ATNICG WG/8-WP/15
28/09/10

*International Civil Aviation Organization*

**AERONAUTICAL TELECOMMUNICATION NETWORK IMPLEMENTATION COORDINATION GROUP – EIGHTH WORKING GROUP MEETING (ATNICG WG/8)**

Christchurch New Zealand
28 September – 1 October 2010

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**Agenda Item 3: Planning the use of XML and SWIM related standards in AMHS environment**

# NETWORK PROTOCOLS INCOMPATIBILITY ISSUES AND SOLUTIONS

(Presented by USA)

*International Civil Aviation Organization*

**FOURTEENTH MEETING OF THE COMMUNICATIONS/NAVIGATION/SURVEILLANCE AND METEOROLOGY SUB-GROUP OF APANPIRG (CNS/MET SG/14)**

Jakarta, Indonesia, 19 – 22 July 2010

**Agenda Item 3: Aeronautical Fixed Service (AFS)**

**2) Discuss other AFS related issues**

# NETWORK PROTOCOLS INCOMPATIBILITY ISSUES AND SOLUTIONS

(Presented by United States of America)

**SUMMARY**

The issue of network incompatibility was presented in CNS/MET SG/13. The meeting requested that a solution be developed in ATNICG/5 and report back to CNS/MET SG/14. The ATNICG recommends using Application to overcome network incompatibility.

This paper relates to:

**Strategic Objectives:**
D – Efficiency

**Global Plan Initiatives:**
GPI 22 – Communication Infrastructure

## 1. Introduction

1.1 The European Region has adopted the AMHS based on RFC1006 which utilizes the IP routing network using Network Address Translation - Protocol Translation (NAT-PT) to convert IPv4 to IPv6.

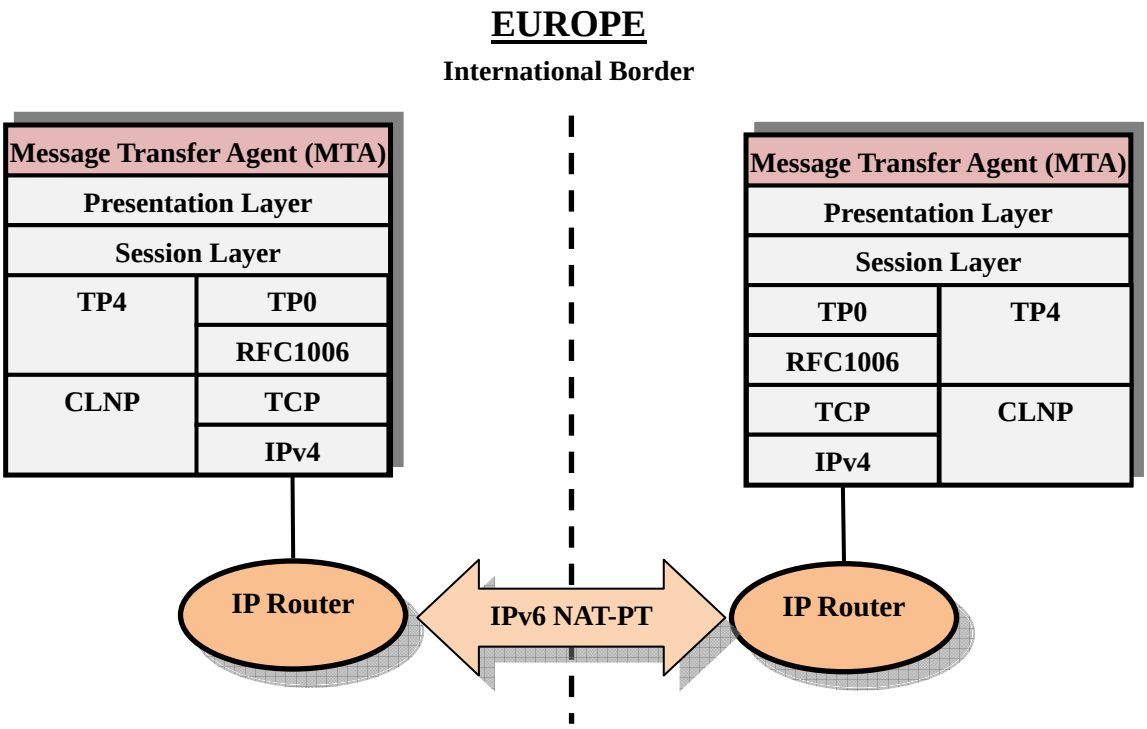



**Figure 1** European AMHS configuration

1.2 The Caribbean and South American Region (CAR/SAM) has adopted the AMHS based on RFC1006, which utilizes the IP routing network using IPv4.

