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WORKING GROUP 3 - APPLICATIONS AND UPPER LAYERS

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Agenda Item 6.4: Ground-Ground Applications Validation

WP/8-5: ATSMHS Draft SARPs Validation Report

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Summary

This document is the proposed Validation Report on the ATS Message Handling Services (ATSMHS) SARPs, as approved for Version 0.1 by SG1 in its 9th meeting (Toulouse, 23-26 September 1996).

Recommendation

WG3 is invited to adopt this material, amended as appropriate, as the basis for the ATSMHS Validation Report to be presented at ATNP/2, and to provide guidance on the further development of this material towards Version 1.0.

Document Control Log

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APPENDIX F : ATSMHS SARPS VALIDATION REPORT

1. INTRODUCTION

1.1. Scope

Since the start of the development of the draft ATSMHS SARPs, there have been a number of validation exercises that have been performed due to the efforts of a number of organisations and states. The purpose of this document is to report on the results of those exercises that have reported their ATSMHS-related results so far, and to draw conclusions on the level of validation of the draft ATSMHS SARPs which has been achieved.

Furthermore, the ATS Message Handling System specified in the draft ATSMHS SARPs makes use of standards which have been stable and mature for long, with several known independent industry implementations. Thus, benefit is fully taken from using ISO MHS standards and ISPs that are pre-validated, i.e. studied and approved by national standards bodies, implemented and interoperability demonstrated between independent implementations.

For this reason, a number of related initiatives concerning the use of MHS standards are reported in this document, giving their inherent credit to the ATSMHS SARPs validation.

Note.- The terms « base standard » and « base ISP » used hereafter in this document refer to the ISO/IEC MHS Standard or ISO/IEC MHS ISP which are relevant in the context in which they are employed.

1.2. Background

The ATSMHS SARPs were placed under configuration control at the 6th meeting of WG3 (Brussels, April 1996), and since that time a detailed change record has been included in the configuration sheet which is part of the SARPs document. A table of all comments and defect reports received from a number of parties has been established and maintained as a separate Working Paper, including cross-reference to each comment and position adopted with respect to the comment.

There has been a major technical upgrade of the ATN Pass-Through Service description and specification at the Munich WG3 meeting, i.e. included in version 2.0a resulting from the Munich meeting. The entire change history since the baseline version is as follows:

Date	Version	Comments
04/02/96	proposed 1.0	input to Brisbane WG3 meeting
25/03/96	1.0a (1st amended proposal)	incorporation of the Brisbane WG3 meeting conclusions : important editorial changes, limited technical changes
15/04/96	1.0b (2nd amended proposal)	output of SG1 Brussels Meeting, input to the sixth WG3 meeting (Brussels)
23/04/96	1.0z (WG3 baseline version)	start of configuration control, output of the sixth WG3 meeting (Brussels)
21/06/96	1.1 (proposed 2.0)	some changes for overall editorial SARPs consistency, refinement of AMHS logging provisions, upgrade of Chapter 3.1.3 (ATN Pass-Through Service), input to the seventh WG3 meeting (Munich)
27/06/96	1.2 (proposed 2.0)	Munich WG3 meeting interim version
04/07/96	1.3 (approved 2.0 with change-bars)	output of the seventh WG3 meeting (Munich), approved for distribution as version 2.0 after adoption changes
04/07/96	2.0	output of the seventh WG3 meeting (Munich), with adoption of all revisions Baseline version submitted to ICAO

2. HIGH LEVEL VALIDATION OBJECTIVES

The following are the high level validation objectives for the ATSMHS applications, based upon the WG3 common list of VOs for ATN applications, with a comment on their applicability to the ATS Message Service (AMHS) and to the ATN Pass-Through Service where appropriate.

