



**INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE**

**REPORT OF
THE THIRD MEETING OF AERONAUTICAL
TELECOMMUNICATION NETWORK (ATN)
IMPLEMENTATION CO-ORDINATION
GROUP OF APANPIRG (ATNICG/3)**

Nadi, Fiji Islands
5 – 9 May 2008

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PART I – HISTORY OF THE MEETING

1.1 Introduction

1.1.1 The Third Meeting of the Aeronautical Telecommunication Network (ATN) Implementation Co-ordination Group (ATNICG/3) of APANPIRG was held in Nadi, Fiji Islands from 5 to 9 May 2008. The Meeting was hosted by the Airports Fiji Limited (AFL).

1.2 Attendance

1.2.1 The Meeting was attended by 67 participants from 17 States: Australia, China, Hong Kong - China, Macao China, Fiji Islands, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Republic of Korea, Samoa, Singapore, Sri Lanka, Thailand, USA, Vanuatu, Viet Nam and representative from two industry partners. A list of participants is provided at **Attachment 1**.

1.3 Opening of the Meeting

1.3.1 The Meeting was opened by Mr. Epeli Nailatkau, Honorable Minister of Foreign Affairs, International Cooperation and Civil Aviation, Government of Fiji Islands in the presence of Mr. Digby Bossley, Chairman, Board of Directors Airports Fiji Limited (AFL). While emphasizing the importance of safety, security and environment supporting technologies, Honorable Minister also stressed on the importance of right attitude at the level of individuals, an attitude which supports acceptance of change. Touching upon the role of ATNICG and significance of these meetings, he hoped that ATN will be fully implemented by 2010. He reminded the meeting about the strategic importance of geographical location of Fiji and hoped that this location advantage will help the State in increasing its air traffic both in terms of passengers and in terms of cargo operations. He welcomed all the participants to Fiji Islands and wished the meeting a big success.

1.3.2 On behalf of Mr. Mokhtar A. Awan, Regional Director, ICAO Asia and Pacific Office, Mr. Sujan K. Saraswati, Regional Officer, CNS of the ICAO Regional Office expressed gratitude and appreciation to the Government of Fiji and in particular to the AFL for hosting the meeting and for the excellent arrangements made. He highlighted some of the significant achievements made in the implementation of ATN in region in the recent past. He emphasized the importance of cooperation and coordination for harmonized implementation of ATN/AMHS in the region. He also reminded the meeting that the objective of meeting was to progress tasks approved by APANPIRG.

1.3.3 Mr. Hoang Tran, Chairman of the ATNICG, in his opening remarks welcomed the participants and appreciated and thanked Honorable Minister of Civil Aviation, Fiji Islands and AFL for the excellent arrangements made for the meeting. He reminded the meeting about the requirement to develop a plan for a seamless network to be used for the exchange of operational communications which include flight plan messages, meteorological information etc. He also suggested that the participants should continue to share their experiences and knowledge, in the interest of early implementation of ATN.

1.3.4 Chairman, Board of Directors, AFL thanked the Ministry for its support and welcomed delegates from different States in the region. Welcoming the participants on behalf of AFL Board and its CEO, he wished all success for the meeting.

1.4 Officers and Secretariat

1.4.1 Mr. Hoang Tran, Chairman of the ATNICG presided over the meeting.

1.4.2 Mr. Sujan K. Saraswati Regional Officer CNS of the ICAO Asia and Pacific acted as the Secretary of the meeting.

1.5 Working Arrangements, Language and Documentation

1.5.1 The ATNICG met as a single body, except for a break-away adhoc working group created during the course of this meeting to review the implementation plan particularly with reference to ATN over IPS. The working language for the meeting was English inclusive of all documentation and this Report. Lists of Working Papers and Information Papers are provided at **Attachment 2**.

1.6 Conclusions/Decisions - Definition

1.6.1 The ATNICG of APANPIRG records its actions in the form of Draft Conclusion, Draft Decision and Decision with the following significance:

- a) Draft Conclusions deal with matters, which, in accordance with the Sub-Group's Terms of Reference, require the attention of States/Organization or actions by ICAO in accordance with establishment procedures:
- b) Draft Decisions relate solely to matters dealing with the internal working arrangements of APANPIRG and its contributory bodies; and
- c) Decisions relate solely to matters dealing with internal working arrangement of the ATNICG only.

1.7 Terms of Reference (TOR) of ATNICG

Title and Terms of Reference

Title: Aeronautical Telecommunication Network Implementation Co-Ordination Group (ATNICG)

Terms of Reference (TOR)

Coordinate ATN implementation and transitional issues in the Asia and Pacific region and address relevant system management, operational procedures and emerging issues that may arise.

Composition

The Group will be composed of experts nominated by:

Australia, China, Hong Kong, China, Fiji, India, Indonesia, Japan, New Zealand, Republic of Korea, Singapore, Thailand and United States.

Reporting

The Group will present its report to APANPIRG through the CNS/MET Sub-group.

1.8 List of Conclusions

Draft Conclusion 3/1 - Asia/Pacific Aeronautical Telecommunication Network System Security Policy

Draft Conclusion 3/2 - AMC Software

Draft Conclusion 3/3 - Adoption of ATN over IPS in addition to ATN over OSI

Draft Conclusion 3/4 - ATN Implementation Schedule

Draft Conclusion 3/5 - Amendment to Asia/Pacific Regional AMHS MTA Routing Policy

Draft Conclusion 3/6 - Amendment to Asia/Pacific AMHS Manual

Draft Conclusion 3/7 - Revision to Subject/Tasks List of ATNICG

Agenda Item 1: Adoption of agenda

The Agenda adopted by the meeting was as follows:

- Agenda Item 1: Adoption of provisional agenda.
- Agenda Item 2: Review outcome of CNS/MET SG/11 and APANPIRG/18 Meetings.
- Agenda Item 3: Review ATN related developments in the Aeronautical Communication Panel (ACP)/Group Meetings.
- Agenda Item 4: Report on the ATNICG Working Group Activities.
- Agenda Item 5: Review States' ATN/AMHS Implementation/Operational activities and issues. *(member States are expected to provide their latest implementation status in the form of Attachment 1A)*
- Agenda Item 6: Discuss issues related to Directory Service, AMHS Address Management, AMC etc.
- Agenda Item 7: Discuss ATN/IPS Implementation related issues.
- Agenda Item 8: Review Tables and Charts for the ground-to-ground part of the CNS FASID.
- Table CNS 1B – ATN Routers Plan
 - Table CNS 1C – AMHS Routing Plan
- Agenda Item 9: Review and develop ATN/AMHS Implementation related regional guidance material, including development of updated Asia/Pacific Regional ATN Implementation System Management Operational Procedures and additional Appendices to the conformance testing document.
- Agenda Item 10: Review the Subject/Tasks List of the ATN Implementation Coordination Group and develop future work programme of the group.
- Agenda Item 11: Any other business.

Agenda Item 2: Review outcome of CNS/MET SG/11 and APANPIRG/18 Meeting

2.1 The meeting reviewed the outcomes of Eleventh meeting of CNS/MET Sub-group and the Eighteenth meeting of APANPIRG. The meeting noted that APANPIRG endorsed the Subject/Tasks list updated by the ATNICG in its Second meeting and endorsed by CNS/MET SG/11, without any change. The meeting also adopted the Guidance Document for AMHS Conformance Testing and the updated AMHS ICD. Meeting was informed that APANPIRG adopted the Conclusion to replace FASID Table CNS-1E, ATS Inter-facility Data Communication (AIDC) implementation plan with an updated table.

2.2 The meeting was also informed that in line with the Conclusion 18/27 adopted by APANPIRG, an ATN/AMHS Workshop to address implementation issues, hosted by Aeronautical Radio of Thailand was held in Chiang Mai from 21 to 23 January 2008. Workshop was attended by 98 participants, 1 International Organization and 11 Industry partners. The Workshop was addressed by experts from States and Industry on issues related to the implementation of ATN/AMHS. States exchanged information on implementation issues. Industrial partners organized demonstration of their systems to bring out the salient features of their systems. Meeting was also informed that the participants expressed satisfaction with the outcomes of the Workshop and reported that the information received at the Workshop will help them in the implementation of ATN.

Agenda Item 3: Review ATN related developments in the Aeronautical Communication Panel (ACP)/Group Meetings

3.1 One Working Paper and two Information Papers were presented under this Agenda Item.

3.2 Information Paper presented by the Secretariat informed the meeting about the status of development of ICAO Aeronautical Telecommunication Network (ATN) Manual for the ATN using IPS Standards and Protocols (Doc 9896). The draft manual provides initial guidance about the technical specifications and requirements of ATN/IPS. It was also informed that the manual contains minimum communication protocols and services that will enable implementation of ATN based on the provisions of Internet Protocol Suite (IPS) utilizing Internet Protocol Version 6 (IPv6). The manual considers implementation of IPv4 in ground-ground sub-network as a regional or local issue and hence this issue has not been addressed in the manual.

3.2.1 The meeting was also informed that as per Annex 10, Volume III, Part I, Paragraph 3.3.3, the implementation of ATN/IPS, including the protocols and services, shall take place on the basis of regional air navigation agreement between ICAO Contracting States. The document has been divided into three parts, Part I containing detailed technical specifications, Part II containing guidance on IPS Applications and Part III providing general guidance.

3.3 Meeting was reminded about the reasons for the publishing of Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols. *Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN)* (Doc 9705) was produced to provide guidance on the implementation of ATN based on OSI. Subsequently, ACP/W, in its first meeting recommended that a separate document should be developed to provide guidance on the implementation of ATN based on IPS and it was decided to update the contents of DOC 9705 and transfer them to *Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocol* (Doc 9880). It was also decided that the relevant volumes of Doc 9705 will become obsolete as and when the corresponding volumes of new document Doc 9880 are published.

3.3.1 Document 9880, Part IIB on Ground –Ground Applications for ATSMHS, 1st Edition was approved and released for publication on 31 December 2007. Technical Specifications for ATN based on OSI contained in this Part is based on relevant standards and protocols established by the International Organization for Standardization (ISO) and the Telecommunication Standardization Sector of the International Telecommunication Union (ITU-T) for Open Systems Interconnection (OSI). As decided, Document 9705, Sub-volume III, Section 3.1 becomes obsolete with the publication of this document.

3.3.2 In response to a query by Fiji, the meeting was informed that AFTN is likely to continue in the foreseeable future, though AMHS implementation will continue.

3.3.3 Two significant changes have been incorporated in the new document Doc. 9880. First is that the new documents provides for operating over TCP/IP and second is that it includes further partitions and lists the extended services. It was further emphasized by USA that basically the changes were of editorial nature and there were no changes in the functionality in the document.

3.4 Detailed brief on the deliberations of Second meeting of ACP Working Group of the Whole (ACP/W) was presented by Chairman, ATNICG. Second meeting of ACP/W was held in Montreal from 21 to 25 April, 2008. Progress of Work within WG-I (IPS) was discussed by the meeting under Agenda Item 3. In addition to reviewing the progress of development of Doc 9896 and Autonomous System Numbering Plan and the IPv6 Address Plan, the meeting also discussed the issues related to Standards for Voice over Internet (VoIP) requirements.

3.4.1 ACP-W/2, while reviewing the development of ATN, was informed through a working paper that AMHS was an overly complex and expensive solution, which provided very little benefit over current AFTN systems. It was also informed that, AMHS being a niche market, very little expertise was available globally on this subject. With its limited capabilities, AMHS standards may not be able to fulfill current and foreseen communication needs especially to support MET applications. The paper presented to ACP-W/2 proposed Simple Message Transfer Protocol (SMTP) as an alternative for AMHS. Presentation to ACP-W/2 listed a number of advantages of SMTP over AMHS and described the benefits likely to be accrued by using SMTP in place of AMHS. Paper concluded that there may be a scope for developing new AFS ground to ground messaging standards, for instance in support of SMTP and XML protocols and recommended that the new standardization work for ground to ground messaging system should adopt an approach of describing the minimum performance requirements for example Addressing Schemes, QOS etc. rather than describing in depth technical details. Paper offered recommendations that relevant Annex 10 provisions should be reduced to a set of messaging formats (for data), addresses, RCP etc. and States and Regions be advised to consider a modular approach facilitating the inclusion of gateway to more modern technologies to ensure a seamless path towards support of future data formats. ACP-W was of the opinion that this would enable States to select more modern and cost effective solutions like SMTP.

3.4.2 Japan, in its presentation informed ACP-W that in the Asia/Pacific and other regions, States are implementing AMHS to transition away from legacy AFTN/CIDIN systems. AMHS can operate over IP network by simply emulating OSI transport service with the TCP protocol and will be deployed over IP in the NAM, CAR/SAM and EUR regions. Deployment of ESMTP/SMTP at this stage would require extensive resources for standardization, development, validation and deployment by ACP, regions and vendors, and in addition there are strong concerns over life cycle cost, security and business case for this development.

3.4.3 Describing the extensive investment made by FAA in evaluating, testing and training its personnel in implementing AMHS, USA in its paper recommended the use of User Agent (UA) as specified in ICAO Doc. 9705 for interfacing with AMHS or the existing AFTN compatible terminal. FAA was of the opinion that UA or AFTN compatible terminals would provide support to the States that do not need a fully functional AMHS in the immediate future. In the longer term, the paper recommended that there will be a migration from AFTN/AMHS platform to the System Wide Information Management (SWIM) environment.

3.5 Chairman, ATNICG and Japan presented the papers which were presented by them to the ACP-W/2. Both the papers emphasized the investments and efforts which had already been invested in the development, deployment of AMHS and recommended that new investments should only be made, if inadequacy of AMHS in meeting certain operational requirements is conclusively established and a business case for investments exists.

3.5.1 Discussing the proposed inclusion of SMTP, the meeting was informed that 8 States in European region had decided to implement AMHS with an AFTN Gateway to replace ageing CIDIN. It was also concluded that implementation of SMTP will add on to the requirement of gateways and will need substantial investment towards development and validation.

3.5.2 Based on the inputs received, the meeting decided to review the implementation strategy under Agenda Item 7.

Agenda Item 4: Report on the ATNICG Working Group Activities

4.1 ATNICG Working Group had two meetings ATNICG WG/2 and ATNICG WG/3 since the last ATNICG meeting held in 2007. Both the Working Group meetings were hosted by Aeronautical Radio of Thailand (AEROTHAI).

4.2 ATNICG WG/2 was held from 19 to 21 September 2007 in Bangkok. The Working Group was informed by AEROTHAI about the current status of AMHS Information Management. The meeting was also informed about the status of acquisition of AMC Software from Eurocontrol. AEROTHAI assured the Group that application software acquired from Eurocontrol can be modified by them to suit the requirements of Asia/Pacific Region. While discussing the MTA Routing Policy, the meeting came to a conclusion that the routing policy should be in line with the AFTN Routing Directory during the transition phase. It was also concluded that any-to-any connection can be applied after sufficient familiarity with the AMHS had been gained.

4.2.1 AEROTHAI proposed that block oriented AFTN AIDC should be adopted to meet the requirements during transition and in future ATN/AMHS environment. AEROTHAI also proposed that AIDC should be adopted to be run over ATN/OSI based Internet Communication Service (ICS) and Internet Protocol Suit (IPS). The Working Group agreed with the proposal and requested AEROTHAI to develop a protocol concept for AFTN AIDC over ATN IPS architecture based on the concept of Flight Message Transfer Protocol (FMTP).

4.2.2 Discussing issues related to IDRP Routing Policy, the meeting concluded that the general strategy should be to support simple flat routing policy.

4.2.3 The Working Group also discussed issues related to implementation of ATN over IPS and concluded that a regional strategy paper on IPS transition should be prepared.

4.3 Third meeting of ATNICG Working Group, hosted by AEROTHAI was held at Chiang Mai from 24 to 25 January, 2008. The meeting was held back to back with the AMHS Implementation Workshop also conducted at Chiang Mai from 21 to 23 January 2008.

4.3.1 The meeting discussed the status of implementation of ATN/AMHS and identified the need to update the planning information contained in the Regional Air Navigation Plan (Volume II) FASID Tables CNS – 1B (ATN Router Plan) and CNS – 1C (AMHS Plan).

4.3.2 To support inter-operability testing of AMHS, two annexes, Annex E (Inter-operability trials of States/ANSPs AMHS systems subsequent to their implementation) and Annex F (Pre-operational testing prior to the operational commencement of their AMHS services) were recommended by the meeting for appending to the Guidance Document on AMHS Conformance Testing (1st Edition).

4.3.3 The meeting also agreed that in addition to the technical parameters, operational parameters like queue build up, bandwidth consumed, saturation point and limits should be included in the list of performance parameters for the system. The meeting also agreed that criteria used by ICAO/EUR in their documents should be taken into consideration as reference. Japan assured to continue with the task with the support of Republic of Korea and India.

4.3.4 ATNICG WG/3 decided that a survey should be conducted to assess the level of investment/commitment by the States in ATN/OSI and the information derived from survey responses should be used for deciding the future direction for implementation.

4.4 A sub-working group was established by ATNICG WG/3 to address Security related tasks identified under Sl. No. 7 of the Subject/Tasks List developed by ATNICG in its First meeting held in Seoul, Republic of Korea from 22 to 26 May, 2006. .

4.4.1 The sub-working group meeting was held from 21 to 23 April in Bangkok. While reviewing the “Asia/Pacific Aeronautical Telecommunication Network System Integrated Policy” sub-group recommended renaming the document as “Asia/Pacific Aeronautical Telecommunication Network System Security Policy” and also recommended to replace all the references to “System Integrity” with “System Security”. It was recommended that references relevant to Interoperability Requirements may be transferred to some other document for example “ASIA/PAC – Guidance Document for AMHS Conformance Testing (AMHS Manual)”. ATNIGG agreed to recommend the following Draft Conclusion developed by ATNIGG WG/3 for the consideration of APANPIRG through CNS/MET Sub Group.

Draft Conclusion 3/1 - Asia/Pacific Aeronautical Telecommunication Network System Security Policy

That, the updated “Asia/Pacific Aeronautical Telecommunication Network System Integrity Policy” be adopted as “Asia/Pacific Aeronautical Telecommunication Network System Security Policy” attached to this report as **Appendix A**.

4.4.2 The sub-group meeting reviewed “Security Technical Guidance Document” and proposed to include Management and Technical Controls in the document. The sub-working group reviewed management, operational and technical controls listed in NIST 800-53 document and proposed to develop a Check List based on these control items.

4.4.3 The meeting also proposed to develop a Contingency Plan and Incident Response Plan for the Asia/Pacific Region and work out the format and contents of the Guidance Material. The meeting recommended expanding the current draft, which contains guidance on technical controls, to include management and operational controls also.

Agenda Item 5: Review States' ATN/AMHS Implementation/Operational activities and Issues**ATN/AMHS Implementation Status**

5.1 Mr. Ken Morris, expert from Australia presented the report on the incorporation of updates to the ATN implementation status provided on ICAO Asia/Pacific website, http://www.icao.or.th/apac_projects/atn/charts/atn_chart.asp. Presentation included a list of significant developments which have taken place recently in the. Some of these significant activities are listed below:

- a) Singapore started ATN trials with Malaysia in 2007 and continues to conduct interoperability and preoperational testing (Annex E and F of AMHS Manual) in the 3rd Quarter of 2008;
- b) United States has the AMHS integrated into the NADIN message switch rehost (NMR) as a sub-application. This allows OSI and IP routings. Japan is the only State connected via AMHS to USA;
- c) United States has planned installation in October 2008 for Atlanta. Router testing has been conducted with China;
- d) Australia implemented AMHS/AFTN/ATN in June 2007 and is planning to conduct tests with Singapore. Australia is also planning tests with the United States in 4th Quarter of 2008;
- e) New Zealand has started planning the development of AMHS interfaces for other systems, e.g. domestic and oceanic ATM systems. Initially, these systems will link to ATN/AMHS network using AFTN via AFTN/AMHS gateway, but ultimately they are going to need AMHS (X.400) capabilities; and
- f) ATN/AMHS implementation has started in Beijing, China.

5.1.1 Hong Kong revised its schedule with the Contract Work for 3rd Quarter of 2008, Testing in 1st Quarter of 2009, Training to commence in 1st Quarter of 2009 and Commissioning for 2nd Quarter of 2009. Malaysia revised its AMHS implementation schedule as 2009.

5.1.2 Secretariat presented for the review by the meeting, the CNS/ATM Implementation Planning Matrix updated by ADS-B Study and Implementation Task Force meeting held from 7 to 11 April 2008. The meeting updated information in respect of their implementation status in the Matrix. The updated Matrix will be presented to the CNS/MET SG/12 for its review.

5.1.3 Meeting also reviewed the implementation status presented by Vietnam, China, New Zealand, Singapore, Malaysia, U.S.A., Australia, Thailand, Fiji, Sri Lanka, Indonesia and India. Vietnam informed the meeting about its proposed plan to test AMHS connectivity with Sanya, China. India informed the meeting that contract for supply of the system was signed in May 2007. Design review was carried out in July 2007 and the equipment for the facility has already been installed. The Site Acceptance Testing for the system is likely to be conducted in May 2008.

5.1.4 Singapore and Malaysia, jointly presented a paper on the status of ATN/AMHS trials that are going on to evaluate connectivity and interoperability of the link. Meeting was informed that ATN Router and AMHS connectivity had been successfully established and both ends are able to exchange AFTN messages over ATN.

Agenda Item 6: Discuss issues related to Directory Service, AMHS Address Management AMC etc.

6.1 Five Working Papers were presented under this Agenda Items.

6.2 Fiji, on behalf of the group assigned to Task 6 of the ATNICG Subject/Tasks list presented a Working Paper on the proposed implementation strategy for ATN Directory Service in the Asia/Pacific Region. The paper proposed to define the strategy in two phases, first phase for the provision of Offline Directory Service and the second phase for the Online Directory Service. Strategy proposes that the region should start with the implementation of Offline Directory Service initially and should slowly migrate to an On-line Directory Service after a full study on the impact of ATN DIR in the region is completed.

6.2.1 The paper proposes that an Off_line Directory Service will be provided by AMC being implemented by AEROTHAI. Subsequently, after adequate experience has been gained, On-line Directory will be provided as per ATN Guidance Material ICAO Doc 9739 and ICAO Doc. 9705 Vol. VII.

6.2.2 The paper also proposes that two operational DSA in the region should be implemented in line with the back up concept. The DSAs will provide the inter-region gateway for ATN DIR in the Asia/Pacific Region. The two DSAs will be installed at two different sites.

6.3 Japan presented a paper suggesting performance indicators for AMHS. The paper suggested that there was a significant difference between performance monitoring and conformance testing and validation. The paper focused on Quality of Services in terms of Quality of Message Delivery, Quality of Delivered Message and Time Efficiency. The paper groups performance indicators into three distinct groups, Regional, Bilateral and Local matters. Regional group included parameters like the Quality of Service (like the number of NDR etc.), Quality of Delivered Message (number of messages with detected errors) and Information collection and report (like inbound message traffic etc.). The paper also proposes Message Transmission Time Efficiency in terms of message traffic load at the receiving servers.

6.3.1 The two attachments to the paper on Development/establish/adapt/monitor/identify/analyze performance indicators and Performance Analysis of Networked Operations provide detailed information on the subject.

6.4 Update on the Asia/Pacific Interim AMHS Database and AMC was provided by Thailand under this Agenda Item. It was informed that AEROTHAI had set up a working group within the Aeronautical Network Management Center to handle the AMHS register information management since 2007. The working group is also the working entity for the operation of the Asia/Pacific Interim AMHS database. The group is coordinating with Eurocontrol and has applied to European AMC as the External Comm. Center.

6.4.1 The meeting was informed that information in the AMHS Interim database was stable and currently there was no additional information from the users in the region. Reviewing the status of receipt of AMC Software from Eurocontrol, the meeting came to a conclusion that availability of AMC Software was essential to ensure effective and efficient management of the network. The meeting was informed about the status of availability of the software. The matter was discussed at length and it was decided to formulate a Draft Conclusion requesting ICAO to facilitate transfer of AMC software from Eurocontrol to AEROTHAI along with their consent for modification of the software by AEROTHAI to meet the requirements of Asia/Pacific Region.

Draft Conclusion 3/2 - AMC Software

That, to facilitate implementation and management of ATN in Asia/Pacific Region, ICAO be urged to facilitate transfer of Eurocontrol AMC Software to AEROTHAI and to allow AEROTHAI to modify the software to suit the requirements of Asia/Pacific Region.

6.4.2 The meeting was also informed that a member of the Working Group in AEROTHAI attended the AMC User Training and Eurocontrol IANS, Luxemburg on 16 and 17 April, 2008. The meeting noted that the training was also attended by representatives from USA and Philippines also

6.4.3 Presenting a paper on AMHS Management Network Operational Management Guidelines, USA brought out the requirements which are to be met during the deployment and operation of AMHS for the operational management of the ATN/AMHS network. Though maintenance and operation of AMHS Communication Centers were considered to be the local matters, yet to maintain high level of operational reliability and performance, it was felt that there are critical items, procedures, and methods that are required to be coordinated and shared between and amongst network Centers. Meeting agreed with view presented in the paper that centralized processes and procedures should provide a logical centralized network operation in a decentralized physical network structure.

6.5. Guidance to be considered in the development ATN/AMHS operational procedures necessary for communication center operators to provide continuous high performance un-interrupted AMHS network services is placed at **Appendix B**. The meeting was also informed that the Appendix provides a framework for operational guidelines and need to be further developed to be really usable.

6.5.1 In the opinion of Japan, a control management team for the network should be appointed in the region. It was agreed that though it will be possible to resolve most of the network related issues at the local level, but a centralized coordination body will be in a better position to coordinate issues which are related to more than one State. It was also felt that this centralized body could be a part of the AMC.

6.6 Implementation status of ATS Inter-facility Data Communication (AIDC) in Asia/Pacific Region was taken up for review in the meeting. The meeting was informed that APANPIRG had adopted revised Version 3 Asia/Pacific AIDC ICD through its Conclusion 18/8. The version had been reviewed by ATM/AIS/SAR Sub-group and the revisions were further reviewed and endorsed by CNS/MET Sub Group.

6.6.1 The meeting noted that APANPIRG/18 had agreed to dissolve the AIDC Task Force on the basis of recommendations made by ATM/AIS/SAR and CNS/MET Sub-groups. The meeting also noted that APANPIRG had also decided that outstanding matters with respect to ATN/AMHS Transition support as indicated in Section 3.2 of Part II of the AIDC ICD, which needed to be further addressed can be included in the work program of the ATN ICG and CNS/MET SG of APANPIRG. The meeting was informed that though technical specifications for ATN based AIDC had already been published by ICAO, these provisions might not be practical for implementation at the current stage.

6.6.2 The meeting also took note of the developments concerning implementation of AIDC in the region.

6.6.3 ATNIGG also noted the concern expressed by APANPIRG/18 that coordination error across FIR boundaries are the most crucial aspect of APAC regional RVSM operations, and identified automation using AIDC as a means of mitigating errors in controller to controller verbal communication.

6.7 Responding to the request to develop a concept paper on the Proposed AFTN AIDC/ATN Gateway Architecture to handle the exchange of AFTN/AIDC messages, Thailand presented a concept paper to the meeting for its consideration. The concept proposes a gateway application by limiting the conversion requirements. The situation resembles AFTN/ATN Gateway Type A that was introduced in the ATN SARPs in the 1st Edition and was removed later in 3rd edition. The gateway does not convert AFTN message to an AMHS message but encapsulates the message and sends it over the ATN. The paper recommended that AFTN/ATN Gateway Type A concept can be adopted to be the AFTN AIDC/ATN Gateway. The paper included details on the structure and also discussed some of the critical issues.

6.7.1 Through an attachment to the paper, system level provisions have also been proposed. The attachment also suggests the specifications required to be met by the system.

6.7.2 Appreciating the concerns expressed by APANPIRG in its Eighteenth meeting, ATNICG noted that ATN implementation will support AFTN AIDC, which is currently in use.

Agenda Item 7: Discuss ATN/IPS Implementation related issues

7.1 Two working papers were presented on this Agenda Item.

7.1.1 The meeting was informed about the inclusion of IPS SARPs in Annex 10, Volume 3 in March 2008. The meeting was also reminded about Recommendation 2 adopted by ATNIGG WG/3 that APANPIRG may study a common OSI/IPS network infrastructure that will support AMHS and other ATN/OSI applications while allowing the introduction of new IPS applications and to develop a transition plan and required documentation for its implementation. Issue of inclusion of ATN over IPS, in line with ATNIGG WG/3 Recommendation was discussed by the meeting and it was decided to formulate following Draft Conclusion to adopt ATN over IPS in addition to ATN over OSI for the BBIS in the strategy for Implementation of ATN in Asia/Pacific Region.

Draft Conclusion 3/3 - Adoption of ATN over IPS in addition to ATN over OSI

That, considering the inclusion of ATN over IPS SARPs in ICAO Annex 10, Volume 3 and to support global harmonization of ATN implementation, States hosting BBIS be encouraged to implement ATN over IPS in addition to ATN over OSI under implementation in the Asia/Pacific Region as per the existing regional strategy.

7.1.2 ATNIGG WG/3, while discussing issues related to the implementation of ATN/IPS in the region developed Recommendation 1 that Asia/Pacific Region continue with the current transition plan to implement ATN/AMHS based on the *ICAO Doc 9705 technical manual*.. While taking note of inclusion of ATN/IPS SARPs in Annex 10, Volume III, ATNIGG WG/3 also decided that a survey should be carried out to assess the investment already made/committed by the States in the implementation of ATN/OSI. Singapore was requested to take the lead and in coordination with ATNIGG members from Australia, China, Hong Kong-China, Japan and USA prepare a survey document. ICAO Regional Office was requested to issue a letter to States hosting Backbone Boundary Intermediate Systems (BBIS) requesting them to respond to the survey questionnaire.

7.1.3 The meeting was informed that response was received from Australia, China, Fiji, Hong Kong-China, India, Japan, Singapore and USA. Response from Thailand was still awaited. Responses received from the States were presented to the meeting in the form of a matrix.

7.1.4 Based on the response received from the States, the meeting concluded that almost all the States had made/committed investment towards the implementation of OSI based ATN Router. The meeting also concluded that most of these MTAs are dual stack and have provision for both OSI and IP sub-network. The meeting, on the basis of the responses received, came to a conclusion that BBIS network could very well support both IPS and OSI communications.

7.2 Based on the response received from the States and to ensure early implementation of ATN in the region, the meeting developed following Draft Conclusion for consideration by CNS/MET SG/12 and APANPIRG/19.

Draft Conclusion 3/4 - ATN Implementation Schedule

That, States hosting Backbone Boundary Intermediate Systems (BBIS) be urged to complete the implementation of ATN Dual Stack (ATN/OSI and ATN/IPS) as per the following schedule:

2010 – All ATN/OSI backbone identified in FASID Table CNS – 1B operational.

2011 – All backbone AMHS MTAs support both OSI and ICAO-compliant IPS protocols.

7.3 In a presentation made on the alternatives available for implementing IPS in Asia/Pacific Region, USA described various options available for the ATN Implementation Coordination Group to be evaluated.

7.3.1 The meeting was informed that ICAO Asia/Pacific Region had adopted and implemented Aeronautical Message Handling System (AMHS) over an Aeronautical Telecommunication Network (ATN) Router using X.25 Network Protocol. However, recent development in the regulatory provisions has included the use of Transport Control Protocol/Internet Protocol (TCP/IP). ATNICG is hence required to include this new requirement into its implementation strategy.

7.3.2 Presentation described a number of alternatives available for the implementation of ATN over IPS, in addition to ATN over CLNP.

7.4 After a protracted discussion, it was agreed that an adhoc working group should be established to discuss various options available to assist in the transition to IPS. The adhoc working group meeting was attended by participants from Australia, China, Hong Kong China, India, Japan, Macao China, Malaysia, New Zealand, Sri Lanka, Singapore, Thailand, USA and Vietnam,

7.4.1 The adhoc working group met as a break-away group from the main meeting. Report of the adhoc working group meeting is provided in **Appendix C**.

7.4.2 After identifying the alternatives available for the implementation and after assessing the infrastructure implemented/committed, the group recommended the implementation strategy for the consideration of ATNICG as follows:

- 1) All States having Backbone Boundary Intermediate System (BBIS) in the Asia/Pacific Region should continue to implement ATN/OSI as per the current regional plan (FASID Tables CNS-1B and CNS-1C);
- 2) For States with Boundary Intermediate System (BIS), deployment of IPS based AMHS and/or inter-State ATN circuits may be considered depending on the impact on the regional ATN network connectivity and redundancy, and the agreement with the adjacent States;
- 3) For AFS interface to adjacent regions, communication with States with only one connection to the APAC region can use IPS on a bilateral basis. States in adjacent regions that have multiple connections to the APAC region are recommended to continue to support ATN/OSI links;
- 4) The region should construct an effective regional ATN ground network that supports both OSI and IPS based services. This could be achieved by upgrading inter-State circuits to support IPS as well as OSI communication, and introducing IPS routers alongside BIS routers;
- 5) Any subsequent new services or AMHS Message Transfer Agent (MTA) should be able to support dual stack to assist future transition to “ICAO compliant” IPS network technology; and
- 6) The ATNICG task list shall be revised to include development of IPS implementation documentation.

7.4.3 Report presented by adhoc working group was discussed in the meeting. It was decided that these recommendations should be presented to CNS/MET SG/12 for their consideration.

