STRATEGY FOR IMPLEMENTATION OF THE ATS MESSAGE HANDLING SYSTEM (AMHS) IN THE AFI REGION

DESCRIPTION

Titre : AFI ATN/AMHS STRATEGY
Type : DRAFT
Commentaire : Le présent document présente le contexte de mise en œuvre de l'AMHS et propose un TIMEFRAME pour sa mise en œuvre en relation avec les préalables..
Mots clés : AMHS, ATN, AFI, Backbone, Système d'extrémité.

Comment [I1]:

HISTORIQUE

Version	Date (jj/mm/aa)	DESCRIPTION DE L'ÉVOLUTION	OBSERVATION
0.1	19/06/11	Création du document	Pour présentation aux acteurs ASECNA

NOTE IMPORTANTE : *Toute nouvelle version annule et remplace la version précédente qui doit être détruite ou au niveau « Archivage » porter clairement sur la page de garde la mention manuscrite VERSION PÉRIMÉE.*

MAITRISE

Tâche	Identification	Fonction	Visa	Date
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Vérificateurs				

DIFFUSION

Comment [I2]: Needs to be translated to English

- AFI states

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1. INTRODUCTION

The ATS Message Handling System (AMHS), which has been defined in the ICAO Aeronautical Telecommunication Network (ATN) standards, is intended to be a replacement for the current legacy Aeronautical Fixed Telecommunications Network (AFTN).
In order to assist States /Organizations on the matters relating to the implementation of ATS Messages Handling System (AMHS) in the AFI region and to ensure a uniform, smooth and harmonious implementation and regional interoperability, the AMHS/I/TF was requested to develop a Draft AFI AMHS Implementation Strategy.

2. OBJECT OF THE DOCUMENT

This document presents the draft AFI strategy to guide States and/or Organizations in implementation of AMHS within the AFI Region as required by the terms of reference of the AFI AMHS/I/TF meeting, Nairobi, Kenya, 20-21 May 2011. The document contains:

- A background about the states of AMHS implementation in AFI and other Regions
- an AFI implementation strategy

3. BACKGROUND

The exchange of ATS messages, as part of the Aeronautical Fixed Service (AFS) defined in ICAO Annex 10 Volume II is an essential function to the safety of air navigation and to the regular, efficient and economical operation of ATS provision. The Aeronautical Fixed Telecommunications Network (AFTN/CIDIN) has so far provided an effective store-and-forward messaging service for the conveyance of text messages, using character-oriented procedures. However, with regard to the future requirements in the exchange of ATS messages and the technological evolution, AFTN/CIDIN technology is now becoming obsolete, and is not sufficiently flexible to support messaging functions found in modern messaging systems (such as transfer of binary information and data folders).

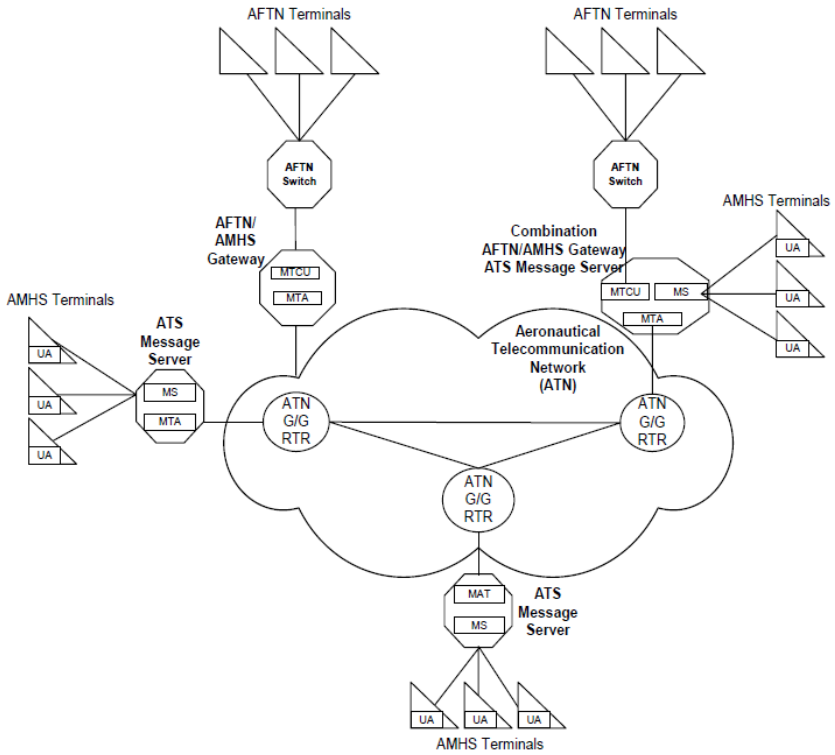
With a view to meet the critical requirements of the aviation community for enhancing its ground data communications by means of up to date technology, ICAO has specified that the Aeronautical Telecommunications Network (ATN) may replace the existing networks based on AFTN. The Aeronautical Telecommunication Network (ATN) will enable seamless communications between ground users (e.g. ANSPs, Airlines) and aircraft.