VO	Description
SV01	To determine which System Level Requirements as specified in «Sub-Volume 1» are satisfied by the functional descriptions in combination with the user requirements and recommended practices of the SARPs.
SV02	To determine if the CNS/ATM-1 Package applications specifications are mutually consistent.
FV01	To determine if the functional descriptions in the SARPs are compatible with the technical requirements
FV02	To determine if the user requirements and recommended practices are compatible with the technical requirements.
FV03	To determine if the SARPs are complete.
FV04	To determine if the SARPs are unambiguous.
FV05	To determine if the SARPs are consistent.
FV06	To determine if there are requirements in the SARPs which would have no effect if removed.
FV07	To determine if provision has been made to ensure that the SARPs are implementation independent.
TV01	To determine if the protocol description supports the end-to-end services.
TV02	To determine if the protocol description has any unacceptable behaviour.
TV03	To determine if the abstract service interface parameters are mapped appropriately to PDU fields and/or communication service interface parameters, and vice versa.
TV04	To determine if protocol errors in the peer application entity are correctly handled.
TV05	To determine if the SARPs are consistent with the upper layer architecture to the extent that this is a requirement, e.g. use of the Dialogue Service, application of the control function.
TV06	To determine if the APDUs are correctly specified.
TV07	To determine if provision for QoS management has been addressed.
TV08	To determine if provision for future migration has been addressed.
TV09	To determine if efficiency requirements have been addressed, e.g. minimising size of data transfer, appropriate maintenance of dialogue.
TV10	To determine that the functionality described in the SARPs is implementable.

TV11	To determine that independent implementations built in accordance with the SARPs will be able to interoperate.
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3. VALIDATION MEANS

The following generic means of validation have been identified:

- a) Two or more independently developed interoperating implementations, validated by two or more States/ Organisations.
- b) Two or more independently developed interoperating implementations, validated by one State/ Organisation.
- c) One implementation, validated by more than one State/ Organisation.
- d) One implementation, validated by one State/ Organisation.
- e) Partial implementation, validated by one or more State/ Organisation.
- f) Simulation, analysis using tools e.g. ASN.1 compiler, modelling tools.
- g) Analysis and inspection.

4. APPLICATION FUNCTIONALITY VALIDATION ACHIEVED BY STATES AND ORGANISATIONS

The following table summarises the validation activities that have been completed to date or are expected to be completed shortly. The letter in the table corresponds to the validation means given in section 3. The ATS Message Service (AMHS) and ATN Pass-Through Service form two distinct parts of the SARPs, which together build the whole ATSMHS SARPs.

Application Functionality (group of « shalls » or part of the SARPs)	ATNP/WG3/SG1	AENA (Spain)	Euro-control	FAA	Dornier	Sita	various industry suppliers	U.S. DoD / NATO
ATS Message Service (AMHS)	g						g	
ATS Message Server	g					e	e,g	e
ATS Message User Agent	g					e	e,g	
AFTN/AMHS Gateway	g	e (d: expected 1Q97)	g		e (d: expected 1Q97)		g	
ATN Pass-Through Service	g							
AFTN/ATN Type A Gateway	g			d				

5. SUMMARY OF VALIDATION METHODS AND TOOLS

5.1. Generic validation methods

The following generic methods of validation have been identified:

1. Target Environment Testing (TE). Requirements are validated by testing in the target environment. It is assumed that an implementation has been developed.
2. Interworking (IW). Interoperability is demonstrated between two or more independent implementations.
3. Prototype Implementation (PI).
4. Simulation (S).
5. Formal Modelling (FM).
6. Inspection and Analysis (IA).

