *per-recipient-fields* elements in the probe transfer envelope varying between the different resulting probes; and

2) processing of each of these probes as specified in 4.5.5.5;

b) if this number exceeds 512 probe recipients:

1) rejection of the probe for all the probe recipients; and

2) generation of a non-delivery report as specified in 4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) "unable-to-transfer" for the *non-delivery-reason-code*;

ii) "too-many-recipients" for the *non-delivery-diagnostic-code*; and

iii) "unable to convert to AFTN due to number of recipients" for the *supplementary-information*; or

c) processing as specified in 4.5.5.5, if this number does not exceed 21 probe recipients.

4.5.5.5 A probe which was not rejected as the result of ¶4.5.5.4 shall be processed in one of the following manners, depending on the ability of the message transfer and control unit to translate the originator-name element of the probe transfer envelope into an AF-address:

a) processing as specified in ¶4.5.5.6 if address conversion into an AF-address as specified in ¶4.5.2.2.6 a), b) or c) can be achieved; or

b) if address conversion into an AF-address as specified in ¶4.5.2.2.6 a), b) and c) cannot be achieved, then:

1) rejection of the probe for all the probe recipients; and

2) generation of a non-delivery report as specified in ¶4.5.6 with the following elements taking the following abstract-values in all the *per-recipient-fields* of the report:

i) "unable-to-transfer" for the *non-delivery-reason-code*;

ii) "invalid-arguments" for the *non-delivery-diagnostic-code*; and

iii) "unable to convert to AFTN due to unrecognized originator O/R address" for the *supplementary-information*.

4.5.5.6 For each probe recipient, a probe which was not rejected as the result of ¶4.5.5.5 shall be processed in one of the following manners, depending on the ability of the message transfer and control unit to translate the considered *recipient-name* element of the probe transfer envelope into an AF-address:

a) processing as specified in ¶4.5.5.7 if address conversion into an AF-address as specified in ¶4.5.2.2.6 a), b) or c) can be achieved, or

b) if address conversion into an AF-address as specified in ¶4.5.2.2.6 a), b) and c) cannot be achieved, then:

1) rejection of the probe for the considered recipient; and

2) generation of a non-delivery report as specified in ¶4.5.6 with the following elements taking the following abstract-values in the corresponding *per-recipient-fields* of the report:

i) "unable-to-transfer" for the *non-delivery-reason-code*; and

ii) "unrecognised-OR-name" for the *non-delivery-diagnostic-code*.

4.5.5.7 For the probe recipients which were not rejected as the result of ¶4.5.5.6, a delivery-report shall be generated as specified in ¶4.5.6, if requested, to indicate the successful result of the probe conveyance test.

4.5.6 Generation of AMHS reports

4.5.6.1 General

4.5.6.1.1 A non-delivery report shall be generated by the message transfer and control unit for each message or probe which was rejected at the AFTN/AMHS gateway, as the result of the procedures described in 4.5.1., 4.5.1.4, 4.5.2 and 4.5.5, either for all the recipients or for certain recipients.

4.5.6.1.2 When the generation of a non-delivery report is required in relation to the rejection at the AFTN/AMHS gateway of the subject AMHS message for more than one recipient of the subject AMHS message, a single non-delivery

report should be generated to report on the rejection for multiple recipients, using several *per-recipient-fields* elements in the report transfer content.

4.5.6.1.3 For each AMHS message which was converted by the message transfer and control unit as the result of the procedures specified in ¶4.5.2.2 to ¶4.5.2.4 and then successfully passed to the AFTN component as specified in ¶4.5.1.6, a delivery report shall be generated by the message transfer and control unit for each message recipient of which:

a) the *originating-MTA-report-request* element has the abstract-value “report” or “audited-report”; or

b) the *originator-report-request* element has the abstract-value “report”; or

c) both conditions a) and b) above are met.

4.5.6.1.4 When the generation of a delivery report is required as specified in ¶4.5.6.1.3 for more than one recipient of the subject AMHS message, a single delivery report should be generated to report on the conveyance towards multiple recipients, using several *per-recipient-fields* elements in the report transfer content.

4.5.6.1.5 When the generation of a delivery report is required in relation with the result of a probe conveyance test as specified in ¶4.5.5, ¶4.5.6.1.3 to ¶4.5.6.1.4 shall apply with the difference that the event which triggers the generation of the delivery report is the success of the probe conveyance test.