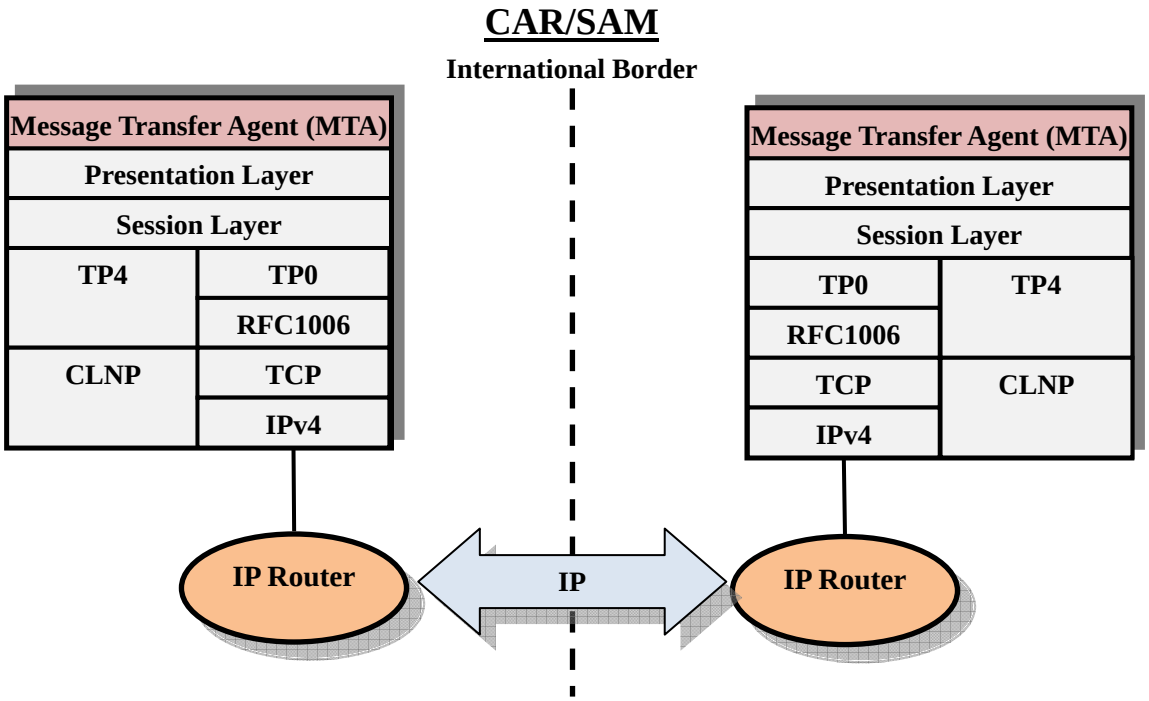



**Figure 2** CAR/SAM AMHS Configuration

1.3 The Asia/Pacific Region has adopted AMHS based on OSI interface which utilizes the ATN router over X.25 sub-network. The region is in the process of implementing an IP sub-network using IPv4.