7. Engineering Judgment (EJ).

5.2. Validation means appropriate for each method

The following table describes which validation means are considered appropriate for each validation method:

Validation mean	TE	IW	PI	S	FM	IA	EJ
a Two or more independently developed interoperating implementations, validated by two or more States/ Organisations.	x	x	x				
b Two or more independently developed interoperating implementations, validated by one State/ Organisation.		x	x				
c One implementation, validated by more than one State/ Organisation.			x				
d One implementation, validated by one State/ Organisation.			x				
e Partial implementation, validated by one or more State/ Organisation.			x				
f Simulation, analysis using tools e.g. ASN.1 compiler, modelling tools.				x	x		
g Analysis and inspection.						x	x

5.3. Validation methods for each VO

The following table describes which validation methods are considered appropriate for each validation objective, for the ATN Pass-Through Service (indicated by an « A ») and for the ATS Message Service / AMHS (indicated by a « B »), respectively, the leftmost method in each row providing the most complete method for a given VO:

VO	Description	TE	IW	PI	S	FM	IA	EJ
SV01	To determine which System Level Requirements as specified in « Sub-Volume 1 » are satisfied by the SARPs.						A/B	A/B
FV01	To determine if the functional descriptions in the SARPs are compatible with the technical requirements						A/B	A/B
FV02	To determine if the user requirements and recommended practices are compatible with the technical requirements.						A/B	A/B
FV03	To determine if the SARPs are complete.						A/B	A/B
FV04	To determine if the SARPs are unambiguous.						A/B	A/B
FV05	To determine if the SARPs are consistent.						A/B	A/B
FV06	To determine if there are requirements in the SARPs which would have no effect if removed.						A/B	A/B
FV07	To determine if provision has been made to ensure that the SARPs are implementation independent.	A/B	A/B					B
TV01	To determine if the protocol description supports the end-to-end services.			A	A	A	A/B	B
TV02	To determine if the protocol description has any unacceptable behaviour.			A	A	A	A	B
TV03	To determine if the abstract service interface parameters are mapped appropriately to PDU fields and/or communication service interface parameters, and vice versa.			A	A	A	A/B	B
TV04	To determine if protocol errors in the peer application entity are correctly handled.		A	A	A	A	A	B
TV05	To determine if the SARPs are consistent with the upper layer architecture to the extent that this is a requirement, e.g. use of the Dialogue Service, application of the control function.			A	A	A	A	
TV06	To determine if the APDUs are correctly specified.			A	A		A/B	B
TV07	To determine if provision for QoS management has been addressed.			A/B			A/B	

VO	Description	TE	IW	PI	S	FM	IA	EJ
TV08	To determine if provision for future migration has been addressed.						A/B	A/B
TV09	To determine if efficiency requirements have been addressed, e.g. minimising size of data transfer, appropriate maintenance of dialogue.						A	
TV10	To determine that the functionality described in the SARPs is implementable.		A/B	A/B			A	B
TV11	To determine that independent implementations built in accordance with the SARPs will be able to interoperate.	A/B	A/B				A	B

6. DEFECT REPORT SUMMARY

The following Table is a summary of defect reports since the ICAO baseline version (known as 2.0a within WG3).

Note.- The entire list of comments since version 1.0a is given as Attachment B to this document.

DR ref.	Status	Version	Section	Summary
ATSMHS-001	CLOSED	2.0a	3.1.3.3.2.4.4	No specification made of the processing to be performed upon receipt of a D-START-confirm.
ATSMHS-002	CLOSED	2.0a	3.1.3.3.2.4.6	No explanation is given of what is considered as an "acceptable" value for the D-START-indication parameters.
ATSMHS-003	CLOSED	2.0a	3.1.3.3.2.4.7	No explanation is given of what is considered as an "unacceptable" value for the D-START-indication parameters.
ATSMHS-004	CLOSED	2.0a	3.1.3.3.3.5.9	No explanation is given concerning where this "ICAO facility designator" of the GA-Data-request initiator is taken from.
ATSMHS-005	CLOSED	2.0a	3.1.3	The SARPs approach is not consistent between the ATS Message Service and the ATN Pass-Through Service, concerning the processing of AFTN messages formatted in ITA-2.
ATSMHS-006	CLOSED	2.0a	3.1.3.1.8.1b)	No reference is made about the definition or specification of ICAO-facility-designators which are referred to section 3.1.3.1.8.