The most recent development with regard to messaging in the ATS environment is the ATS Message Handling System (AMHS). The AMHS is a natural evolution from AFTN/CIDIN and replaces the telegraphic style of working with a modern Message Handling System based on international Standards. The AMHS, being an ATN application utilizes the infrastructure of the ATN network, however this is not a prerequisite for the initial deployment of AMHS.

The AMHS is designed according to the International Telecommunication Union's (ITU) X.400 messaging standard which provides the core messaging framework similar to modern day email messages for the use of exchanging messages between Air Traffic Service users over the ATN. As an X.400-based system, the AMHS is specified in such a way that messages can be transferred from the sender to the recipient by passing reliably through intermediate AMHS systems. The AMHS system at the originating station, when it first receives a newly submitted message, must determine the AMHS system that will receive the AMHS message. This may be:

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

3.1 OVERVIEW OF AMHS



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In terms of functionality, the AMHS comprises the following components:

- the Message Transfer Agent (MTA) which performs the function of the message switch,
- the User Agent (UA) which performs the user access to the MTA and provides an appropriate user interface,
- the Message Store (MS) which provides the intermediary storage between MTA and UA and is usually co-located with the MTA, and
- the Access Unit (AU) which provides for intercommunication with other Messaging.

Three categories of AMHS end systems are defined for the support of the ATS Message Handling Service:

- the ATS message server (MTA)
- the ATS message user agent (UA)
- the AFTN/AMHS gateway.

3.2 TECHNICAL PROVISION

The provisions pertaining to AMHS, such as SARPs, technical manuals and /or specifications and general guidance material are now available and the Industry has so far developed systems to provide AMHS along these guidelines. The following ICAO documents constitute the main references:

- Annex 10, Volume II, Chapter 4
- Annex 10, Volume III, Part I, Chapter 3
- Doc 9880 Part IIB
- Manual for the ATN using IPS Standards and Protocols (Doc 9896)
- Doc 9705

3.3 REQUIREMENTS FOR THE NETWORK

The performance network to support the AMHS is very important to ensure a reliable AMHS service. From the ICAO SARPS, AMHS could be implemented using ISO or IPS protocols. There are already national AMHS implementations in place, based on the TCP/IP protocol suite. In addition, ANSPs have the necessary TCP/IP expertise on hand from various national applications. The broad market of TCP/IP products would facilitate rapid implementation with reasonable costs.

In the AFI Region, the States adopted to implement the AMHS under ATN/IPS as the ground-ground network in line with several ICAO Regions. Today, the majority of the links of current AFTN circuits are configured at 9600 kbps.

The implementation of the AMHS requires more bandwidth because of the overhead of the protocol. The network speed in areas of high traffic density is 64 kbps with at least 32 kbps in general. The AFI strategy will thus have to take into account the necessity of increasing the network capacity through the implementation of a successful ATN network.

This increased capacity will necessarily have an associated cost and may require the upgrade of the network infrastructures.

3.4 STATUS OF AMHS IMPLEMENTATION ACTIVITIES

At present, there are many initiatives and activities aiming at a rapid implementation and operation of the ATS Message Handling System (AMHS). At the level of ICAO, Regional working groups are tasked with the development of guidelines and the coordination of implementation. Regional AMHS workshops are conducted to facilitate coordination between States and exchange of information with manufacturers. In addition, trials and operational implementations are underway.

The 17th APIRG meeting, Ouagadougou, Burkina Faso, 2-6 August 2010 per conclusion 17/17 set up a Task Force to coordinate and plan for the implementation of AMHS in the AFI Region; and the SAT/16 meeting Recife, 02-06 May 2011 per conclusion 16/13 calls States to participate in the forthcoming regionalSeminars and workshops organized by ICAO to support the implementation of AMHS regional Plans requirements.

Today, some AFI States have already installed AMHS systems, conducted trials and demonstrations for implementation of AMHS and have taken actions for the introduction of AMHS operationally on a national basis. It is therefore necessary to develop a regional strategy, in order to conduct a standardized and harmonized implementation process within the AFI Region.

4. AFI AMHS IMPLEMENTATION TIMEFRAME

The implementation of the AMHS will follow several stages. Currently, only a very few states within the AFI region have AMHS infrastructures and the necessary network capacities. The AFI strategy should therefore take into account the experience gained from the equipped countries and progress studies conducted.

2011 –2013 Experimentation

During this period, pioneer and new States will continue to install AMHS systems. The experimentations and testing of interoperability will be expedited. This phase will allow the constraints related to the implementation and especially to the interconnections to be determined.

2011 - 2015 Validation of the architecture ATN – Upgrade of the network capacities

The harmonization and the increase of the network capabilities are necessary for the implementation of the AMHS. Several projects related to satellite VSAT networks of the AFI region are currently on going and in particular the audit of the AFISNET network which will involve some modifications to the network.