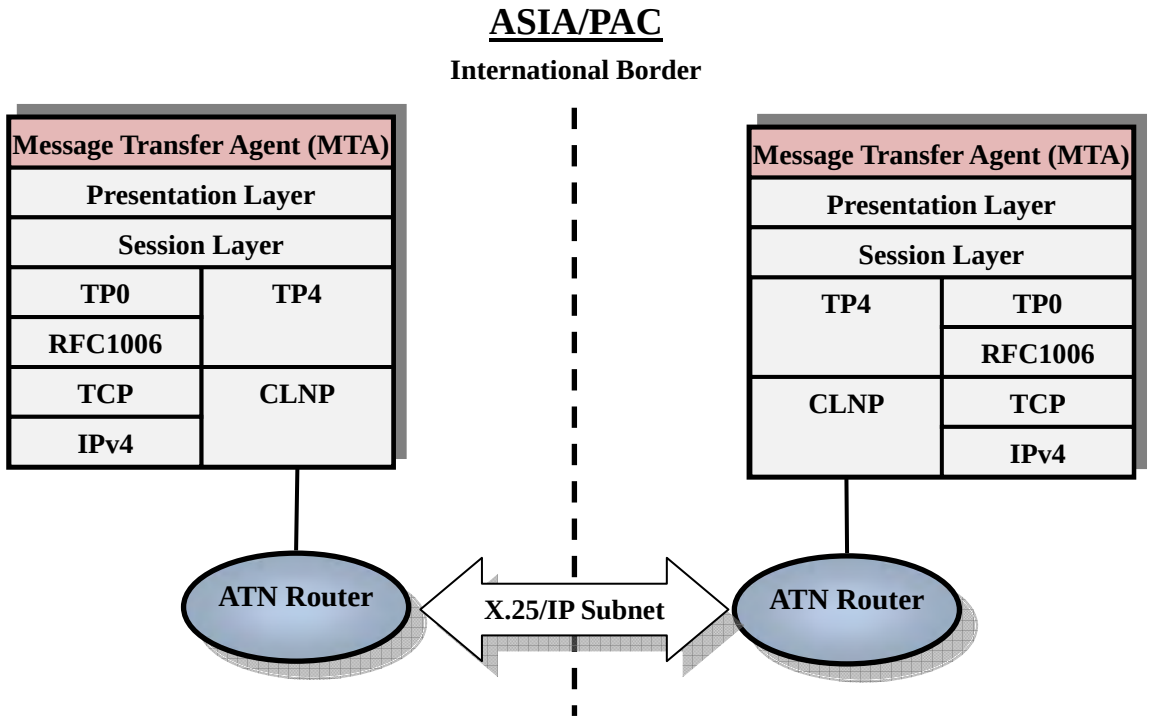
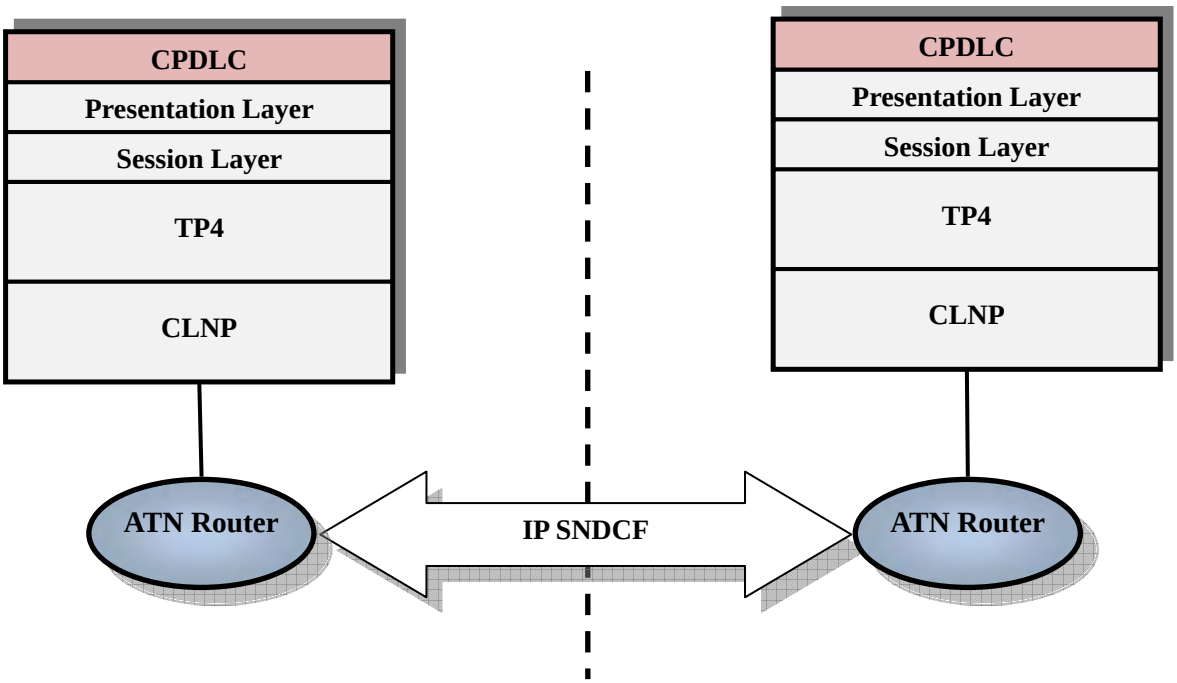