DR ref.	Status	Version	Section	Summary
ATSMHS-007	CLOSED	2.0a	3.1.2.2.2.1 a)	Erroneous reference for profile AMH21.
ATSMHS-008	CLOSED	2.0a	3.1.2.3.2.3.4	Inconsistent reference to ISO/IEC 10611-1.
ATSMHS-009	CLOSED	2.0a	3.1.2.3.4.2.3.2	While the gateway has the DL-expansion capability it does not perform PDAI expansion. This restriction is not explicitly mentioned in the specification.
ATSMHS-010	CLOSED	2.0a	3.1.2.3.5.2.2.6.2	It should be specified that only MF-Addresses marked with the <i>responsibility flag</i> shall be translated.
ATSMHS-011	CLOSED	2.0a	Table 3.1.2-17, Ref. 2.1.1	The reference to 3.1.2.3.5.4.2.4 is meaningless.
ATSMHS-012	CLOSED	2.0a	3.1.2.3.2.3	The processing of Probes by the MTCU is not reflected in this overview.
ATSMHS-013	CLOSED	2.0a	3.1.3.3.2.4.5	Inconsistency between the title of the referred Table and the text of the clause.
ATSMHS-014	CLOSED	2.0a	3.1.2.3.2.4.2	Editorial inconsistency in the order of terms.
ATSMHS-015	CLOSED	2.0a	3.1.2.3.4.3, 3.1.2.3.4.4, and places where action by the control position is required	1) The actions to be undertaken, in the AFTN/AMHS Gateway MTCU or at the Control Position, are unsufficiently described in the SARPs. 2) The specification that the considered message is discarded in the MTCU before action at the control position is inappropriate since the Control Position needs the information object to determine its action.
ATSMHS-016	OPEN	2.0a	3.1.2.3.5.4.1.1 and 3.1.2.3.5.4.1.2	In the direction AFTN-to-AMHS, an ATS Message Server or the ATN component of an AFTN/AMHS Gateway may reject an IPM and return a NDR to the MTCU. As currently specified the NDR will be sent to the AFTN/AMHS Gateway Control Position. At this point, both the AFTN message and the IPM have been discarded by the MTCU. Hence the AFTN message may be lost.
ATSMHS-017	CLOSED	2.0a	Table 3.1.2-13, "Text" row	Inconsistency between Table and referenced clause.

7. ANALYSIS AND CONCLUSIONS

7.1. SVO1

The following System Level Requirements are fulfilled by the Draft SARPs for ATS Message Handling Services:

OSI Standards

The ATS Message Service is based on ISO OSI Standards for Message Handling Services (ISO/IEC 10021) and on the associated International Standardized Profiles (ISO/IEC 10611 and 12062). The ATN Pass-Through Service is based on ISO OSI Standards, using the ATN Upper Layer Architecture which itself meets this requirement.

AFTN Transition to ATN

The ATS Message Service is an essential piece in the AFTN to ATN transition strategy. It offers a level of service and functionality which is at least equivalent to that of the AFTN, and includes transparent conversion mechanisms at AFTN/AMHS Gateways to make interworking possible between AMHS users and AFTN users (and vice-versa), as well as to allow the transparent conveyance of AFTN messages from an AFTN station to another through the ATN. The ATN Pass-Through Service contributes to the AFTN to ATN transition by the transparent encapsulation of AFTN messages at AFTN/ATN Type A Gateways. Therefore it may allow isolated AFTN islands to communicate over the ATN Internet with other AFTN users.

Policy Based Routing

The AMHS being a store-and-forward messaging service, routing is also performed at the application level. AMHS Routing policy based between AMHS Management Domains.

Authorized Paths

No preference is expressed in terms of ATS traffic types for the ATSC communications in the ATS Message Service and the ATN Pass-Through Service, as allowed by the ATN, since these applications employ only ground subnetworks and are therefore not subject to major bandwidth restrictions.