4.5.6.1.6 A report resulting from 4.5.6.1.1 to 4.5.6.1.5 shall be generated as specified in ¶4.5.6.2.

4.5.6.2 Generation of report transfer envelope and content

4.5.6.2.1 Each report resulting from the specification in ¶4.5.6.1 shall be generated by the message transfer and control unit in the form of an AMHS report transfer envelope and report transfer content, composed of elements as specified in the column “action” of Table 4-16. These elements, which are classified as “G” or “G2”, shall be either generated or conditionally generated according to the specification in the provisions referred to in the column “generation action”.

4.5.6.2.2 Table 4-16 is structured as a PRL derived from the MT-EoS pro forma included in ISO/IEC ISP 10611-3. The columns “base” and “ISP” are extracted from ISO/IEC ISP 10611-3, and the column “basic ATSMHS” specifies the static capability of an AU in relation with the MT-EoS, i.e. the ability to convey, handle and act in relation tothe element. The references to the ISP profile are indicated in the part titles as AMH11/ref, where appropriate.

4.5.6.2.3 The element *report-identifier* in the report transfer envelope shall be:

a) generated locally so as to ensure that it distinguishes the report from all other messages, probes or reports generated in the AMHS, as specified in ISO/IEC 10021-4, 12.2.1.3.1.1; and

b) composed as specified in Table 4-16/Part 2/1.

4.5.6.2.4 The element *global-domain-identifier* in the *report-identifier*, or in the *trace-information*, or in the *internal-trace-information* shall:

a) identify the AMHS management domain operating the AFTN/AMHS gateway; and

b) be composed as specified in Table 4-16/Part 2/2.

4.5.6.2.5 The element *local-identifier* in the *report-identifier* shall be generated locally so as to ensure that it

distinguishes the report from all other messages, probes or reports generated in the AMHS management domain operating the AFTN/AMHS gateway.

4.5.6.2.6 The *report-destination-name* element in the report transfer envelope shall be one of the following:

a) the last OR-name in the *DL-expansion-history* element, if present, of the subject AMHS message as specified in Table 4-10/Part 1/1.1.11.11; or

b) the *originator-name* of the subject AMHS message, as specified in Table 4-10/Part 1/1.1.2 if there is no *DL-expansion-history* element in the subject AMHS message.

4.5.6.2.7 The first *trace-information-element* in the *trace-information* of the report transfer envelope shall be generated as specified in Table 4-16/Part 2/6.

Table 4-16. Generation of AMHS report

Ref	*Element*	*Base*	*ISP*	*Basic ATSMHS*	*Action*	*Generation action*
Part 1: AMH11/A.1.4.3 Report transfer						
1	ReportTransferEnvelope	M	M	M	G	see Part 1/1.1-1.4
1.1	report-identifier	M	M	M	G	see ¶4.5.6.2.3 and Part 2/1
1.2	report-destination-name	M	M	M	G	see ¶4.5.6.2.6
1.3	trace-information	M	M	M	G	see ¶4.5.6.2.7
1.4	extensions	M	M	M		see ¶4.5.6.2.8
1.4.1	message-security-label	O	M-	M-	X	-
1.4.2	originator-and-DL-expansion-history	M	M	M	G2	see ¶4.5.6.2.9
1.4.3	reporting-DL-name	O	M-	M-	X	-
1.4.4	reporting-MTA-certificate	O	M-	M-	X	-
1.4.5	report-origin-authentication-check	O	M-	M-	X	-
1.4.6	internal-trace-information	M	M	M	G	see ¶4.5.6.2.10
2	ReportTransferContent	M	M	M	G	see Part1/2.1 and 2.2
2.1	(per report fields)					
2.1.1	subject-identifier	M	M	M	G	see ¶4.5.6.2.11
2.1.2	subject-intermediate-trace-information	O	M	M	G2	see ¶4.5.6.2.12
2.1.3	original-encoded-information-types	M	M	M	G	see ¶4.5.6.2.13
2.1.4	content-type	M	M	M	G	see ¶4.5.6.2.14
2.1.5	content-identifier	M	M	M	G2	see ¶4.5.6.2.15
2.1.6	returned-content	O	M-	M-	G2	see ¶4.5.6.2.16
2.1.7	additional-information	O	M-	M-	X	-
2.1.8	extensions	M	M	M		see ¶4.5.6.2.8
2.1.8.1	content-correlator	M	M	M	G2	see ¶4.5.6.2.17
2.2	per-recipient-fields	M	M	M		see Part1/2.2.1-2.2.7
2.2.1	actual-recipient-name	M	M	M	G	¶4.5.6.2.18
2.2.2	originally-specified-recipient-number	M	M	M	G	see ¶4.5.6.2.19
2.2.3	per-recipient-indicators	M	M	M	G	see ¶4.5.6.2.20
2.2.4	last-trace-information	M	M	M	G	see Part 2/7
2.2.5	originally-intended-recipient-name	M	M	M	G2	see ¶4.5.6.2.26
2.2.6	supplementary-information	O	M-	M-	G2	see ¶4.5.6.2.27
2.2.7	extensions	M	M	M		see ¶4.5.6.2.8

