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# Aeronautical Telecommunication Network

**Andrej Novák[1], Nikolas Žáčik[2]**

[1]Air transport department, University of Žilina, Žilina, 010 26, Slovakia (andrej.novak@fpedas.uniza.sk)
[2]Air transport department, University of Žilina, Žilina, 010 26, Slovakia (nikolas.zacik@fpedas.uniza.sk)

**Abstract** This paper summarizes the results of a study of modern telecommunication technology in the Aeronautical Telecommunication Network. The article deals with the integration of modern telecommunication technology into the still developing sector of aeronautical telecommunication. The ATN is a data communications inter-network that provides its users a robust and reliable Air/Air, Air/Ground and Ground/Ground communications service.

**Keywords** AMHS, message, communication, information architecture.

**JEL** O3

## 1. Introduction

Europe is contributing much to the development of the ATN. This is being achieved by participating in standardizing the system and validating the technical and operational and by preparing implementation plans. A large effort to certify the system has also started recently. All actors in the ATS arena, the Commission of the European Community (CEC), EUROCONTROL, European ATSOs, airlines, equipment manufacturers, and communication service providers are involved in that process.

## 2. Aviation Messaging (AMHS)

The aviation industry is adopting AMHS (Air Traffic Services (ATS) Message Handling Services) to support ground to ground communications for services such as flight plans and meteorological data. This will eventually replace the current AFTN (Aeronautical Fixed Telecommunication Network) and CIDIN (Common ICAO Data Interchange Network) based systems. AMHS-based systems are now being deployed around the globe with a large majority of countries who have so far made the switch, using solutions from Isode partners, based on Isode servers and APIs.

The state company Letové prevádzkové služby Slovenskej republiky štátny podnik (LPS SR) had implemented Basic ATSMHS capability and gateway facilities to AFTN in 2008. Migration of the international CIDIN circuits to AMHS started with COM centres in Vienna and Budapest. AMHS connections to other centres like Madrid, Warsaw, Zagreb have been implemented and other will follow. Military will be connected to the AFTN/AMHS through the ANSP – LPS SR.

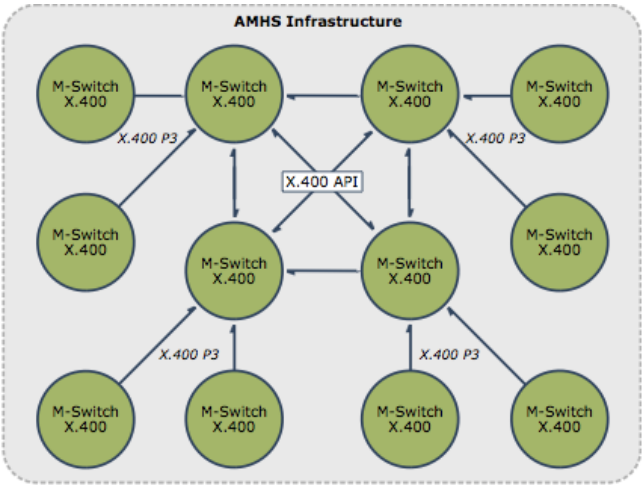


**Figure 1.** AMHS infrastructure. [1]

## 3. AMHS Architecture

AMHS provides a distributed message switching and storage infrastructure, to enable transfer of ATS messages, such as flight plans, NOTAM (Notice to Airman) and Meteorological information. The AMHS service is accessed by users, using AMHS terminals, and applications (such as Meteorological applications), in order to exchange ATS messages. AMHS Terminals and AMHS Applications connect to the AMHS infrastructure using X.400 protocols as shown in the diagram below.

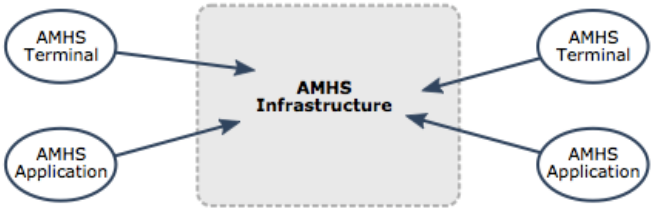


**Figure 2.** AMHS infrastructure using X 400 protocols. [1]

## 4. AFTN Transition and Co-Existence

As ground to ground messaging moves from AFTN to AMHS, it is important that full connectivity is maintained. This is achieved by use of an AFTN/AMHS gateway, which is formally known as an MTCU (Message Transfer and Conversion Unit). MTCUs are critical to enabling full connectivity while both AMHS and AFTN are being used.

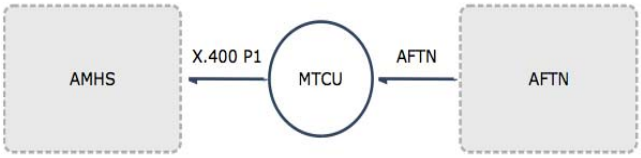


**Figure 3.** MTCU connection of AMHS and AFTN. [1]

MTCUs are available from Isode partners. Isode provides the AMHS side of an MTCU, to enable development of an MTCU.

## 5. The ATN Directory and Extended ATS Service

AMHS defines two services:

- The Basic ATS Service, which provides functionality equivalent to AFTN.
- The Extended ATS Service, which provides additional services and functions, including security based on digital signatures; binary attachments; large attachments.

The Isode servers and integration APIs provide full support for both the Basic and Extended ATS Service. A key element of the Extended ATS Service is use of the ATN Directory. Isode provides a full set of products for constructing an ATN Directory solution.

## 6. Further Information

For further information on the overall architecture of an AMHS solution, see the AMHS Architecture page. Isode has written a number of whitepapers that give more information AMHS:

- Why use a P7 Message Store? Getting X.400 messages to and from end-users. The goal of this paper is to give an understanding of what an X.400 Message Store, such as Isode's M-Store X.400 does, and where and how it should be used. In order to do this, the paper looks at general requirements for sending and receiving (X.400) messages, and looks at various approaches that can be taken.
- Why X.400 is good for high reliability messaging. X.400 was specified in the 1980s, with the expectation that it would be the universal standard for email. While this did not happen, X.400 is still used for many applications, particularly where high reliability is required. This paper summarizes the key features of X.400 that make it good for applications needing high reliability, with particular focus on capabilities not available with Internet email.
- AMHS Security The Aeronautical Traffic Services (ATS) Message Handling Service (ATSMHS) defines a set of security services for use as part of the Extended ATS Message Service for providing that ATS Message Handling System (AMHS). This White Paper describes these security services, how they are provided and how they can be deployed. The paper concludes that AMHS Security is needed now, and should be pursued urgently as a part of AMHS deployment.
- Delivering the ATS Message Service to the End User using AMHS. AMHS (Air Traffic Services (ATS) Message Handling Services), as specified in the ICAO ATN (Aeronautical Telecommunications Network) SARPs, is the new standard for ground to ground messaging communications. The "ATS Message Service" is the end to end message service that AMHS provides. AMHS specifies the service, and the underlying infrastructure that is used in order to provide this service. To build a complete system, the ATS Message Service needs to be provided to end users, sitting at terminals. This paper looks at various approaches to doing this.

## 7. Conclusions

LPS SR had implemented infrastructure which was required for AMHS communication in 2008. The Slovak aviation industry had finally adopted AMHS to support ground communication in 2014, so whole process of implementation had taken more than 6 years. AMHS system is fully capable of AMHS airport what is essential for future development of whole aviation industry of SR.

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