Priorities

The ATS Message Service includes a priority mechanism at the application level allowing to prioritize message transmission based on the category of communications to which the message pertains. The AFTN/ATN Type A Gateway maps the priority indicator of the AFTN message onto the QoS (Priority) parameter of the Dialogue Service, to select an appropriate transport priority.

Peer Information Exchange

The ATN Pass-Through Service enables the peer-to-peer exchange of AFTN messages over the ATN Internet, when an authorized path exists between two AFTN/ATN Type A Gateways.

Store-and-forward Information Exchange

The ATS Message Service enables the store-and-forward exchange of information when authorized paths exist between the ATS Message Servers and, if required, the AFTN/AMHS Gateways forming the AMHS.

Lack of Path Notification	In the ATS Message Service, the service user, either a human at a user interface or an Application Process at an API is informed of a message non-delivery by means of a non-delivery report. Positive acknowledgements are also transferred for messages with the highest priority.
Unambiguous Addressing	In the ATS Message Service, all involved systems, either ATS Message User Agents, ATS Message Servers or AFTN/AMHS Gateways, are ATN End Systems addressed as such by means of NSAPs and transport, session and presentation selectors. Furthermore every user of the ATS Message Service is individually identified at the application level by means of an O/R name. AFTN/ATN Type A Gateways are also part of the ATN Addressing scheme.
Originator Identification	In the ATS Message Service, the originator identification accompanies the ATS message and it is given to the message recipient by means of the originator O/R name indication. In the ATN Pass-Through Service, the encapsulated AFTN message includes the originator indicator.
Addressing and Name Assignments	At the application level, the AMHS is organized in Management Domains of two categories respectively named Administrative Management Domains (ADMD) and Private Management Domains (PRMD) within which the aforementioned O/R names are assigned.
ATSMHS Associations	The applications defined in these SARPs are the actual CNS/ATM-1 applications for ATS Message Handling Services.
UTC Reference	All dates and times referenced in the ATS Message Service are expressed as UTC.

7.2. SV02

VO Description: To determine if the CNS/ATM-1 Package applications specifications are mutually consistent.

This validation objective may be considered as being **achieved**, with the conclusion that the applications specifications in the SARPs are consistent with other applications, since there is no direct relationship with other CNS/ATM-1 Package applications, and thus no risk of inconsistency.

7.2. FV01

VO Description: To determine if the functional descriptions in the SARPs are compatible with the technical requirements.

This validation objective may be considered as being **achieved**, with the conclusion that the functional descriptions in the SARPs are compatible with the technical requirements. Upon completion of the SARPs inspection and analysis process by several parties, no incompatibility has been reported as detected, nor has any defect report been generated in this area.

7.3. FV02

VO Description: To determine if the user requirements and recommended practices are compatible with the technical requirements.

This validation objective may be considered as being **achieved**, with the conclusion that the user requirements and recommended practices are compatible with the technical requirements. Upon completion of the SARPs inspection and analysis process by several parties, no incompatibility has been reported as detected, nor has any defect report been generated in this area.

For the AFTN/AMHS Gateway, the use of the ISPICS Proforma included in the base ISPs has allowed an easy verification of the compatibility between the gateway specification and the technical requirements related to the use of the base standards.

Note.- There is no formal description of user requirements in the ATSMHS SARPs. However, the AFTN/AMHS Gateway specification and the AFTN/ATN Type A specification include a description of the gateway dynamic behaviour which is similar, from a communication standard perspective, to a set of user requirements as expressed e.g. in ATN Air-Ground Application SARPs.

7.4. FV03

VO Description: To determine if the SARPs are complete.

This validation objective may be considered as being **partly achieved**, the only identified incompleteness being reported in DR ATSMHS016, with the conclusion that the SARPs will be complete upon resorption of this defect. Upon completion of the SARPs inspection and analysis process by several parties, the comments/defect reports expressed in relation with this VO, other than DR ATSMHS016, have been duely analysed and taken into account where appropriate.