Agenda Item 8: Review Tables and Charts for the ground-to-ground part of the CNS FASID

- **Table CNS 1 C – AMHS Routing Plan**
- **Table CNS 1 B – ATN Routers Plan**

8.1 The meeting was reminded that revision of FASID Tables CNS-1B and CNS-1C was discussed in ATNICG/2. Both these tables were earlier reviewed by ATNICG/1. FASID Table 1B lists the requirements to increase the capacity of existing AFTN Circuits or proposes creating of new circuits to implement ATN Routers. The table also gives schedule of implementation of this update. FASID Table 1-C lists the requirement of AMHS in the Region.

8.2 The meeting was also reminded that both these Tables were approved and published in the First Edition of ANP (Doc 9673) Volume II, FASID in 2006.

8.3 ATNICG/2 agreed that most of the States had progressed considerably in the implementation of ATN in last few years. It was, hence considered that both FASID Table CNS - 1B and CNS – 1C should be reviewed to ensure that the information available in these tables was more realistic.

8.4 ATNICG WG/3 proposed that these FASID tables should be updated.

8.5 In view of above, both FASID Tables CNS – 1B and CNS – 1C were taken up for review by the meeting. Updated Tables are provided respectively at **Appendices D and E** to this report for the consideration by CNS/MET Sub-group of APANPIRG.

Agenda Item 9: Review and develop ATN/AMHS Implementation related regional guidance material, including development of updated Asia/Pacific Regional ATN Implementation System Management Operational Procedures and additional Appendices to the conformance testing document

9.1 Asia/Pacific Regional AMHS MTA Routing Policy

9.1.1 ATNIG WG/2 meeting discussed issues related to Asia/Pacific Regional MTA routing policy. The meeting was of the opinion that requirement for the backbone MTAs to perform connection tests between a new MTA and the other MTAs prior to commissioning might be difficult to achieve, particularly during the implementation phase.

9.1.2 Paper presented by Thailand proposes that permitting the routing configuration of the new MTA to correspond to the AFTN routing table prior to commissioning may mitigate the problem.

9.1.3 To incorporate this proposed solution, the regional AMHS MTA Routing Policy has been modified. Modified AMHS MTA Policy is placed at **Appendix F** to this report.

9.1.4 Appendix A to the MTA Routing Policy has been amended to incorporate the recommended change. Revision also provides guidance as to how a new MTA site is required to be inducted into network and it includes a requirement of test to be conducted between the MTA system and all other AMHS systems to which it will be connected.

9.1.5 The proposal presented by Thailand was reviewed by the meeting and it was agreed to formulate the following Draft Conclusion for the consideration by CNS/MET Sub Group to incorporate the recommended changes.

Draft Conclusion 3/5 - Amendment to Asia/Pacific Regional AMHS MTA Routing Policy

That, the revised Asia/Pacific AMHS MTA Routing Policy placed at **Appendix F** to this report be adopted.

9.2 Asia/Pacific AMHS Manual

9.2.1 A guidance document has been created to assist the States in defining the functional tests to ensure interoperability between AMHSs. These tests are recommended to be conducted after the successful completion of AMHS conformance testing, through which the compliance of all systems with the AMHS SARPs are confirmed.

9.2.2 Paper presented by Singapore on behalf of a group which includes China, Hong Kong China, Indonesia, Republic of Korea and United States as other members, proposes inclusion of two more Annexes to the Document 'Asia/Pacific AMHS Manual'.

Annex E: Inter-operability trials of States'/ANSPs' AMHS systems subsequent to their implementation

Annex F: Pre-operational testing prior to the operational commencement of their AMHS services.

9.2.3 The proposed Annexes were reviewed by ATNIG WG/2 and WG/3 meetings. ATNIG WG/3 meeting after reviewing the documents came to a conclusion that the final draft documents should be recommended for adoption as appendices to the Guidance Document of AMHS Conformance Testing.

9.2.4 The meeting was further informed that some changes have been incorporated in Appendix D, AMHS Conformance Test of EUR AMHS Manual Version 3.0. These changes have been released in April 2008 and in view of these changes Appendix B of Asia/Pacific guidance document on Conformance Testing needs to be updated. Meeting was also informed that a proposal incorporating these changes will be presented to the next Working Group meeting.

9.2.5 The presentation highlighted that this document on AMHS Conformance Testing is a living document and invited the States to provide their comments so that the document could be updated from time to time.

9.2.6 Based on above, the meeting decided to formulate following Draft Conclusion.

Draft Conclusion 3/6 - Amendment to Asia/Pacific AMHS Manual

That, Annex E and Annex F placed at **Appendix G** to this report be adopted as appendices to the Guidance Document for AMHS Conformance Testing (AMHS Manual).

Agenda Item 10: Review the Subject/Tasks List of the ATN Implementation Coordination Group and develop future work programme of the group

10.1 The meeting noted that with the inclusion of SARPs for ATN over IPS in ICAO Annex 10, Volume III, it has now become necessary to develop guidance materials which will assist the States in the implementation. Some of the guidance materials already developed to assist implementation of ATN over OSI may be required to be reviewed in light of this development. Meeting therefore recommended to include development/review of manuals on ATN over IPS option in the Tasks List for ATNICG.

10.2 ATNICG Security Sub-working Group had its first meeting in April 2008 in Bangkok, Thailand. The meeting decided to recommend inclusion of additional security related tasks in the Tasks List recommended to be approved by APANPIRG for the ATNICG. The meeting reviewed the proposed additional tasks and agreed with the proposal.

10.3 Based on the recommendation of APANPIRG regarding the inclusion of transition to ATN/AMHS based AIDC in the work program of ATNICG, the meeting concluded to deliberate on this proposal further in the Working Group meeting wherein the progress on this subject in ACP/I will also be taken into account.

10.4 The meeting also reviewed additional tasks proposed by Chairman, ATNICG in ATNICG/2 and came to a conclusion that some of these tasks have already been included in the Subject/Tasks List.

10.5 In addition, the meeting reviewed the complete Subject/Tasks List and proposed some changes based on the developments, which have taken place recently. Revised Subject/Tasks list incorporating changes mentioned above is provided in **Appendix H**. Meeting decided to recommend following Draft Conclusion for consideration by CNS/MET SG/12.

Draft Conclusion 3/7 - Revision to Subject/Tasks List of ATNICG

That, the revised Subject/Tasks List of ATNICG provided in **Appendix H** be adopted.

Next Meeting of the Working Group

10.6 To progress tasks related to implementation of ATN and to discuss issues related to the implementation process, the meeting agreed that next meeting of ATNICG Working Group should be held in September in Bangkok. Agenda for the Working Group meeting will be announced at a later date and will be posted on ICAO Asia/Pacific Website. If possible, a meeting of ATNICG Security Sub-working Group will also be held during same period coinciding with the Working Group meeting. Next meeting of ATN Implementation Coordination Group will be held in early May 2009. Exact date and venue of the meeting will be coordinated with States and will be informed to the members after the Working Group meeting scheduled to be held in September 2008.

Agenda Item 11: Any other business

11.1 New Zealand presented an information paper on Some Observations on ATN/AMHS Implementation in the Middle East Region. The meeting was informed that MID AFS Task Force meeting held in 2005 had recommended:

- a) establishment of high speed digital link to facilitate implementation of ground to ground element of ATN;
- b) expedite finalization of MID Region ATN Planning Document;
- c) consider using AMHS over TCP/IP;
- d) hold an ATN Seminar/Workshop in 2006; and
- e) use CAAS addressing scheme rather than XF Addressing Scheme.

11.2 CNS Sub Group of MIDANPIRG (2007), in its Draft Conclusion 1/6 recommended that MID States implementing AMHS will have the AFTN/AMHS gateway where needed to ensure the interoperability of AFTN and CIDIN stations and networks with the ATN.

11.2.1 CNS Sub Group in the same meeting also adopted Draft Conclusion 1/7, which recommends that MID Region ATN shall

- a) be based on and use the Internet Protocol Suite (IPS) as the default networking protocol; and
- b) provide communication in accordance with the prescribed required communication performance (RCP).

11.2.2 The meeting also established a Working Group to develop documents, complete MID Region Implementation Plan, review and analyze the MID Region rationalized AFTN plan etc. The presentation went on to describe the Task List developed for this Working Group

11.2.3 The meeting was informed that following States in ICAO Mid Region had either recently installed AFTN/AMHS systems or were in the process of procuring AFTN/AMHS systems

- Bahrain (AFTN/AMHS installed in 2007)
- UAE (Abu Dhabi) (AFTN/AMHS installed in 2007)
- Oman (AFTN/AMHS installed in 2008)
- Egypt (contract signed for AFTN/AMHS system, expected in 2009)
- Saudi Arabia (Procurement process underway, System delivery expected in 2009)

11.2.4 The paper further described the implementation status of AFTN/AMHS System in Oman.

11.3 USA made a presentation on the structure of ICAO Documentation for ATN. The presentation covered details of Doc 9705, Doc 9880 and Doc 9896 and traced the history of these documents. Sub-volumes and Parts of these documents were explained and information on the development of various versions of these documents was also explained.

11.4 On behalf of all the participants and on his own behalf, Chairman ATNICG expressed his gratitude and appreciation for Airports Fiji Limited for the excellent arrangements made for the meeting and for the wonderful hospitality extended. Thanking the participants of the meeting, Chairman ATNICG wished a safe journey back to their States.



**INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE**

**ASIA/PAC
AERONAUTICAL TELECOMMUNICATION NETWORK
SYSTEM SECURITY POLICY**

**DRAFT
Second Edition**

May 2008

**ASIA/PAC AERONAUTICAL TELECOMMUNICATIONS NETWORK
SYSTEM SECURITY POLICY**

1. Purpose. This document prescribes the system security policy and associated requirements applicable to the Aeronautical Telecommunications Network (ATN). It applies to ATN implementations and defines the rules governing the protection of ATN data, services and resources associated with ATN applications and processes from both unintentional defects and deliberate attack. The design, implementation and operation of the ATN must support the complete and consistent enforcement of this system security policy.
2. Applicability. For the purpose of this policy, the ATN encompasses hardware, software, procedures, standards, facilities, and personnel. System security services provided in support of the ATN protect all data transmitted, stored, or processed by the system, for various levels of sensitivity.
3. Authority. This document is published in accordance with the authority of the International Civil Aviation Organization (ICAO).
4. Implementation and Enforcement. This system security policy defines a minimum set of rules to be enforced for the protection of data, services, and resources under ATN cognizance. Regional and local authorities may apply more stringent rules or constraints, while not degrading the ATN system security posture and maintaining consistency with the minimum essential required system security rules identified in this ATN System security Policy.
5. System security Requirements. System security requirements apply to the protection of the physical information technology, the communications equipment, and the data and information systems. Protection also applies to the facilities, environment, hardware, software, and people associated with the ATN. The fundamental ATN system security requirements are:
 - (1) Protect all ATN data directly associated with ATN applications and processes including ATN messages and stored information from unauthorized disclosure, modification, or deletion.
 - (2) Protect ATN services and resources from unauthorized use and denial of service.
6. System Security Services. Safe and secure operation of the ATN depends upon the accurate and consistent enforcement of six high level services: confidentiality, data integrity, authenticity, availability, accountability, and interoperability.
 - (1) Confidentiality. Ensures data is not disclosed to unauthorized entities. For the ATN, confidentiality, when appropriate, extends to data associated with ATN support applications and processes including system management and security applications.
 - (2) Data Integrity. Ensures data has not been altered or destroyed in an unauthorized manner.
 - (3) Authenticity. Ensures that the source of data or the identity of an entity is as claimed.
 - (4) Availability. Ensures resources, services, and data are accessible and usable on demand or in a timely, reliable manner by an authorized entity.
 - (5) Accountability. Enables activities to be traced to users and processes that may then be held responsible for those actions.

7. System Security Policy Statements. The ATN system security policy is intended to result in management, operational, and technical controls implemented on a regional or local level to provide system security services meeting the fundamental system security requirements. Accordingly, the following functional policy statements are identified in terms of the defined services:

(1) Functional Policy Statements

- a. Confidentiality
 - (a) ATN data shall be protected from unauthorized disclosure during processing, transmission, and storage commensurate with the designated sensitivity of the data.
- b. Data Integrity
 - (a) ATN data shall be protected from unauthorized or undetected modification during transmission, storage, and processing.
- c. Authenticity
 - (a) ATN users and processes shall be uniquely identified.
 - (b) ATN users and processes shall be authenticated before being granted access to ATN data, services, and resources.
 - (c) ATN data, services, and resources shall be protected from unauthorized use or tampering.
 - (d) ATN users and processes shall have access only to those ATN data, services, and resources for which they have authorization.
- d. Availability
 - (a) ATN data, services, and resources shall be available for use by authorized users and processes.
- e. Accountability
 - (a) An audit trail of use of ATN data, services, and resources by ATN users and processes shall be maintained.

8. Verification and Authorization. The process used by an independent agent to confirm or establish that the management, operational, and technical controls effectively meet the system security requirements is termed *verification*. Verification includes establishing that the system security functional policy is adequately provided. The *authorization* by responsible entities to place a system into operation is based on the verified effectiveness of management, operational, and technical controls.

(1) Verification

- a. ATN systems shall be verified to have system security commensurate with the risk and magnitude of harm resulting from unauthorized disclosure, modification, or deletion of ATN data, or unauthorized use and denial of service of ATN services and resources.

(2) Authorization

- a. ATN systems shall be formally approved for operation by the cognizant Designated Approving Authority (DAA).
- b. Significant changes to ATN systems shall require another formal approval (or re-authorization).

ATN/AMHS OPERATIONS GUIDELINES

1. Background:

1.1 Because of the basic principle of equal status among all States operating COM Centers, no provision has been made for unique or special functions, including network management, to be performed at any single specific place in the network: any function which is performed at one Center would or should be performed at all Centers. This means that the former situation (AFTN) did not contain or even allow the presence of a non-distributed, i.e. centralized network management function.

1.2 It must, however, be recognized that one of the reasons for the stability and robustness of the AFTN is the very distribution of operational responsibility. Any introduction of non-distributed functions has to consider carefully the possibility of keeping distributed operational functions for stability reasons.

1.3 In most all cases the maintenance and operation of AMHS Communications Centers is a local matter. However, to maintain a high level of operational reliability and performance there are critical items, procedures, and methods that must be coordinated and shared between and among network centers. Therefore the introduction of centralized functions into the ATN/AMHS communications centers will provide for a logical centralized network operation in a decentralized physical network structure.

2. Centralized Management Concepts:

2.1 Network management operations use databases describing the current configuration of managed elements. Different management functions need to share one common database which must be accurate for the whole network at all times. It need not be centrally located in a single location but it must, at least logically, function as one "central", set of data.

2.2 Network management operations can only give network-wide, optimal results when it is in a position to "view" and "have control" of the whole network. This means that the data available to it must relate to the whole network and any other controlling instance.

2.3 The communication paths between elements in the network and a Management Center are simpler to operate when centrally managed rather than when there is a set of many-to-many relationships. This is also true for communication relationships with other management domains (e.g. Regions),

2.4 Specialized network management and equipment resources can be better exploited if they are located at one or at a few central sites. Also the growth of knowledge and experience is better because one central team remains aware of all network problems and their solutions. Operation will realize enhanced performance due to more frequent exposure to network operations and equipment.

2.5 The procedures involving operations personnel at different sites are easier to implement and are more vigorous if there is a management component in the network responsible for coordination.

AFTN management is based on a decentralized but closely coordinated management infrastructure. ATN/AMHS management will be decentralized as well but steps must be taken to achieve at least the logical appearance of a centrally managed network.

3. Centrally Provided and Coordinated AMHS Network Management requirements.

3.1 Address management:

All participating communication centers will be responsible to maintain and update in a timely manner addresses within their domain of responsibility.

Timely address changes must be entered and recognized, and shared with a common database. Addressing table updates must be performed within a narrow scheduled timeframe for the entire network.

Network participants will be diligent to see that addresses entered and utilized are valid and registered with ICAO and other network participants.

Schedules and timeframes will be determined by agreement of network participants.

3.2 Routing updates and router management:

Changes to routing tables and updates to routing equipment must be coordinated and performed at scheduled times with fixed methods for the entire network.

Schedules and timeframes will be determined by agreement of network participants.

3.3 Problem Description Reports (PDRs):

PDRs shall be generated and communicated by all network participants when realized and shared with the ICAO regional office and all network participants.

Network participants will actively seek to resolve PDRs as soon as possible.

3.4 Non-deliverable Report (NDR) Handling:

It must be the goal of network participants to reduce and eliminate NDRs generated within the ATN/AMHS. This is especially critical during transition from legacy AFTN and AMHS and when AFTN and AMHS are operating in the environment at the same time. Excessive NDRs can result in critical message delivery situations.

3.5 Identification of Service Providers:

Network participants will clearly identify to other network participants names and points of contact for service providers used by the participant when they may likely effect the operations of other communications centers.

End-to-end management by the Service Providers between network elements is recommended whenever possible. This can result in significant cost savings and more efficient problem resolution. However, this matter must be resolved by adjacent network participants with negotiated agreements, or is considered a local matter.

3.6 AMHS Management Center Points of Contact (POCs):

Network Participants will provide to all other network participants the names, organizations, e-mail, and phone contact information of necessary points of contact within their

organizations to facilitate the efficient operation, restoration, improvement, and repair of the ATN/AMHS networks.

Network Participants will to the greatest extent possible keep POC information current and assure dissemination in a timely matter to other participants.

3.7 Offline Management:

Network participants will manage databases offline and only introduce changes to the operational databases when those changes have been advertised and coordinated among network participants.

3.8 Identification of repair coordination guidelines:

Network participants will notify all other affected network participants of modification and repair activities that can or will possibly affect the performance and operation of the network.

A logical centralized management dictates that this information be shared with the entire network much as information is now shared with affected adjacencies in the AFTN network

3.9 Performance Reporting:

Network participants will provide statistics and reports based on recognized network performance requirements required by ICAO and developed and agreed by ATN/AMHS regional performance guidelines.

3.10 Security:

Network participants shall adhere to and follow developed and recommended security guidelines. Participants will generate and submit to the ICAO regional office a proper security incident report and any required supporting documentation when a security matter is identified.

Security guidance document will address operational controls which should be considered for inclusion in the AMHS Operational Management.

4. Introduction of New AMHS Center(s) into the Network.

TBD:

The introduction of a new AMHS Center or system into the network is not within the scope of this document. This document only describes that which is basically necessary to operate a logical centralized AMHS in what in reality is a physically de-centralized network.

5. Recommendation:

All items identified in Section 3 should be implemented and consider for inclusion in the AMHS Management Center (AMC) software suite.

REPORT OF AD HOC MEETING FOR THE APANPIRG IPS ALTERNATIVES

(Presented by Australia, China, Hong Kong, Japan, Singapore and United States)

1. Introduction

1.1 Under Agenda Item 7 of the Third meeting of Aeronautical Telecommunication Network (ATN) Implementation Co-ordination Group (ATNICG/3) held in Fiji in 2008, an Ad-Hoc working group was formed to discuss the various options available to assist in the transition of Aeronautical Message Handling System (AMHS) service to an Internet Protocol (IP) network for the Asia and Pacific (APAC) region as presented in WP/09. The ad hoc working group was attended by the task group comprising of Australia, China, Hong Kong China, Japan, Singapore and USA, member States representatives of Macao China, Fiji, India, Malaysia, New Zealand, Sri Lanka, Thailand and Vietnam.

1.2 The ad hoc working group thus met and discuss on the following options that may be considered under current ICAO documents in supporting an ATN/IPS network:

- AMHS using RFC1006 over TCP/IP Ipv4 Router
- AMHS using RFC2126 over TCP/IP Ipv6 Router
- AMHS using RFC1006 over tunneling TCP/IP Ipv6 Router
- AMHS using CLNP over ATN IP SNDCE Router (Ipv4)

2. Discussion

2.1 Results of the survey response indicated in WP/06 have shown that majority of the States in the ICAO APAC region has already adopted and implemented ATN/OSI with AMHS based on the International Civil Aviation Organization (ICAO) Doc. 9705 technical manual in their ATN implementation plan.

2.2 These results led to an assessment on the current situation and discussion on issues relating to the network redundancy, dynamic routing policy, availability of documentation for ATN/IPS implementation and the time it will take to study, plan and deploy an ATN/IPS network in APAC region by the Ad Hoc working group.

2.3 After much discussion, the meeting agreed that the way forward in allowing for both OSI and future IPS application to share a common infrastructure is to develop a common strategy in supporting the transition to an IPS-based infrastructure for ATN implementation in the APAC region and the recommendations can be found in the following section.

3. Recommendations

3.1 The Ad hoc working group recommended the adoption of the following strategy to support the introduction of ATN/IPS in the APAC region:

Considering:

1. That APAC states are already in the process of implementing a regional ATN ground network and AMHS based on OSI, and that complete OSI backbone link and MTA networks are necessary to ensure AFS availability and reliability,
2. That there will be a future need to support IPS-based ground-ground services as well as OSI in the region,
3. That the IPS technical manual will not be completed till November 2008, and regional documentation will then need to be developed to support IPS, and
4. That eventual harmonization with global ATN implementation is desirable,

It is recommended that:

1. All States having Backbone Boundary Intermediate System (BBIS) in the APAC region should continue to implement ATN/OSI circuits and AMHS and as per the current regional plan (Table CNS-1B and CNS-1C).
2. For States with Boundary Intermediate System (BIS), deployment of IPS-based AMHS and/or inter-State ATN circuits may be considered depending on the impact to the regional ATN network connectivity and redundancy, and the agreement of adjacent States.
3. For AFS interface to adjacent regions, communication with States with only one connection to the APAC region can use IPS on a bilateral basis. States in adjacent regions that have multiple connections to the APAC region are recommended to continue to support ATN/OSI links.
4. The region should construct an effective regional ATN ground network that supports both OSI-based and IPS-based services. This could be achieved by upgrading inter-State circuits to support IPS as well as OSI communication, and introducing IPS routers alongside BIS routers.
5. Any subsequent new services or AMHS Messages Transfer Agents (MTA) should be able to support dual-stack to assist future transition to “ICAO compliant” IPS network technology.
6. The ATNICG task list shall be revised to include development of IPS implementation documentation.

4. Action by the meeting

- 4.1 The meeting is invited to consider the above recommendations and to recommend them for adoption by APANPIRG/19 at CNS/MET SG/12.

TABLE CNS 1B – ATN ROUTER PLAN

Explanation of the Table

Column

1	Administration – the name of the Administration, State or Organization responsible for management of the router
2	Location of Router
3	Type of Router: BBIS - Backbone Boundary Intermediate System BIS - Boundary Intermediate System
4	Type of Interconnection: Inter – Regional Intra – Regional Sub – Regional
5	Interconnection, Connected to router of: name of the location of the correspondent router
6	Link Speed – Speed requirements of the interconnecting link
7	Link Protocol – Protocol requirements for the interconnecting link
8	Target Date of Implementation – date of implementation of the router TBD- To be determined
9	Remarks

TABLE CNS-1B – ATN ROUTER PLAN

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
American Samoa	Pago Pago			United States				Intra-domain
Australia	Brisbane			Timor Leste				Intra-domain
		BBIS	Sub-Regional	Fiji	19200 bps	X.25	2009	Implemented
		BIS	Sub-Regional	Indonesia	9600 bps	X.25	2008	Implemented
		BBIS	Intra-Regional	Japan	64000 bps	X.25	2010	Not implemented
				Nauru				Intra-domain
		BIS	Sub-Regional	New Zealand	9600 bps	X.25	2010	Circuit implemented
				Papua New Guinea				Intra-domain
		BBIS	Inter-Regional	South Africa	64000 bps	X.25	TBD	Circuit implemented
				Solomon Islands	VPN		2008	Intra-domain
				Vanuatu	VPN		2008	Intra-domain
	Melbourne	BBIS	Intra-Regional	Singapore	64000bps	X.25	2008	Circuit implemented
		BBIS	Inter-Regional	United States	64000 bps	X.25	2009	Circuit implemented
Bangladesh	Dhaka	BIS	Sub-Regional	India	9600 bps	X.25	TBD	(India)
		BIS	Sub-Regional	Thailand	9600 bps	X.25	2009-2010	(Thailand)
Bhutan	Paro	BIS	Sub-Regional	India	9600 bps	X.25	TBD	(India)
Brunei Darussalam	Brunei	BIS	Sub-Regional	Malaysia	64000 bps	X.25	TBD	(Malaysia)
		BIS	Sub-Regional	Singapore	9600 bps	X.25	TBD	(Singapore)

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Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Cambodia	Phnom Penh	BIS	Sub-Regional	Thailand	9600 bps	X.25	2009-2010	(Thailand)
China	Beijing	BIS	Sub-Regional	DPR Korea	9600 bps	X.25	2010	ATN Router Implemented
		BBIS	Intra-Regional	Hong Kong, China	64000 bps	X.25	2009	ATN Router Implemented
		BBIS	Intra-Regional	India	64000 bps	X.25	2008	ATM Router Implemented
		BBIS	Intra-Regional	Japan	64000 bps	X.25	2010	ATN Router Implemented
		BBIS	Inter-Regional	Kuwait	64000 bps	X.25	TBD	ATN Router Implemented
		BIS	Sub-Regional	Macau, China	9600 bps	X.25	2009	ATN Router Implemented
		BIS	Sub-Regional	Mongolia	9600 bps	X.25	2010	ATN Router Implemented
		BIS	Sub-Regional	Myanmar	9600 bps	X.25	2010	ATN Router Implemented
		BIS	Sub-Regional	Nepal	9600 bps	X.25	2010	ATN Router Implemented
		BIS	Sub-Regional	Pakistan	9600 bps	X.25	2010	ATN Router Implemented
		BIS	Sub-Regional	Republic of Korea	64000 bps	X.25	2011	ATN Router Implemented
		BBIS	Inter-Regional	Russian Federation	19200 bps	X.25	TBD	ATN Router Implemented
		BBIS	Intra-Regional	Thailand	64000 bps	X.25	2009	ATN Router Implemented
		BIS	Sub-Regional	Vietnam			TBD	(Vietnam)
	Taipei	BIS	Sub-Regional	Hong Kong, China	9600 bps	X.25	2009	
		BIS	Sub-Regional	Japan	9600 bps	X.25	2009	
Hong Kong, China	Hong Kong	BBIS	Intra-Regional	China	64000 bps	X.25	2009	
		BIS	Sub-Regional	Macau, China	9600 bps	X.25	2009	
		BBIS	Intra-Regional	Japan	64000 bps	X.25	2010	
		BIS	Sub-Regional	Philippines	9600 bps	X.25	2009	

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Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
		BIS	Sub-Regional	Taipei	9600 bps	X.25	2009	
		BBIS	Intra-Regional	Thailand	64000 bps	X.25	Implemented	
		BIS	Sub-Regional	Viet Nam	9600 bps	X.25	2006	
Macau, China	Macau	BIS	Sub-Regional	China	9600 bps	X.25	2009	
		BIS	Sub-Regional	Hong Kong, China	9600 bps	X.25	2009	
Cook Islands	Rarotonga			New Zealand	9600 bps	X.25		Intra-domain
DPR Korea	Pyongyang	BIS	Sub-Regional	China	9600 bps	X.25	2010	(China)
Fiji	Nadi	BBIS	Intra-Regional	Australia	19200 bps	X.25	2009	Circuit implemented
		BIS	Sub-Regional	Kiribati	9600 bps	X.25	TBD	Intra-domain
				New Caledonia		TBD	TBD	Intra-domain
		BIS	Sub-Regional	Tuvalu			TBD	Intra-domain
		BBIS	Inter-Regional	United States	19200 bps	X.25	2009	Circuit implemented
				Wallis Islands			TBD	Intra-domain
French Polynesia	Papeete			New Zealand			TBD	Intra-domain
India	Mumbai	BIS	Sub-Regional	Bangladesh	9600 bps	X.25	TBD	
		BIS	Sub-Regional	Bhutan	9600 bps	X.25	TBD	
		BBIS	Intra-Regional	China	64000 bps	X.25	2008	
		BIS	Inter-Regional	Kenya	19200 bps	X.25	TBD	
		BIS	Sub-Regional	Nepal	9600 bps	X.25	TBD	
		BIS	Inter-Regional	Oman	19200 bps	X.25	TBD	
		BIS	Sub-Regional	Pakistan	9600 bps	X.25	TBD	

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Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
		BBIS	Intra-Regional	Singapore	64000 bps	X.25	2008	
		BIS	Sub-Regional	Sri Lanka	9600 bps	X.25	TBD	
		BBIS	Intra-Regional	Thailand	64000 bps	X.25	2008	
Indonesia	Jakarta	BIS	Sub-Regional	Australia	9600 bps	X.25	2010	
		BIS	Sub-Regional	Singapore	9600 bps	X.25	2009	
Japan	Tokyo	BBIS	Intra-Regional	Australia	64000 bps	X.25	2010	
		BBIS	Intra-Regional	China	64000 bps	X.25	2010	
		BBIS	Intra-Regional	Hong Kong, China	64000 bps	X.25	2010	
		BBIS	Inter-Regional	Europe	64000 bps	X.25	TBD	
		BIS	Sub-Regional	Republic of Korea	64000 bps	X.25	2011	
		BBIS	Inter-Regional	Russia Federation	64000 bps	X.25	TBD	
		BBIS	Intra-Regional	Singapore	64000 bps	X.25	2010	
		BIS	Sub-Regional	Taipei	64000 bps	X.25	2008	
		BBIS	Inter-Regional	United States	64000 bps	X.25	Implemented	
Kiribati	Tarawa	BIS	Sub-Regional	Fiji	9600 bps	X.25	TBD	Intra-domain
Lao PDR	Vientiane	BIS	Sub-Regional	Thailand	9600 bps	X.25	2009-2010	(Thailand)
		BIS	Sub-Regional	Viet Nam	9600 bps	X.25	2010	(Vietnam)
Malaysia	Kuala Lumpur	BIS	Sub-Regional	Brunei	64000 bps	X.25	TBD	
		BIS	Sub-Regional	Singapore	64000 bps	X.25	2007	Implemented
		BIS	Sub-Regional	Thailand	64000 bps	X.25	2008	

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Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Micronesia Federated State of	Chuuk			United States				Intra-domain
	Kosrae			United States				Intra-domain
	Ponapei			United States				Intra-domain
	Yap			United States				Intra-domain
Mongolia	Ulaanbaatar	BIS	Sub-Regional	China	9600 bps	X.25	2010	(China)
Myanmar	Yangon	BIS	Sub-Regional	China	9600 bps	X.25	2010	(China)
		BIS	Sub-Regional	Thailand	9600 bps	X.25	2009-2010	(Thailand)
Nauru	Nauru			Australia				Intra-domain
Nepal	Kathmandu	BIS	Sub-Regional	China	9600bps	X.25	2010	(China)
		BIS	Sub-Regional	India	9600bps	X.25	TBD	(India)
New Caledonia	Noumea			Fiji			TBD	Intra-domain
New Zealand	Christchurch	BIS	Sub-Regional	Australia	9600 bps	X.25	2010	
				Cook Is				Intra-domain
				French Polynesia	9600 bps	X.25	TBD	Intra-domain
				Niue	9600 bps	X.25		Intra-domain
				Samoa	9600 bps	X.25		Intra-domain
				Tonga	9600 bps	X.25		Intra-domain
		BIS	Inter-Regional	USA	9600 bps	X.25	2010	
Niue Islands	Niue			New Zealand	9600 bps	X.25		Intra-domain

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Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Pakistan	Karachi	BIS	Sub-Regional	China	9600 bps	X.25	2010	(China)
		BIS	Sub-Regional	India	9600 bps	X.25	TBD	(India)
Papua New Guinea	Port Moresby			Australia				Intra-domain
Philippines	Manila	BIS	Sub-Regional	Hong Kong, China	9600 bps	X.25	2009	Circuit Implemented
		BIS	Sub-Regional	Singapore	32000 bps	X.25	2009	Circuit Implemented
Republic of Korea	Seoul	BIS	Sub-Regional	China	64000 bps	X.25	2011	
		BIS	Sub-Regional	Japan	64000 bps	X.25	2011	
Samoa	Faleolo			New Zealand				Intra-domain
Singapore	Singapore	BBIS	Intra-Regional	Australia	64000 bps	X.25	2008	Circuit Implemented
		BIS	Inter-Regional	Bahrain	64000 bps	X.25	TBD	Circuit Implemented
		BIS	Sub-Regional	Brunei	9600 bps	X.25	TBD	Circuit Implemented
		BBIS	Intra-Regional	India	64000 bps	X.25	2008	
		BIS	Sub-Regional	Indonesia	9600 bps	X.25	2008-2009	Circuit Implemented
		BBIS	Intra-Regional	Japan	64000 bps	X.25	2010	Circuit Implemented
		BIS	Sub-Regional	Malaysia	64000 bps	X.25	2007	Circuit Implemented
		BIS	Sub-Regional	Philippines	32000 bps	X.25	2009	Circuit Implemented
		BIS	Sub-Regional	Sri Lanka	64000 bps	X.25	2010	Circuit Implemented
		BBIS	Intra-Regional	Thailand	64000 bps	X.25	2009-2010	Circuit Implemented
		BBIS	Inter-Regional	United Kingdom	64000 bps	X.25	2008-2009	Circuit Implemented
		BIS	Sub-Regional	Viet Nam	9600 bps	X.25	2010-2011	Circuit Implemented