During the current phase, the ATN architecture will be validated and the increase of the capabilities of the various connections will be completed. These modifications can involve the modifications of the network infrastructure;

Due to the financial resources which it could require, the priority will be given to the main links establishing the ATN Backbone, which will allow to conduct effectively the experiments and to validate the ATN backbone.

During this period, the priority will be given to the systems of extremity AMHS in case of replacement of AFTN switches.

Comment [I3]: i'm not sure what is meant here?

This deadline takes into account the necessary time for the validation of the ATN and AMHS architectures as well as the planning and the mobilization of the necessary financing.

From 2015 - Deployment in the main centers

In 2015, it can be considered that the ATN backbone and the network capabilities are quite completed.

The systems of extremity ATN / AMHS will then be deployed in the main centers with an AMHS/AFTN Gateway if required

From 2017 General Deployment

From 2017 onwards, all the End Systems of the network will have to be AMHS compatible. Various end-system such as the automated systems for the management of ATS data will be updated and the exchange l of ATS messages through the AMHS.

5. STRATEGY FOR IMPLEMENTATION OF THE AMHS IN THE AFI REGION

Considering the initiatives related to the AMHS implementation in the AFI region and the AMHS implementation activities progress in the other ICAO regions and in Industry, the AFI States/Organizations should take into consideration the following strategy to implement AMHS in the AFI region.

Considering:

1) The requirements for a reliable, secured and homogenous ground-to-ground Aeronautical Telecommunication Network to support the ATS Message Handling System (AMHS);

2) The availability of ICAO SARPs and technical manuals for the ATN/AMHS, the availability of equipment and readiness of vendors to support the AMHS ground-to-ground communications;

3) The availability of AMHS Transition and Implementation guidance materials required to assist States to ensure harmonization of procedures and protocols and thereby assure interoperability within the region;

4) The need for States using the currently AFTN systems for communication with other States and Regions to migrate gradually and harmoniously to the AMHS system by replacing the aging AFTN switches with ATS Message Transfer Agents (MTA);

5) The efforts of AFI States to take over and implement ATN/ AMHS; and

6) the need to support States to ensure a uniform, smooth and harmonious implementation;

THE GENERAL STRATEGY FOR THE IMPLEMENTATION OF AMHS INFRASTRUCTURE IN THE AFI REGION IS AS FOLLOWS:

a) Deploy a backbone network of ATN/IPS to provide a reliable infrastructure to initially support ground-to-ground applications (AMHS, AIDC…);

b) Use the TCP/IP communication protocol for the initial implementation of ATS Message Handling Systems, as a transition mechanism to enable AMHS operations to commence ahead of eventual full SARPs compliance;

c) The backbone States to implement in the short term a interoperable AMHS infrastructure and to conduct trials and studies on bilateral and multilateral basis in AFI region and on inter-regional basis to validate the operational implementation of AMHS and AMHS/AFTN Gateway;

d) The BBIS states with interface to other regions that adopt TCP/IP or, should establish connection based on bilateral agreement;

e) The none backbone States, to implement gradually AMHS when replacing their aging current AFTN systems and to connect to backbone States using the ATN/ IPS protocols and the appropriate security provision ;

IN ORDER TO ACHIEVE THE ABOVE STRATEGY THE FOLLOWING IS REQUIRED OF STATES AND ORGANIZATION IN THE AFI REGION:

a) States shall provide implementation in compliance with Annex 10 SARPS and ICAO Manuals, and with the Plans, Policies and AMHS Transition and Implementation guidance materials adopted by APIRG;

b) Backbone States shall upgrade their network capability and later migrate to an IP sub-network capability for interconnection with other Backbone States and Non-backbone States.

c) States shall work co-operatively to assist each other on a multinational basis to implement the ATN and AMHS in an expeditious and coordinated manner and to ensure system inter-operability; and

d) States shall organize training of personnel to provide necessary capability to maintain and operate the ground-to-ground ATN/AMHS infrastructure and applications;

STRATEGY IMPLEMENTATION PLAN

	Short term 2011-2013	Mid-term 2014-2017	Long term2018-2023
APIRG technical provision	Elaboration of AFI technical provision	Implementation based on the AFI technical provision	
Telecommunications Infrastructure	Upgrade of ANSP VSAT networks and validation of the AMHS topology	Integration of AFI VSAT network and implementation of the AMHS topology	Full operational implementation of AMHS backbone and applications
Implementation of AMHS	Operation of (the existing AFTN system and progressive implementation of AMHS systems on national or regional basis	Implementation of AMHS systems at all Main AFTN centers and experimentation of inter-regional links	Completed transition of all the AFTN centers and full operational implementation
Operational deployment	AMHS trials on national basis and regional	Pursue of Trials on regional basis and operational implementation	Full AMHS operational implementation

Conclusion

The implementation of the ATN / AMHS requires the commitment of all the actors as was reaffirmed during the first meeting of the AMHS TASKFORCE. It will require the implementation of new systems of extremity ATN as well as the availability of an ATN network combining capabilities and adequate performances.