For the ATS Message Server and the ATS Message User Agent, the use of the basic requirements of the ISPs complemented by the necessary parameter specification and Optional Functional Group specification has allowed to concentrate the verification on the support of the elements necessary for AFTN interworking.

For the AFTN/AMHS Gateway, the use of the ISPICS Proforma included in the base ISPs has allowed an easy verification that all applicable ISPICS have been properly taken into account.

7.5. FV04

VO Description: To determine if the SARPs are unambiguous.

This validation objective may be considered as being **achieved**, with the conclusion that the SARPs are unambiguous. Upon completion of the SARPs inspection and analysis process by several parties, the comments/defect reports expressed in relation with this VO have been duely analysed and taken into account where appropriate.

7.6. FV05

VO Description: To determine if the SARPs are consistent.

This validation objective may be considered as being **achieved**, with the conclusion that the SARPs are consistent. Upon completion of the SARPs inspection and analysis process by several parties, the comments/defect reports expressed in relation with this VO have been duely analysed and taken into account where appropriate.

7.7. FV06

VO Description: To determine if there are requirements in the SARPs which would have no effect if removed.

This validation objective may be considered as being **achieved**, with the conclusion that there are no requirements in the SARPs which would have no effect if removed. Upon completion of the SARPs inspection and analysis process by several parties, no defect has been reported as detected in this area.

7.8. FV07

VO Description: To determine if provision has been made to ensure that the SARPs are implementation independent.

This validation objective may be considered as being **partly achieved for the ATS Message Service**, with the conclusion that the SARPs are implementation independent (ATS Message Server and ATS Message User Agent).

The existence of off-the-shelf MHS products already provides a high level of independence. Certification bodies exist in several countries, and some of these products are partly certified as conformant to the base standards (i.e. conformant to the initial version of the base standards known as X.400-84). The certification of certain implementations against the whole base standards is known as being underway, under the aegis of the aforementioned certification bodies. Thus, the potential dependencies are restricted only to the few additional requirements expressed in the SARPs, with a limited risk of dependence.

Upon completion of the SARPs inspection and analysis process by several parties, no defect has been reported as detected in this area.

The complete achievement of this VO is subject to prototype implementations being developed and tested.

7.9. TV01

VO Description: To determine if the protocol description supports the end-to-end services.

This validation objective may be considered as being **achieved for the ATS Message Service**, with the conclusion that the protocol description supports the end-to-end services. This is an intrinsic feature of the base standards.

The same validation objective may be considered as being **partly achieved for the ATN Pass-Through Service**, with the conclusion that the protocol description supports the end-to-end services. Upon completion of the SARPs inspection and analysis process by several parties, no defect has been reported as detected in this area.

7.10. TV02

VO Description: To determine if the protocol description has any unacceptable behaviour.

This validation objective may be considered as being **achieved for the ATS Message Service**, with the conclusion that the protocol description has no unacceptable behaviour. This is an intrinsic feature of the base standards.

This validation objective may be considered as being **partly achieved for the ATN Pass-Through Service**, with the conclusion that the protocol specification has no unacceptable behaviour. Upon completion of the SARPs inspection and analysis process by several parties, the comments/defect reports expressed in relation with this VO have been duly analysed and taken into account where appropriate.

The complete achievement of this VO for the ATN Pass-Through Service is subject to prototype implementations being developed and tested.

7.11. TV03

VO Description: To determine if the abstract service interface parameters are mapped appropriately to PDU fields and/or communication service interface parameters, and vice versa.

This validation objective may be considered as being **achieved for the ATS Message Service**, with the conclusion that the abstract service interface parameters are mapped appropriately to PDU fields and/or communication service interface parameters, and vice-versa. This is an intrinsic feature of the base standards.

The same validation objective may be considered as being **partly achieved for the ATN Pass-Through Service**, with the conclusion that the mapping is appropriately performed. Upon completion of the SARPs inspection and analysis process by several parties, the comments/defect reports expressed in relation with this VO have been duly analysed and taken into account where appropriate.