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Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Solomon Islands	Honiara			Australia	VPN		2008	(Australia) Intra-Domain
Sri Lanka	Colombo	BIS	Sub-Regional	India	64000 bps	X.25	2010	
		BIS	Sub-Regional	Maldives	9600bps	X.25	2010	
		BIS	Sub-Regional	Singapore	64000 bps	X.25	2010	
Thailand	Bangkok	BIS	Sub-Regional	Bangladesh	9600 bps	X.25	2009-2010	
		BIS	Sub-Regional	Cambodia	9600 bps	X.25	2009-2010	
		BBIS	Intra-Regional	China	64000 bps	X.25	2009	
		BBIS	Intra-Regional	Hong Kong, China	64000 bps	X.25	Implemented	
		BBIS	Intra-Regional	India	64000 bps	X.25	2009-2010	Circuit Implemented
		BBIS	Inter-Regional	Italy	64000 bps	X.25	TBD	Circuit Implemented
		BIS	Sub-Regional	Lao PDR	9600 bps	X.25	2009-2010	
		BIS	Sub-Regional	Malaysia	9600 bps	X.25	2009-2010	
		BIS	Sub-Regional	Myanmar	9600 bps	X.25	2009-2010	
		BBIS	Intra-Regional	Singapore	64000 bps	X.25	2009-2010	Circuit Implemented
		BIS	Sub-Regional	Viet Nam	9600 bps	X.25	2009-2010	
Timor Leste	Dili			Australia				Intra-domain
Tonga	Tongatapu			New Zealand	9600 bps	X.25		Intra-domain
Tuvalu	Funafuti			Fiji			TBD	Intra-domain
United States	Salt Lake City	BBIS	Inter-Regional	Australia	64000 bps	X.25	2007	Circuit Implemented
				American Samoa				Intra-domain

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Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
		BBIS	Inter-Regional	Fiji	19200 bps	X.25	2007	Circuit Implemented
		BBIS	Inter-Regional	Japan	64000 bps	X.25	2006	Circuit Implemented
				Marshall Islands				Intra-domain
				Micronesia, Federated State of				Intra-domain
		BIS	Inter-Regional	New Zealand	9600 bps	X.25	2010	Circuit Implemented
				Palau	9600 bps	X.25	2005	Intra-domain
Vanuatu	Port Vila			Australia	VPN		2008	Intra-domain (Australia)
Viet Nam	Ho Chin Minh/Hanoi	BIS	Sub-Regional	China			TBD	
		BIS	Sub-Regional	Hong Kong, China	9600bps	X.25	2010	
		BIS	Sub-Regional	Lao PDR	9600bps	X.25	2010	
		BIS	Sub-Regional	Singapore	9600bps	X.25	2010	
		BIS	Sub-Regional	Thailand	9600bps	X.25	2010	
Wallis Islands	Wallis			Fiji		X.25	TBD	Intra-domain

TABLE CNS-1C
ATS MESSAGE HANDLING SERVICE (ATSMHS)
IMPLEMENTATION PLAN

Explanation of the Table

Column

1	Administration – the name of the Administration, State or Organization responsible for management of the facility
2	Location of Facility
3	Facility Type: AMHS UA (Location of AMHS)
4	Target Date of Implementation – date of implementation of the ATSMHS TBD – To be determined
5	Remarks

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

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TABLE CNS-1C ATS MESSAGE HANDLING SERVICE (ATSMHS) IMPLEMENTATION PLAN

Administration	Location of Facility	Facility Type	Target Date of Implementation	Remarks
American Samoa	Pago Pago	UA (Salt Lake City)	2005	
Australia	Brisbane	AMHS	2006	
Bangladesh	Dhaka	AMHS	2007	
Bhutan	Paro	UA (Mumbai)	2008	
Brunei Darussalam	Brunei	AMHS	2007	
Cambodia	Phnom Penh	AMHS	2007	
China	Beijing	AMHS	2008	Implemented
	Taibei	AMHS	2006	
Hong Kong, China	Hong Kong	AMHS	2009	
Macau, China	Macau	AMHS	2009	
Cook Island	Rarotonga	UA (Christchurch)	2006	
DPR Korea	Pyongyang	AMHS	2007	
Fiji	Nadi	AMHS	2009	
French Polynesia	Papeete	AMHS	TBD	
India	Mumbai	AMHS	2008	
Indonesia	Jakarta	AMHS	2009	
	Ujung Pandang	AMHS	2010	
Japan	Tokyo	AMHS	Implemented	
Kiribati	Tarawa	UA (Nadi)	2010	
Lao PDR	Vientiane	AMHS	2005	

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TABLE CNS-1C ATS MESSAGE HANDLING SERVICE (ATSMHS) IMPLEMENTATION PLAN

Administration	Location of Facility	Facility Type	Target Date of Implementation	Remarks
Malaysia	Kuala Lumpur	AMHS	2009	
Maldives	Male	AMHS	2005	
Marshall Island	Majuro	UA (Salt Lake City)	2005	
Micronesia Federated State of	Chuuk	UA (Salt Lake City)	2005	
	Kosrai	UA (Salt Lake City)	2005	
	Ponapei	UA (Salt Lake City)	2005	
	Yap	UA (Salt Lake City)	2005	
Mongolia	Ulaanbaatar	AMHS	2006	
Myanmar	Yangon	AMHS	2005	
Nauru	Nauru	UA (Brisbane)	2006	
Nepal	Kathmandu	AMHS	2010	
New Caledonia	Noumea	AMHS	TBD	
New Zealand	Christchurch	AMHS	2010	
Niue Is	Niue	UA (Christchurch)	2006	
Pakistan	Karachi	AMHS	2006	
Palau	Koror	UA (Salt Lake City)	2005	
Papua New Guinea	Port Moresby	UA (Brisbane)	2006	
Philippines	Manila	AMHS	2006	Implemented
Republic of Korea	Seoul	AMHS	2011	
Samoa	Faleolo	UA (Christchurch)	2006	
Singapore	Singapore	AMHS	2006	Implemented

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TABLE CNS-1C ATS MESSAGE HANDLING SERVICE (ATSMHS) IMPLEMENTATION PLAN

Administration	Location of Facility	Facility Type	Target Date of Implementation	Remarks
Solomon Is	Honiara	UA (Brisbane)	2006	
Sri Lanka	Colombo	AMHS	2006	
Thailand	Bangkok	AMHS	2006	
Timor Leste	Dili	UA (Brisbane)	2006	
Tonga	Tongatapu	UA (Christchurch)	2006	
Tuvalu	Funafuti	UA (Nadi)	2010	
United States	Salt Lake City	AMHS	Implemented	
Vanuatu	Port Vila	UA (Brisbane)	2006	
Viet Nam	Ho Chi Minh	AMHS	2012	2010 for Test, 2012 for deployment
Wallis Is.	Wallis	AMHS	TBD	



International Civil Aviation Organization
Asia and Pacific Office

Asia/Pacific Regional AMHS MTA Routing Policy

First Edition

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1.0 Introduction

Within the Asia/Pacific Region, work is underway to implement the ATN AMHS as a replacement and complement to the AFTN. The Region has already prepared planning documents on AMHS naming standards as well as draft guidelines on the implementation of AMHS within the Region. To progress implementation, planning documents for the routing of AMHS message between systems within the Region and to systems outside the Region are needed to serve as guidance.

1.1 Objective

This document presents AMHS routing policies to be used within the Asia/Pacific Region for implementation of AMHS. The development of AMHS message routing policies is based on the need for States and AMHS administrators to be able to control the flow of messages into individual AMHS systems.

1.2 Scope

The MTA routing policy document covers policy for AMHS systems to route AMHS messages between MTAs within Asia/Pacific Region both in the transitional phase and final phase of AMHS implementation. It also outlines the policy for inter-region AMHS connections between the regions. It does not, however, specify the characteristics for MTAs or how the connections between MTAs are established.

1.3 Reference

- 1) ICAO Doc. 9705-AN/956 *Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN)*. Third Edition 2002.
- 2) ICAO Doc. 9739-AN/961 *Comprehensive Aeronautical Telecommunication Network (ATN) Manual*. First Edition 2000.
- 3) ICAO AFSG Operations Group *Routing Directory for AFTN and CIDIN Centres in the EUR/NAT Region*. Part IV COM Charts per ICAO Region, Version 1.2 – March 2004.
- 4) ATNTTF/6 – *Report of the Sixth Meeting of Aeronautical Telecommunication Network (ATN) Transition Task Force of APANPIRG (ATNTTF/6)*. Table CNS-1A AFTN-PLAN, Appendix A – April 2004
- 5) ATNTTF/6 – *Report of the Sixth Meeting of Aeronautical Telecommunication Network (ATN) Transition Task Force of APANPIRG (ATNTTF/6)*. Table CNS-1B ATN Router Plan, Appendix A – April 2004
- 6) ATNTTF/6 – *Report of the Sixth Meeting of Aeronautical Telecommunication Network (ATN) Transition Task Force of APANPIRG (ATNTTF/6)*. Table CNS-1C ATSMHS Implementation Plan, Appendix A – April 2004
- 7) ATNTTF/6 – WP10. *MTA Transitional Routing Policy*. Presented by Japan.
- 8) ATNTTF/6 – WP15. *AMHS Routing Impact*. Presented by Hong Kong, China.

2.0 Background

The ATN AMHS is designed according to the X.400 email standards. It is further complemented by the history that ICAO has with the AFTN. As an X.400-based system, the ATN AMHS is specified in such a way that messages can be transferred from the sender to the recipient by passing reliably through intermediate ATN AMHS systems.

The ATN AMHS system at originating station, when it first receives a newly submitted message, must determine the ATN AMHS system that will receive the AMHS message. This may be:

- the destination ATN AMHS,
- a relay ATN AMHS, or
- the AFTN.

If one looks at the Internet and its SMTP-based email system as an example, it becomes clear that routing policies need to be developed for the successful exchange of messages between senders and recipients. First, it is possible for any AMHS system to send a message directly to the destination AMHS system if it has the appropriate NSAP and TSEL of the destination system. This is due to the fact that ATN routing should provide a path between any two ATN end systems. Second, it is logical that some, if not most, ATN operators will choose to manage their systems in a way that limits its use of bandwidth and the amount of information it must maintain. Third, systems will most likely be configured to take advantage of logical cooperation between States and Organizations to minimize costs and complexity.

Of particular concern is the need for ATN system operators to be able to control what systems are able to get connected to its system and to protect the integrity of its systems through access control.

3.0 Routing Overview

The ATN AMHS is not defined with routing protocols that dynamically pass routing information amongst the cooperating ATN AMHS systems. Rather, the “routing tables” maintained by the ATN AMHS are static and are typically established through manual configuration by system operators.

The ability of ATN AMHS systems to dynamically route AMHS messages is based on the implementation and sophistication of the algorithms and is not based on provisions in the SARPs or X.400 standards.

AMHS MTAs perform routing by matching the X.400 O/R address with the routing information maintained by the MTA. The destination MTA affects whether direct delivery or relaying messages is required. The complexity of routing decisions that a particular MTA makes is entirely a local implementation issue.

3.1 Routing Fundamentals

An MTA becomes responsible for the routing and delivery of a message when it is successfully submitted to the MTA either from a UA (or MS), another MTA or directly connected AMHS gateway. The MTA routing process is entirely based upon the destination addresses and the internal routing tables. An MTA compares the destination addresses against its criteria for forwarding to another MTA. If the results of the MTA lookup are not in the current traceable information, the message is forwarded. If it is in the current traceable information, an NDR is generated and the message is discarded.

The central issue in establishing a local MTA routing table is the trade-offs between: routing table size, performance, and security. Routing decisions and security are considered in the next section.

The trade-off between routing table size and performance is due to the nature of routing. For optimal performance – which means a single hop between source MTA and destination MTA – each MTA would potentially need routing information about every other MTA in the ATN. While in early stages of AMHS implementation, the number of MTAs may be small. In later stages the number of MTAs may be too large for simple routing table to process. As the number of entries rise in the routing table, the costs of searching the table and the complexity of maintaining the table will increase. On the other side, as the number of routing entries is reduced the potential for longer message propagation delays increase as messages are routed and relayed through other MTAs.

The development of routing policies attempts to optimize the performance while maintaining a reasonable sized routing table.

3.2 Routing and Security

Routing can be performed by providing each MTA with sufficient information so that the MTA can send every AMHS message directly to its destination. In other words, AMHS messages would always go directly from the sender to the recipient MTA and leave the routing process for the network infrastructure.

Routing can also be performed by providing each MTA with the addresses of only a limited number of other MTAs, which is called “Access Control List.” In this case, an AMHS message addressed to one of the limited MTAs would be routed just like the first case; but a message addresses to any other MTA would need to be relayed.

The choices of which method of routing is to be used, is a decision by the operators of the MTAs. In the first case, MTAs must be configured to accept Bind Requests from any MTA (as indicated by the MTA-name parameter). This implies that all incoming Bind Requests will be accepted and traffic will be accepted. In the second case, an MTA may compare the MTA-name against a list of MTAs from which it will accept connections, and forward messages.

However, considering security for the first case, an MTA configured to accept all incoming Bind Requests, regardless of the source system, is open to both malicious attacks and traffic. A malicious attacker may launch a Denial of Service (DoS) by sending many Bind Requests (and associated large amounts of data) to a MTA in order to overwhelm it. Similarly, if traffic is being accepted from all MTAs, a system must be engineered to provide for larger number of incoming connections, potentially larger traffic loads are generated and consequently increasing the system complexity. Therefore, both security and network management technique should be implemented together with this policy to prevent the problems, such as authentication using IDRP version 2 or router authentication on network sub-layer.

For the second case, security aspect is already considered when the MTA operator generates the “Access Control List.” The MTA system only accepts Bind Request and messages from MTAs within the list and denies Bind Requests from the rest. This policy is similar with the current AFTN routing table and therefore shares the same deficiencies, such as inflexibility, but it offers greater control for the operator.

It is desirable for MTA operators to be able to provide sufficient security with delivering and receiving messages with minimum resource utilization. However, the policy and implementation of any supporting mechanism are considered a local or bilateral matter for operators.

4.0 AMHS MTA routing policy

4.1 Backbone MTAs

Backbone MTAs are the currently assigned inter-regional MTAs, which are entry/exit points of AMHS connection between Asia/Pacific region and other regions. Each backbone MTA should independently send/receive messages with other (backbone) MTAs of other regions and between each other within the region. Because the networking capability of the ATN, the operation of backbone MTA is more flexible and can handle more capacity than the current AFTN operation. Therefore, unlike the AFTN, the designation of backbone MTAs can be independent of the main inter-region communication links at the respective COMM Centers. The table of proposed location of backbone MTAs within Asia/Pacific region is provided in Appendix B.

4.2 AMHS System Interconnection

Within the Asia/Pacific Region, routing of AMHS messages will be as follows:

- **Messages exchanged within the region:** All MTA within the region should be able to send/receive AMHS message directly with each other or have direct MTA-to-MTA routing. Consequently, the number of hop for sending a message within the region will be one, and the MTA routing table will contain entries of all other MTAs within the region.
- **Messages exchanged between States within the Region and other regions:** All AMHS messages exchanged between States within Asia/Pacific region and others should pass through backbone MTAs. To send AMHS messages to other MTAs outside the region, the source MTA will first send those messages to backbone MTA responsible for sending messages to the destination MTAs. In reverse direction, the backbone MTAs act as a gateway for incoming messages from corresponding MTAs outside of the region and relays the messages to the destination MTA within the region.

However, the aforementioned routing policy will not be fully implemented immediately due to the different AMHS transition timeframes of each State. Instead, there will be a transitional period during which the Aeronautical Fixed Service (AFS) in the region will be provided by a mixture of interoperating AMHS and AFTN sites, with “islands” of directly connected AMHS sites gradually expanding and merging, and AFTN links progressively being eliminated. The transitional routing policy and example figures are presented in Appendix A.

APPENDIX A Transitional Routing Policy

During the transition period, it is proposed that the following transitional policy be adopted to ensure smooth transition from AFTN to AMHS.

- **Message exchanged between states that have implemented AMHS:** States that have implemented AMHS shall use direct MTA-to-MTA routing among themselves, forming an “island” of AMHS sites. However, to ease the transition process, whenever a new AMHS system is implemented, the initial routing configuration should correspond to the AFTN routing table exactly. Once it has been operational, it is necessary to carry out coordination with all States in the island. The coordination should also include connection tests between the MTA system and all other AMHS systems to which it will connect. In conclusion, the following steps are recommended:
 - If the new MTA is introduced to the AMHS Islands, it is recommended that during the initial phase of implementation, the new MTA use AFTN routing table for routing configuration.
 - As the new MTA gain more experience from the operation of AMHS, it should enter bi-lateral agreement with other MTAs to establish direct message exchange at a later stage.
- **Message exchanged between States using AFTN and States using AMHS:** The AMHS/AFTN gateway function should be implemented alongside with the AMHS systems to provide message exchange service with states using AFTN. However, in order to avoid changes in the AFTN routing directory, the AMHS should also route messages to adjacent states, which are using AFTN, based on the current AFTN Routing Directory. It should be noted that even if a state connects to other states using only AMHS, an AMHS/AFTN gateway function would still be necessary to support domestic legacy AFTN networks.

The following figures illustrate the AMHS routing mechanism and transitional routing policy:

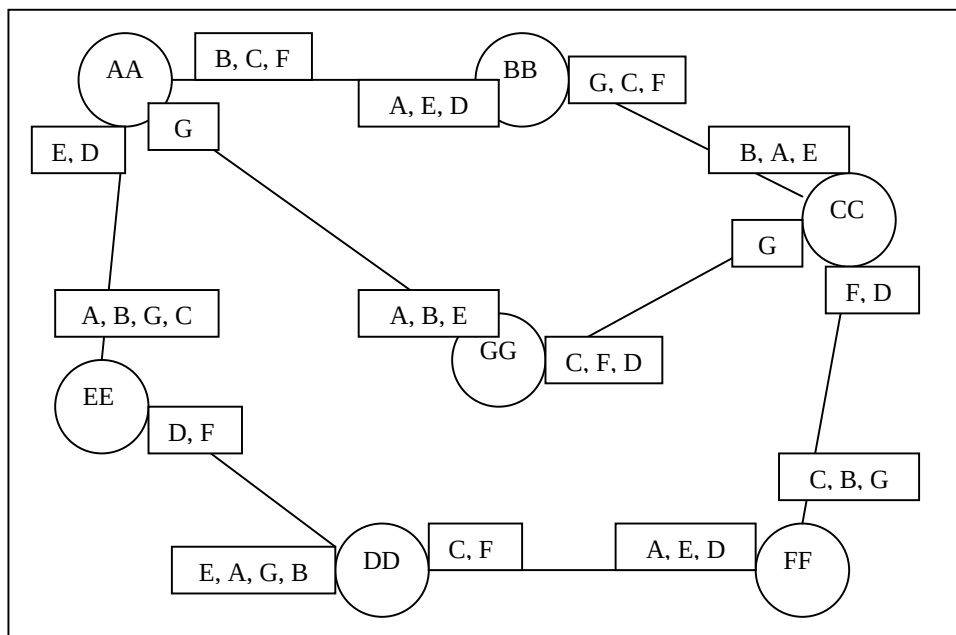


Figure 1 Example of configuration with all organization using AFTN

Figure 1 displays the configuration where all organizations have implemented AFTN and already configured the routing paths among themselves. The circle illustrates an organization with its name inside. The lines between circles illustrate the physical connections between organizations. The box above the line adjacent to the circle shows the routing configuration on that connection. The box with letters 'C, F' signifies that all messages with destination addresses starting with C or F will be routed through this connection.

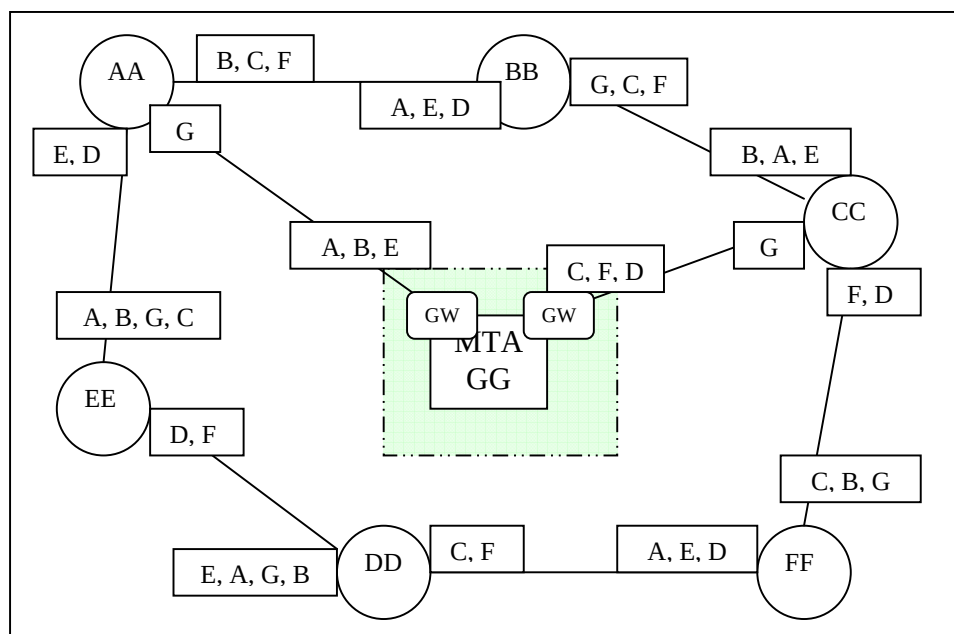


Figure 2 Example of configuration with only one MTA presented among AFTN nodes

Figure 2 displays the configuration when one organization has started implementing AMHS and setting up MTA. In this example, the organization GG is the first to implement MTA. However both organization AA and CC, to whom GG is connected, have not implemented AMHS. Furthermore, the MTA of GG will require function of AFTN/AMHS gateway to be able to seamlessly transmit messages with AFTN sites. Therefore, following the transitional policy, the messages from GG to AA and CC will follow the same AFTN configuration as in figure 1. For GG, messages with destination addresses starting with C, F and D will be routed through AFTN/AMHS gateway and to organization CC, and messages with destination addresses starting with A, B, and E will be routed through gateway to organization AA.

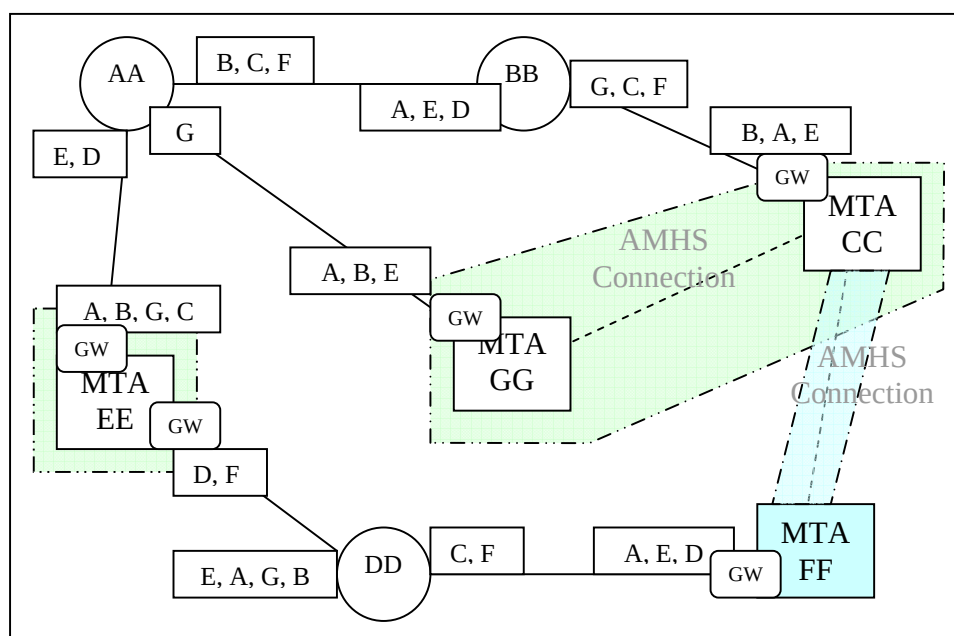


Figure 3 Example configuration with more than one MTAs

Figure 3 displays the situation when more than one organizations have implemented AMHS in the region. In this example, organization GG, CC, FF, and EE have implemented MTA systems. Because the MTA of EE does not have direct connections to other MTAs, it will connect with neighbor AFTN using gateway functions as described in figure 2. As previously stated in the policy, the gateways should be configured to be compatible with the routing table configuration as defined in figure 1. Organization GG establishes AMHS connection with CC with the route configuration corresponding with AFTN routing table. Organization FF also establishes AMHS connection and exchanges all AMHS messages with CC only. As FF and GG become confident in AMHS operation, they may enter bi-lateral agreement with each other to test and later establish AMHS connection.

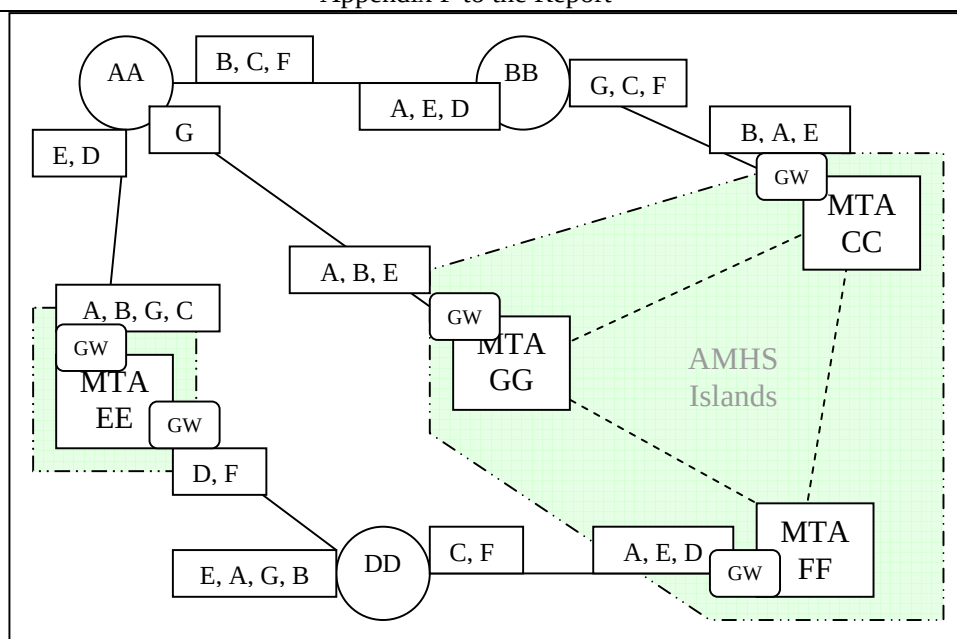


Figure 4 Example configuration with more than one MTAs presented

Figure 4 displays the situation when more than one organizations have implemented AMHS in the region. Following figure 3, after organization FF becomes confident with the AMHS operation and request bi-lateral agreement with organization GG, it establishes 'logical AMHS connection' with GG. Consequently, all MTAs within the island establish logical 'direct MTA-to-MTA'¹ connections, which are illustrated as dotted lines, for transmitting AMHS messages between themselves. The AFTN/AMHS gateway functions are still required at the edge of the island where messages are transmitted from AMHS MTAs to AFTN.

¹ The above "direct MTA-to-MTA" connection shows a logical connection and it may not be necessarily the same as a physical connection using ATN Routers. At least two physical connections are necessary between the organization GG, CC and FF in the above case.

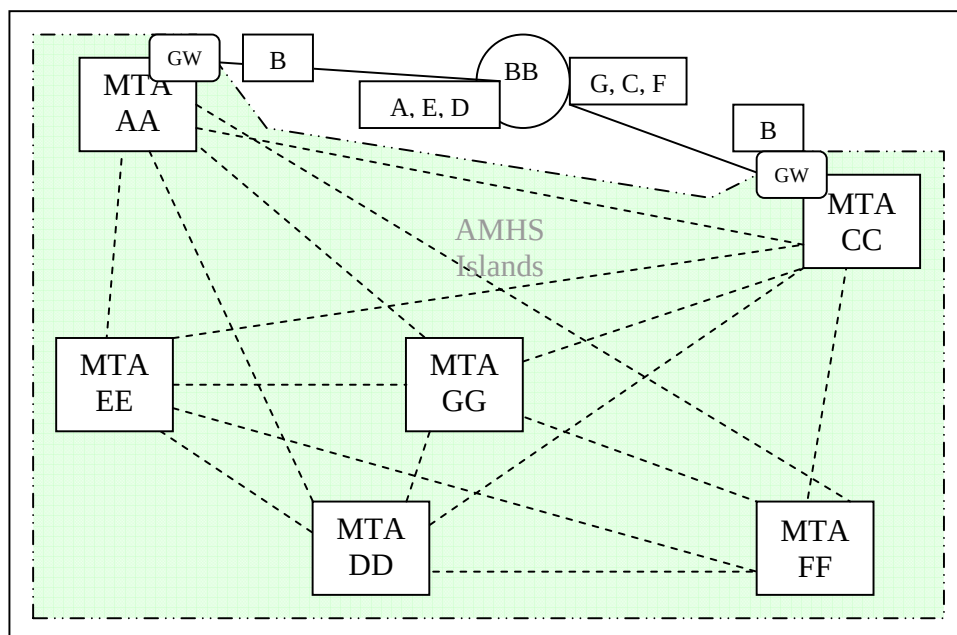


Figure 5 displays the situation when more organizations have implemented AMHS than AFTN. All MTAs will from AMHS islands and have logical 'direct MTA-to-MTA²' connection between them. At the edge of the island, MTAs will connect with AFTN using AFTN/AMHS gateway functions. From the figure, however, only organization BB has not implemented AMHS MTA, thus the gateways are configured to send messages with destination addresses starting with B only.

² The above "direct MTA-to-MTA" connection shows a logical connection and it may not be necessarily the same as a physical connection using ATN Routers. At least one physical path must exist between the MTAs.

APPENDIX B Table of Proposed Backbone MTAs Site in Asia/Pacific Region

The following table contains the proposed location of Backbone MTAs within the Asia/Pacific region:

Name and location of Proposed Backbone MTA
NFFN – Nadi International Airport, Fiji
NZCH – Christchurch International Airport, New Zealand ³
RJAA – New Tokyo International Airport, Japan
VABB – Mumbai/Jawaharlal Nehru International Airport, India
VHHH – China (Hong Kong) COMM Center
VTBB – Bangkok ACC/FIC/COM, Thailand
WSSS – Singapore Changi Airport, Singapore
YBBB – Brisbane (FIS/FIC/ACC/COM/MET/NOF), Australia
ZBBB – Beijing City, China

Table 1 Proposed Backbone MTA in Asia/Pacific Region⁴

³ The connection between New Zealand and the US will be considered as a restricted link for AMHS use only.

⁴ KSLC [Salt Lake City, US] is considered to be in the North America region and thus is outside the scope of this table. However, there are many pacific islands with connections with KSLC. They will be considered exceptions because they will become UAs to the KSLC AMHS as stated in the table CNS-1C [5].

APPENDIX C ACRONYMS

AFS	(Aeronautical Fixed Service)
AFTN	(Aeronautical Fixed Telecommunication Network)
AMHS	(ATS message handling system)
ATN	(Aeronautical Telecommunication Network)
ATS	(Air Traffic Service)
ATSMHS	(ATS Message Handling Service)
DoS	(Denial of Service)
IDRP	(Inter-domain Routing Protocol)
MS	(Message Storage)
MTA	(Message Transfer Agent)
NDR	(Non-Delivery Report)
NSAP	(Network Service Access Point)
O/R Address	(Originator/Recipients Address)
SARPs	(Standards and Recommended Practices)
SMTP	(Simple Mail Transfer Protocol)
TBD	(To Be Determined)
TBP	(To Be Proposed)
TSEL	(Transport Selector)
UA	(User Agent)

Annex E - AMHS Inter-Operability Tests
and
Annex F of AMHS Manual

ANNEX E

AMHS Inter-Operability Tests

ANNEX E

of

AMHS Manual

Document Control Log

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- [2] ICAO DOC 9705-AN/956: The Manual of technical provisions for the ATN, Sub-volume III, Section 3.1 –Edition 3 (2002) – Referred to as AMHS SARPs
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1 Introduction

1.1 Purpose of the Document

The purpose of the document is to define the functional tests for AMHS Interoperability in order to ensure the end-to-end interoperability between AMHS systems under test. These tests are performed after the successful completion of AMHS conformance testing, through which the compliance of all systems under test to the AMHS SARPs has been demonstrated.

For this reason the data used in the interoperability tests are generated either:

- manually; or,
- using records obtained by copy (duplication) and storage of some real traffic occurred among users in service; or
- using parallel duplicated traffic.

Implementations tested in this phase will not be operational systems, but test beds in order to neither disturb the real traffic nor cause potential outages in the operational systems.

As a summary, the correct performance of the interoperability tests included in this document is the previous step to progress the IUT towards a future operational system; this will be done by means of a transition plan to real traffic in the future operational environment.

•

1.2 Document Structure

Chapter 2 presents the test environment used for AMHS interoperability testing.

Chapter 3 defines the addressing plan implemented in the test environment.

Chapters 4 and 5 contain the general description of the bilateral and trilateral test procedures with subsections for each AMHS functional area. Each test procedure is presented in a structured way consisting of

- defined test criteria,
- a (brief) scenario description,
- reference to the relevant part of the standard specification (SARPs section),

Chapters 6 and 7 contain the detailed test-case descriptions for the bilateral and trilateral test procedures.