Ref	*Element*	*Base*	*ISP*	*Basic ATSMHS*	*Action*	*Generation action*
2.2.7.1	redirection-history	M	M	M	G2	see ¶4.5.6.2.28
2.2.7.2	physical-forwarding-address	O	M-	M-	X	-
2.2.7.3	recipient-certificate	O	M-	M-	X	-
2.2.7.4	proof-of-delivery	O	M-	M-	X	-
Part 2: AMH11/A.1.5 Common data types						
1	MTSIdentifier					
1.1	global-domain-identifier	M	M	M	G	see ¶4.5.6.2.4 and Part 2/2
1.2	local-identifier	M	M	M	G	see ¶4.5.6.2.5
2	GlobalDomainIdentifier					
2.1	country-name	M	M	M		see ¶4.5.6.2.29
2.2	administration-domain-name	M	M	M		see ¶4.5.6.2.30
2.3	private-domain-identifier	M	M	M		see ¶4.5.6.2.31
6	TraceInformation					
6.1	TraceInformationElement	M	M	M	G	see Part 2/6.1.1 and 6.1.2
6.1.1	global-domain-identifier	M	M	M	G	see ¶4.5.6.2.32 and Part 2/2
6.1.2	domain-supplied-information	M	M	M	G	see Part 2/6.1.2.1-6.1.2.4
6.1.2.1	arrival-time	M	M	M	G	see ¶4.5.6.2.33
6.1.2.2	routing-action	M	M	M	G	see Part 2/6.1.2.2.1 and 6.1.2.2.2
6.1.2.2.1	relayed	M	M	M	G	see ¶4.5.6.2.34
6.1.2.2.2	rerouted	O	C1	C1	X	-
6.1.2.3	attempted-domain	O	C1	C1	X	-
6.1.2.4	(additional actions)					-
6.1.2.4.1	deferred-time	M	C2	C2	X	-
6.1.2.4.2	converted-encoded-information-types	O	M-	M-	X	-
6.1.2.4.3	other-actions	O	M-	M-	X	-
6.1.2.4.3.1	redirected	O	M-	M-	X	-
6.1.2.4.3.2	dl-operation	O	M-	M-	X	-
7	LastTraceInformation					
7.1	arrival-time	M	M	M	G	see ¶4.5.6.2.21
7.2	converted-encoded-information-types	M	M	M	G2	see ¶4.5.6.2.22
7.3	report-type	M	M	M	G	see Part 2/7.3.1and 7.3.2
7.3.1	delivery	M	M	M	G2	see Part 2/7.3.1.1 and 7.3.1.2
7.3.1.1	message-delivery-time	M	M	M	G	see ¶4.5.6.2.23
7.3.1.2	type-of-MTS-user	M	M	M	G	see ¶4.5.6.2.24

Ref	*Element*	*Base*	*ISP*	*Basic ATSMHS*	*Action*	*Generation action*
7.3.2	non-delivery	M	M	M	G2	see Part 2/7.3.2.1 and 7.3.2.2
7.3.2.1	non-delivery-reason-code	M	M	M	G	see ¶4.5.6.2.25
7.3.2.2	non-delivery-diagnostic-code	M	M	M	G	see ¶4.5.6.2.25
Part 3: AMH11/A.1.6 Extension Data Types						
1	ExtensionField					
1.1	type	M	M	M	G	see Part 3/1.1.1 and 1.1.2
1.1.1	standard-extension	M	M	M	G	see ¶4.5.6.2.8
1.1.2	private-extension	O	M-	M-	X	-
1.2	criticality	M	M	M	G	see ¶4.5.6.2.8
1.3	value	M	M	M	G	see ¶4.5.6.2.8
5	InternalTraceInformation					
5.1	global-domain-identifier	M	M	M	G	see ¶4.5.6.2.32
5.2	mta-name	M	M	M	G	see ¶4.5.6.2.35
5.3	mta-supplied-information	M	M	M	G	see Part 3/5.3.1-5.3.4
5.3.1	arrival-time	M	M	M	G	see ¶4.5.6.2.33
5.3.2	routing-action	M	M	M	G	see Part 3/5.3.2.1-5.3.2.2
5.3.2.1	relayed	M	M	M	G	see ¶4.5.6.2.34
5.3.2.2	rerouted	O	C1	C1	X	-
5.3.3	attempted	O	C1	C1	X	-
5.3.4	(additional actions)					
5.3.4.1	deferred-time	M	C2	C2	X	-
5.3.4.2	converted-encoded-information-types	O	M-	M-	X	-
5.3.4.3	other-actions	O	M-	M-	X	-
5.3.4.3.1	redirected	O	M-	M-	X	-
5.3.4.3.2	dl-operation	O	M-	M-	X	-