The complete achievement of this VO for the ATN Pass-Through Service is subject to prototype implementations being developed and tested.

7.12. TV04

VO Description: To determine if protocol errors in the peer application entity are correctly handled.

This validation objective may be considered as being **achieved for the ATS Message Service**, with the conclusion that protocol errors in the peer application entity are correctly handled. This is an intrinsic feature of the base standards.

The same validation objective may be considered as being **partly achieved for the ATN Pass-Through Service**, with the conclusion that protocol errors in the peer application entity are correctly handled. Upon completion of the SARPs inspection and analysis process by several parties, the comments/defect reports expressed in relation with this VO have been duly analysed and taken into account where appropriate.

The complete achievement of this VO for the ATN Pass-Through Service is subject to prototype implementations being developed and tested.

7.13. TV05

VO Description: To determine if the SARPs are consistent with the upper layer architecture to the extent that this is a requirement, e.g. use of the Dialogue Service, application of the control function.

This validation objective may be considered as being **achieved for the ATS Message Service**, with the conclusion that there is no possible inconsistency since it is not a requirement for the ATS Message Service to use the ATN Upper Layer Communications Service. The ATS Message Service uses a full functionality OSI Upper Layer Architecture, in compliance with the MHS base standards.

The same validation objective may be considered as being **partly achieved for the ATN Pass-Through Service**, with the conclusion that the SARPs are consistent with the upper layer architecture. Upon completion of the SARPs inspection and analysis process by several parties, the comments/defect reports expressed in relation with this VO have been duly analysed and taken into account where appropriate.

7.14. TV06

VO Description: To determine if the APDUs are correctly specified.

This validation objective may be considered as being **achieved for the ATS Message Service**, and **partly achieved for the ATN Pass-Through Service**, with the conclusion in both cases that the APDUs are correctly specified

For the ATS Message Service, this is an intrinsic feature of the base standards.

For the ATN Pass-Through Service, no specific APDU is created and the user-data specification for the PPDU is determined by the encoding specification.

7.15. TV07

VO Description: To determine if provision for QoS management has been addressed.

This validation objective may be considered as being **partly achieved**, with the conclusion that the QoS management has been addressed. Upon completion of the SARPs inspection and analysis process by several parties, no defect report has been generated in this area.

The complete achievement of this VO is subject to prototype implementations being developed and tested.

7.16. TV08

VO Description: To determine if provision for future migration has been addressed.

This validation objective may be considered as being **achieved**, with the conclusion that provision for future migration has been addressed. Upon completion of the SARPs inspection and analysis process by several parties, no defect report has been generated in this area.

For the ATS Message Service, this is an intrinsic feature of the base standards, which have already been to subject to extensions from their initial version to the current version. Extension mechanisms are in place to allow for additional components to be integrated in the protocol elements or message body parts.

For the ATN Pass-Through Service, this is an inherent result of the use of the ATN Upper Layer Communication Services.

7.17. TV09

VO Description: To determine if efficiency requirements have been addressed, e.g. minimising size of data transfer, appropriate maintenance of dialogue.

This validation objective may be considered as being **achieved for the ATS Message Service**, since the AMHS efficiency is pre-determined by the efficiency of the base MHS standards, and the requirements used have been limited to the ISP basic requirements (except when absolutely necessary) thus minimizing the exchange of information.

This validation objective may be considered as being **achieved for the ATN Pass-Through Service**, with the conclusion that efficiency requirements have been addressed. Upon completion of the SARPs inspection and analysis process by several parties, no defect report has been generated in this area.

7.18. TV10

VO Description: To determine that the functionality described in the SARPs is implementable.

This validation objective may be considered as being **partly achieved for the ATS Message Service**, with the conclusion that the functionality described in the SARPs is implementable as far as the ATS Message Server and ATS Message User Agent are concerned, and that the functionality described in the SARPs is very likely to be implementable, as far as the AFTN/AMHS Gateway is concerned.