Chapter 8 contains the templates for the test messages.

1.3 Test Identification Scheme

Each Interoperability Test procedure has an identifier in the form

ITxnn where:

IT is an acronym for Interoperability Test, *x* is a number identifying the test group₁ and *nn* is a consecutive number identifying the individual test procedure.

Test procedures are classified in two blocks: Bilateral Tests and Trilateral Tests.

The bilateral test groups consist of tests using messages specifically generated by IUTs for trials. The following six groups have been identified:

- testing of submission, transfer and delivery operations (*x* = 1),

- testing of gateway operations converting a user message from AFTN to AMHS (x=2),
- testing of gateway operations converting a user message from AMHS to AFTN (x=3),
- testing of gateway operations converting a user message from AFTN to AMHS and back to AFTN (x=4),
- testing of gateway operations – special cases (x=5) and
- testing of stress traffic situations (x=6)

The two trilateral test groups are:

- testing of transfer (relay) operations (x=7),
- testing of special situations (alternate routing, traffic loop) (x=8).¹

¹ Test groups for AMHS conformance tests have been identified in [4].

2 AMHS Interoperability Test Environment

2.1 Application infrastructure

Both AMHS Implementations Under Test (IUTs) are complete systems constituted by AFTN, AMHS and AFTN/AMHS gateway components, with corresponding AFTN and AMHS user terminals and supervision positions, as decided locally by the corresponding organization.

In each IUT, an AMHS User Agent is used in submission and delivery tests. Gateway tests involve an AFTN user terminal. The use of the Monitor & Control Position is required in order to observe the outcome of the conversion processes, especially in out-of-line situations.

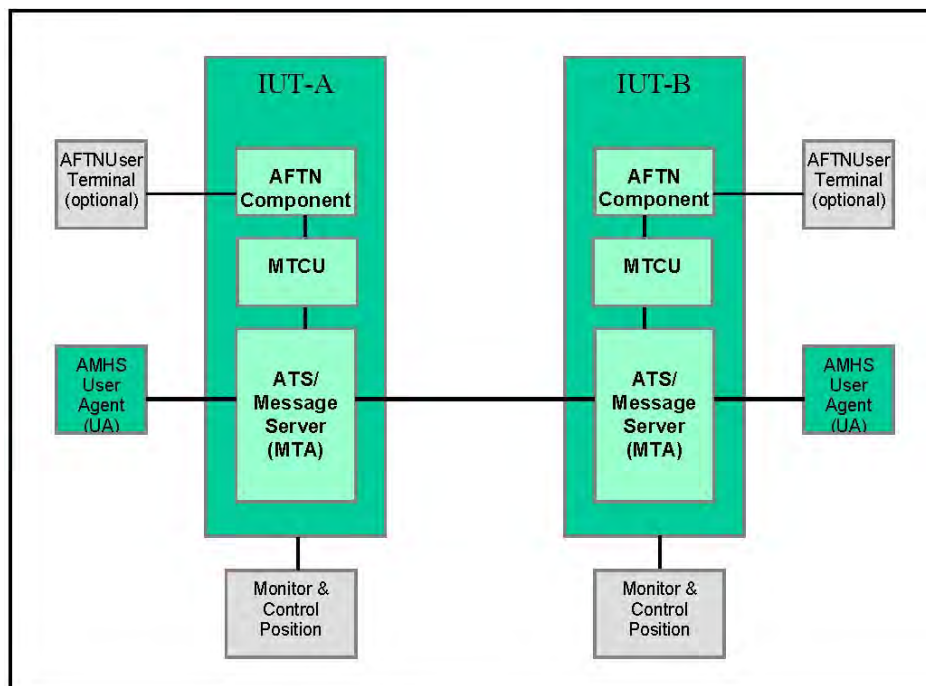


Figure E- 1: AMHS Inter-operability Test Environment

Figure E-1 shows the test environment used for AMHS interoperability tests. Both IUTs will be interconnected via AMHS transfer ports supporting the X.400/P1 protocol over a TCP/IP/LAN.

Note. – In Figure E-1 the AFTN Terminal is directly connected to the AFTN Component in an abstract way. There may exist different implementations with an AFTN component only connected to an AFTN switch or integrated AFTN/AMHS switches. For the interoperability tests it does not matter whether the AFTN Terminal is connected directly or indirectly.

The components of the test environment as depicted in Figure 1 are involved in the test procedures in following way:

Submission, Transfer and Delivery operation tests (AMHS => AMHS) (x=1):

AMHS User Agent => ATS Message Server => ATS Message Server => AMHS User Agent

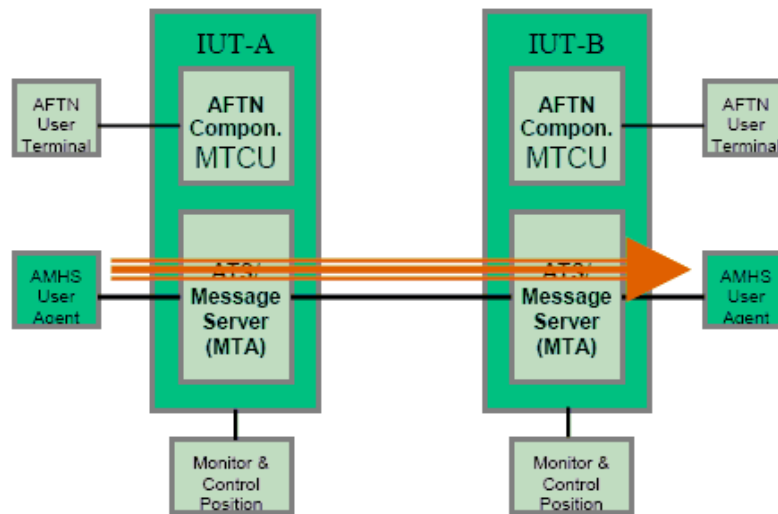


Figure E- 2: UA to UA (IUT-A to IUT-B)

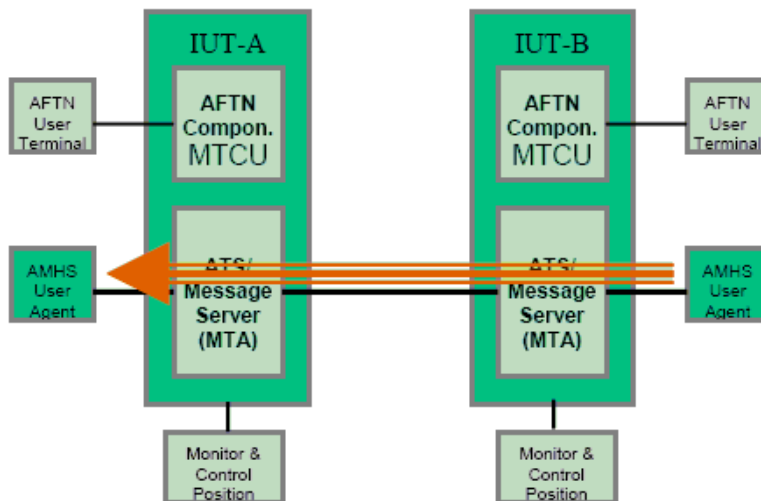


Figure E- 3: UA to UA (IUT-B to IUT-A)

AMHS / AFTN gateway tests (AFTN => AMHS) (x=2):
 AFTN Terminal => Gateway and ATS Message Server => UA

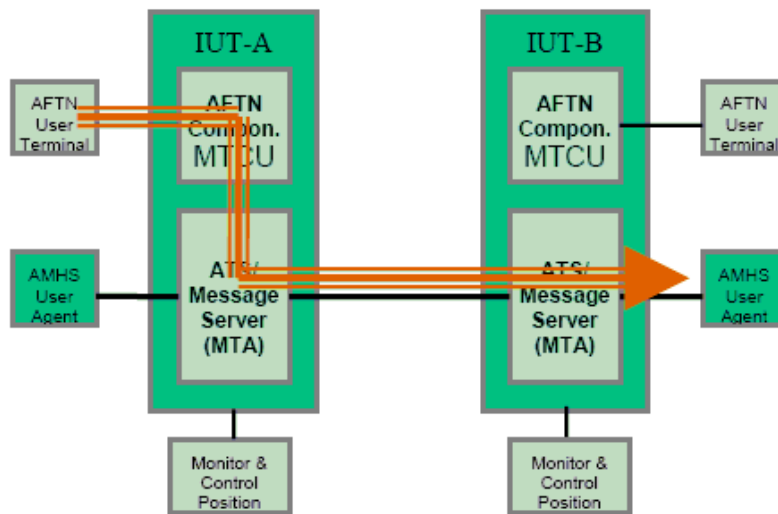


Figure E- 4: AFTN Terminal to UA (IUT-A to IUT-B)

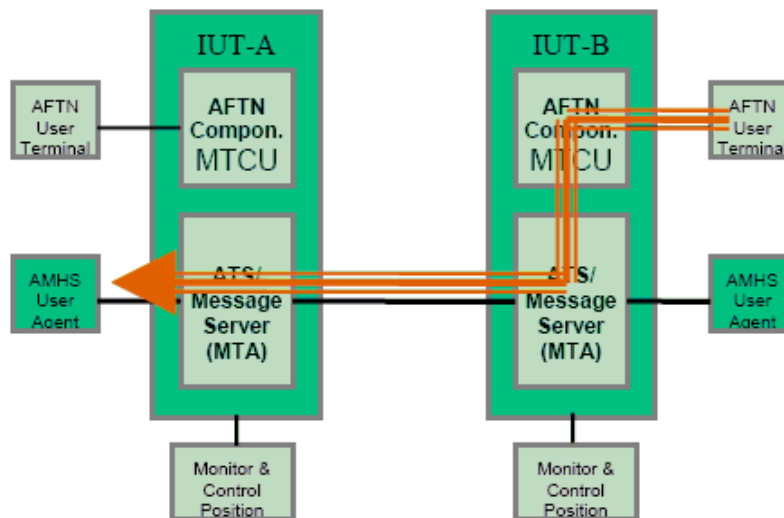


Figure E- 5: AFTN Terminal to UA (IUT-B to IUT-A)

AMHS / AFTN gateway tests (AMHS => AFTN) (x=3):

UA => ATS Message Server and Gateway => AFTN Terminal

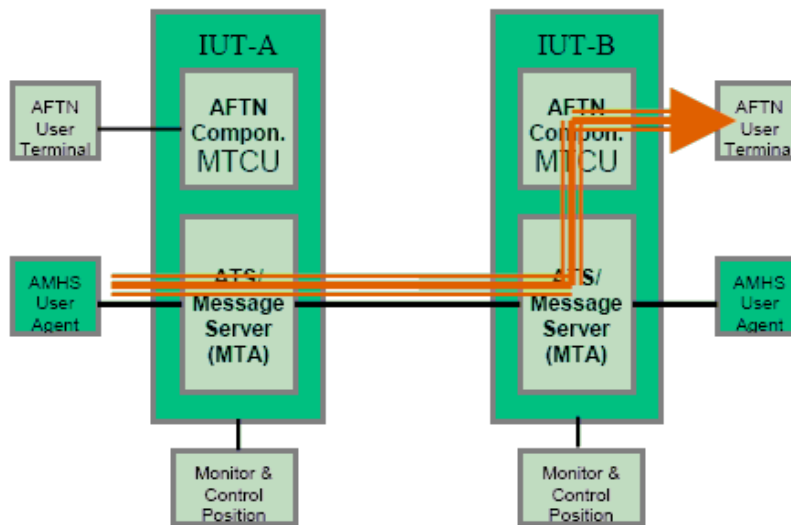


Figure E- 6: UA to AFTN Terminal (IUT-A to IUT-B)

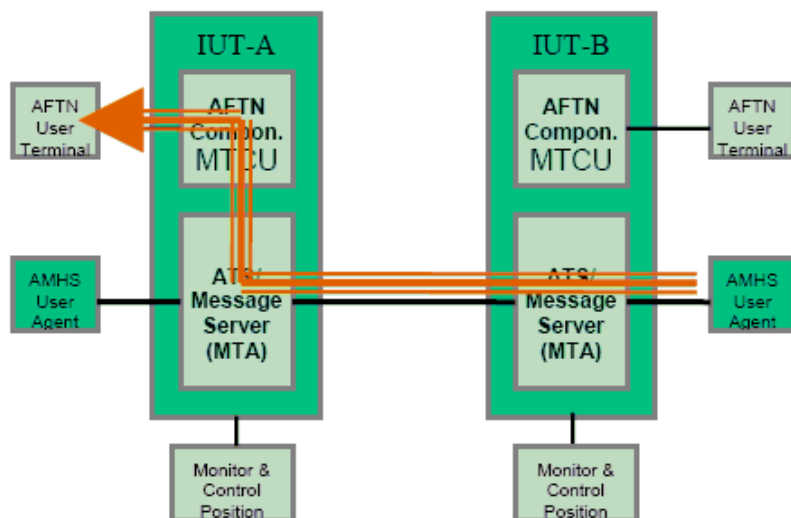


Figure E- 7: UA to AFTN Terminal (IUT-B to IUT-A)

AMHS / AFTN gateway tests (AFTN => AMHS => AFTN) (x=4):

AFTN Terminal => Gateway => ATS Message Servers => Gateway => AFTN Terminal

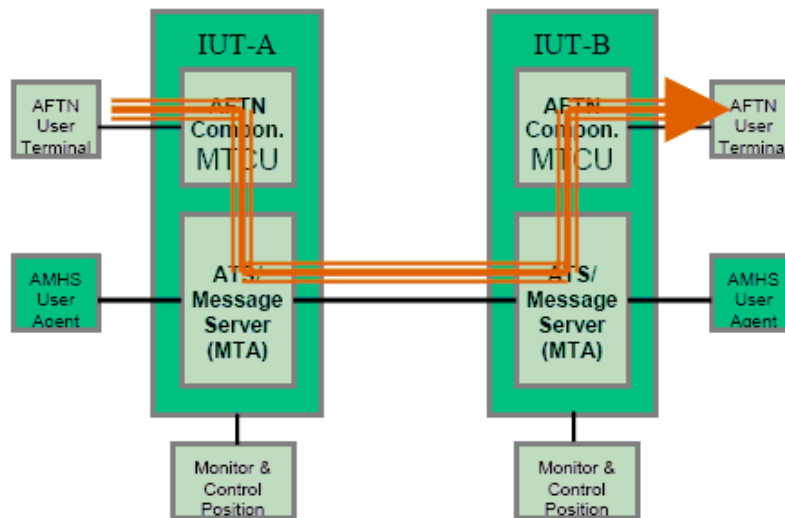


Figure E- 8: AFTN Terminal to AFTN Terminal (IUT-A to IUT-B)

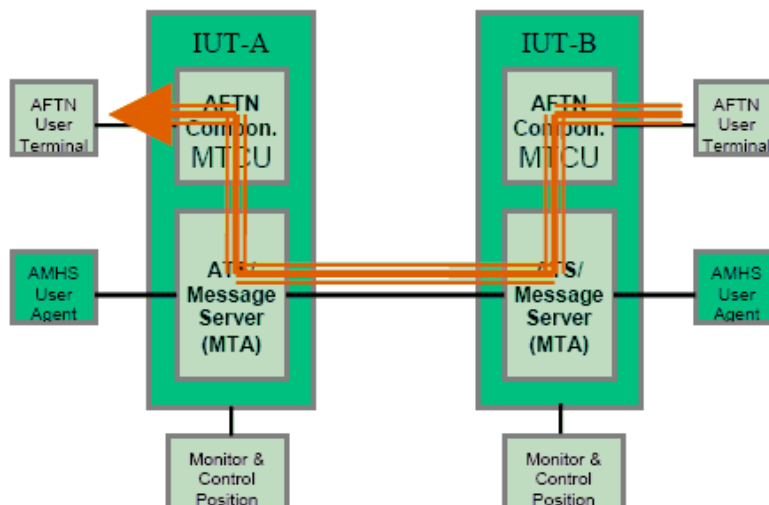


Figure E- 9: AFTN Terminal to AFTN Terminal (IUT-B to IUT-A)

Gateway Operations – special case scenarios (x=5)

For the special case scenarios different combinations of the flows shown above are used.

Stress traffic situations (x=6)

Depending on the stress scenario chosen combinations of the flows shown above are used.

“Relay” operation tests (x=7) – (optional - additional test partner required – IUT-C)

Peer IUT => IUT (ATS Message Server) => peer IUT

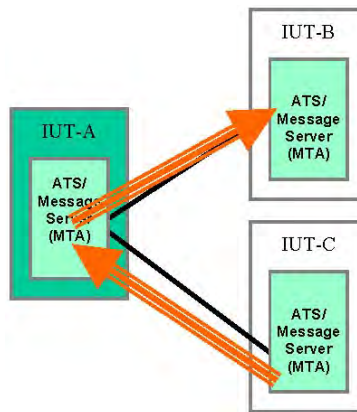


Figure E- 10: “Relay” operation tests

Testing of special situations (x=8) – (optional - additional test partner required – IUT-C and – additional connectivity required IUT-B - IUT-C)

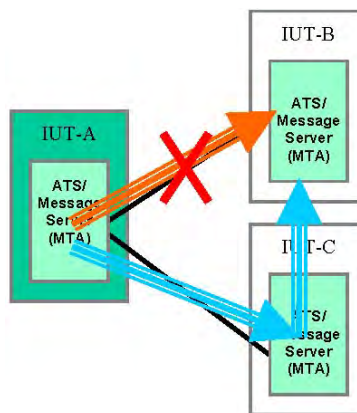


Figure E- 11: Alternate MTA routing

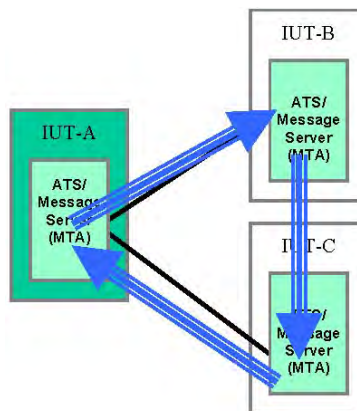


Figure E- 12: Traffic loop test

2.2 Transport infrastructure

To perform the bilateral interoperability tests, an underlying infrastructure for message transport between the two IUTs has to be agreed. In case of multilateral tests an underlying infrastructure for message transport between the involved IUTs (minimum three) has to be agreed. Other “non-standard” solutions may be used for testing. Those refer to the actual network environment or other means offered by communications suppliers, such as ADSL, public internet; in this case, agreement among the parties is necessary due to the potential impact of this solution on the configuration of the timers of the systems concerned, as compared to the standard solution.

2.3 General parameters to be agreed

The following entries and/or parameter shall be agreed between the test partners. Preferred the default values should be used.

2.3.1 Default MTA names and passwords

IUT	MTA name	Remarks
IUT-A	MTA-IUTA-1	
IUT-B	MTA-IUTB-1	
IUT-C	MTA-IUTC-1	

Table 1: Default MTA names

IUT	password	Remarks
IUT-A	ICAO-IUTA-1	
IUT-B	ICAO-IUTB-1	
IUT-C	ICAO-IUTC-1	

Table 2: Default passwords

2.3.2 TSAP addresses

IUT	TSAP address	Remarks
IUT-A	to be agreed bilaterally	
IUT-B	to be agreed bilaterally	
IUT-C	to be agreed	

Table 3: TSAP addresses

2.3.3 IP addresses

IUT	IP address	Remarks
IUT-A	to be agreed bilaterally	
IUT-B	to be agreed bilaterally	
IUT-C	to be agreed	

Table 4: IP addresses

2.3.4 Type and number of associations

IUT	Type of associations	Number of associations	Remarks
IUT-A	monologue	5	
IUT-B	monologue	5	
IUT-C	monologue	5	

Table 5: Default type and number of associations

3 Addressing Plan for AMHS Interoperability Testing

3.1 User addresses

To meet the scope of testing, the test-address space used by AMHS Interoperability Testing should include, for each IUT, the respective AFTN and AMHS addresses and the corresponding AMHS PRMD.

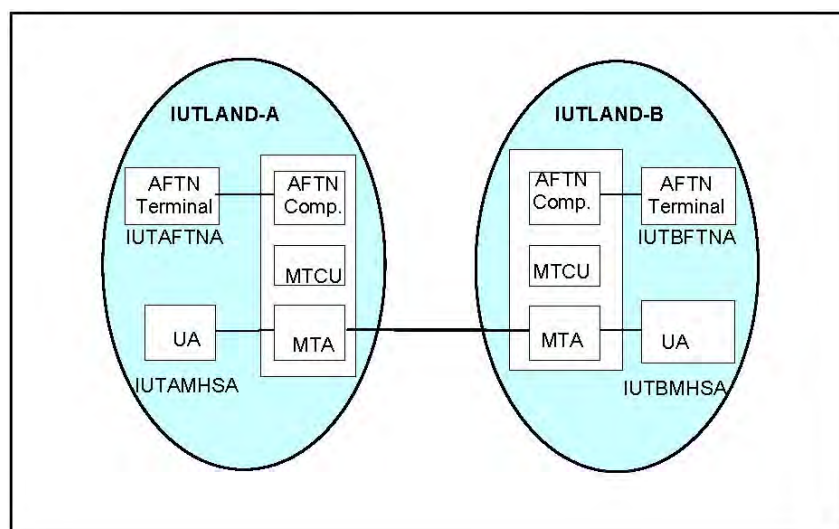


Figure E- 13: Addressing Plan

The original, operational AMHS and AFTN addresses assigned to the COM Centre could be used as test addresses for each IUT. To distinguish between operational and test addresses it is recommended to use alternatively, a generic address space taken from fictitious PRMD/AFTN countries IUTLAND-A and IUTLAND-B.

This includes generic user addresses IUTAFTNA and IUTAMHSA for IUTLAND-A as well as IUTBFTNA and IUTBMHSA for IUTLAND-B, which may be mapped either according to the CAAS (preferred, or a more comprehensive set of addresses in case of CAAS with multiple "O" values) or the XF addressing scheme.

The following tables show the generic address space assigned to the two IUTs and a third IUT if trilateral network tests are performed.

CAAS (preferred) – single "O"	CAAS – multiple "O"	XF
C = XX ADMD = ICAO PRMD = IUTLAND-A O = A-REGION OU1 = IUTA CN = IUTAFTNA ... IUTAMHSA	C = XX ADMD = ICAO PRMD = IUTLAND-A O = A-REGION1 OU1 = IUTA CN = IUTAFTNA ... IUTAMHSA O = A-REGION2 OU1 = IUAA CN = IUAAFTNA ... IUAAHSA	C = XX ADMD = ICAO PRMD = IUTLAND-A O = AFTN OU1 = IUTAFTNA ... IUTAMHSA

Table 6: Generic address spaces of IUTLAND-A

CAAS (preferred) – single "O"	CAAS – multiple "O"	XF
C = XX ADMD = ICAO PRMD = IUTLAND-B O = B-REGION OU1 = IUTB CN = IUTBFTNA ... IUTBMHSA	C = XX ADMD = ICAO PRMD = IUTLAND-B O = B-REGION1 OU1 = IUTB CN = IUTBFTNA ... IUTBMHSA O = B-REGION2 OU1 = IUBB CN = IUBBFTNA ... IUBBHSA	C = XX ADMD = ICAO PRMD = IUTLAND-B O = AFTN OU1 = IUTBFTNA ... IUTBMHSA

Table 7: Generic address spaces of IUTLAND-B

CAAS (preferred) – single "O"	CAAS – multiple "O"	XF
C = XX ADMD = ICAO PRMD = IUTLAND-C O = C-REGION OU1 = IUTC CN = IUTCFTNA ... IUTCMHSA	C = XX ADMD = ICAO PRMD = IUTLAND-C O = B-REGION1 OU1 = IUTC CN = IUTCFTNA ... IUTCMHSA O = B-REGION2 OU1 = IUCC CN = IUCCFTNA ... IUCCMHSA	C = XX ADMD = ICAO PRMD = IUTLAND-C O = AFTN OU1 = IUTCFTNA ... IUTCMHSA

Table 8: Generic address spaces of IUTLAND-C

3.2 DL addresses

Distribution List name	Addresses included in the DL	Remarks
IUTADLLO	IUTBFTNA IUTBFTNB IUTBMHSA	
IUTADLRE	IUTAFTNA IUTAFTNB IUTAMHSA	

Table 9: DL addresses of IUT-A

Distribution List name	Addresses included in the DL	Remarks
IUTBDLLO	IUTAFTNA IUTAFTNB IUTAMHSA	
IUTBDLRE	IUTBFTNA IUTBFTNB IUTBMHSA	

Table 10: DL addresses of IUT-B

3.3 AFTN and X.400 Routing Tables

3.3.1 AFTN and X.400 Routing Tables of IUT-A

AFTN Routing Indicator	Routing direction	Remarks
IUTAFT*	AFTN Terminal	
IUTA*	MTCU	
IUTB*	MTCU	
IUTC*	MTCU	

Table 11: AFTN Routing Table of IUT-A X.400

Routing Indicator X.400 Routing Indicator	Routing direction	Remarks
/C=XX/A=ICAO/P=IUTLAND-A /O=A-REGION/OU1=IUTA/CN=IUTAMHSA/	UA IUT - A	If CAAS “single “O” type
/C=XX/A=ICAO/P=IUTLAND-A /O=A-REGION/OU1=IUTA/CN=IUTAMHSB/	UA IUT - A	If CAAS “single “O” type
/C=XX/A=ICAO/P=IUTLAND-A /O=A-REGION/OU1=IUTA/CN=IUTAMHSC/	UA IUT - A	If CAAS “single “O” type
/C=XX/A=ICAO/P=IUTLAND-A /O=AFTN/OU1=IUTAMHSA/	UA IUT - A	If “XF” type
/C=XX/A=ICAO/P=IUTLAND-A /O=AFTN/OU1=IUTAMHSB/	UA IUT - A	If “XF” type
/C=XX/A=ICAO/P=IUTLAND-A /O=AFTN/OU1=IUTAMHSC/	UA IUT - A	If “XF” type
/C=XX/A=ICAO/P=IUTLAND-A	MTCU	
/C=XX/A=ICAO/P=IUTLAND-B	MTA - IUTB - 1	
/C=XX/A=ICAO/P=IUTLAND-C	MTA - IUTC - 1	
/C=XX/A=ICAO/P=IUTLAND-X	MTA - IUTB - 1	

Table 12: X.400 Routing Table of IUT-A

3.3.2 AFTN and X.400 Routing Tables of IUT-B

AFTN Routing Indicator	Routing direction	Remarks
IUTBFT *	AFTN Terminal	
IUTA *	MTCU	
IUTB *	MTCU	
IUTC *	MTCU	

Table 13: AFTN Routing Table of IUT-B

X.400 Routing Indicator	Routing direction	Remarks
/C=XX/A=ICAO/P=IUTLAND-B /O=B-REGION/OU1=IUTB/CN=IUTBMHSA/	UA IUT - B	If CAAS “single “O” type
/C=XX/A=ICAO/P=IUTLAND-B /O=B-REGION/OU1=IUTB/CN=IUTBMHSB/	UA IUT - B	If CAAS “single “O” type
/C=XX/A=ICAO/P=IUTLAND-B /O=B-REGION/OU1=IUTB/CN=IUTBMHSC/	UA IUT - B	If CAAS “single “O” type
/C=XX/A=ICAO/P=IUTLAND-B /O=AFTN/OU1=IUTBMHSA/	UA IUT - B	If “XF” type
/C=XX/A=ICAO/P=IUTLAND-B /O=AFTN/OU1=IUTBMHSB/	UA IUT - B	If “XF” type

X.400 Routing Indicator	Routing direction	Remarks
/C=XX/A=ICAO/P=IUTLAND-B /O=AFTN/OU1=IUTBMHSC/	UA IUT - B	If “XF” type
/C=XX/A=ICAO/P=IUTLAND-B	MTCU	
/C=XX/A=ICAO/P=IUTLAND-A	MTA - IUTA - 1	
/C=XX/A=ICAO/P=IUTLAND-C	MTA - IUTC - 1	
/C=XX/A=ICAO/P=IUTLAND-X	MTA - IUTC - 1	

Table 14: X.400 Routing Table of IUT-B

3.3.3 AFTN and X.400 Routing Tables of IUT-C

AFTN Routing Indicator	Routing direction	Remarks
IUTCFT*	AFTN Terminal	
IUTA*	MTCU	
IUTB*	MTCU	
IUTC*	MTCU	

Table 15: AFTN Routing Table of IUT-C

X.400 Routing Indicator	Routing direction	Remarks
/C=XX/A=ICAO/P=IUTLAND-C /O=C- REGION/OU1=IUTC/CN=IUTCMHSA/	UA IUT - C	If CAAS “single “O” type
/C=XX/A=ICAO/P=IUTLAND-C /O=C- REGION/OU1=IUTC/CN=IUTCMHSB/	UA IUT - C	If CAAS “single “O” type
/C=XX/A=ICAO/P=IUTLAND-C /O=C- REGION/OU1=IUTC/CN=IUTCMHSC/	UA IUT - C	If CAAS “single “O” type
/C=XX/A=ICAO/P=IUTLAND-C /O=AFTN/OU1=IUTCMHSA/	UA IUT - C	If “XF” type
/C=XX/A=ICAO/P=IUTLAND-C /O=AFTN/OU1=IUTCMHSB/	UA IUT - C	If “XF” type
/C=XX/A=ICAO/P=IUTLAND-C /O=AFTN/OU1=IUTCMHSC/	UA IUT - C	If “XF” type
/C=XX/A=ICAO/P=IUTLAND-C	MTCU	
/C=XX/A=ICAO/P=IUTLAND-A	MTA - IUTA - 1	
/C=XX/A=ICAO/P=IUTLAND-B	MTA - IUTB - 1	
/C=XX/A=ICAO/P=IUTLAND-X	MTA - IUTA - 1	

Table 16: X.400 Routing Table of IUT-C

3.4 Look-up Table

3.4.1 Generic look-up Table for all Implementations Under Test (IUT) (CAAS single “O” type)

AFTN address	O/R Address (CAAS single “O” type)
IUTAFTN*	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/
IUTAFTA*	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/
IUTAFTU*	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/ <i>Note. – This address has to be unknown and not defined in IUT-A</i>
IUTAMHSA	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAMHSA/
IUTAMHSB	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAMHSB/
IUTAMHSC	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAMHSC/
IUTADLLO	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTADLLO/
IUTADLRE	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTADLRE/
IUTBFTN*	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/
IUTBFTA*	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/
IUTBFTU*	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/ <i>Note. – This address has to be unknown and not defined in IUT-B</i>
IUTBMHSA	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBMHSA/
IUTBMHSB	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBMHSB/
IUTBMHSC	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBMHSC/
IUTBDLLO	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBDLLO/
IUTBDLRE	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBDLRE/
IUTCFTNC	/C=XX/A=ICAO/P=IUTLAND-C/O=C-REGION/OU1=IUTC/CN=IUTCFTNA/
IUTCMHSA	/C=XX/A=ICAO/P=IUTLAND-C/O=C-REGION/OU1=IUTC/CN=IUTCMHSA/
IUTXLOOP	/C=XX/A=ICAO/P=IUTLAND-X/O=X-REGION/OU1=IUTX/CN=IUTXLOOP/

Table 17: Generic look-up table (CAAS single “O” type)

3.4.2 Generic look-up Table for all Implementations Under Test (IUT) (“XF” type)

AFTN address	O/R Address (“XF” type)
IUTAFTN*	/C=XX/A=ICAO/P=IUTLAND-A/
IUTAFTA*	/C=XX/A=ICAO/P=IUTLAND-A/
IUTAFTU*	/C=XX/A=ICAO/P=IUTLAND-A/ <i>Note. – This address has to be unknown and not defined in IUT-A</i>
IUTAMHSA	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAMHSA/
IUTAMHSB	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAMHSB/
IUTAMHSC	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAMHSC/
IUTADLLO	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTADLLO/
IUTADLRE	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTADLRE/
IUTBFTN*	/C=XX/A=ICAO/P=IUTLAND-B/
IUTBFTA*	/C=XX/A=ICAO/P=IUTLAND-B/
IUTBFTU*	/C=XX/A=ICAO/P=IUTLAND-B/ <i>Note. – This address has to be unknown and not defined in IUT-B</i>
IUTBMHSA	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBMHSA/
IUTBMHSB	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBMHSB/
IUTBMHSC	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBMHSC/
IUTBDLLO	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBDLLO/
IUTBDLRE	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBDLRE/
IUTCFTNC	/C=XX/A=ICAO/P=IUTLAND-C/O=AFTN/OU1=IUTCFTNA/
IUTCMHSA	/C=XX/A=ICAO/P=IUTLAND-C/O=AFTN/OU1=IUTCMHSA/
IUTXLOOP	/C=XX/A=ICAO/P=IUTLAND-X/O=AFTN/OU1=IUTXLOOP/

Table 18: Generic look-up table (“XF” type)

Note. – There are further possibilities: IUT-A could have XF addressing scheme whilst IUT-B has CAAS, or vice-versa. In such a case, the corresponding table entries should be selected. To simplify matters it is recommended to use CAAS single “O” type or “XF” type only.