C1 = if re-routing is supported then M else M-
C2 = if deferred delivery is supported then M else M-
G = generated
G2 = conditionally generated
I = out of scope
M = mandatory support
M- = mandatory minimal support
O = optional support
X = excluded (not used)
- = not applicable

4.5.6.2.8 Only extensions of type “standard-extension” as defined in the base standards shall be used, as further specified in the classification of Table 4-16.

4.5.6.2.9 If a *DL-expansion-history* element as specified in Table 4-10/Part 1/1.1.11.11 was present in the subject AMHS message, the *originator-and-DL-expansion-history* element shall be generated as the sequence of the *originator-name* of the subject AMHS message, as specified in Table 4-10/Part 1/1.1.2, and of the aforementioned *DL-expansion-history* element of the subject AMHS message.

4.5.6.2.10 The first *internal-trace-information-element* in the *internal-trace-information* of the report transfer envelope shall be generated as specified in Table 4-16/Part 3/5.

4.5.6.2.11 The *subject-identifier* element in the report transfer content shall be an MTS identifier composed of the *global-domain-identifier* and *local-identifier* elements found in the *message-identifier* element of the subject AMHS message as specified in Table 4-10/Part 1/1.1.1.

4.5.6.2.11.1 The *global-domain-identifier* element of the MTS identifier is made of address attributes, so its case is insignificant. Although discouraged, this case may be modified when constructing the *subject-identifier* element from the elements of the subject message.

4.5.6.2.12 The *subject-intermediate-trace-information* element in the report transfer content shall take the value which the *trace-information* element of the subject AMHS message as specified in Table 4-10/Part 1/1.1.10 had when the subject AMHS message entered the AMHS management domain operating the message transfer and control unit, if and only if the *originating-MTA-report-request* element in the *per-recipient-indicators* of all the subject AMHS message recipients in the subject message transfer envelope has the abstract-value “audited-report”.

4.5.6.2.13 The *original-encoded-information-types* element in the report transfer content shall take the value of the *original-encoded-information-types* element of the subject AMHS message as specified in Table 4-10/Part 1/1.1.3.

4.5.6.2.14 The *content-type* element in the report transfer content shall take the value of the *content-type* element of the subject AMHS message as specified in Table 4-10/Part 1/1.1.4.

4.5.6.2.15 The *content-identifier* element in the report transfer content shall either:

a) take the value of the *content-identifier* element of the subject AMHS message as specified in Table 4-10/Part 1/1.1.5, if present; or

b) be omitted in the report if there is no such element in the subject AMHS message.

4.5.6.2.16 The *returned-content* element in the report transfer content shall optionally take the value of the *content* of the subject AMHS message, if and only if the *content-return-request* element in the *per-message-indicators* of the subject AMHS message in the subject message transfer envelope has the abstract-value “content-return-requested”.

4.5.6.2.16.1 The message transfer and control unit is not mandated to implement the return of content optional FG as defined in ISO/IEC ISP 10611-1.

4.5.6.2.17 The *content-correlator* element in the report transfer content shall either:

a) take the value of the *content-correlator* element of the subject AMHS message as specified in Table 4-10/Part 1/1.1.11.10, if present; or

b) be omitted in the report if there is no such element in the subject AMHS message.

4.5.6.2.18 The *actual-recipient-name* element in a *per-recipient-fields* element of the report transfer content shall take the value of the corresponding *recipient-name* element in the *per-recipient-fields* of the subject AMHS message as specified in Table 4-10/Part 1/1.2.1.

4.5.6.2.19 The *originally-specified-recipient-number* element in a *per-recipient-fields* element of the report transfer content shall take the value of the corresponding *originally-specified-recipient-number* element in the *per-recipient-fields* of the subject AMHS message as specified in Table 4-10/Part 1/1.2.2.