Implementations which cover partly the same functions as those of the ATS Message Server and ATS Message User Agent, as specified in the SARPs, have been developed as indicated in section 4. The existence of off-the-shelf MHS products also provides a high level of assurance that these AMHS components may be implemented. Certification bodies exist in several countries, and some of these products are partly certified as conformant to the base standards (i.e. conformant to the initial version of the base standards known as X.400-84). The certification of certain implementations against the whole base standards is known as being underway, under the aegis of the aforementioned certification bodies.

For the AFTN/AMHS Gateway, specific development is required by the implementors. However, since the MTCU, which is the most specific gateway component, is conceptually a MHS Access Unit (AU), it is possible that building bricks from previous AU developments, for gateways between MHS and other telegraphic environments (e.g. aeronautical industry or military telegraphic procedures) may be used by suppliers to develop AFTN/AMHS Gateways implementations.

The complete achievement of this VO is subject to prototype implementations fully conformant with the SARPs being developed and tested.

7.19. TV11

VO Description: To determine that independent implementations built in accordance with the SARPs will be able to interoperate.

This validation objective may be considered as being **partly achieved for the ATS Message Service**, with the conclusion that independent implementations will be able to interoperate, as far as the ATS Message Server and ATS Message User Agent are concerned.

The certification process described in 7.18 above aims at ensuring that independent off-the-shelf MHS implementations will be able to interoperate. Since such products will be the basis for the implementation of AMHS Components (ATS Message Server and ATS Message User Agent), the risk that independent implementations would not interoperate is extremely limited, if certified base products are used.

This validation objective may be considered as being **partly achieved for the ATN Pass-Through Service**, with the conclusion that independent implementations will be able to interoperate. Upon completion of the SARPs inspection and analysis process by several parties, the comments/defect reports expressed in relation with this VO have been duly analysed and taken into account where appropriate.

The complete achievement of this VO is subject to independent prototype implementations being developed and tested in an interworking configuration.

8. SUMMARY OF VO ACHIEVEMENT

The summary of the extent to which each VO may be considered as having been achieved is described in the following table.

A= fully achieved
P = partly achieved

SARPs functionality (group of shalls)	SV01	SV02	FV01	FV02	FV03	FV04	FV05	FV06	FV07	TV01	TV02	TV03	TV04	TV05	TV06	TV07	TV08	TV09	TV10	TV11
ATS Message Service (AMHS)	see	A	A	A	A	A	A	A	P	A	A	A	A	A	A	P	A	A	P	P
ATS Message Server	7.1	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A	A
ATS Message User Agent		A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A	A
AFTN/AMHS Gateway		A	A	A	A	A	A	A		A	A	A	A	A	A		A	A	P	
ATN Pass-Through Service	see	A	A	A	A	A	A	A		P	P	P	P	P	P	P	A	A	P	P
AFTN/ATN Type A Gateway	7.1	A	A	A	A	A	A	A		P	P	P	P	P	P	P	A	A	P	P

Where a VO is considered as being only partly achieved for either the ATS Message Service or the AFTN/ATN Type A Gateway, the other items in the table (ATS Message Server, ATS Message User Agent, AFTN/AMHS Gateway, AFTN/ATN Type A Gateway) give more details on which functionality of the SARPs has been validated and to which extent.

ATTACHMENT A : ATSMHS VALIDATION DATABASE PRINT-OUT

**ATTACHMENT B : COMPLETE LIST OF COMMENTS ON ATSMHS DRAFT SARPs SINCE
VERSION 1.0A (PRE WG3-BRUSSELS)**

**ATTACHMENT C : DESCRIPTION OF THE IMPLEMENTATION OF THE AMHS IN THE SYSTEM
FSINFOSYSBW OPERATED BY THE GERMAN AIR FORCES (PRESENTED AS
ATNP/WG3/SG1 WP(IP)-128)**