3.5 Local AMHS User address book

3.5.1 Local AMHS User address book for UA of all Implementations Under Test (IUT) (CAAS single “O” type)

Nick name	O/R Address (CAAS single “O” type)
IUTAFTNA	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNA/
IUTAFTNB	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNB/
IUTAFTNC	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNC/
IUTAFTND	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTND/
IUTAFTNE	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNE/
IUTAFTNF	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNF/
IUTAFTNG	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNG/
IUTAFTNH	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNH/
IUTAFTNI	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNI/
IUTAFTNJ	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNJ/
IUTAFTNK	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNK/
IUTAFTNL	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNL/
IUTAFTNM	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNM/
IUTAFTNN	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNN/
IUTAFTNO	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNO/
IUTAFTNP	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNP/
IUTAFTNQ	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNQ/
IUTAFTNR	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNR/
IUTAFTNS	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNS/
IUTAFTNT	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNT/
IUTAFTNU	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNU/
IUTAFTNV	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNV/
IUTAFTNW	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNW/
IUTAFTNX	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNX/
IUTAFTNY	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTNY/
IUTAFTAA	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAA/
IUTAFTAB	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAB/
IUTAFTAC	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAC/
IUTAFTAD	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAD/
IUTAFTAE	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAE/
IUTAFTAF	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAF/
IUTAFTAG	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAG/
IUTAFTAH	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAH/
IUTAFTAI	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAI/
IUTAFTAJ	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAJ/

IUTAFTAK	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAK/
IUTAFTAL	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAL/
IUTAFTAM	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAM/
IUTAFTAN	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAN/
IUTAFTAO	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAO/
IUTAFTAP	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAP/
IUTAFTAQ	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAQ/
IUTAFTAR	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAR/
IUTAFTAS	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAS/
IUTAFTAT	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAT/
IUTAFTAU	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAU/
IUTAFTAV	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAV/
IUTAFTAW	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAW/
IUTAFTAX	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAX/
IUTAFTAY	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTAY/
IUTAFTUU	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAFTUU/
IUTAMHSA	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAMHSA/
IUTAMHSB	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAMHSB/
IUTAMHSC	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTAMHSC/
IUTADLLO	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTADLLO/
IUTADLRE	/C=XX/A=ICAO/P=IUTLAND-A/O=A-REGION/OU1=IUTA/CN=IUTADLRE/
IUTBFTNA	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBFTNA/
IUTBFTNB	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBFTNB/
IUTBFTNC	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBFTNC/
till	To be continued till
IUTBFTNY	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBFTNY/
IUTBFTAA	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBFTAA/
till	To be continued till
IUTBFTAY	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBFTAY/
IUTBFTUU	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBFTUU/
IUTBMHSA	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBMHSA/
IUTBMHSB	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBMHSB/
IUTBMHSC	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBMHSC/
IUTBDLLO	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBDLLO/
IUTBDLRE	/C=XX/A=ICAO/P=IUTLAND-B/O=B-REGION/OU1=IUTB/CN=IUTBDLRE/
IUTCFTNC	/C=XX/A=ICAO/P=IUTLAND-C/O=C-REGION/OU1=IUTC/CN=IUTCFTNA/
IUTCMHSA	/C=XX/A=ICAO/P=IUTLAND-C/O=C-REGION/OU1=IUTC/CN=IUTCMHSA/
IUTXLOOP	/C=XX/A=ICAO/P=IUTLAND-X/O=X-REGION/OU1=IUTX/CN=IUTXLOOP/

Table 19: Local AMHS User address book (CAAS single “O” type)

3.5.2 Local AMHS User address book for UA of all Implementations Under Test (IUT) (“XF” type)

Nick name	O/R Address (“XF” type)
IUTAFTNA	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAFTNA/
IUTAFTNB	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAFTNB/
IUTAFTNC	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAFTNC/
till	To be continued till
IUTAFTNY	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAFTNY/
IUTAFTAA	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAFTAA/
till	To be continued till
IUTAFTAY	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAFTAY/
IUTAFTUU	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAFTUU/
IUTAMHSA	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAMHSA/
IUTAMHSB	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAMHSB/
IUTAMHSC	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTAMHSC/
IUTADLLO	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTADLLO/
IUTADLRE	/C=XX/A=ICAO/P=IUTLAND-A/O=AFTN/OU1=IUTADLRE/
IUTBFTNA	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBFTNA/
IUTBFTNB	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBFTNB/
IUTBFTNC	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBFTNC/
till	To be continued till
IUTBFTNY	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBFTNY/
IUTBFTAA	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBFTAA/
till	To be continued till
IUTBFTAY	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBFTAY/
IUTBFTUU	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBFTUU/
IUTBMHSA	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBMHSA/
IUTBMHSB	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBMHSB/
IUTBMHSC	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBMHSC/
IUTBDLLO	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBDLLO/
IUTBDLRE	/C=XX/A=ICAO/P=IUTLAND-B/O=AFTN/OU1=IUTBDLRE/
IUTCFTNC	/C=XX/A=ICAO/P=IUTLAND-C/O=AFTN/OU1=IUTCFTNA/
IUTCMHSA	/C=XX/A=ICAO/P=IUTLAND-C/O=AFTN/OU1=IUTCMHSA/
IUTXLOOP	/C=XX/A=ICAO/P=IUTLAND-X/O=AFTN/OU1=IUTXLOOP/

Table 20: Local AMHS User address book (“XF” type)

4 Bilateral Test Procedures

4.1 Submission, Transfer and Delivery Operation (AMHS to AMHS)

4.1.1 IT101 – Submit, transfer and deliver an IPM (UA IUT-A to UA IUT-B)

IT101	Submit, transfer and deliver an IPM (UA IUT-A to UA IUT-B)
Test criteria	This test is successful, if the MTA of the sending IUT transfers the submitted ATS messages (IPM) correctly to a peer MTA which delivers the ATS messages (IPM) to the UA of the receiving IUT.
Scenario description	From the UA of IUT-A send a sequence of five ATS messages (IPMs) to the IUT addressing a remote AMHS user in the peer IUT, via AMHS. • Message 1 (IT101M01) shall have ATS-message-priority KK. • Message 2 (IT101M02) shall have ATS-message-priority GG. • Message 3 (IT101M03) shall have ATS-message-priority FF. • Message 4 (IT101M04) shall have ATS-message-priority DD. • Message 5 (IT101M05) shall have ATS-message-priority SS. Each message shall have different ATS-filing-time and ATS-message-text. The <i>optional-heading-information</i> element shall be empty. Verify the messages received by the remote UA. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.
AMHS SARPs reference	3.1.2.2.1 (ATS Message User Agent), 3.1.2.2.2 (ATS Message Server), 3.1.2.2.3.2.3 (ATS-Message-Header)
Test class	Normal AMHS communications (N)

4.1.2 IT102 – Submit, transfer and deliver an IPM (UA IUT-B to UA IUT-A)

IT102	Submit, transfer and deliver an IPM (UA IUT-B to UA IUT-A)
Test criteria	This test is successful, if the MTA of the sending IUT transfers the submitted ATS messages (IPM) correctly to a peer MTA which delivers the ATS messages (IPM) to the UA of the receiving IUT.
Scenario description	From the UA of IUT-B send a sequence of five ATS messages (IPMs) to the IUT addressing a remote AMHS user in the peer IUT, via AMHS. • Message 1 (IT102M01) shall have ATS-message-priority KK. • Message 2 (IT102M02) shall have ATS-message-priority GG. • Message 3 (IT102M03) shall have ATS-message-priority FF. • Message 4 (IT102M04) shall have ATS-message-priority DD. • Message 5 (IT102M05) shall have ATS-message-priority SS. Each message shall have different ATS-filing-time and ATS-message-text. The <i>optional-heading-information</i> element shall be empty. Verify the messages received by the remote UA. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.
AMHS SARPs reference	3.1.2.2.1 (ATS Message User Agent), 3.1.2.2.2 (ATS Message Server), 3.1.2.2.3.2.3 (ATS-Message-Header)
Test class	Normal AMHS communications (N)

4.2 Gateway Operations (AFTN to AMHS)

4.2.1 IT201 – Convert an AFTN message to AMHS format (IUT-A)

IT201	Convert an AFTN message to AMHS format (IUT-A)
Test criteria	This test is successful, if the sending IUT converts AFTN messages correctly to AMHS messages (IPM).
Scenario description	From the sending IUT send a sequence of AFTN messages addressing a remote AMHS user, consisting of five messages: • AFTN message 1 (IT201M01) shall have priority KK. • AFTN message 2 (IT201M02) shall have priority GG. • AFTN message 3 (IT201M03) shall have priority FF. • AFTN message 4 (IT201M04) shall have priority DD. • AFTN message 5 (IT201M05) shall have priority SS. The filing time shall be different in each message and the OHI field of each message shall be empty. Check the IPMs that the AMHS user receives in the receiving IUT. Verify that the IUT has converted the messages correctly according to Table 3.1.2-8 of the AMHS SARPs – see section 3.1.2.3.4.2. In particular: • verify that each message has different ATS-filing-time; • verify that the optional-heading-information element is empty; • check the correct format of the ATS message; • verify the ATS-message-priority and the related message transfer priority for each received message; • compare the ATS-message-text with the original AFTN message text.
AMHS SARPs reference	3.1.2.3.4.2
Test class	Normal AMHS communications (N)

4.2.2 IT202 – Convert an AFTN message to AMHS format (IUT-B)

IT202	Convert an AFTN message to AMHS format (IUT-B)
Test criteria	This test is successful, if the sending IUT converts AFTN messages correctly to AMHS messages (IPM).
Scenario description	From the sending IUT send a sequence of AFTN messages addressing a remote AMHS user, consisting of five messages: • AFTN message 1 (IT202M01) shall have priority KK. • AFTN message 2 (IT202M02) shall have priority GG. • AFTN message 3 (IT202M03) shall have priority FF. • AFTN message 4 (IT202M04) shall have priority DD. • AFTN message 5 (IT202M05) shall have priority SS. The filing time shall be different in each message and the OHI field of each message shall be empty. Check the IPMs that the AMHS user receives in the receiving IUT. Verify that the IUT has converted the messages correctly according to Table 3.1.2-8 of the AMHS SARPs – see section 3.1.2.3.4.2. In particular: • verify that each message has different ATS-filing-time; • verify that the optional-heading-information element is empty; • check the correct format of the ATS message; • verify the ATS-message-priority and the related message transfer priority for each received message; • compare the ATS-message-text with the original AFTN message text.
AMHS SARPs reference	3.1.2.3.4.2
Test class	Normal AMHS communications (N)

4.3 Gateway Operations (AMHS to AFTN)

4.3.1 IT301 – Convert an IPM generated by the UA of IUT-A to AFTN format

IT301	Convert an IPM to AFTN format (IUT-B)
Test criteria	This test is successful, if the receiving IUT converts IPMs correctly into AFTN format.
Scenario description	Send from IUT-A (UA) a sequence of ATS messages (IPMs) to the IUT-B, addressing an AFTN terminal. • Message 1 (IT301M01) shall have ATS-message-priority KK. • Message 2 (IT301M02) shall have ATS-message-priority GG. • Message 3 (IT301M03) shall have ATS-message-priority FF. • Message 4 (IT301M04) shall have ATS-message-priority DD. • Message 5 (IT301M05) shall have ATS-message-priority SS. Each message shall have different ATS-filing-time and ATS-message-text. The <i>optional-heading-information</i> element shall be empty. The implicit-conversion-prohibited attribute of the AMHS message must be set to “false”. Check the correct format of the AFTN message. Verify the AFTN priority and filing time for each received message. Compare the AFTN message text with the original ATS-message-text.
AMHS SARPs reference	3.1.2.3.5.2 (AMHS IPM conversion)
Test class	Normal AMHS communications (N)

4.4 Gateway Operations (AFTN to AMHS to AFTN)

4.4.1 IT401 – Convert an AFTN message to AMHS and back to AFTN format

IT401	Convert an AFTN message to AMHS and back to AFTN format
Test criteria	This test is successful, if the sending IUT-A converts AFTN user messages correctly to AMHS messages (IPM) and the IPMs are converted back to AFTN in IUT-B.
Scenario description	From IUT-A send a sequence of AFTN messages addressing a remote AFTN user in IUT-B, consisting of five messages: • AFTN message 1 (IT401M01) shall have priority KK. • AFTN message 2 (IT401M02) shall have priority GG. • AFTN message 3 (IT401M03) shall have priority FF. • AFTN message 4 (IT401M04) shall have priority DD. • AFTN message 5 (IT401M05) shall have priority SS. The filing time shall be different in each message and the OHI field of each message shall be empty. Check the AFTN message received by the AFTN user in the IUT-B. • Check the correct format of the AFTN message. • Each AFTN message shall have original filing time. • Each message shall have an empty OHI. • Verify the AFTN priority for each received message. • Compare the AFTN message text with the original AFTN message text.
AMHS SARPs reference	3.1.2.3.4.2, 3.1.2.3.5.2
Test class	Normal AMHS communications (N)

4.4.2 IT402 – Convert an AFTN message to AMHS and back to AFTN format

IT402	Convert an AFTN message to AMHS and back to AFTN format
Test criteria	This test is successful, if the sending IUT-B converts AFTN user messages correctly to AMHS messages (IPM) and the IPMs are converted back to AFTN in IUT-A.
Scenario description	From IUT-B send a sequence of AFTN messages addressing a remote AFTN user in IUT-A, consisting of five messages: • AFTN message 1 (IT402M01) shall have priority KK. • AFTN message 2 (IT402M02) shall have priority GG. • AFTN message 3 (IT402M03) shall have priority FF. • AFTN message 4 (IT402M04) shall have priority DD. • AFTN message 5 (IT402M05) shall have priority SS. The filing time shall be different in each message and the OHI field of each message shall be empty. Check the AFTN message received by the AFTN user in the IUT-A. • Check the correct format of the AFTN message. • Each AFTN message shall have original filing time. • Each message shall have an empty OHI. • Verify the AFTN priority for each received message. • Compare the AFTN message text with the original AFTN message text.
AMHS SARPs reference	3.1.2.3.4.2, 3.1.2.3.5.2
Test class	Normal AMHS communications (N)

4.5 Gateway Operations – special case scenarios

Note – The following special case scenarios are symmetric. That means, all test-cases have to be performed by IUT-A as well as IUT-B.

4.5.1 IT501 – Distribute an IPM to AMHS and AFTN users

IT501	Distribute an IPM to AMHS and AFTN users
Test criteria	This test is successful, if the receiving IUT distributes an IPM addressing both an AMHS and an AFTN user correctly.
Scenario description	From the sending IUT send an ATS message (IPM), addressing both AMHS and AFTN users, at the receiving IUT. The IPM Heading of the message shall contain two primary recipients, which are one AMHS and one AFTN user. The IPM Heading of the next message shall contain additionally, two copy recipients, which are also one AMHS and one AFTN user. Finally the IPM Heading of the last message shall contain additionally two blind copy recipients, which are also one AMHS and one AFTN user. Verify that all the users, whose addresses have been included in the IPM, receive the message correctly.
AMHS SARPs reference	3.1.2.2.1 (ATS message user agent), 3.1.2.2.2 (ATS message server), 3.1.2.3.5.2 (IPM conversion)
Test class	Normal AMHS communications (N)

4.5.2 IT502 – Expand a DL addressing both AMHS and AFTN users

IT502	Expand a DL addressing both AMHS and AFTN users
Test criteria	This test is successful, if the receiving IUT distributes an IPM, addressing AMHS and AFTN users in a distribution list, correctly.
Scenario description	From the sending IUT send an ATS message (IPM) to the receiving IUT. The recipient contained in the MTE addresses a distribution list, for which the receiving IUT is responsible. The distribution list shall have the addresses of one AMHS user and two AFTN users as members. The message shall have the <i>dl-expansion-prohibited</i> attribute set to “false”. Check the messages received in each AFTN user address verifying that each one contains its corresponding address.
AMHS SARPs reference	3.1.2.2.2.1.1 (DL functional group), 3.1.2.3.5.2 (IPM conversion)
Test class	Normal AMHS communications (N)

4.5.3 IT503 – Convert an IPM, if the ATS-message-text contains more than 1800 characters

IT503	Convert or reject an IPM, if the ATS-message-text contains more than 1800 characters
Test criteria	This test is successful, if the IUT, when it receives an ATS message with ATS-message-text longer than 1800 characters, a) rejects the message and returns a NDR, or b) splits the received IPM into several messages and converts the resulting messages into AFTN format as specified in ICAO Annex 10, Attn. B [1], or c) converts the received IPM into a “long” AFTN message. Note. – The AMHS SARPs (3.1.2.3.5.2.1.7) specify that the message can be rejected (case a) or split into several messages (case b).

Scenario description	From the sending IUT send an ATS message (IPM) containing ATS-message-text of 4500 characters to an AFTN recipient of the receiving IUT. <u>If case a is implemented:</u> Verify that the receiving IUT does not convert the IPM into AFTN format, but returns a NDR. Check the NDR contents received at the sending User Agent. Verify that the NDR contains the following elements: • “unable-to-transfer” for the non-delivery-reason-code; • “content-too-long” for the non-delivery-diagnostic-code; and • “unable to convert to AFTN due to message text length” for the supplementary-information. <u>If case b is implemented:</u> Verify that (at least) three AFTN messages are received by the AFTN recipient. Check the correct format of the AFTN messages. Check the text field of all received AFTN messages. Verify that the text is complete and unchanged, i.e. compare the received data with the <i>ATS-message-text</i> provided in the original IPM. Verify that the received messages contain the sequence indicators as specified in Attm. B of ICAO Annex 10, Vol. II [1]. <u>If case c is implemented:</u> Verify that the AFTN message is received by the AFTN recipient. Check the correct format of the received AFTN message. Verify that the text is complete and unchanged, i.e. compare the received data with the <i>ATS-message-text</i> provided in the original IPM.
AMHS SARPs reference	3.1.2.3.5.2.1.7
Test class	Normal AMHS communications (N)

4.5.4 IT504 – Split an incoming IPM addressing more than 21 AFTN users

IT504	Split an incoming IPM addressing more than 21 AFTN users
Test criteria	This test is successful, if the receiving IUT receives an ATS message (IPM) addressing more than 21 AFTN users and splits the received IPM into several messages each addressing 21 or less AFTN users. <i>Note. – PDR M4050004 (Title: AMHS - Too Many Recipients) is resolved. Therefore the message shall be split into several messages.</i>
Scenario description	From the sending IUT send an ATS message (IPM) to the receiving IUT. The message shall address 50 (primary) recipients. Verify that the receiving IUT converts the IPM into AFTN format and sends three AFTN messages to its AFTN component. Check the addressee indicators contained in the AFTN messages. Verify that no AFTN recipient is lost and the total number of AFTN addressee indicators contained in all three messages is 50. For example • the first AFTN message contains addressee indicators for the first 21 recipients, • the second AFTN message contains addressee indicators for the next 21 recipients, and • the third AFTN message contains addressee indicators for the remaining 8 recipients.
AMHS SARPs reference	3.1.2.3.5.2.1.8
Test class	Normal AMHS communications (N)

4.5.5 IT505 – Probe Conveyance Test

IT505	Probe Conveyance Test
Test criteria	This test is successful, if the receiving IUT generates a report (DR or NDR), when it receives a probe with AFTN users as intended recipients.
Scenario description	From the sending IUT, send AMHS probes to the receiving IUT: a) addressing two AFTN recipients and one AMHS recipient, b) addressing two AFTN recipients, one of which can be mapped and one of which cannot be mapped onto a valid AFTN address. Verify that the receiving IUT returns a. one DR with 2 AFTN recipients from the MTCU and one DR with one recipient from the MTA b. a combined DR and NDR or one DR and one NDR in response to the probe received. Verify in all cases that the DRs reporting about the AFTN addresses which could be translated contains the supplementary information “This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient”.
AMHS SARPs reference	3.1.2.3.5.5 (reception of AMHS probe), 3.1.2.3.5.6.2.27
Test class	Normal AMHS communications (N)

4.6 Stress traffic situations

4.6.1 IT601 – Stress load

IT601	Stress load
Test criteria	This test is successful, if both IUTs perform AMHS traffic interchange correctly for a number of messages queued in advance.
Scenario description	Defined numbers of messages (beginning with 100, 200, till 400 messages) have to be selected from the data base or generated by the UA or the AFTN terminal. These messages need to be queued (in MTAs) in both IUTs, preferably by disabling the physical connector used to send information to the underlying network in one of the IUTs. When reconnecting, the messages queued in both IUTs will be sent simultaneously from the two sites, the rate being defined by the line speed of the interconnection, as well as the process followed by each system. No errors due to malfunction of the IUTs should be observed during the interchange period. The time from sending the first till receiving the last message has to be measured and analysed in both IUTs.
AMHS SARPs reference	None
Test class	Normal (forced) AMHS communications (N)

5 Trilateral Test procedures - optional

5.1 Submission/Transfer/Delivery and Relay operations

5.1.1 IT701 – Submission /Transfer/Delivery between the partner MTAs

IT701	Submission / Transfer / Delivery between the partner MTAs
Test criteria	This test is successful, if the messages from all UAs are received by the corresponding UAs of the other the IUTs.
Scenario description	Create “normal” X.400 routing: (see 3.3, AFTN and X.400 Routing Tables) From the UA send an ATS message (IPM) with ATS-message-priority FF addressed to the UA of the other IUTs. • Message 1 (IT701M01) from UA IUT-A to UAs of IUT-B and IUT-C • Message 2 (IT701M02) from UA IUT-B to UAs of IUT-A and IUT-C. • Message 3 (IT701M03) from UA IUT-C to UAs of IUT-A and IUT-B. Each message shall have different ATS-filing-time and ATS-message-text. The <i>optional-heading-information</i> element shall be empty. Verify the messages received by both remote UAs. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.
AMHS SARPs reference	None
Test class	Normal AMHS communications (N)

5.1.2 IT702 – Relay operations

IT702	Relay operations
Test criteria	This test is successful, if the message from the sending UA is routed by the IUT in between and received by the addressed UA.
Scenario description	Create a “transfer” X.400 routing: The X.400 routing table of IUT-A routes PRMD=IUTLAND-B and PRMD=IUTLAND-C to IUT-B. The X.400 routing table of IUT-B routes PRMD=IUTLAND-A and PRMD=IUTLAND-C to IUT-C. The X.400 routing table of IUT-C routes PRMD=IUTLAND-A and PRMD=IUTLAND-B to IUT-A. From the UA send an ATS message (IPM) with ATS-message-priority FF to one UA of another IUT. • Message 1 (IT702M01) from UA IUT-A to UA of IUT-C • Message 2 (IT702M02) from UA IUT-B to UA of IUT-A. • Message 3 (IT702M03) from UA IUT-C to UA of IUT-B. Each message shall have different ATS-filing-time and ATS-message-text. The <i>optional-heading-information</i> element shall be empty. Verify the messages received by the remote UA and passed the IUT in between. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.
AMHS SARPs reference	None
Test class	Normal AMHS communications (N)

5.2 Test of special situations

5.2.1 IT801 – Alternate MTA routing

IT801	Alternate MTA routing
Test criteria	This test is successful, if the message from the sending UA is received by the addressed UA
Scenario description	Create a “normal” X.400 routing: (see 3.3, AFTN and X.400 Routing Tables) Cut the direct connection to the IUT to which you intend to send a message. From the UA send an ATS message (IPM) with ATS-message-priority FF to the UA of the IUT concerned. • Message 1 (IT801M01) from UA IUT-A to UA of IUT-B • Message 2 (IT801M02) from UA IUT-B to UAs of IUT-C. • Message 3 (IT801M03) from UA IUT-C to UAs of IUT-A. Each message shall have different ATS-filing-time and ATS-message-text. The <i>optional-heading-information</i> element shall be empty. If alternate MTA routing functionality is implemented and configured the message will be forwarded automatically via the “other” connection; otherwise the queued message should be forced to follow the alternate routing by the adequate means (manually). Verify the messages received by the remote UA and passed the IUT in between. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.
AMHS SARPs reference	None
Test class	Normal AMHS communications (N)

5.2.2 IT802– Loop detection

IT802	Loop detection
Test criteria	This test is successful; if the one of the IUT detects that the message has traversed a loop.
Scenario description	Create a temporary routing loop. The X.400 routing table of IUT-A routes PRMD=IUTLAND-X to IUT-B. The X.400 routing table of IUT-B routes PRMD=IUTLAND-X to IUT-C. The X.400 routing table of IUT-C routes PRMD=IUTLAND-X to IUT-A. Send a message addressed to PRMD=IUTLAND-X which will be routed by the IUT to the other IUT so that finally the message is performing a loop. Verify that: • the one of the IUTs detects the loop, • this IUT discards the message and • generates a NDR Verify that the sending IUT receives the NDR Repeat the test with all IUTs, so that all sending IUTs have received the NDR.
AMHS SARPs reference	3.1.1, Note 2a (ISO/IEC 10021), 3.1.2.1.6 (AMHS routing), <i>See also ITU-T Rec. X.411 clause 14.3.1 and clause 12.3.1.</i>
Test class	MHS procedural errors (E2)

6 Bilateral Test Procedures – Test Scenarios

6.1 Introduction

The following tables contain the scenarios for the different Interoperability Tests (IT) described in the previous chapters.

The test scenarios consist of several test-cases. The test-case reference is as follows:

ITxxx/TCzz

Test scenario: Txxx where xxx is the scenario number

Test-case: Czz where zz is the number of test-case.

6.2 Submission, Transfer and Delivery Operation (AMHS to AMHS)

IT101	Submit, transfer and deliver an IPM (UA IUT-A to UA IUT-B)		
Test-case id: IT101/TC01	Tested functionality: Submission, transfer and delivery of messages with different ATS-message-priorities A KK priority message will be submitted from the UA of IUT-A and delivered to the UA of IUT-B.		
Test description:	From the User Agent IUTAMHSA send the following message to the UA IUTBMHSA: PRI: KK FT: <FT> OHI: TEST IT101/TC01 Get the message with IUTBMHSA (UA-terminal of IUT-B).		
Test control:	Check the correct reception of the message at the UA IUTBMHSA of the IUT-B system. Check - the ATS-message-priority: PRI: KK - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT101	Submit, transfer and deliver an IPM (UA IUT-A to UA IUT-B)		
Test-case id: IT101/TC02	Tested functionality: Submission, transfer and delivery of messages with different ATS-message-priorities A GG priority message will be submitted from the UA of IUT-A and delivered to the UA of IUT-B.		
Test description:	From the User Agent IUTAMHSA send the following message to the UA IUTBMHSA: PRI: GG FT: <FT> OHI: TEST IT101/TC02 Get the message with IUTBMHSA (UA-terminal of IUT-B).		
Test control:	Check the correct reception of the message at the UA IUTBMHSA of the IUT-B system. Check - the ATS-message-priority: PRI: GG - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT101	Submit, transfer and deliver an IPM (UA IUT-A to UA IUT-B)		
Test-case id: IT101/TC03	Tested functionality: Submission, transfer and delivery of messages with different ATS-message-priorities An FF priority message will be submitted from the UA of IUT-A and delivered to the UA of IUT-B.		
Test description:	From the User Agent IUTAMHSA send the following message to the UA IUTBMHSA: PRI: FF FT: <FT> OHI: TEST IT101/TC03 Get the message with IUTBMHSA (UA-terminal of IUT-B).		
Test control:	Check the correct reception of the message at the UA IUTBMHSA of the IUT-B system. Check - the ATS-message-priority: PRI: FF - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT101	Submit, transfer and deliver an IPM (UA IUT-A to UA IUT-B)		
Test-case id: IT101/TC04	Tested functionality: Submission, transfer and delivery of messages with different ATS-message-priorities A DD priority message will be submitted from the UA of IUT-A and delivered to the UA of IUT-B.		
Test description:	From the User Agent IUTAMHSA send the following message to the UA IUTBMHSA: PRI: DD FT: <FT> OHI: TEST IT101/TC04 Get the message with IUTBMHSA (UA-terminal of IUT-B).		
Test control:	Check the correct reception of the message at the UA IUTBMHSA of the IUT-B system. Check - the ATS-message-priority: PRI: DD - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT101	Submit, transfer and deliver an IPM (UA IUT-A to UA IUT-B)		
Test-case id: IT101/TC05	Tested functionality: Submission, transfer and delivery of messages with different ATS-message-priorities An SS priority message will be submitted from the UA of IUT-A and delivered to the UA of IUT-B.		
Test description:	From the User Agent IUTAMHSA send the following message to the UA IUTBMHSA: PRI: SS FT: <FT> OHI: TEST IT101/TC05 Get the message with IUTBMHSA (UA-terminal of IUT-B). A RN is submitted when the message is displayed. Note. – Depending on UA implementation the user might be requested to send the RN.		
Test control:	Check the correct reception of the message at the UA IUTBMHSA of the IUT-B system. Check - the ATS-message-priority: PRI: SS - the ATS-message-filing-time and - the ATS-message-text Check the reception of a RN on the UA IUTAMHSA of the IUT-A system.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT102	Submit, transfer and deliver an IPM (UA IUT-B to UA IUT-A)		
Test-case id: IT102/TC01	Tested functionality: Submission, transfer and delivery of messages with different ATS-message-priorities A KK priority message will be submitted from the UA of IUT-B and delivered to the UA of IUT-A.		
Test description:	From the User Agent IUTBMHSA send the following message to the UA IUTAMHSA: PRI: KK FT: <FT> OHI: TEST IT102/TC01 Get the message with IUTAMHSA (UA-terminal of IUT-A).		
Test control:	Check the correct reception of the message at the UA IUTAMHSA of the IUT-A system. Check - the ATS-message-priority: PRI: KK - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT102	Submit, transfer and deliver an IPM (UA IUT-B to UA IUT-A)		
Test-case id: IT102/TC02	Tested functionality: Submission, transfer and delivery of messages with different ATS-message-priorities A GG priority message will be submitted from the UA of IUT-B and delivered to the UA of IUT-A.		
Test description:	From the User Agent IUTBMHSA send the following message to the UA IUTAMHSA: PRI: GG FT: <FT> OHI: TEST IT102/TC02 Get the message with IUTAMHSA (UA-terminal of IUT-A).		
Test control:	Check the correct reception of the message at the UA IUTAMHSA of the IUT-A system. Check - the ATS-message-priority: PRI: GG - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT102	Submit, transfer and deliver an IPM (UA IUT-B to UA IUT-A)		
Test-case id: IT102/TC03	Tested functionality: Submission, transfer and delivery of messages with different ATS-message-priorities An FF priority message will be submitted from the UA of IUT-B and delivered to the UA of IUT-A.		
Test description:	From the User Agent IUTBMHSA send the following message to the UA IUTAMHSA: PRI: FF FT: <FT> OHI: TEST IT102/TC03 Get the message with IUTAMHSA (UA-terminal of IUT-A).		
Test control:	Check the correct reception of the message at the UA IUTAMHSA of the IUT-A system. Check - the ATS-message-priority: PRI: FF - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT102	Submit, transfer and deliver an IPM (UA IUT-B to UA IUT-A)		
Test-case id: IT102/TC04	Tested functionality: Submission, transfer and delivery of messages with different ATS-message-priorities A DD priority message will be submitted from the UA of IUT-B and delivered to the UA of IUT-A.		
Test description:	From the User Agent IUTBMHSA send the following message to the UA IUTAMHSA: PRI: DD FT: <FT> OHI: TEST IT102/TC04 Get the message with IUTAMHSA (UA-terminal of IUT-A)		
Test control:	Check the correct reception of the message at the UA IUTAMHSA of the IUT-A system. Check - the ATS-message-priority: PRI: DD - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT102	Submit, transfer and deliver an IPM (UA IUT-B to UA IUT-A)		
Test-case id: IT102/TC05	Tested functionality: Submission, transfer and delivery of messages with different ATS-message-priorities An SS priority message will be submitted from the UA of IUT-B and delivered to the UA of IUT-A.		
Test description:	From the User Agent IUTBMHSA send the following message to the UA IUTAMHSA: PRI: SS FT: <FT> OHI: TEST IT102/TC05 Get the message with IUTAMHSA (UA-terminal of IUT-A). A RN is submitted when the message is displayed. <i>Note. – Depending on UA implementation the user might be requested to send the RN.</i>		
Test control:	Check the correct reception of the message at the UA IUTAMHSA of the IUT-A system. Check - the ATS-message-priority: PRI: SS - the ATS-message-filing-time and - the ATS-message-text Check the reception of a RN on the UA IUTBMHSA of the IUT-B system.		
Test result:	PASS	FAILED	INCONCLUSIVE

