



International Civil Aviation Organization

**AMHS/SWIM SEMINAR AND THE SEVENTH MEETING OF
AERONAUTICAL TELECOMMUNICATION NETWORK
(ATN) IMPLEMENTATION CO-ORDINATION GROUP OF
APANPIRG (ATNICG/7)**



Chiang Mai, Thailand, 5 – 9 March 2012

Agenda Item 5: Security and Applications

**CONVEYANCE OF XML-BASED AERONAUTICAL DATA IN THE
ATS MESSAGE HANDLING SYSTEM (AMHS)**

(Presented by COMSOFT)

SUMMARY

This Working Paper discusses the conveyance of new data types by means of the ATS Message Handling System (AMHS) making use of the File Transfer Body Part (FTBP).

1 INTRODUCTION

1.1 Emerging ATM applications such as Digital NOTAM and Digital Flight Plan applications increasingly deploy new data and information models. Examples for new data and information models are:

- Aeronautical Information Exchange Model (AIXM)¹;
- Flight Information Exchange Model (FIXM)²;
- Weather Information Exchange Models (WXXM)³; and
- Aviation Information Data Exchange (AIDX) Model⁴.

1.2 These new data and information models make use of the Extensible Markup Language (XML) for representation and exchange of information. The XML is a general purpose language that defines a set of rules for representation and encoding of information. The fact that XML encoded information is human-readable and machine-readable at the same is considered a significant advantage over other formats.

¹ <http://www.aixm.aero/> (website by EUROCONTROL and FAA)

² <http://www.fixm.aero/> (website by FAA)

³ <http://www.wxxm.aero/> (website by EUROCONTROL)

⁴ <http://www.aidx.aero/> (website by SITA)

1.3 Implementation of Digital NOTAM is expected in 2012 and implementation of further new ATM applications is expected in the mid-term. Distribution mechanisms for those new ATM applications are required in due time. Otherwise, benefit and success of such new applications and data formats will be marginal, and usage will be limited to a rather small group of users.

1.4 The deployment of System Wide Information Management (SWIM) enabling the exchange and distribution of new data formats is expected to be completed not before 2018; and there are already doubts with this figure. In the light of these time-lines it might be worthwhile considering alternatives paving the way for an initial SWIM environment based on existing communication infrastructure.

2 DISCUSSION

2.1 The basic idea is to use the ATS Message Handling System (AMHS) for the exchange of new data formats.

Sample Situation for Digital NOTAM

2.2 With the introduction of Digital NOTAM offices, these new offices will have to communicate also with existing NOTAM offices and NOTAM users. It is unlikely that an authority will operate both, a legacy NOTAM office and a Digital NOTAM office in parallel. Thus, Digital NOTAM offices will have to support both environments, the legacy NOTAM environment and the new Digital NOTAM environment.

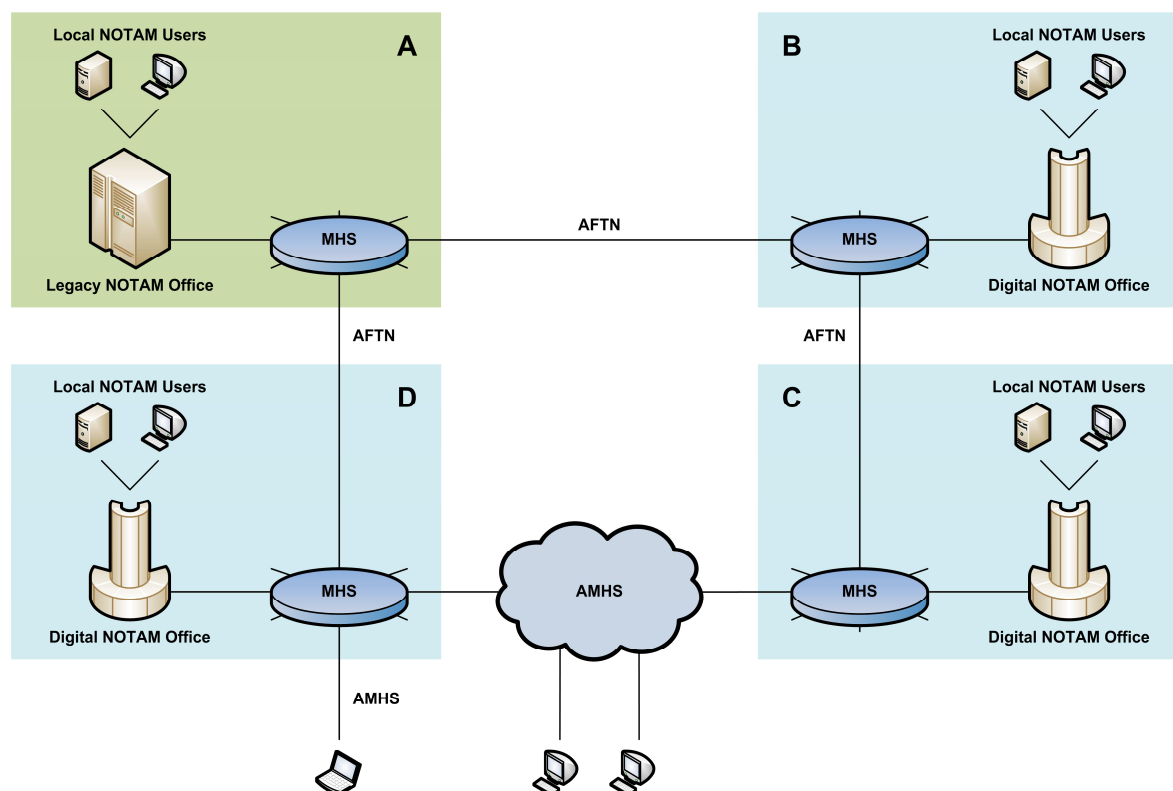
2.3 Digital NOTAM offices will have to provide configuration and registration facilities in order to distinguish offices and users having different capabilities, i.e. offices and users supporting Digital NOTAM, and offices and users supporting legacy NOTAM. In the beginning, it will be mostly legacy NOTAM exchange. In the course of time, this is expected to change to the exchange of Digital NOTAM.

