International Civil Aviation Organization

Eleventh Meeting of the Aeronautical Communication Services Implementation Coordination Group (ACSICG/11)

Bangkok, Thailand, 19 - 22 March 2024

Agenda Item 8:   AMHS transition to SWIM

AMHS OPERATION AND SUPPORT OF XML BASED MESSAGES

(Presented by USA/Federal Aviation Administration)

SUMMARY

This paper presents the current AMHS operation and its capability to support XML based messages. AMHS and its AFTN/AMHS address header based on ASCII is a critical address to allow messages to be distributed globally and compatible with ATC automation systems.

1.   INTRODUCTION

1.1   The Air Traffic Services Message Handling System (AMHS) was defined in early 1990s by ICAO to replace the Aeronautical Fixed Telecommunications Network (AFTN) which, with distribution speeds of 1.2kbps to 9.6kbps, was determined too slow for the anticipated message volumes.

1.2   ICAO Doc. 9705 was completed in the early 2000s and the Asia-Pacific region implemented its first AMHS connection in 2005. ICAO Doc. 9705 specifies the use of an OSI-based X.25 network, using Inter-Domain Routing Protocol (IDRP).

1.3   In the late 2000s, ICAO Doc. 9880 superseded ICAO Doc. 9705 specifying the use of AMHS over an IP network. The Asia/Pac region changed its underlying OSI network to an IP network in 2018, to comply with ICAO Doc. 9880 and ICAO Doc. 9896 Internet Protocol Suites, by implementing the Asia Pacific Common AeRonautical Virtual Private Network (CRV).

1.4   In 2021, the Asia-Pacific region adopted the distribution of XML-based ICAO Weather Information Exchange Model (IWXXM) formatted messages using the AMHS File Transfer Body Part (FTBP) functionality.

1.5   As of 2024, all major hubs (BBIS) in the region have completed their AMHS implementations using IP networks. Other BIS members should complete their AMHS conversions with IP connections through the CRV.

1.6   AMHS continues the message store-and-forward operation between Comm centers that was used for AFTN. But in contrast to AFTN, each center maintains routing based on the AMHS address Private Management Domain (PRMD) rather than the AFTN address.

1.7   AFTN addresses, based on location and service and contained in AMHS header information, are used to determine the PRMD and route traffic independent of the underlying network structure. The elements of AFTN addresses are documented and maintained in ICAO Doc. 7910/8585.

AMHS address management and routing is maintained by ICAO European region under ATS Messaging Management Center (AMC).

2.   DISCUSSION

2.1   The future of AMHS operational requirements:

2.1.1   AMHS is currently a critical infrastructure for exchange of data messages between ANSPs, and many other organizations, in support of safe and efficient air traffic movement. There are discussions about how to improve its operation in addition to increasing its bandwidth.

2.1.2   As the region has moved from expensive point-to-point circuits to a common CRV network, additional direct connections between users become possible. While this will result in faster routing, these additional connections must be balanced against increased operational complexity and operator workload.

2.1.2   AFTN/AMHS messaging has been very effective worldwide as the primary data communications messaging supporting ANSPs: with airlines, IATA, the military, custom services, meteorological agencies, and international search and rescue. As replacement information distribution systems are introduced, similar elements of location and service will be needed for effective information filtering.

2.2   AMHS to support future data distribution:

2.2.1   AMHS is currently supporting XML-based IWXXM distribution, which includes compressing the data to reduce its bandwidth requirement.

2.2.2   The next emerging message that might require AMHS is the Flight Information Exchange Model (FIXM) in support of FF-ICE. The FF-ICE concept supports filing of a trial flight plan to determine constraints leading to an optimal flight route. While the trial plan is envisioned in a SOA environment, the final filed plan may need AMHS distribution. Whether this might use the current flight plan format or FIXM has to be determined. AMHS should be able to support distribution in either format without additional upgrade.

2.3   As indicated above, AMHS is a critical element to route messages to their intended users using globally adopted and ICAO sanctioned AFTN addressing. Any system that

plans to succeed/replace AMHS would likely need to support similar elements of AFTN address functionality.

3.   ACTION BY THE MEETING

3.1   The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matter as appropriate.

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