6.3 Gateway Operations (AFTN to AMHS)

IT201	Convert an AFTN message to AMHS format (IUT-A)		
Test-case id: IT201/TC01	Tested functionality: Conversion of messages with different AFTN priorities A KK priority message will be sent from the AFTN terminal of IUT-A, converted to AMHS and received at the UA of IUT-B.		
Test description:	From the AFTN terminal IUTAFTNA of IUT-A send the following message to the User Agent (UA) of IUT-B: KK IUTBMHSA <FT> IUTAFTNA TEST IT201/TC01 The message is converted from AFTN into AMHS format in the MTCU of IUT-A.		
Test control:	Check the correct reception of the message at the UA IUTBMHSA of the IUT-B system. Check - the ATS-message-priority: PRI: KK - the message transfer priority: NON URGENT - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT201	Convert an AFTN message to AMHS format (IUT-A)		
Test-case id: IT201/TC02	Tested functionality: Conversion of messages with different AFTN priorities A GG priority message will be sent from the AFTN terminal of IUT-A, converted to AMHS and received at the UA of IUT-B.		
Test description:	From the AFTN terminal IUTAFTNA of IUT-A send the following message to the User Agent (UA) of IUT-B: GG IUTBMHSA <FT> IUTAFTNA TEST IT201/TC02 The message is converted from AFTN into AMHS format in the MTCU of IUT-A.		
Test control:	Check the correct reception of the message at the UA IUTBMHSA of the IUT-B system. Check - the ATS-message-priority: PRI: GG - the message transfer priority: NON URGENT - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT201	Convert an AFTN message to AMHS format (IUT-A)		
Test-case id: IT201/TC03	Tested functionality: Conversion of messages with different AFTN priorities An FF priority message will be sent from the AFTN terminal of IUT-A, converted to AMHS and received at the UA of IUT-B.		
Test description:	From the AFTN terminal IUTAFTNA of IUT-A send the following message to the User Agent (UA) of IUT-B: FF IUTBMHSA <FT> IUTAFTNA TEST IT201/TC03 The message is converted from AFTN into AMHS format in the MTCU of IUT-A.		
Test control:	Check the correct reception of the message at the UA IUTBMHSA of the IUT-B system. Check - the ATS-message-priority: PRI: FF - the message transfer priority: NORMAL - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT201	Convert an AFTN message to AMHS format (IUT-A)		
Test-case id: IT201/TC04	Tested functionality: Conversion of messages with different AFTN priorities A DD priority message will be sent from the AFTN terminal of IUT-A, converted to AMHS and received at the UA of IUT-B.		
Test description:	From the AFTN terminal IUTAFTNA of IUT-A send the following message to the User Agent (UA) of IUT-B: DD IUTBMHSA <FT> IUTAFTNA TEST IT201/TC04 The message is converted from AFTN into AMHS format in the MTCU of IUT-A.		
Test control:	Check the correct reception of the message at the UA IUTBMHSA of the IUT-B system. Check - the ATS-message-priority: PRI: DD - the message transfer priority: NORMAL - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT201	Convert an AFTN message to AMHS format (IUT-A)		
Test-case id: IT201/TC05	Tested functionality: Conversion of messages with different AFTN priorities An SS priority message will be sent from the AFTN terminal of IUT-A, converted to AMHS and received at the UA of IUT-B.		
Test description:	From the AFTN terminal IUTAFTNA of IUT-A send the following message to the User Agent (UA) of IUT-B: SS IUTBMHSA <FT> IUTAFTNA TEST IT201/TC05 The message is converted from AFTN into AMHS format in the MTCU of IUT-A. <i>Optional:</i> Generate a RN at the receiving UA IUTBMHSA of IUT-B.		
Test control:	Check the correct reception of the message at the UA IUTBMHSA of the IUT-B system. Check - the ATS-message-priority: PRI: SS - the message transfer priority: URGENT - the ATS-message-filing-time and - the ATS-message-text <i>Optional:</i> If a RN is replied from the UA IUTBMHSA of IUT-B, the MTCU of IUT-A converts it into an SS Ack message which is sent to the AFTN terminal of IUT-A. Check the reception of the SS Ack message at the AFTN terminal IUTAFTNA of IUT-A. Its originator indicator shall be the AFTN address IUTBMHSA, and its text shall be “R <FT> IUTAFTNA”, where <FT> denotes the filing time of the subject AFTN message.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT202	Convert an AFTN message to AMHS format (IUT-B)		
Test-case id: IT202/TC01	Tested functionality: Conversion of messages with different AFTN priorities A KK priority message will be sent from the AFTN terminal of IUT-B, converted to AMHS and received at the UA of IUT-A.		
Test description:	From the AFTN terminal IUTBFTNA of IUT-B send the following message to the User Agent (UA) of IUT-A: KK IUTAMHSA <FT> IUTBFTNA TEST IT202/TC01 The message is converted from AFTN into AMHS format in the MTCU of IUT-B.		
Test control:	Check the correct reception of the message at the UA IUTAMHSA of the IUT-A system. Check - the ATS-message-priority: PRI: KK - the message transfer priority: NON URGENT - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT202	Convert an AFTN message to AMHS format (IUT-B)		
Test-case id: IT202/TC02	Tested functionality: Conversion of messages with different AFTN priorities A GG priority message will be sent from the AFTN terminal of IUT-B, converted to AMHS and received at the UA of IUT-A.		
Test description:	From the AFTN terminal IUTBFTNA of IUT-B send the following message to the User Agent (UA) of IUT-A: GG IUTAMHSA <FT> IUTBFTNA TEST IT202/TC02 The message is converted from AFTN into AMHS format in the MTCU of IUT-B.		
Test control:	Check the correct reception of the message at the UA IUTAMHSA of the IUT-A system. Check - the ATS-message-priority: PRI: GG - the message transfer priority: NON URGENT - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT202	Convert an AFTN message to AMHS format (IUT-B)		
Test-case id: IT202/TC03	Tested functionality: Conversion of messages with different AFTN priorities An FF priority message will be sent from the AFTN terminal of IUT-B, converted to AMHS and received at the UA of IUT-A.		
Test description:	From the AFTN terminal IUTBFTNA of IUT-B send the following message to the User Agent (UA) of IUT-A: FF IUTAMHSA <FT> IUTBFTNA TEST IT202/TC03 The message is converted from AFTN into AMHS format in the MTCU of IUT-B.		
Test control:	Check the correct reception of the message at the UA IUTAMHSA of the IUT-A system. Check - the ATS-message-priority: PRI: FF - the message transfer priority: NORMAL - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT202	Convert an AFTN message to AMHS format (IUT-B)		
Test-case id: IT202/TC04	Tested functionality: Conversion of messages with different AFTN priorities A DD priority message will be sent from the AFTN terminal of IUT-B, converted to AMHS and received at the UA of IUT-A.		
Test description:	From the AFTN terminal IUTBFTNA of IUT-B send the following message to the User Agent (UA) of IUT-A: DD IUTAMHSA Test message ID: IT202M04 <FT> IUTBFTNA DD IUTAMHSA TEST IT202/TC04 <FT> IUTBFTNA TEST IT202/TC04 The message is converted from AFTN into AMHS format in the MTCU of IUT-B. Test message ID: IT202M05		
Test control: <FT> IUTBFTNA TEST IT202/TC05	Check the correct reception of the message at the UA IUTAMHSA of the IUT-A system. Check - the ATS-message-priority: PRI: DD - the message transfer priority: NORMAL - the ATS-message-filing-time and - the ATS-message-text		
Test result:	PASS	FAILED	INCONCLUSIVE

Test-case id: IT202/TC05	Tested functionality: Conversion of messages with different AFTN priorities An SS priority message will be sent from the AFTN terminal of IUT-B, converted to AMHS and received at the UA of IUT-A.		
Test description:	From the AFTN terminal IUTBFTNA of IUT-B send the following message to the User Agent (UA) of IUT-A: SS IUTAMHSA <FT> IUTBFTNA TEST IT202/TC05 The message is converted from AFTN into AMHS format in the MTCU of IUT-B. Optional: Generate a RN at the receiving UA IUTAMHSA of IUT-A.		
Test control:	Check the correct reception of the message at the UA IUTAMHSA of the IUT-A system. Check - the ATS-message-priority: PRI: SS - the message transfer priority: URGENT - the ATS-message-filing-time and - the ATS-message-text Optional: If a RN is replied from the UA IUTAMHSA of IUT-A, the MTCU of IUT-B converts it into an SS Ack message which is sent to the AFTN terminal of IUT-B. Check the reception of the SS Ack message at the AFTN terminal IUTBFTNA of IUT-B. Its originator indicator shall be the AFTN address IUTAMHSA, and its text shall be "R <FT> IUTBFTNA", where <FT> denotes the filing time of the subject AFTN message.		
Test result:	PASS	FAILED	INCONCLUSIVE

6.4 Gateway Operations (AMHS to AFTN)

IT301	Convert an IPM to AFTN format (IUT-B)		
Test-case id: IT301/TC01	Tested functionality: Conversion of messages with different ATS-message-priorities A KK priority message will be submitted from the UA of IUT-A, converted to AFTN in IUT-B and received at the AFTN terminal of IUT-B.		
Test description:	From the User Agent IUTAMHSA send the following message to the AFTN terminal IUTBFTNA of IUT-B: PRI: KK FT: <FT> OHI: TEST IT301/TC01 The message is converted from AMHS into AFTN format in the MTCU of IUT-B.		
Test control:	Check the correct reception of the message at the AFTN terminal IUTBFTNA of the IUT-B system. Check - the AFTN priority: KK - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT301	Convert an IPM to AFTN format (IUT-B)		
Test-case id: IT301/TC02	Tested functionality: Conversion of messages with different ATS-message-priorities A GG priority message will be submitted from the UA of IUT-A, converted to AFTN in IUT-B and received at the AFTN terminal of IUT-B.		
Test description:	From the User Agent IUTAMHSA send the following message to the AFTN terminal IUTBFTNA of IUT-B: PRI: GG FT: <FT> OHI: TEST IT301/TC02 The message is converted from AMHS into AFTN format in the MTCU of IUT-B.		
Test control:	Check the correct reception of the message at the AFTN terminal IUTBFTNA of the IUT-B system. Check - the AFTN priority: GG - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT301	Convert an IPM to AFTN format (IUT-B)		
Test-case id: IT301/TC03	Tested functionality: Conversion of messages with different ATS-message-priorities An FF priority message will be submitted from the UA of IUT-A, converted to AFTN in IUT-B and received at the AFTN terminal of IUT-B.		
Test description:	From the User Agent IUTAMHSA send the following message to the AFTN terminal IUTBFTNA of IUT-B: PRI: FF FT: <FT> OHI: TEST IT301/TC03 The message is converted from AMHS into AFTN format in the MTCU of IUT-B.		
Test control:	Check the correct reception of the message on the AFTN terminal IUTBFTNA of the IUT-B system. Check - the AFTN priority: FF - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT301	Convert an IPM to AFTN format (IUT-B)		
Test-case id: IT301/TC04	Tested functionality: Conversion of messages with different ATS-message-priorities A DD priority message will be submitted from the UA of IUT-A, converted to AFTN in IUT-B and received at the AFTN terminal of IUT-B.		
Test description:	From the User Agent IUTAMHSA send the following message to the AFTN terminal IUTBFTNA of IUT-B: PRI: DD FT: <FT> OHI: TEST IT301/TC04 The message is converted from AMHS into AFTN format in the MTCU of IUT-B.		
Test control:	Check the correct reception of the message on the AFTN terminal IUTBFTNA of the IUT-B system. Check - the AFTN priority: DD - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT301	Convert an IPM to AFTN format (IUT-B)		
Test-case id: IT301/TC05	Tested functionality: Conversion of messages with different ATS-message-priorities An SS priority message will be submitted from the UA of IUT-A, converted to AFTN in IUT-B and received at the AFTN terminal of IUT-B		
Test description:	From the User Agent IUTAMHSA send the following message to the AFTN terminal IUTBFTNA of IUT-B: PRI: SS FT: <FT> OHI: TEST IT301/TC05 The message is converted from AMHS into AFTN format in the MTCU of IUT-B. <i>Optional:</i> <i>Send an SS Acknowledgement message from the receiving AFTN terminal.</i>		
Test control:	Check the correct reception of the message on the AFTN terminal IUTBFTNA of the IUT-B system. Check - the AFTN priority: SS - the AFTN filing time and - the AFTN message text <i>Optional:</i> <i>When the SS Ack message is replied, the MTCU of IUT-B converts it into a RN.</i> <i>Check the reception of the RN at the UA IUTAMHSA of ITU-A.</i>		
Test result:	PASS	FAILED	INCONCLUSIVE

IT302	Convert an IPM to AFTN format (IUT-A)		
Test-case id: IT302/TC01	Tested functionality: Conversion of messages with different ATS-message-priorities A KK priority message will be submitted from the UA of IUT-B, converted to AFTN in IUT-A and received at the AFTN terminal of IUT-A.		
Test description:	From the User Agent IUTBMHSA send the following message to the AFTN terminal IUTAFTNA of IUT-A: PRI: KK FT: <FT> OHI: TEST IT302/TC01 The message is converted from AMHS into AFTN format in the MTCU of IUT-A.		
Test control:	Check the correct reception of the message on the AFTN terminal IUTAFTNA of the IUT-A system. Check - the AFTN priority: KK - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT302	Convert an IPM to AFTN format (IUT-A)		
Test-case id: IT302/TC02	Tested functionality: Conversion of messages with different ATS-message-priorities A GG priority message will be submitted from the UA of IUT-B, converted to AFTN in IUT-A and received at the AFTN terminal of IUT-A.		
Test description:	From the User Agent IUTBMHSA send the following message to the AFTN terminal IUTAFTNA of IUT-A: PRI: GG FT: <FT> OHI: TEST IT302/TC02 The message is converted from AMHS into AFTN format in the MTCU of IUT-A.		
Test control:	Check the correct reception of the message on the AFTN terminal IUTAFTNA of the IUT-A system. Check - the AFTN priority: GG - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT302	Convert an IPM to AFTN format (IUT-A)		
Test-case id: IT302/TC03	Tested functionality: Conversion of messages with different ATS-message-priorities An FF priority message will be submitted from the UA of IUT-B, converted to AFTN in IUT-A and received at the AFTN terminal of IUT-A.		
Test description:	From the User Agent IUTBMHSA send the following message to the AFTN terminal IUTAFTNA of IUT-A: PRI: FF FT: <FT> OHI: TEST IT302/TC03 The message is converted from AMHS into AFTN format in the MTCU of IUT-A.		
Test control:	Check the correct reception of the message on the AFTN terminal IUTAFTNA of the IUT-A system. Check - the AFTN priority: FF - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT302	Convert an IPM to AFTN format (IUT-A)		
Test-case id: IT302/TC04	Tested functionality: Conversion of messages with different ATS-message-priorities A DD priority message will be submitted from the UA of IUT-B, converted to AFTN in IUT-A and received at the AFTN terminal of IUT-A.		
Test description:	From the User Agent IUTBMHSA send the following message to the AFTN terminal IUTAFTNA of IUT-A: PRI: DD FT: <FT> OHI: TEST IT302/TC04 The message is converted from AMHS into AFTN format in the MTCU of IUT-A.		
Test control:	Check the correct reception of the message on the AFTN terminal IUTAFTNA of the IUT-A system. Check - the AFTN priority: DD - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT302	Convert an IPM to AFTN format (IUT-A)		
Test-case id: IT302/TC05	Tested functionality: Conversion of messages with different ATS-message-priorities An SS priority message will be submitted from the UA of IUT-B, converted to AFTN in IUT-A and received at the AFTN terminal of IUT-A.		
Test description:	From the User Agent IUTBMHSA send the following message to the AFTN terminal IUTAFTNA of IUT-A: PRI: SS FT: <FT> OHI: TEST IT302/TC05 The message is converted from AMHS into AFTN format in the MTCU of IUT-A. <i>Optional:</i> <i>Send an SS Acknowledgement message from the receiving AFTN terminal.</i>		
Test control:	Check the correct reception of the message on the AFTN terminal IUTAFTNA of the IUT-A system. Check - the AFTN priority: SS - the AFTN filing time and - the AFTN message text <i>Optional:</i> <i>When the SS Ack message is replied, the MTCU of IUT-A converts it into a RN.</i> <i>Check the reception of the RN at the UA IUTBMHSA of ITU-B.</i>		
Test result:	PASS	FAILED	INCONCLUSIVE

6.5 Gateway Operations (AFTN to AMHS to AFTN)

IT401	Convert an AFTN message to an IPM and back to AFTN format (IUT-A to IUT-B)		
Test-case id: IT401/TC01	Tested functionality: Conversion of messages with different AFTN priorities An AFTN message with KK priority will be sent from the AFTN terminal of IUT-A to the AFTN terminal of IUT-B.		
Test description:	From the AFTN terminal IUTAFTNA send the following message to the AFTN terminal IUTBFTNA of IUT-B: KK IUTBFTNA <FT> IUTAFTNA TEST IT401/TC01 The message is - converted from AFTN into AMHS format in the MTCU of IUT-A, - transferred via the MTA of IUT A to the MTA of IUT-B, - routed to the MTCU of IUT-B and - converted from AMHS into AFTN format in the MTCU of IUT-B. .		
Test control:	Check the correct reception of the message on the AFTN terminal IUTBFTNA of the IUT-B system. Check - the AFTN priority: KK - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT401	Convert an AFTN message to an IPM and back to AFTN format (IUT-A to IUT-B)		
Test-case id: IT401/TC02	Tested functionality: Conversion of messages with different AFTN priorities An AFTN message with GG priority will be sent from the AFTN terminal of IUT-A to the AFTN terminal of IUT-B.		
Test description:	From the AFTN terminal IUTAFTNA send the following message to the AFTN terminal IUTBFTNA of IUT-B: GG IUTBFTNA <FT> IUTAFTNA TEST IT401/TC02 The message is - converted from AFTN into AMHS format in the MTCU of IUT-A, - transferred via the MTA of IUT A to the MTA of IUT-B, - routed to the MTCU of IUT-B and - converted from AMHS into AFTN format in the MTCU of IUT-B.		
Test control:	Check the correct reception of the message on the AFTN terminal IUTBFTNA of the IUT-B system. Check - the AFTN priority: GG - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT401	Convert an AFTN message to an IPM and back to AFTN format (IUT-A to IUT-B)		
Test-case id: IT401/TC03	Tested functionality: Conversion of messages with different AFTN priorities An AFTN message with FF priority will be sent from the AFTN terminal of IUT-A to the AFTN terminal of IUT-B.		
Test description:	From the AFTN terminal IUTAFTNA send the following message to the AFTN terminal IUTBFTNA of IUT-B: FF IUTBFTNA <FT> IUTAFTNA TEST IT401/TC03 The message is - converted from AFTN into AMHS format in the MTCU of IUT-A, - transferred via the MTA of IUT A to the MTA of IUT-B, - routed to the MTCU of IUT-B and - converted from AMHS into AFTN format in the MTCU of IUT-B. .		
Test control:	Check the correct reception of the message on the AFTN terminal IUTBFTNA of the IUT-B system. Check - the AFTN priority: FF - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT401	Convert an AFTN message to an IPM and back to AFTN format (IUT-A to IUT-B)		
Test-case id: IT401/TC04	Tested functionality: Conversion of messages with different AFTN priorities An AFTN message with DD priority will be sent from the AFTN terminal of IUT-A to the AFTN terminal of IUT-B.		
Test description:	From the AFTN terminal IUTAFTNA send the following message to the AFTN terminal IUTBFTNA of IUT-B: DD IUTBFTNA <FT> IUTAFTNA TEST IT401/TC04 The message is - converted from AFTN into AMHS format in the MTCU of IUT-A, - transferred via the MTA of IUT A to the MTA of IUT-B, - routed to the MTCU of IUT-B and - converted from AMHS into AFTN format in the MTCU of IUT-B. .		
Test control:	Check the correct reception of the message on the AFTN terminal IUTBFTNA of the IUT-B system. Check - the AFTN priority: DD - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT401	Convert an AFTN message to an IPM and back to AFTN format (IUT-A to IUT-B)		
Test-case id: IT401/TC05	Tested functionality: Conversion of messages with different AFTN priorities An AFTN message with SS priority will be sent from the AFTN terminal of IUT-A to the AFTN terminal of IUT-B.		
Test description:	From the AFTN terminal IUTAFTNA send the following message to the AFTN terminal IUTBFTNA of IUT-B: SS IUTBFTNA <FT> IUTAFTNA TEST IT401/TC05 The message is - converted from AFTN into AMHS format in the MTCU of IUT-A, - transferred via the MTA of IUT A to the MTA of IUT-B, - routed to the MTCU of IUT-B and - converted from AMHS into AFTN format in the MTCU of IUT-B. <i>Optional:</i> <i>Send an SS Acknowledgement message from the receiving AFTN terminal.</i>		
Test control:	Check the correct reception of the message on the AFTN terminal IUTBFTNA of the IUT-B system. Check - the AFTN priority: SS - the AFTN filing time and - the AFTN message text <i>Optional:</i> <i>When the SS Ack message is replied, the MTCU of IUT-B converts it into a RN, the RN is re-converted to an SS Acknowledgement message in the MTCU of IUT-A.</i> <i>Check the reception of the SS Acknowledgement at the AFTN terminal IUTAFTNA of ITU-A.</i>		
Test result:	PASS	FAILED	INCONCLUSIVE

IT402	Convert an AFTN message to an IPM and back to AFTN format (IUT-B to IUT-A)		
Test-case id: IT402/TC01	Tested functionality: Conversion of messages with different AFTN priorities An AFTN message with KK priority will be sent from the AFTN terminal of IUT-B to the AFTN terminal of IUT-A.		
Test description:	From the AFTN terminal IUTBFTNA send the following message to the AFTN terminal IUTAFTNA of IUT-A: KK IUTAFTNA <FT> IUTBFTNA TEST IT402/TC01 The message is - converted from AFTN into AMHS format in the MTCU of IUT-B, - transferred via the MTA of IUT B to the MTA of IUT-A, - routed to the MTCU of IUT-A and - converted from AMHS into AFTN format in the MTCU of IUT-A.		
Test control:	Check the correct reception of the message on the AFTN terminal IUTAFTNA of the IUT-A system. Check - the AFTN priority: KK - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT402	Convert an AFTN message to an IPM and back to AFTN format (IUT-B to IUT-A)		
Test-case id: IT402/TC02	Tested functionality: Conversion of messages with different AFTN priorities An AFTN message with GG priority will be sent from IUT-B to the AFTN terminal of IUT-A.		
Test description:	From the AFTN terminal IUTBFTNA send the following message to the AFTN terminal IUTAFTNA of IUT-A: GG IUTAFTNA <FT> IUTBFTNA TEST IT402/TC02 The message is - converted from AFTN into AMHS format in the MTCU of IUT-B, - transferred via the MTA of IUT B to the MTA of IUT-A, - routed to the MTCU of IUT-A and - converted from AMHS into AFTN format in the MTCU of IUT-A.		
Test control:	Check the correct reception of the message on the AFTN terminal IUTAFTNA of the IUT-A system. Check - the AFTN priority: GG - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT402	Convert an AFTN message to an IPM and back to AFTN format (IUT-B to IUT-A)		
Test-case id: IT402/TC03	Tested functionality: Conversion of messages with different AFTN priorities An AFTN message with FF priority will be sent from the AFTN terminal of IUT-B to the AFTN terminal of IUT-A.		
Test description:	From the AFTN terminal IUTBFTNA send the following message to the AFTN terminal IUTAFTNA of IUT-A: FF IUTAFTNA <FT> IUTBFTNA TEST IT402/TC03 The message is - converted from AFTN into AMHS format in the MTCU of IUT-B, - transferred via the MTA of IUT B to the MTA of IUT-A, - routed to the MTCU of IUT-A and - converted from AMHS into AFTN format in the MTCU of IUT-A.		
Test control:	Check the correct reception of the message on the AFTN terminal IUTAFTNA of the IUT-A system. Check - the AFTN priority: FF - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT402	Convert an AFTN message to an IPM and back to AFTN format (IUT-B to IUT-A)		
Test-case id: IT402/TC04	Tested functionality: Conversion of messages with different AFTN priorities An AFTN message with DD priority will be sent from the AFTN terminal of IUT-B to the AFTN terminal of IUT-A.		
Test description:	From the AFTN terminal IUTBFTNA send the following message to the AFTN terminal IUTAFTNA of IUT-A: DD IUTAFTNA <FT> IUTBFTNA TEST IT402/TC04 The message is - converted from AFTN into AMHS format in the MTCU of IUT-B, - transferred via the MTA of IUT B to the MTA of IUT-A, - routed to the MTCU of IUT-A and - converted from AMHS into AFTN format in the MTCU of IUT-A.		
Test control:	Check the correct reception of the message on the AFTN terminal IUTAFTNA of the IUT-A system. Check - the AFTN priority: DD - the AFTN filing time and - the AFTN message text		
Test result:	PASS	FAILED	INCONCLUSIVE

IT402	Convert an AFTN message to an IPM and back to AFTN format (IUT-B to IUT-A)		
Test-case id: IT402/TC05	Tested functionality: Conversion of messages with different AFTN priorities An AFTN message with SS priority will be sent from the AFTN terminal of IUT-B to the AFTN terminal of IUT-A.		
Test description:	From the AFTN terminal of IUTBFTNA send the following message to the AFTN terminal IUTAFTNA of IUT-A: SS IUTAFTNA <FT> IUTBFTNA TEST IT402/TC05 The message is - converted from AFTN into AMHS format in the MTCU of IUT-B, - transferred via the MTA of IUT B to the MTA of IUT-A, - routed to the MTCU of IUT-A and - converted from AMHS into AFTN format in the MTCU of IUT-A. Optional: Send an SS Acknowledgement message from the receiving AFTN terminal.		
Test control:	Check the correct reception of the message on the AFTN terminal IUTAFTNA of the IUT-A system. Check - the AFTN priority: SS - the AFTN filing time and - the AFTN message text Optional: When the SS Ack message is replied, the MTCU of IUT-A converts it into a RN, the RN is re-converted to an SS Acknowledgement message in the MTCU of IUT-B. Check the reception of the SS Acknowledgement at the AFTN terminal IUTBFTNA of IUT-B.		
Test result:	PASS	FAILED	INCONCLUSIVE

6.6 Gateway Operations – special cases

IT501	Distribute an IPM to AMHS and AFTN users		
Test-case id: IT501/TC01	Tested functionality: Distribution of IPM A message will be sent from a UA on IUT-A to IUT-B with Primary Recipients addressing an AFTN terminal and a UA in IUT-B.		
Test description:	From IUTAMHSA send the following message to: <u>Primary Recipients</u> : IUTBMHSA and IUTBFTNA PRI: FF FT: <FT> TEST IT501/TC01 Get the message at the UA- and AFTN terminals of IUT-B.		
Test control:	Check the correct reception of the message by IUTBFTNA and IUTBMHSA in the IUT-B configuration.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT501	Distribute an IPM to AMHS and AFTN users		
Test-case id: IT501/TC02	Tested functionality: Distribution of IPM A message will be sent from a UA on IUT-B to IUT-A with Primary Recipients addressing an AFTN terminal and a UA in IUT-A.		
Test description:	From IUTBMHSA send the following message to: <u>Primary Recipients:</u> IUTAMHSA and IUTAFTNA PRI: FF FT: <FT> TEST IT501/TC02 Get the message at the UA- and AFTN terminals of IUT-A.		
Test control:	Check the correct reception of the message by IUTAFTNA and IUTAMHSA in the IUT-A configuration.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT501	Distribute an IPM to AMHS and AFTN users		
Test-case id: IT501/TC03	Tested functionality: Distribution of IPM A message will be sent from a UA on IUT-A to IUT-B with Primary Recipients and Copy Recipients, addressing AFTN terminals and UAs in IUT-B.		
Test description:	From IUTAMHSA send the following message to: <u>Primary Recipients:</u> IUTBMHSA and IUTBFTNA <u>Copy Recipients:</u> IUTBMHSB and IUTBFTNB PRI: FF FT: <FT> TEST IT501/TC03 Get the message at the UA- and AFTN terminals of IUT-B.		
Test control:	Check the correct reception of the message by IUTBFTNA, IUTBFTNB and IUTBMHSA, IUTBMHSB in the IUT-B configuration.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT501	Distribute an IPM to AMHS and AFTN users		
Test-case id: IT501/TC04	Tested functionality: Distribution of IPM A message will be sent from a UA on IUT-B to IUT-A with Primary Recipients and Copy Recipients, addressing AFTN terminals and UAs in IUT-A.		
Test description:	From IUTBMHSA send the following message to: <u>Primary Recipients:</u> IUTAMHSA and IUTAFTNA <u>Copy Recipients:</u> IUTAMHSB and IUTAFTNB PRI: FF FT: <FT> TEST IT501/TC04 Get the message at the UA- and AFTN terminals of IUT-A.		
Test control:	Check the correct reception of the message by IUTAFTNA, IUTAFTNB and IUTAMHSA, IUTAMHSB in the IUT-A configuration.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT501	Distribute an IPM to AMHS and AFTN users		
Test-case id: IT501/TC05	Tested functionality: Distribution of IPM A message will be sent from a UA on IUT-A to IUT-B with Primary Recipients, Copy Recipients and Blind Copy Recipients, addressing AFTN terminals and UAs in IUT-B.		
Test description:	From IUTAMHSA send the following message to: <u>Primary Recipients:</u> IUTBMHSA and IUTBFTNA <u>Copy Recipients:</u> IUTBMHSC and IUTBFTNB <u>Blind Copy Recipients:</u> IUTBMHSC and IUTBFTNC PRI: FF FT: <FT> TEST IT501/TC05 Get the message at the UA- and AFTN terminals of IUT-B.		
Test control:	Check that at the AFTN Station of IUT-B one message with addresses IUTBFTNA, IUTBFTNB and another message with the address IUTBFTNC is received. Check that at the UA IUTBMHSA one IPM is received which contains the Primary Recipients IUTBMHSA, IUTBFTNA and the Copy Recipients IUTBMHSC, IUTBFTNB, but no Blind Copy Recipients. Check that at the UA IUTBMHSC one IPM is received which contains the Primary Recipients IUTBMHSA, IUTBFTNA, the Copy Recipients IUTBMHSC, IUTBFTNB and one Blind Copy Recipient IUTBMHSC.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT501	Distribute an IPM to AMHS and AFTN users		
Test-case id: IT501/TC06	Tested functionality: Distribution of IPM A message will be sent from a UA on IUT-B to IUT-A with Primary Recipients, Copy Recipients and Blind Copy Recipients, addressing AFTN terminals and UAs in IUT-A.		
Test description:	From IUTBMHSA send the following message to: <u>Primary Recipients:</u> IUTAMHSA and IUTAFTNA <u>Copy Recipients:</u> IUTAMHSB and IUTAFTNB <u>Blind Copy Recipients:</u> IUTAMHSC and IUTAFTNC PRI: FF FT: <FT> TEST IT501/TC06 Get the message at the UA- and AFTN terminals of IUT-A.		
Test control:	Check that at the AFTN Station of IUT-A one message with addresses IUTAFTNA, IUTAFTNB and another message with the address IUTAFTNC is received. Check that at the UA IUTAMHSA one IPM is received which contains the Primary Recipients IUTAMHSA, IUTAFTNA and the Copy Recipients IUTAMHSB, IUTAFTNB, but no Blind Copy Recipients. Check that at the UA IUTAMHSC one IPM is received which contains the Primary Recipients IUTAMHSA, IUTAFTNA, the Copy Recipients IUTAMHSB, IUTAFTNB and one Blind Copy Recipient IUTAMHSC.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT502	Expand a DL addressing both AMHS and AFTN users		
Test-case id: IT502/TC01	Tested functionality: Expanding of Distribution list The message will be sent from a UA on IUT-A addressing a local DL which contains addresses of AFTN terminals and the UA in IUT-B.		
Test description:	IUTADLLO must be configured as a local DL entry in IUT-A containing the addresses IUTBFTNA IUTBFTNB and IUTBMHSA. From IUTAMHSA send the following message to IUTADLLO: PRI: FF FT: <FT> TEST IT502/TC01 Get the message at the UA and AFTN terminals of IUT-B.		
Test control:	Check the correct reception of the message by AFTN terminals IUTBFTNA, IUTBFTNB and UA IUTBMHSA in the IUT-B configuration.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT502	Expand a DL addressing both AMHS and AFTN users		
Test-case id: IT502/TC02	Tested functionality: Expanding of Distribution list The message will be sent from a UA on IUT-B addressing a local DL which contains addresses of AFTN terminals and the UA in IUT-A.		
Test description:	IUTBDLLO must be configured as a local DL entry in IUT-A containing the addresses IUTAFTNA, IUTAFTNB and IUTAMHSA. From IUTBMHSA send the following message to IUTBDLLO: PRI: FF FT: <FT> TEST IT502/TC02 Get the message at the UA and AFTN terminals of IUT-A.		
Test control:	Check the correct reception of the message by AFTN terminals IUTAFTNA, IUTAFTNB and UA IUTAMHSA in the IUT-A configuration.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT502	Expand a DL addressing both AMHS and AFTN users		
Test-case id: IT502/TC03	Tested functionality: Expanding of Distribution list The message will be sent from a UA on IUT-A addressing a remote DL in IUT-B which contains addresses of AFTN terminals and the UA in IUT-B		
Test description:	IUTBDLRE must be configured as a local DL entry in IUT-B containing the addresses IUTBFTNA, IUTBFTNB and IUTBMHSA. From IUTAMHSA send the following message to IUTBDLRE: PRI: FF FT: <FT> TEST IT502/TC03 Get the message at the UA and AFTN terminals of IUT-B.		
Test control:	Check the correct reception of the message by AFTN terminals IUTBFTNA, IUTBFTNB and UA IUTBMHSA in the IUT-B configuration.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT502	Expand a DL addressing both AMHS and AFTN users		
Test-case id: IT502/TC04	Tested functionality: Expanding of Distribution list The message will be sent from a UA on IUT-B addressing a remote DL in IUT-A which contains addresses of AFTN terminals and the UA in IUT-A		
Test description:	IUTADLRE must be configured as a local DL entry in IUT-A containing the addresses IUTAFTNA, IUTAFTNB and IUTAMHSA. From IUTBMHSA send the following message to IUTADLRE: PRI: FF FT: <FT> TEST IT502/TC04 Get the message at the UA- and AFTN terminals of IUT-B.		
Test control:	Check the correct reception of the message by AFTN terminals IUTAFTNA, IUTAFTNB and UA IUTAMHSA in the IUT-A configuration.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT503	Convert or reject an IPM, if the ATS-message-text contains more than 1800 characters		
Test-case id: IT503/TC01	Tested functionality: Conversion of “long” messages A message with normal priority and length of about 4500 characters is sent from the IUT-A to the IUT-B		
Test description:	From UA IUTAMHSA of IUT-A send the following message to the AFTN terminal IUTBFTNA: PRI: FF FT: <FT> OHI: TEST IT503/TC01 TEXT 4500 CHARACTERS 12345678901234567890123456789012345678901234567890123456789 12345678901234567890123456789012345678901234567890123456789 12345678901234567890123456789012345678901234567890123456789 ... 12345678901234567890123456789012345678901234567890123456789 END		
Test control:	The SARPs (3.1.2.3.5.2.1.7) specify that the message can be rejected (case a) or split into several messages (case b). If the system provides “long AFTN message” capability the message will be converted (case c). <u>If case a is implemented:</u> The message is not conveyed to the AFTN component. Check the Report received at the User Agent position IUTAMHSA Verify the following Per-Recipient-Report Non-Delivery information: - Actual-recipient-name: MF-form address of IUTBFTNA - reason code 1 signifies "unable-to-transfer" - diagnostic code 7 signifies "content-too-long". - supplementary information: "unable to convert to AFTN due to message text length". <u>If case b is implemented:</u> Check that IUTBFTNA receives several messages. <u>If case c is implemented:</u> Check that IUTBFTNA receives one message.		
Test result:	PASS	FAILED	INCONCLUSIVE
	a / b / c		