2.4 Whereas legacy NOTAM exchange can make use of both, existing AFTN communications paths and new AMHS communication paths, the AIXM-5 nature of Digital NOTAM does not allow to use the AFTN for transport of such information objects. Thus, for the exchange of Digital NOTAM, the AMHS is the only viable solution for the time being.

2.5 In the example situation below, four ANSPs (A, B, C, and D) operate NOTAM offices. The NOTAM offices are locally connected to the respective ANSP's message handling systems (MHS). The ANSPs are interconnected via AFTN or AMHS.

2.6 ANSPs C and D are able to exchange Digital NOTAM over the AMHS. Also the local NOTAM users of the ANSPs B, C, and D are able to use the advanced functionality of the respective Digital NOTAM offices.

2.7 Although ANSP B operates a Digital NOTAM office, the absence of AMHS connectivity limits the office to legacy NOTAM exchange using the AFTN. ANSP A operates a legacy NOTAM office and of course exchanges legacy NOTAM only.



2.8 It is important to note that exchange of Digital NOTAM is not limited to exchange between Digital NOTAM offices. Also users connected to a Digital NOTAM office by means of the AMHS (e.g. the users depicted below the above AMHS cloud and the user directly connected to the MHS of ANSP D) can already benefit from Digital NOTAM.

2.9 The use of the AMHS for the exchange of Digital NOTAM is a viable solution, because a Digital NOTAM office can include all references made by a Digital NOTAM in the corresponding AIXM-5 object. Thus, a user not directly connected to a Digital NOTAM office nevertheless can process each Digital NOTAM received from such an office, as the Digital NOTAM is self-contained.

Use of the File Transfer Body Part

2.10 In order to convey XML encoded information of new ATM applications via the AMHS, the File Transfer Body Part (FTBP) can be employed. Furthermore, the FTBP can also be used for conveyance of other, non-XML and even binary data types.

2.11 The FTBP has already been adopted by ICAO Doc 9880 Part II as a functional group of the Extended ATSMHS. ICAO Doc 9880 puts no additional restrictions on its use. Thus, the use of the FTBP for conveyance of new data types is in line with the specification of the ATSMHS.

2.12 The FTBP is intended for the exchange of information between direct AMHS users. The term 'direct AMHS users' refers to users that are directly connected to the AMHS and includes human as well as machine user. Direct AMHS users are able to generate and receive messages with the FTPB at the ATS Message User Agent (UA) when supporting the Extended ATSMHS. Indirect AMHS users, i.e. AFTN users connected through an AFTN/AMHS Gateway, are not able to benefit from this advanced AMHS feature.

2.13 In contrast to textual body parts such as the IA5 and General Text Body Part, the FTBP allows to use native, most efficient Unicode/UTF-8 encoding of the XML based information. The FTBP is also suitable to convey any other textual or binary information such as commonly used, data formats in meteorology like Gridded Binary 2nd Edition (GRIB2) and the Binary Universal Form (BUFR) standardised by the WMO.

2.14 The FTBP does not only carry the data itself, it can also carry additional meta information providing further details on the data being transferred. Examples are the document type, the application suitable for processing of the data, file name, time of modification, etc. Use of this additional information can increase benefit as it allows an indication of suitable processing methods to the receiving ATS Message User Agent. By means of the meta information, the ATS Message User Agent in turn can determine and forward the information to the appropriate ATM application for further processing.

2.15 As a result the highly generic and flexible FTBP option is proposed for conveyance of XML based information using the AMHS in line with ICAO documentation.

3 ACTION BY THE MEETING

3.1 The ATNICG is invited to

- a) discuss the approach;
- b) provide comments; and
- c) consider use of the FTBP for conveyance of new data types.