4.5.6.2.20 The *per-recipient-indicators* element in a *per-recipient-fields* element of the report transfer content shall be composed of *responsibility*, *originating-MTA-report* and *originating-MTA-non-delivery-report* bits taking any value, and of the *originator-report* and *originator-non-delivery-report* bits taking the value of the corresponding bits in the *per-recipient-indicators* element in the *per-recipient-fields* of the subject AMHS message as specified in Table 4-10/Part 1/1.2.3.

4.5.6.2.21 The *arrival-time* element in the *last-trace-information* of a *per-recipient-fields* element shall take the value of the time at which the subject AMHS message entered the AMHS management domain operating the AFTN/AMHS gateway, as found in the last *trace-information-element* of the subject AMHS message, as specified in Table 4-10/ Part 2/6.1.2.1.

4.5.6.2.22 The *converted-encoded-information-types* element in the *last-trace-information* of a *per-recipient-fields* element shall either:

a) take the last value of the *converted-encoded-information-types* element in the *trace-information* of the subject AMHS message, as specified in Table 4-10/Part 2/6.1.2.4.2, if this element exists; or

b) be omitted in the report, if no such element is present in the *trace-information* of the subject AMHS message.

4.5.6.2.23 If the report is a delivery-report, the *message-delivery-time* element in the *last-trace-information* of a *per-recipient-fields* element shall be the time at which the subject AMHS message has been successfully passed to the AFTN component by the message transfer and control unit.

4.5.6.2.24 If the report is a delivery-report, the *type-of-MTS-user* element in the *last-trace-information* of a *per-recipient-fields* element shall take the abstract-value “other”.

4.5.6.2.25 If the report is a non-delivery-report, the *non-delivery-reason-code* and *non-delivery-diagnostic-code* elements in the *last-trace-information* of a *per-recipient-fields* element shall take the abstract-values specified in the provision which caused the generation of the report.

4.5.6.2.26 The *originally-intended-recipient-name* element in a *per-recipient-fields* element shall either:

a) take the value of the first O/R name found in the *redirection-history* element of the subject AMHS message, if present, as specified in Table 4-10/Part 1/1.2.5.13; or

b) be omitted in the report if there is no *redirection-history* element in the subject AMHS message.

4.5.6.2.27 The *supplementary-information* element in a *per-recipient-fields* element shall take one of the following values:

a) the value “This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient” if the report is a delivery-report; or

b) the value, if any, specified in the provision which caused the generation of the report if it is a non-delivery-report.

4.5.6.2.28 The *redirection-history* element in a *per-recipient-fields* element shall either:

a) take the value of the *redirection-history* element of the subject AMHS message, if present, as specified in Table 4-10/Part 1/1.2.5.13; or

b) be omitted in the report if there is no *redirection-history* element in the subject AMHS message.

4.5.6.2.29 The element *country-name* in the *global-domain-identifier* element of the *MTS-identifier* and of the first *trace-information-element* shall be the *country-name* element of the identifier of the AMHS management domain operating the AFTN/AMHS gateway as specified in 2.5.1.3.

4.5.6.2.30 The element *administration-domain-name* in the *global-domain-identifier* element of the *MTS-identifier* and of the first *trace-information-element* shall be the *administration-domain-name* element of the identifier of the AMHS management domain operating the AFTN/AMHS gateway as specified in 2.5.1.3.

4.5.6.2.31 The element *private-domain-identifier* in the *global-domain-identifier* element of the *MTS-identifier* and of the first *trace-information-element* shall be the *private-domain-identifier* element of the identifier of the AMHS management domain operating the AFTN/AMHS gateway as specified in 2.5.1.3.

4.5.6.2.32 The element global-domain-identifier in the trace-information or in the internal-trace-information shall:

a) identify the AMHS management domain operating the AFTN/AMHS gateway; and

b) be composed as specified in Table 4-16/Part 2/2.

4.5.6.2.33 The element *arrival-time* in the first element of *trace-information* or of *internal-trace-information* shall take the semantic value of the time when the report was generated by the message transfer and control unit for conveyance in the AMHS.

4.5.6.2.34 The element *routing-action* in the first element of *trace-information* or of *internal-trace-information* shall take the abstract-value “relayed”.

4.5.6.2.35 The element *mta-name* in the first element of *internal-trace-information* shall be the mta-name assigned to the message transfer and control unit included in the AFTN/AMHS gateway.

4.5.6.2.35.1 The structure of the *mta-name* of the message transfer and control unit included in an AFTN/AMHS gateway within an AMHS management domain is a matter of policy internal to the AMHS management domain.

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