IT503	Convert or reject an IPM, if the ATS-message-text contains more than 1800 characters		
Test-case id: IT503/TC02	Tested functionality: Conversion of “long” messages A message with normal priority and length of about 4500 characters is sent from the IUT-B to the IUT-A		
Test description:	From UA IUTBMHSA of IUT-B send the following message to the AFTN terminal IUTAFTNA: PRI: FF FT: <FT> OHI: TEST IT503/TC02 TEXT 4500 CHARACTERS 12345678901234567890123456789012345678901234567890123456789 12345678901234567890123456789012345678901234567890123456789 12345678901234567890123456789012345678901234567890123456789 ... 12345678901234567890123456789012345678901234567890123456789 END		
Test control:	The SARPs (3.1.2.3.5.2.1.7) specify that the message can be rejected (case a) or split into several messages (case b). If the system provides “long AFTN message” capability the message will be converted (case c). <u>If case a is implemented:</u> The message is not conveyed to the AFTN component. Check the Report received at the User Agent position IUTBMHSA Verify the following Per-Recipient-Report Non-Delivery information: - Actual-recipient-name: MF-form address of IUTAFTNA - reason code 1 signifies "unable-to-transfer" - diagnostic code 7 signifies "content-too-long". - supplementary information: "unable to convert to AFTN due to message text length". <u>If case b is implemented:</u> Check that IUTAFTNA receives several messages. <u>If case c is implemented:</u> Check that IUTAFTNA receives one message.		
Test result:	PASS	FAILED	INCONCLUSIVE
	a / b / c		

IT504	Split an incoming IPM addressing more than 21 AFTN users		
Test-case id: IT504/TC01	Tested functionality: Conversion of messages with more than 21 addresses A message with normal priority containing 50 recipients is sent from the IUT-A to the IUT-B.		
Test description:	From IUTAMHSA send the following message to the following addressees (all recipients in the corresponding MF-Form): IUTBFTNA, IUTBFTNB, IUTBFTNC, IUTBFTND, IUTBFTNE, IUTBFTNF, IUTBFTNG, IUTBFTNH, IUTBFTNI, IUTBFTNJ, IUTBFTNK, IUTBFTNL, IUTBFTNM, IUTBFTNN, IUTBFTNO, IUTBFTNP, IUTBFTNQ, IUTBFTNR, IUTBFTNS, IUTBFTNT, IUTBFTNU, IUTBFTNV, IUTBFTNW, IUTBFTNX, IUTBFTNY, IUTBFTAA, IUTBFTAB, IUTBFTAC, IUTBFTAD, IUTBFTAE, IUTBFTAF, IUTBFTAG, IUTBFTAH, IUTBFTAI, IUTBFTAJ, IUTBFTAK, IUTBFTAL, IUTBFTAM, IUTBFTAN, IUTBFTAO, IUTBFTAP, IUTBFTAQ, IUTBFTAR, IUTBFTAS, IUTBFTAT, IUTBFTAU, IUTBFTAV, IUTBFTAW, IUTBFTAX, IUTBFTAY FT: <FT> OHI: TEST IT504/TC01		
Test control:	PDR M4050004 (Title: AMHS - Too Many Recipients) is resolved. Therefore the message shall be split into several messages. The message is split into 3 copies, each conveyed to the AFTN component. The first copy is addressed to 21 of the 50 addressee indicators. The second copy is addressed to further 21 addressee indicators. The third copy is addressed to the remaining 8 of the 50 addressee indicators. Check the correct reception of the messages on the AFTN terminal of IUT-B.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT504	Split an incoming IPM addressing more than 21 AFTN users		
Test-case id: IT504/TC02	Tested functionality: Conversion of messages with more than 21 addresses A message with normal priority containing 50 recipients is sent from the IUT-B to the IUT-A.		
Test description:	From IUTBMHSA send the following message to the following addressees (all recipients in the corresponding MF-Form): IUTAFTNA, IUTAFTNB, IUTAFTNC, IUTAFTND, IUTAFTNE, IUTAFTNF, IUTAFTNG, IUTAFTNH, IUTAFTNI, IUTAFTNJ, IUTAFTNK, IUTAFTNL, IUTAFTNM, IUTAFTNN, IUTAFTNO, IUTAFTNP, IUTAFTNQ, IUTAFTNR, IUTAFTNS, IUTAFTNT, IUTAFTNU, IUTAFTNV, IUTAFTNW, IUTAFTNX, IUTAFTNY, IUTAFTAA, IUTAFTAB, IUTAFTAC, IUTAFTAD, IUTAFTAE, IUTAFTAF, IUTAFTAG, IUTAFTAH, IUTAFTAI, IUTAFTAJ, IUTAFTAK, IUTAFTAL, IUTAFTAM, IUTAFTAN, IUTAFTAO, IUTAFTAP, IUTAFTAQ, IUTAFTAR, IUTAFTAS, IUTAFTAT, IUTAFTAU, IUTAFTAV, IUTAFTAW, IUTAFTAX, IUTAFTAY PRI: FF FT: <FT> OHI: TEST IT504/TC02		
Test control:	PDR M4050004 (Title: AMHS - Too Many Recipients) is resolved. Therefore the message shall be split into several messages. The message is split into 3 copies, each conveyed to the AFTN component. The first copy is addressed to 21 of the 50 addressee indicators. The second copy is addressed to further 21 addressee indicators. The third copy is addressed to the remaining 8 of the 50 addressee indicators. Check the correct reception of the messages on the AFTN terminal of IUT-A.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT505	Probe Conveyance Test		
Test-case id: IT505/TC01	Tested functionality: Processing of Probe Messages by UA and MTCU. The messages will be sent from a UA on IUT-A to IUT-B, addressing AFTN terminals and UAs in IUT-B.		
Test description:	From IUTAMHSA send a probe to IUTBFTNA, IUTBFTNB, IUTBMHSA.		
Test control:	On IUT-A UA IUTAMHSA: One Delivery Report (DR) with 2 AFTN recipients from the MTCU and one DR with one recipient from the MTA Verify that the DR reporting about the AFTN addresses contains the supplementary information “This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient”.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT505	Probe Conveyance Test		
Test-case id: IT505/TC02	Tested functionality: Processing of Probe Messages by UA and MTCU. The messages will be sent from a UA on IUT-B to IUT-A, addressing AFTN terminals and UAs in IUT-A.		
Test description:	From IUTBMHSA send a probe to IUTAFTNA, IUTAFTNB, IUTAMHSA.		
Test control:	On IUT-B UA IUTBMHSA: One Delivery Report (DR) with 2 AFTN recipients from the MTCU and one DR with one recipient from the MTA Verify that the DR reporting about the AFTN addresses contains the supplementary information “This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient”.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT505	Probe Conveyance Test		
Test-case id: IT505/TC03	Tested functionality: Processing of Probe Messages by UA and MTCU. The messages will be sent from a UA on IUT-A to IUT-B, containing the address of an AFTN terminal of IUT-B and an MF address which cannot be translated by the MTCU of IUT-B.		
Test description:	From IUTAMHSA send a probe to IUTBFTNA, IUTBFTUU (address is not provided in the look-up table of IUT-B).		
Test control:	Verify that at UA IUTAMHSA: A Delivery Report, containing the reported recipient IUTBFTNA and a NDR, containing the reported recipient IUTBFTUU, with: - non-delivery-reason-code set to “unable-to-transfer”, - non-delivery-diagnostic-code set to “unrecognized-OR-name” are received. Verify that the DR reporting about the address which could be translated contains the supplementary information “This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient”.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT505	Probe Conveyance Test		
Test-case id: IT505/TC04	Tested functionality: Processing of Probe Messages by UA and MTCU. The messages will be sent from a UA on IUT-B to IUT-A, containing the address of an AFTN terminal of IUT-A and an MF address which cannot be translated by the MTCU of IUT-A.		
Test description:	From IUTBMHSA send a probe to IUTAFTNA, IUTAFTUU (address is not provided in the look-up table of IUT-A)		
Test control:	Verify that at UA IUTBMHSA: A Delivery Report, containing the reported recipient IUTAFTNA and a NDR, containing the reported recipient IUTAFTUU, with: - non-delivery-reason-code set to “unable-to-transfer”, - non-delivery-diagnostic-code set to “unrecognized-OR-name” are received. Verify that the DR reporting about the address which could be translated contains the supplementary information “This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient”.		
Test result:	PASS	FAILED	INCONCLUSIVE

6.7 Stress traffic situations

IT601	Stress load		
Test-case id: IT601/TC01	Tested functionality: AMHS traffic interchange after queuing of an amount of messages After queuing of an amount of messages both IUTs start sending a burst of messages		
Test description:	Interrupt the connection between IUT-A and IUT-B by disabling the physical connector used to send information to the underlying network in one of the IUTs. Select from the data base or generated by the UA and/or the AFTN terminal 100 messages in both IUTs. For example, from IUTAFTNA send 100 messages to IUTBFTNA, IUTBMHSA. and from IUTBFTNA send 100 messages to IUTAFTNA, IUTAMHSA, In the result on IUT-A and IUT-B there are 100 messages queued in direction to the peer IUT. Re-establish the connection between IUT-A and IUT-B. The queued messages will be sent simultaneously from both IUTs. Measure the time: from re-establishing the connection till sending the first message and from sending the first till sending the last message. Measure the time: from re-establishing the connection till receiving the first message and from receiving the first message till receiving the last message.		
Test control:	Check that all 100 messages are received at the addressed terminals. Check that no errors or malfunction are reported or observed at the IUTs during the interchange period. Analyse the measured time. Calculate at both sides the amount of time needed to flush the queues. Unacceptable delays shall be treated as "FAILED".		
Test result:	PASS	FAILED	INCONCLUSIVE

The following table can be used to make notes of the Test Control Result.

Test Control	Result IT601/TC01	Result IT601/TC02	Result IT601/TC03
1. Notice the time of re-establishing the connection sending direction.			
2. Notice the time of sending the first message.			
3. Notice the time of sending the last message.			
4. Notice the time of re-establishing the connection receiving direction.			
5. Notice the time of receiving the first message.			
6. Notice the time of receiving the last message.			
7. Notice the number of messages received (shall be equal to the number of messages expected.)			
8. Check the event logging of the system for abnormalities in the area of AMHS / X.400 / AFTN/AMHS Gateway.			
9. Check the event logging / traffic traces for NDRs. (No NDRs are awaited.)			
10. Check for Control Position events. (No related events are awaited.)			
11. Check the X.400 / AMHS diagnostics, check the number of associations used (in particular possible hanging/unused associations).			
12. Monitor the underlying network infrastructure (network specialist).			
13. At both sides note the amount of time needed to flush the queues. (Unacceptable delays shall be treated as "FAILED")			

IT601	Stress load		
Test-case id: IT601/TC02	Tested functionality: AMHS traffic interchange after queuing of an amount of messages After queuing of an amount of messages both IUTs start sending a burst of messages		
Test description:	Interrupt the connection between IUT-A and IUT-B by disabling the physical connector used to send information to the underlying network in one of the IUTs. Select from the data base or generated by the UA and/or the AFTN terminal 200 messages in both IUTs. For example, from IUTAFTNA send 200 messages to IUTBFTNA, IUTBMHSA. and from IUTBFTNA send 200 messages to IUTAFTNA, IUTAMHSA, In the result on IUT-A and IUT-B there are 200 messages queued in direction to the peer IUT. Re-establish the connection between IUT-A and IUT-B. The queued messages will be sent simultaneously from both IUTs. Measure the time: • from re-establishing the connection till sending the first message and • from sending the first till sending the last message. Measure the time: • from re-establishing the connection till receiving the first message and • from receiving the first message till receiving the last message.		
Test control:	Check that all 200 messages are received at the addressed terminals. Check that no errors or malfunction are reported or observed at the IUTs during the interchange period. Analyse the measured time. Calculate at both sides the amount of time needed to flush the queues. Unacceptable delays shall be treated as “FAILED”.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT601	Stress load		
Test-case id: IT601/TC03	Tested functionality: AMHS traffic interchange after queuing of an amount of messages After queuing of an amount of messages both IUTs start sending a burst of messages		
Test description:	Interrupt the connection between IUT-A and IUT-B by disabling the physical connector used to send information to the underlying network in one of the IUTs. Select from the data base or generated by the UA and/or the AFTN terminal 400 messages in both IUTs. For example, from IUTAFTNA send 400 messages to IUTBFTNA, IUTBMHSA. and from IUTBFTNA send 400 messages to IUTAFTNA, IUTAMHSA, In the result on IUT-A and IUT-B there are 400 messages queued in direction to the peer IUT. Re-establish the connection between IUT-A and IUT-B. The queued messages will be sent simultaneously from both IUTs. Measure the time: • from re-establishing the connection till sending the first message and • from sending the first till sending the last message. Measure the time: • from re-establishing the connection till receiving the first message and • from receiving the first message till receiving the last message.		
Test control:	Check that all 400 messages are received at the addressed terminals. Check that no errors or malfunction are reported or observed at the IUTs during the interchange period. Analyse the measured time. Calculate at both sides the amount of time needed to flush the queues. Unacceptable delays shall be treated as “FAILED”.		
Test result:	PASS	FAILED	INCONCLUSIVE

7 Trilateral Test procedures - optional

7.1 Submission/Transfer/Delivery and Relay operations

IT701	Submission / Transfer / Delivery		
Test-case id: IT701/TC01	Tested functionality: Submission, transfer and delivery of messages to different IUTs An IPM submitted in IUT-A is transferred to IUT-B, IUT-C and delivered to the UAs of IUT-B, IUT-C.		
Test description:	Verify that the X.400 routing tables are configured according section 3.3, thus: The X.400 routing table of IUT-A routes PRMD=IUTLAND-B to IUT-B and PRMD=IUTLAND-C to IUT-C. From UA IUTAMHSA send an ATS message (IPM) to UA IUTBMHSA and IUTCMHSA: PRI: FF FT: <FT> OHI: TEST IT701/TC01		
Test control:	Verify that the message is received by both remote UAs in IUT-B and IUT-C. In particular, verify: • ATS-message-priority FF, • ATS-message-filing-time, • ATS-message-text.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT701	Submission / Transfer / Delivery		
Test-case id: IT701/TC02	Tested functionality: Submission, transfer and delivery of messages to different IUTs An IPM submitted in IUT-B is transferred to IUT-C, IUT-A and delivered to the UAs of IUT-C, IUT-A.		
Test description:	Verify that the X.400 routing tables are configured according section 3.3, thus: The X.400 routing table of IUT-B routes PRMD=IUTLAND-C to IUT-C and PRMD=IUTLAND-A to IUT-A. From the UA IUTBMHSA send an ATS message (IPM) to UA IUTAMHSA and IUTCMHSA. PRI: FF FT: <FT> OHI: TEST IT701/TC02		
Test control:	Verify that the message is received by both remote UAs in IUT-A and IUT-C. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT701	Submission / Transfer / Delivery between the partner MTAs		
Test-case id: IT701/TC03	Tested functionality: Submission, transfer and delivery of messages to different IUTs An IPM submitted in IUT-C is transferred to IUT-A, IUT-B and delivered to the UA of IUT-A, IUT-B.		
Test description:	Verify that the X.400 routing tables are configured according section 3.3, thus: The X.400 routing table of IUT-C routes PRMD=IUTLAND-A to IUT-A and PRMD=IUTLAND-B to IUT-B. From the UA IUTCMHSA send an ATS message (IPM) to UA IUTAMHSA and IUTBMHSA. PRI: FF FT: <FT> OHI: TEST IT701/TC03		
Test control:	Verify that the messages is received by both remote UAs in IUT-A and IUT-B. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT702	Relay operations		
Test-case id: IT702/TC01	Tested functionality: Transfer of messages by an IUT in between An IPM is routed via an intermediate MTA and transferred from one IUT to another IUT via a “relay” IUT.		
Test description:	Modify the X.400 routing as follows: The X.400 routing table of IUT-A routes PRMD=IUTLAND-B and PRMD=IUTLAND-C to IUT-B. The X.400 routing table of IUT-B routes PRMD=IUTLAND-C to IUT-C. Hence, IUT-B is the “relay” IUT. From the UA IUTAMHSA send an ATS message (IPM) to the UA IUTCMHSA. PRI: FF FT: <FT> OHI: TEST IT702/TC01		
Test control:	Verify that the message has passed the IUT-B in between (if possible). Verify that the message is received by the UA IUTCMHSA. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT702	Relay operations		
Test-case id: IT702/TC02	Tested functionality: Transfer of messages by an IUT in between An IPM is routed via an intermediate MTA and transferred from one IUT to another IUT via a “relay” IUT.		
Test description:	Modify the X.400 routing as follows: The X.400 routing table of IUT-B routes PRMD=IUTLAND-A and PRMD=IUTLAND-C to IUT-C. The X.400 routing table of IUT-C routes PRMD=IUTLAND-A to IUT-A. Hence, IUT-C is the “relay” IUT. From the UA IUTBMHSA send an ATS message (IPM) to the UA IUTAMHSA. PRI: FF FT: <FT> OHI: TEST IT702/TC02		
Test control:	Verify that the message has passed the IUT-C in between (if possible). Verify that the message is received by the UA IUTAMHSA. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT702	Relay operations		
Test-case id: IT702/TC03	Tested functionality: Transfer of messages by an IUT in between An IPM is routed via an intermediate MTA and transferred from one IUT to another IUT via a “relay” IUT.		
Test description:	Modify the X.400 routing as follows: The X.400 routing table of IUT-C routes PRMD=IUTLAND-A and PRMD=IUTLAND-B to IUT-A. The X.400 routing table of IUT-A routes PRMD=IUTLAND-B to IUT-B. Hence, IUT-A is the “relay” IUT. From the UA IUTCMHSA send an ATS message (IPM) to the UA IUTBMHSA. PRI: FF FT: <FT> OHI: TEST IT702/TC03		
Test control:	Verify that the message has passed the IUT-A in between (if possible). Verify that the message is received by the UA IUTBMHSA. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.		
Test result:	PASS	FAILED	INCONCLUSIVE

7.2 Test of special situations

IT801	Alternate MTA routing		
Test-case id: IT801/TC01	Tested functionality: Alternate routing capability An ATS message (IPM) queued due to outage of the primary X.400 routing path is routed via an alternate MTA (IUT).		
Test description:	Verify that the X.400 routing tables are configured according section 3.3, thus: The X.400 routing table of IUT-A routes PRMD=IUTLAND-B to IUT-B and PRMD=IUTLAND-C to IUT-C. The X.400 routing table of IUT-C routes PRMD=IUTLAND-A to IUT-A and PRMD=IUTLAND-B to IUT-B. Cut the direct connection from IUT-A to IUT-B. From the UA IUTAMHSA send an ATS message (IPM) to the UA IUTBMHSA. If alternate MTA routing functionality is implemented and configured in IUT-A, the message will be transferred automatically via the “alternate” connection. Otherwise: Reroute the queued message manually (an operational procedure for should exist).		
Test control:	Verify that the messages had passed the IUT-C in between (if possible). Verify the message received by the UA IUTBMHSA. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT801	Alternate MTA routing		
Test-case id: IT801/TC02	Tested functionality: Alternate routing capability An ATS message (IPM) queued due to outage of the primary X.400 routing path is routed via an alternate MTA (IUT).		
Test description:	Verify that the X.400 routing tables are configured according section 3.3, thus: The X.400 routing table of IUT-A routes PRMD=IUTLAND-B to IUT-B and PRMD=IUTLAND-C to IUT-C. The X.400 routing table of IUT-B routes PRMD=IUTLAND-A to IUT-A and PRMD=IUTLAND-C to IUT-C. Cut the direct connection from IUT-B to IUT-C. From the UA IUTBMHSA send an ATS message (IPM) to the UA IUTCMHSA. If alternate MTA routing functionality is implemented and configured in IUT-B, the message will be transferred automatically via the “alternate” connection. Otherwise: Reroute the queued message manually (an operational procedure for should exist).		
Test control:	Verify that the message had passed the IUT-A in between (if possible). Verify the message received by the UA of IUTCMHSA. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT801	Alternate MTA routing		
Test-case id: IT801/TC03	Tested functionality: Alternate routing capability An ATS message (IPM) queued due to outage of the primary X.400 routing path is routed via an alternate MTA (IUT).		
Test description:	Verify that the X.400 routing tables are configured according section 3.3, thus: The X.400 routing table of IUT-B routes PRMD=IUTLAND-A to IUT-A and PRMD=IUTLAND-C to IUT-C. The X.400 routing table of IUT-C routes PRMD=IUTLAND-A to IUT-A and PRMD=IUTLAND-B to IUT-B. Cut the direct connection from IUT-C to IUT-A. From the UA IUTCMHSA send an ATS message (IPM) to the UA IUTAMHSA. If alternate MTA routing functionality is implemented and configured in IUT-C, the message will be transferred automatically via the “alternate” connection. Otherwise: Reroute the queued message manually (an operational procedure for should exist).		
Test control:	Verify that the message had passed the IUT-B in between (if possible). Verify the message received by the UA of IUTAMHSA. In particular, verify: • ATS-message-priority, • ATS-message-filing-time, • ATS-message-text.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT802	Loop detection		
Test-case id: IT802/TC01	Tested functionality: A message traversing a loop is detected by an IUT.		
Test description:	Create a temporary routing loop. The X.400 routing table of IUT-A routes PRMD=IUTLAND-X to IUT-B. The X.400 routing table of IUT-B routes PRMD=IUTLAND-X to IUT-C. The X.400 routing table of IUT-C routes PRMD=IUTLAND-X to IUT-A. From UA IUTAMHSA send a message (IT802/M01) addressed to IUTXLOOP. This message will be routed cyclically so that it is finally performing a loop. One IUT detects the looping message, stops the further transfer and non-delivers the message.		
Test control:	Verify that: • the message is discarded • at UA IUTAMHSA a Non-Delivery-Report is received with non-delivery-reason “transfer-failure” and non-delivery-diagnostic-code “loop detected”.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT802	Loop detection		
Test-case id: IT802/TC02	Tested functionality: A message traversing a loop is detected by an IUT.		
Test description:	Create a temporary routing loop. The X.400 routing table of IUT-A routes PRMD=IUTLAND-X to IUT-B. The X.400 routing table of IUT-B routes PRMD=IUTLAND-X to IUT-C. The X.400 routing table of IUT-C routes PRMD=IUTLAND-X to IUT-A. From UA IUTBMHSA send a message (IT802/M02) addressed to IUTXLOOP. This message will be routed cyclically so that it is finally performing a loop. One IUT detects the looping message, stops the further transfer and non-delivers the message.		
Test control:	Verify that: • the message is discarded • at UA IUTBMHSA a Non-Delivery-Report is received with non-delivery-reason “transfer-failure” and non-delivery-diagnostic-code “loop detected”.		
Test result:	PASS	FAILED	INCONCLUSIVE

IT802	Loop detection		
Test-case id: IT802/TC03	Tested functionality: A message traversing a loop is detected by an IUT.		
Test description:	Create a temporary routing loop. The X.400 routing table of IUT-A routes PRMD=IUTLAND-X to IUT-B. The X.400 routing table of IUT-B routes PRMD=IUTLAND-X to IUT-C. The X.400 routing table of IUT-C routes PRMD=IUTLAND-X to IUT-A. From UA IUTCMHSA send a message (IT802/M03) addressed to IUTXLOOP. The message will be routed cyclically so that it is finally performing a loop. One IUT detects the looping message, stops the further transfer and non-delivers the message.		
Test control:	Verify that: • the message is discarded • at UA IUTCMHSA a Non-Delivery-Report is received with non-delivery-reason “transfer-failure” and non-delivery-diagnostic-code “loop detected”.		
Test result:	PASS	FAILED	INCONCLUSIVE

8 Test message templates

8.1 Test message templates for IUT-A

8.1.1 Input device User Agent (UA): IUTAMHSA

From UA IUTAMHSA	to UA IUTBMHSA
Test message ID: IT101M01	PRI: KK FT: <FT> OHI: TEST IT101/TC01
Test message ID: IT101M02	PRI: GG FT: <FT> OHI: TEST IT101/TC02
Test message ID: IT101M03	PRI: FF FT: <FT> OHI: TEST IT101/TC03
Test message ID: IT101M04	PRI: DD FT: <FT> OHI: TEST IT101/TC04
Test message ID: IT101M05	PRI: SS FT: <FT> OHI: TEST IT101/TC05

From UA IUTAMHSA	to UA IUTBFTNA
Test message ID: IT301M01	PRI: KK FT: <FT> OHI: TEST IT301/TC01
Test message ID: IT301M02	PRI: GG FT: <FT> OHI: TEST IT301/TC02
Test message ID: IT301M03	PRI: FF FT: <FT> OHI: TEST IT301/TC03
Test message ID: IT301M04	PRI: DD FT: <FT> OHI: TEST IT301/TC04
Test message ID: IT301M05	PRI: SS FT: <FT> OHI: TEST IT301/TC05

From UA IUTAMHSA Test message ID: IT501M01	<u>To Primary Recipients:</u> IUTBMHSA and IUTBFTNA PRI: FF FT: <FT> OHI: TEST IT501/TC01
Test message ID: IT501M03	<u>To Primary Recipients:</u> IUTBMHSA and IUTBFTNA <u>To Copy Recipients:</u> IUTBMHSB and IUTBFTNB PRI: FF FT: <FT> OHI: TEST IT501/TC03
Test message ID: IT501M05	<u>To Primary Recipients:</u> IUTBMHSA and IUTBFTNA <u>To Copy Recipients:</u> IUTBMHSB and IUTBFTNB <u>To Blind Copy Recipients:</u> IUTBMHSC and IUTBFTNC PRI: FF FT: <FT> OHI: TEST IT501/TC05

From UA IUTAMHSA Test message ID: IT502M01	<u>To:</u> IUTADLLO PRI: FF FT: <FT> OHI: TEST IT502/TC01
Test message ID: IT502M03	<u>To:</u> IUTBDLRE PRI: FF FT: <FT> OHI: TEST IT502/TC03
From UA IUTAMHSA Test message ID: IT503M01	<u>To:</u> AFTN terminal IUTBFTNA PRI: FF FT: <FT> OHI: TEST IT503/TC01 TEXT 4500 CHARACTERS 12345678901234567890123456789012345678901234567890123456789 12345678901234567890123456789012345678901234567890123456789 12345678901234567890123456789012345678901234567890123456789 ... <63 figure lines 1234567890 ... 123456789> 12345678901234567890123456789012345678901234567890123456789 END
From UA IUTAMHSA Test message ID: IT504M01	<u>To:</u> IUTBFTNA, IUTBFTNB, IUTBFTNC, IUTBFTND, IUTBFTNE, IUTBFTNF, IUTBFTNG, IUTBFTNH, IUTBFTNI, IUTBFTNJ, IUTBFTNK, IUTBFTNL, IUTBFTNM, IUTBFTNN, IUTBFTNO, IUTBFTNP, IUTBFTNQ, IUTBFTNR, IUTBFTNS, IUTBFTNT, IUTBFTNU, IUTBFTNV, IUTBFTNW, IUTBFTNX, IUTBFTNY, IUTBFTAA, IUTBFTAB, IUTBFTAC, IUTBFTAD, IUTBFTAE, IUTBFTAF, IUTBFTAG, IUTBFTAH, IUTBFTAI, IUTBFTAJ, IUTBFTAK, IUTBFTAL, IUTBFTAM, IUTBFTAN, IUTBFTAO, IUTBFTAP, IUTBFTAQ, IUTBFTAR, IUTBFTAS, IUTBFTAT, IUTBFTAU, IUTBFTAV, IUTBFTAW, IUTBFTAX, IUTBFTAY PRI: FF FT: <FT> OHI: TEST IT504/TC01

8.1.2 Input device AFTN Terminal: IUTAFTNA

From AFTN Terminal IUTAFTNA	To UA IUTBMHSA
Test message ID: IT201M01	KK IUTBMHSA <FT> IUTAFTNA TEST IT201/TC01
Test message ID: IT201M02	GG IUTBMHSA <FT> IUTAFTNA TEST IT201/TC02
Test message ID: IT201M03	FF IUTBMHSA <FT> IUTAFTNA TEST IT201/TC03
Test message ID: IT201M04	DD IUTBMHSA <FT> IUTAFTNA TEST IT201/TC04
Test message ID: IT201M05	SS IUTBMHSA <FT> IUTAFTNA TEST IT201/TC05

From AFTN Terminal IUTAFTNA	to AFTN Terminal IUTBFTNA
Test message ID: IT401M01	KK IUTBFTNA <FT> IUTAFTNA TEST IT401/TC01
Test message ID: IT401M02	GG IUTBFTNA <FT> IUTAFTNA TEST IT401/TC02
Test message ID: IT401M03	FF IUTBFTNA <FT> IUTAFTNA TEST IT401/TC03
Test message ID: IT401M04	DD IUTBFTNA <FT> IUTAFTNA TEST IT401/TC04
Test message ID: IT401M05	SS IUTBFTNA <FT> IUTAFTNA TEST IT401/TC05

8.2 Test message templates for IUT-B

8.2.1 Input device User Agent (UA): IUTBMHSA

From UA IUTBMHSA	to UA IUTAMHSA
Test message ID: IT102M01	PRI: KK FT: <FT> OHI: TEST IT102/TC01
Test message ID: IT102M02	PRI: GG FT: <FT> OHI: TEST IT102/TC02
Test message ID: IT102M03	PRI: FF FT: <FT> OHI: TEST IT102/TC03
Test message ID: IT102M04	PRI: DD FT: <FT> OHI: TEST IT102/TC04
Test message ID: IT102M05	PRI: SS FT: <FT> OHI: TEST IT102/TC05

From UA IUTBMHSA	to AFTN Terminal IUTAFTNA
Test message ID: IT302M01	PRI: KK FT: <FT> OHI: TEST IT302/TC01
Test message ID: IT302M02	PRI: GG FT: <FT> OHI: TEST IT302/TC02
Test message ID: IT302M03	PRI: FF FT: <FT> OHI: TEST IT302/TC03
Test message ID: IT302M04	PRI: DD FT: <FT> OHI: TEST IT302/TC04
Test message ID: IT302M05	PRI: SS FT: <FT> OHI: TEST IT302/TC05

From UA IUTBMHSA Test message ID: IT501M02	<u>To Primary Recipients:</u> IUTAMHSA and IUTAFTNA PRI: FF FT: <FT> OHI: TEST IT501/TC02
Test message ID: IT501M04	<u>To Primary Recipients:</u> IUTAMHSA and IUTAFTNA <u>To Copy Recipients:</u> IUTAMHSB and IUTAFTNB PRI: FF FT: <FT> OHI: TEST IT501/TC04
Test message ID: IT501M06	<u>To Primary Recipients:</u> IUTAMHSA and IUTAFTNA To Copy Recipients: IUTAMHSB and IUTAFTNB To Blind Copy Recipients: IUTAMHSC and IUTAFTNC PRI: FF FT: <FT> OHI: TEST IT501/TC06
From UA IUTBMHSA Test message ID: IT502M02	To: IUTBDLLO PRI: FF FT: <FT> OHI: TEST IT502/TC02
Test message ID: IT502M04	To: IUTADLRE PRI: FF FT: <FT> OHI: TEST IT502/TC04
From UA IUTBMHSA Test message ID: IT503M02	To: AFTN Terminal IUTAFTNA PRI: FF FT: <FT> OHI: TEST IT503/TC02 TEXT 4500 CHARACTERS 12345678901234567890123456789012345678901234567890123456789 12345678901234567890123456789012345678901234567890123456789 12345678901234567890123456789012345678901234567890123456789 ... <63 figure lines 1234567890 ... 123456789> 12345678901234567890123456789012345678901234567890123456789 END

From UA IUTBMHSA Test message ID: IT504M02	To: IUTAFTNA, IUTAFTNB, IUTAFTNC, IUTAFTND, IUTAFTNE, IUTAFTNF, IUTAFTNG, IUTAFTNH, IUTAFTNI, IUTAFTNJ, IUTAFTNK, IUTAFTNL, IUTAFTNM, IUTAFTNN, IUTAFTNO, IUTAFTNP, IUTAFTNQ, IUTAFTNR, IUTAFTNS, IUTAFTNT, IUTAFTNU, IUTAFTNV, IUTAFTNW, IUTAFTNX, IUTAFTNY, IUTAFTAA, IUTAFTAB, IUTAFTAC, IUTAFTAD, IUTAFTAE, IUTAFTAF, IUTAFTAG, IUTAFTAH, IUTAFTAI, IUTAFTAJ, IUTAFTAK, IUTAFTAL, IUTAFTAM, IUTAFTAN, IUTAFTAO, IUTAFTAP, IUTAFTAQ, IUTAFTAR, IUTAFTAS, IUTAFTAT, IUTAFTAU, IUTAFTAV, IUTAFTAW, IUTAFTAX, IUTAFTAY PRI: FF FT: <FT> OHI: TEST IT504/TC02
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8.3 Input device AFTN Terminal: IUTBFTNA

From AFTN Terminal IUTBFTNA	to UA IUTAMHSA
Test message ID: IT202M01	KK IUTAMHSA <FT> IUTBFTNA TEST IT202/TC01
Test message ID: IT202M02	GG IUTAMHSA <FT> IUTBFTNA TEST IT202/TC02
Test message ID: IT202M03	FF IUTAMHSA <FT> IUTBFTNA TEST IT202/TC03
Test message ID: IT202M04	DD IUTAMHSA <FT> IUTBFTNA TEST IT202/TC04
Test message ID: IT202M05	SS IUTAMHSA <FT> IUTBFTNA TEST IT202/TC05

From AFTN Terminal IUTBFTNA	to UA IUTAMHSA
Test message ID: IT402M01	KK IUTAFTNA <FT> IUTBFTNA TEST IT402/TC01
Test message ID: IT402M02	GG IUTAFTNA <FT> IUTBFTNA TEST IT402/TC02
Test message ID: IT402M03	FF IUTAFTNA <FT> IUTBFTNA TEST IT402/TC03
Test message ID: IT402M04	DD IUTAFTNA <FT> IUTBFTNA TEST IT402/TC04
Test message ID: IT402M05	SS IUTAFTNA <FT> IUTBFTNA TEST IT402/TC05

8.4 Test message templates for multilateral tests

From UA IUTAMHSA Test message ID: IT701M01	To: IUTBMHSA and IUTCMHSA PRI: FF FT: <FT> OHI: TEST IT701/TC01
From UA IUTBMHSA Test message ID: IT701M02	To: IUTAMHSA and IUTCMHSA PRI: FF FT: <FT> OHI: TEST IT701/TC02
From UA IUTCMHSA Test message ID: IT701M03	To: IUTAMHSA and IUTBMHSA PRI: FF FT: <FT> OHI: TEST IT701/TC03

From UA IUTAMHSA Test message ID: IT702M01	To: IUTCMHSA PRI: FF FT: <FT> OHI: TEST IT702/TC01
From UA IUTBMHSA Test message ID: IT702M02	To: IUTAMHSA PRI: FF FT: <FT> OHI: TEST IT702/TC02
From UA IUTCMHSA Test message ID: IT702M03	To: IUTBMHSA PRI: FF FT: <FT> OHI: TEST IT702/TC03

From UA IUTAMHSA Test message ID: IT801M01	To: IUTBMHSA PRI: FF FT: <FT> OHI: TEST IT801/TC01
From UA IUTBMHSA Test message ID: IT801M02	To: IUTCMHSA PRI: FF FT: <FT> OHI: TEST IT801/TC02
From UA IUTCMHSA Test message ID: IT801M03	To: IUTAMHSA PRI: FF FT: <FT> OHI: TEST IT801/TC03

From UA IUTAMHSA Test message ID: IT802M01	To: IUTXMHSA PRI: FF FT: <FT> OHI: TEST IT802/TC01
From UA IUTBMHSA Test message ID: IT802M02	To: IUTXMHSA PRI: FF FT: <FT> OHI: TEST IT802/TC02
From UA IUTCMHSA Test message ID: IT802M03	To: IUTXMHSA PRI: FF FT: <FT> OHI: TEST IT802/TC03

- END -

ANNEX F

AMHS Pre-Operational Tests

ANNEX F

of

AMHS Manual

Document Control Log

[illegible]

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References

- [1] ICAO Annex 10 – Aeronautical Telecommunications, Volume II: Communication Procedures
- [2] ICAO DOC 9705-AN/956: The Manual of technical provisions for the ATN, Sub-volume III, Section 3.1 –Edition 3 (2002) – Referred to as AMHS SARPs
- [3] ASIAPAC Doc 020 – ASIAPAC AMHS Manual, Main Part
- [4] ASIAPAC Doc 020 – ASIAPAC AMHS Manual, Appendix C, AMHS Testing Requirements
- [5] ASIAPAC Doc 020 – ASIAPAC AMHS Manual, Appendix D, AMHS Conformance Tests

- [6] ASIAPAC Doc 020 – ASIAPAC AMHS Manual, Appendix E, AMHS Interoperability Tests

1 Introduction

1.1 Purpose of the Document

The purpose of the document is to define AMHS Pre-operational Tests in order to ensure the interoperability between AMHS systems prepared for going into operation. The document defines the objectives and prerequisites as well as the tests themselves.

The AMHS Pre-operational Tests are interoperability type tests. They are the last tests between Operational Systems and should be performed within the operational network environment before the "AMHS cut-over".

After "AMHS cut-over" the AMHS relation between the two systems is operational. That means: the exchange of the complete operational traffic (or a part of that) is performed by means of AMHS only. For this traffic no other means (AFTN or X.25) are used.

1.2 Objectives of the Pre-operational Tests

The objectives of the AMHS Pre-operational Tests are:

1. To test the interoperability between the AMHS systems in an operational environment.
2. To test the integrity of the messages exchanged.
3. To test the message exchange after a disturbance (e.g. queued messages).

The prerequisites of the AMHS Pre-operational Tests are:

- Successful performance of AMHS Conformance Tests as specified in [5], through which the compliance of all systems under test to the [2] has been demonstrated, and
- Successful performance of AMHS Interoperability Tests as specified in [6], through which the interoperability of these AMHS systems in a test (bed) environment has been demonstrated, and
- Successful performance of Underlying Network Tests, through which is demonstrated that the underlying (IP) network is available and stable, and
- System configuration on both systems (The agreed set is loaded and established.)

The messages used in the AMHS Pre-operational Tests are generated either:

- manually, or
- using parallel duplicated traffic;

1.3 Test Overview

The following tests have to be performed:

1. Go-NoGo Test: A simple test which checks that the configuration and underlying network functions are operating correctly. It is a prerequisite for the subsequent tests.
2. Traffic duplication and verification: For selected AFTN addressee indicators all traffic will be duplicated to corresponding AMHS recipient addresses on the remote system. On the remote system the AFTN message received will be compared with the copy received by the AMHS user.

3. Stress test: The outgoing AMHS traffic recorded in one day within the previous test is repeated from one to the other system and vice versa. To simulate an outage between the involved systems the LAN connection can be disabled; in consequence the messages are queued. If enough messages are queued the LAN connection will be enabled.
4. (Optional) Selected test cases from the AMHS Interoperability Tests: Due to the fact that in the pre-operational test phase the operational system with the complete operational setup is used, a selection of interoperability tests may be repeated.

The estimated duration of the AMHS Pre-operational Tests is 4 days and calculated as follows:

Test ID	Duration	Remark
PRE001 and PRE002	1 hour	inclusive set-up / co-ordination
PRE003	3 days	
PRE003	0.5 day	
optional (selected Interoperability Tests)	1 hour	

Table F- 1: Estimated duration of the AMHS Pre-operational Tests

¹ Traffic consisting of the locally originated AFTN flow and the incoming AFTN flow; *Locally originated AFTN flow*: national AFTN traffic received by the COM Centre addressed to international (or national) communication partners; *Incoming AFTN flow*: international AFTN traffic received by the COM Centre addressed to international (or national) communication partners.

² Where aaaa = the location indicator of the MTA location of the Test partner 1.

³ Where dddd = the location indicator of the MTA location of the Test partner 2.

1.4 Document Structure

Chapter 1 presents the purpose, objectives and test overview.

Chapter 2 presents the test environment used for AMHS Pre-operational Testing.

Chapter 3 defines the set-up and configuration of the AMHS systems.

Chapter 4 defines the addressing plan for AMHS Pre-operational Testing.

Chapter 5 contains the description of the Pre-operational Tests.

2 AMHS Pre-operational Test Environment

2.1 Application infrastructure

The AMHS systems prepared for going into operation are interconnected by means of the operational infrastructure (cf. Figure F-1).

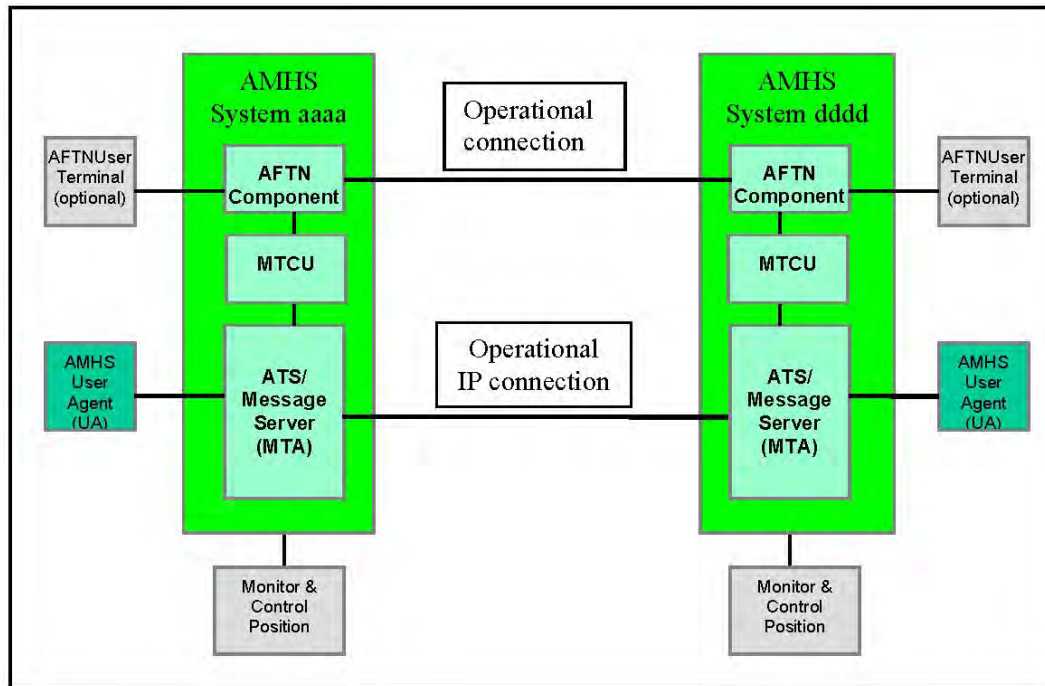


Figure F- 1: AMHS Pre-operational Test Environment

2.2 Transport infrastructure

One of the recommended infrastructures was TCP/IP protocol (IPv4/IPv6). In line with existing recommendations, the operational IP connection should utilize IPv6 at the international level and should provide a redundant connectivity. The redundancy concept of the network ensures the reach ability in any case between the MTAs, while the MTA uses single IP addresses only.

3 Operational system setup - Configuration

The AMHS Systems involved in the pre-operational tests are expected to be configured “as close” to the Operational Systems as possible (with respect to routing tables and look-up tables).

Special addresses needed for testing are listed in this document.

MTA names etc. shall follow the recommendations laid down in [3]. For completeness they are listed hereafter.

3.1 Configuration Lower Layers

Item	Test partner 1	Test partner 2	Recommended values
TSAP	TBD	TBD	e.g. '544350' (“TCP”) or '4D4853' (“MHS”)
IPv6 Address	TBD	TBD	
IP Port	TBD	TBD	102

Table F- 2: Configuration Lower Layers

3.2 Configuration Upper Layers

Item	Test partner 1	Test partner 2	Recommended values
MTA Name	MTA-aaaa2-1	MTA-dddd3-1	cf. [3] section 8.2
Password	ICAO-aaaa-1	ICAO-dddd-1	cf. [3] section 8.2
PSAP	not used	not used	not used
SSAP	not used	not used	not used
Number of incoming associations	TBD	TBD	5, should be equal to the outgoing number
Number of outgoing associations	TBD	TBD	5, should be equal to the incoming number
Protocol type	X.400/1988	X.400/1988	cf. PDR M6080001 Phasing out of IPM 1984
Dialogue mode	Monologue	Monologue	

Table F- 3: Configuration Upper Layers

4 Addressing Plan for AMHS Pre-operational Testing

4.1 User addresses

To meet the scope of testing, the test-address space used by AMHS Pre-operational Testing should include for each test partner as minimum one AMHS user.

4.1.1 AMHS Users for Test partner 1

User Name	MF-address	Remarks
aaaaAMHA	/C=XX/A=ICAO/P=bbbb/O=cccc/OU1=aaaa /CN=aaaaAMHA	or other than AMHA

Table F- 4: Registered AMHS Users (Test partner 1)

Example:

User Name	MF-address	Remarks
LEEEAMHA	/C=XX/A=ICAO/P=AENA/O=LECM/OU1=LEEE /CN=LEEEAMHA	

4.1.2 AMHS Users for Test partner 2

User Name	MF-address	Remarks
ddddAMHA	/C=XX/A=ICAO/P=eeee/O=ffff/OU1=dddd /CN=ddddAMHA	or other than AMHA

Table F- 5: Registered AMHS Users (Test partner 2)

Example:

User Name	MF-address	Remarks
EDDDYFYA	/C=XX/A=ICAO/P=GERMANY/O=EDDD/OU1=EDDD /CN=EDDDYFYA	

4.2 Addresses for Traffic Duplication

Due to the fact that the Pre-operational tests will be performed in an operational environment the addresses selected for duplication cannot be pre-determined in this document. The following tables show two different possibilities how to define these addresses. The test partners have all freedom in definition and selection.

It is recommended to select those addresses for duplication to which a moderate number of messages are usually transmitted.

4.2.1 AFTN Addresses selected for Traffic Duplication -Test partner 1 to Test partner 2

AF Address	O/R address	Remarks
ddaaCOPY	/C=XX/A=ICAO/P=eeee/O=ffff/OU1=ddaa /CN=ddaaCOPY	Copy of a real ddaa address
ddbbCOPY	/C=XX/A=ICAO/P=eeee/O=ffff /OU1=ddbb /CN=ddbbCOPY	Copy of a real ddbb address
ddccCOPY	/C=XX/A=ICAO/P=eeee/O=ffff /OU1=ddcc /CN=ddccCOPY	Copy of a real ddcc address

Table F- 6: AFTN addresses -Test partner 1 to Test partner 2

Example:

AF Address	O/R address	Remarks
LEEECOPY	/C=XX/A=ICAO/P=AENA/O=LECM/OU1=LEEE /CN=LEEECOPY	real address: LEEENYX
LEEACOPY	/C=XX/A=ICAO/P=AENA/O=LECM/OU1=LEEA /CN=LEEACOPY	real address: LEMMYMYX
LECMCOPY	/C=XX/A=ICAO/P=AENA/O=LECM/OU1=LECM /CN=LECMCOPY	real address: LECMZAZX

4.2.2 AFTN Addresses selected for Traffic Duplication -Test partner 2 to Test partner 1

AF Address	O/R address	Remarks
aaaaAMHA	/C=XX/A=ICAO/P=bbbb/O=cccc/OU1=aaaa /CN=aaaaAMHA	Copy of a real aaaa address
aaaaAMHB	/C=XX/A=ICAO/P=bbbb/O=cccc/OU1=aaaa /CN=aaaaAMHB	Copy of another real aaaa address
aaccAMHC	/C=XX/A=ICAO/P=bbbb/O=cccc/OU1=aacc /CN=aaccAMHC	Copy of a real aacc address

Table F- 7: AFTN addresses -Test partner 2 to Test partner 1

Example:

AF Address	O/R address	Remarks
EDDDAMHA	/C=XX/A=ICAO/P=GERMANY/O=EDDD/OU1=EDDD /CN=EDDDAMHA	real address: EDDDYNYX
EDDDAMHB	/C=XX/A=ICAO/P=GERMANY/O=EDDD/OU1=EDDD /CN=EDDDAMHB	real address: EDZOYMYX
EDZZAMHC	/C=XX/A=ICAO/P=GERMANY/O=EDDD/OU1=EDZZ /CN=EDZZAMHC	real address: EDZZNAXX

4.3 DL addresses

It is recommended to use for DLs specific Common Names (CN) to make it transparent for the users that this special O/R address is related to a Distribution list. The CN of a DL O/R address should in line with the definition for PDAI in [1].

4.4 AFTN and X.400 Routing Tables

It is recommended that the systems involved in the Pre-operational Tests are configured with the latest valid **AFTN Routing Table** available in the AMC system including the minor changes needed for the Pre-operational Tests themselves.

Only for the selected traffic (bilaterally agreed addresses) shall AFTN routing paths through the MTCU be set up.

Furthermore it is recommended that the systems are configured with the **complete X.400**.

Routing Table covering all existing PRMD names. For all PRMD names which are not involved in the Pre-operational Tests, a default routing to a "Dummy MTA direction" shall be defined in order to handle exceptional situations within the Pre-operational Tests as well as for future operations.

Only for the selected traffic (bilaterally agreed addresses) shall respective X.400 routing paths through the MTCU or to the adjacent MTA be set up.

The recommended complete setup of the X.400 Routing table allows the responsible international COM Centre to ensure that each message entered into an international Network (AFTN, X.25 as well as AMHS) is correct in format and addressing. When using a reduced X.400 routing table, (use of general default routing entries), such checking of addressing cannot be performed, especially if domestic UAs are connected. Only with the full set of PRMD routing entries, is a minimum checking of address validity possible.

4.5 Look-up Tables

4.5.1 Generic look-up Tables

It is recommended that the systems are configured with the complete set of information required for the address translation.

The tables needed are reflected in [8] or in the Intra MD Addressing function of the ATS Messaging Management Centre (AMC). From the AMC the complete **MD Look-up Table** (AMHS MD Register Export. csv) and the complete **CAAS Look-up Tables** (CAAS Table .csv) can be downloaded.

Loading of the complete tables is recommended to ensure that the AMHS application is able to handle the extensive content of the tables covering the address translation of all existing AFTN addresses into AMHS O/R addresses (XF as well as CAAS) and vice versa.

4.5.2 User address look-up Table

It is recommended to start Pre-operational tests and operations with empty **User address look-up tables**.

This kind of functionality should be foreseen for exceptional users and situations. Each entry in this table shall be coordinated with the AMC for the Regional and world-wide use.

5 Test Description

5.1 Test Scenarios

The tests are described in the following test scenarios:

PRExxx where xxx is the scenario number.

The following table contains an overview of the test scenarios:

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

Table F- 8: Test Scenario overview

5.2 Pre-operational AMHS Tests

This section contains the test-cases. Each test-case is written on a test sheet, which should be completed during testing.

The top of test-sheet contains the **test-case id** and a description of the **tested functionality**.

The **Test description** contains the instructions for the tester, the addresses used and the test message used.

The **Test control** contains the expected reaction/observation of the Systems under Test (SUTs).

The section **Test result** is used to log the test results.

5.2.1 Go-NoGo test (Partner 1 to Test Partner 2)

Test Reference	Tested Functionality
PRE001	This is a simple test with the purpose to check that the configuration and underlying network work correctly. It is a prerequisite for subsequent tests. An FF priority message is sent from Test partner 1 to Test partner2.

Test description:

From aaaaAMHA send the following FF priority message to ddddAMHA:

```
PRE001
12345678901234567890123456789012345678901234567890123456789
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
```

(and so on till)

```
ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ
```

Check the correct reception at ddddAMHA and send the following acknowledgement if the message is received correctly.

From ddddAMHA send the following message to aaaaAMHA:

ACK001 PLS CONTINUE WITH PRE002

Test control:

Check the correct reception of the message at ddddAMHA. No difference must exist between the message as defined above and the received message.

Test result:

PASS	FAILED	INCONCLUSIVE

5.2.2 Go-NoGo test Test partner 2 to Test partner 1

Test Reference	Tested Functionality
PRE002	This is a simple test with the purpose to check that the configuration and underlying network work correctly. It is a prerequisite for subsequent tests. An FF priority message is sent from Test partner 2 to Test partner1.

Test description:

From ddddAMHA send the following message to aaaaAMHA:

```
PRE002
123456789012345678901234567890123456789012345678901234567890123456789
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
```

(and so on till)

```
ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ
```

Check the correct reception at aaaaAMHA and send the following acknowledgement if the message is received correctly.

From aaaaAMHA send the following message to ddddAMHA:

ACK002 PLS CONTINUE WITH PRE003

Test control:

Check the correct reception of the message at aaaaAMHA. No difference must exist between the message as defined above and the received message.

Test result:

PASS	FAILED	INCONCLUSIVE

5.2.3 Duplicated message exchange

Test Reference	Tested Functionality
PRE003	For selected AFTN destination addresses all traffic will be duplicated to corresponding AMHS recipient addresses at the remote system. At the remote system the AFTN messages received will be compared with the copies transmitted via AMHS.

Test description:

- On the system of Test partner 1 enable the duplication of Operational traffic for the agreed AFTN addressee indicators:

The duplication shall remain active for 3 days.

- On the system of Test partner 2 enable the duplication of Operational traffic for agreed AFTN addressee indicators:

The duplication shall remain active for 3 days.

Test control:

Note: Not all details of test control can be defined since two different systems are involved. Therefore the control is done in a general form. The main purpose of this test is to prove the integrity of the message exchange. At the same time, it is possible to detect problems which have not been spotted during previous tests.

1. Compare the number of messages received at the AFTN addresses with the number of messages received as copies at the corresponding AMHS addresses (check if all duplicated messages are received).
2. Compare the contents of the messages received for one randomly selected hour of traffic per day. The method of comparison is a local matter. Some options are:
 - a) the messages can be displayed on two screens and compared one by one,
 - b) the traffic log can be exported and compared (partly) electronically/in an automated way.
3. Check the event logging of the system for abnormalities in the area of AMHS/X.400/AFTN/AMHS Gateway.
4. Check the event logging / traffic traces for NDRs.

5. Check for Control Position events.
6. Check the X.400/AMHS Diagnostics; check the number of associations used (in particular possible hanging/unused associations).
7. Monitor the underlying network infrastructure (network specialist).

The following table can be used to make notes of the Test Control result:

Test Control	Result
1. Compare the number of messages received as AFTN copy with the number of messages received as AMHS copy.	
2. Compare the contents of the messages.	
3. The messages can be displayed on two screens and compared one by one.	
4. The traffic log can be exported and compared (partly) electronically/in an automated way.	
5. Check the event logging of the system for abnormalities in the area of AMHS / X.400 / AFTN/AMHS Gateway.	
6. Check whether NDRs have been received or transmitted.	
7. Check for events at the Control Position.	
8. X.400 / AMHS diagnostics, check the number of associations used (in particular possible hanging/unused associations).	
9. Monitor the underlying network infrastructure (network specialist).	

The test is failed if messages are lost, duplicated or corrupted. The other observations have to be forwarded to each other in the form of a test log and discussed in a test review.

Test result:

PASS	FAILED	INCONCLUSIVE

5.2.4 Stress / Load Test

Test Reference	Tested Functionality
PRE004	This test is performed to observe the behaviour of both systems during a load/stress situation. The traffic exchanged in test PRE003 is repeated in a burst fashion.

Test description:

1. Disable the duplication of traffic on both sides.
2. Three tests should be run. The amount of messages shall be:
 - 100 for the first test
 - 200 for the second test
 - 400 for the third test
3. Both sides shall retrieve the outgoing AMHS traffic exchanged in PRE003 for an agreed day.
4. Both sides shall inform each other about the amount of messages to be expected.
5. At **Test partner 2** (or 1) interrupt the LAN connection to **Test partner 1** (or 2) by an adequate command (should be agreed between the Test partners).
6. At **Test partner 1** and **Test partner 2** “repeat” the messages retrieved in step 2 and observe a queue with a length as communicated in step 3.
7. The moment to re-connect the LAN is co-ordinated by telephone. Note down the time it takes from re-connecting the LAN till the moment the queues are empty.
8. At **Test partner 2** (or 1) re-establish the LAN connection by adequate means (commands).
9. Observe and notice the incoming and outgoing message flow.

Test control:

1. The number of messages received shall be equal to the number of messages expected.
2. Check the event logging of the system for abnormalities in the area of AMHS / X.400 / AFTN/AMHS Gateway.
3. Check the event logging / traffic traces for NDRs.

4. Check for Control Position events.
5. Check the X.400 / AMHS diagnostics, check the number of associations used (in particular possible hanging/unused associations).
6. Monitor the underlying network infrastructure (network specialist).
7. At both sides note the amount of time needed to flush the queues.

The following table can be used to make notes of the Test Control result.

Test Control	Result		
	100	200	400
1. The number of messages received shall be equal to the number of messages expected.			
2. Check the event logging of the system for abnormalities in the area of AMHS / X.400 / AFTN/AMHS Gateway.			
3. Check the event logging / traffic traces for NDRs.			
4. Check for events at the Control Position.			
5. Check the X.400 / AMHS diagnostics, check the number of associations used (in particular possible hanging/unused associations).			
6. Monitor the underlying network infrastructure (network specialist).			
7. At both sides note the amount of time needed to flush the queues.			

Note: The test is failed if messages are lost, duplicated or corrupted. The other observations have to be forwarded to each other in the form of a test log and discussed in a test review.

Test result:

PASS	FAILED	INCONCLUSIVE

5.2.5 Additional selected and agreed Interoperability Tests

Here the selected and bilaterally agreed Test cases should be listed.

- END -

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Appendix H to the Report

No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/3 Update
1	ATN Implementation Coordination	D. Efficiency	GPI-17, GPI-19, GPI-22	(1) Review of implementation problems and develop co-ordinated solutions	Expedite implementation activities, ensure system compatibility through out the region	Co-ordination Report	Ongoing/Semi-annually until (2010)	Ken Morris (Australia)	All members	Updated the information in the ATN Router and AMHS planning tables and the implementation status.
2	ATN Operational Procedures	D. Efficiency	GPI-17, GPI-19, GPI-22	(1) Development of Interim Database for Directory Services	Make available real time and quality assurance addresses for ATN message delivery	(1) Interim Database	(1) (2007)	Robert Hallman(USA)	Thailand, Hong Kong China, Japan	The database was demonstrated. Aerothai will maintain the database on behalf of the regional ICAO Office.
				(2) Develop the operational database management procedures		(2) Operational Procedures	(2) (2007)			Initiated by Aerothai
3	ATN Certification & Validation Process	D. Efficiency	GPI-17, GPI-19, GPI-22	(1) Develop conformance procedures and checklist for AMHS and ATN routers	Expedite implementation activities, ensure global system compatibility	(1) Checklist	(1) (2007)	Sin Hie Sng (Singapore)	China, Hong Kong China, Indonesia,ROK, USA,	The 1st edition Guidance Document for AMHS Conformance Testing was adopted by APANPIRG/18. The 2nd edition of the document is recommended.
				(2) Develop validation process document		(2) Conformance Document	(2) 2007			same as above

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No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/3 Update
						(3) Update to Conformance Document	(3) Ongoing until 2010			Proposed adoption of two additional annexes E & F to the conformance document.
4	ATN Documentation	D. Efficiency	GPI-17, GPI-19, GPI-22	(1) Study DIR objects/attributes proposed in ACP and follow development within other groups	Expedite implementation activities, ensure global system compatibility	(1) Directory Report	(1) Annually until (2010)	Chonlawit B.	Thailand	Develop the database. Will present the procedure for coordination. Further consequential changes needs to be made and additional annex needs to be added.
				(2) Development AIDC documentation (including ICD) and follow development within other groups		(2) AFTN AIDC/ATN Gateway Specification ATN AIDC ICD	(2) 2008 (ACP-dependent)	(Thailand)	Thailand	Postpone development of ATN-based AIDC ICD due to lack of implementation of ATN-based AIDC and new AIDC-related specification from ACP WGI

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Appendix H to the Report

No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNIG/3 Update
				(3) Update of AMHS ICD to comply with SARPs 3rd Edition		(3) Updated AMHS ICD	(3) (2007)		Japan	Provided to ATNIG/2 for endorsement. Adopted by APANPIRG/18. Completed
5	ATN Performance	D. Efficiency	GPI-17, GPI-19, GPI-22	(1) Develop/establish/adapt/monitor/identify/analyse performance indicators	Assure QOS, service continuity, timely delivery of services	(1) AMHS performance report	(1) Annually until (2010)	Japan	Republic of Korea, India	
6	ATN Service Enhancements	D. Efficiency	GPI-17, GPI-19, GPI-22	(1) Review the impact of the implementation of Directory Services in the Region	Enhancing the service	(1) Report on directory	(1) Annually until (2010)	Fiji	USA, Thailand, New Zealand, Japan, Australia	Review the database developed by Aerothai for the Regional ICAO office.
				(2) Development of profiles for the directory access and exchange protocols (Ref. Decision 7/9)	Enhancing the operation	(2) Report on profiles	(2) (2008)	Fiji		
				(3) Study the use of IP	Lowering the operating cost	(3) Develop/update all Implementation Documents Develop/update IPS Implementation Documents	(3) (2010)	Singapore	Australia, China, India, Fiji, HongKong, China, Japan, and USA	Action item revised at ATNIG/3 to include development of IPS implementation document for Asia/Pac Region
				(4) Study for transition to BUFR code	Enhancing the service	(4) Report on the impact of BUFR code to ATN	(4) (2007)	Japan	New Zealand, USA,	Analysis was presented by Hong Kong China to CNS/MET/11. APANPIRG/18 decided to suspend further action for the time being.

No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNIG/3 Update
		D. Efficiency	GPI-17, GPI-19, GPI-22	(5) Study for transition of AFTN-based AIDC as an alternative to ATN based AIDC to ATN environment	Improving the service and lowering the operating cost	(5) Report on the impact of transition of AFTN-AIDC to ATN-AIDC AFTN AIDC/ATN Gateway Specification	(5) (2008)	Thailand	India, Indonesia, New Zealand, USA,	A Draft specification of AFTN AIDC/ATN Gateway was presented.
				Analyze Common Address Prefix Proposal	Improving the service and routing efficiency	Report on common prefix based analysis conducted	End of 2008	Mark Brown (Japan)	Australia, Fiji, HongKong China, New Zealand and USA	Action Items developed at ATNIG/2 for follow-up at WG meetings.
7	Security	B. Security	GPI-17, GPI-19, GPI-22	(1) Develop ATN System Security policy	Safe and Secure Inter and Intra Regional Communication and service infrastructure	(1) Policy Document	(1) Annually until (2010)	Vidyut Patel (USA)	Australia, Hong Kong China	USA made a presentation at ATNIG/2. High level guidance document presented to ATNIG/3
				(2) Develop ATN System Security Guidance		(2) Guidance Document	(2) (2008)			
				(3) Develop ATN System Security Solution for Initial and Enhanced Services		(3) Security, Technical, Management and Operational Control	(3) (2008)			
				(4) Co-ordinate and monitor ACP working group and other regions		(4) Report	(4) Semi-Annually until (2010)		Thailand	
				(5) Develop ATN System Security Check List based on Security Control and Regional Incident Response Plan and Contingency Plan		(5) Check List, Regional Incident Response Plan and Contingency Plan	(5) (2009)			

No.	PERFORMANCE OBJECTIVE	ICAO Strategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNIG/3 Update
	The ATN PERFORMANCE OBJECTIVE The APAC ATN ground-to-ground infrastructure will be fully operational 53 percent at 23 locations by December 2007. (GPI-22) COMMUNICATION NETWORK INFRASTRUCTURE Related ATM objectives: AMSS; HF data; VHF data; SSR Mode S; ATN Scope: To evolve the aeronautical mobile and fixed communication infrastructure, supporting both voice and data communications, accommodating new functions as well as providing the adequate capacity and quality of service to support ATM requirements. (GPI-19) METEOROLOGICAL SYSTEMS Objective: To improve the availability of meteorological information in support of a seamless global ATM system. (GPI-17) IMPLEMENTATION OF DATA LINK APPLICATIONS Scope: Increase the use of data link applications Related ATM objectives: Application of data link; Functional integration of ground systems; with airborne systems; ATS inter-facility data communication (AIDC)									

**The Third Meeting of the Aeronautical Telecommunication Network (ATN)
Implementation Co-ordination Group of APANPIRG
Nadi, Fiji Islands
5 – 9 May 2008**

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International Civil Aviation Organization

**THE THIRD MEETING OF AERONAUTICAL
TELECOMMUNICATION NETWORK (ATN)
IMPLEMENTATION CO-ORDINATION GROUP
OF APANPIRG**



Nadi, Fiji Islands, 5 – 9 May 2008

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3	2	Outcome of APANPIRG/18 and CNS/MET SG/11 Relevant for ATN/AMHS Implementation	Secretariat
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5	5	Update to ATN Implementation Status in the CNS/ATM Implementation Planning Matrix	Secretariat
6	7	ASIA/PACIFIC Backbone Boundary Intermediate System (BBIS) State's Investment/Commitment on ATN/OSI Survey	Secretariat
7	8	Review ASIA/PAC ATN Router Plan (FASID Table CNS 1B and AMHS Routing Plan (FASID Table CNS 1C)	Secretariat
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