Figure 3 AMHS Configuration in Asia Pacific

## A/G Configuration




**SNDCF** Sub Network Dependent Convergence Function

**Figure 4** A/G Configurations

1.4. The Link 2000+ program and the FAA's Data Comm program are using ATN routers over IP sub-networks for ground-ground communications.

1.5. The Operational Meteorological Data (OPMET) has been considering the use of Extensible Markup Language (XML) for distributing OPMET data. Some AFTN platforms are able to transmit OPMET data in XML format. A plan to use the AMHS platform for testing OPMET data in XML format is planned between Hong Kong, China, Singapore, and USA.

1.6 The use of public internet has been adopted by ICAO for accessing the Air Traffic Service Management Center (AMC) and the World Area Forecast System **(W**AFS) **I**nternet **F**ile **S**ervice (WIFS) for WIFS distribution.

1.7. Virtual Private Network (VPN) over public internet has been used by States in the Middle East (MID) Region for AMHS service.

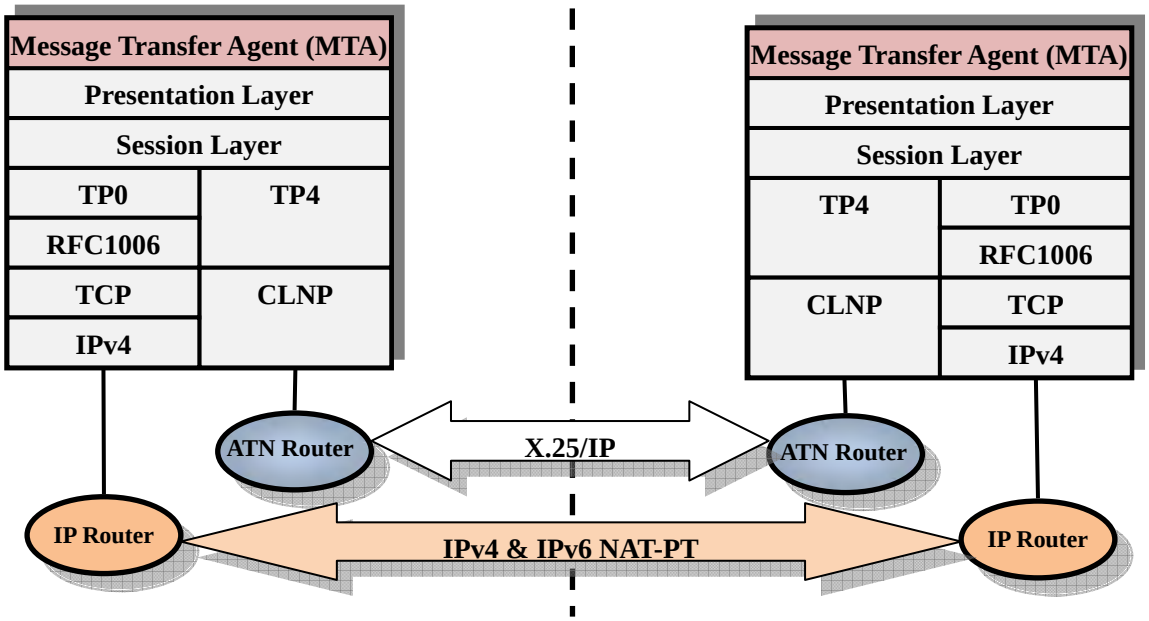
1.8. The use of public internet has been adopted by ICAO for accessing the Air Traffic Service Management Center (AMC).

**2. Discussion**

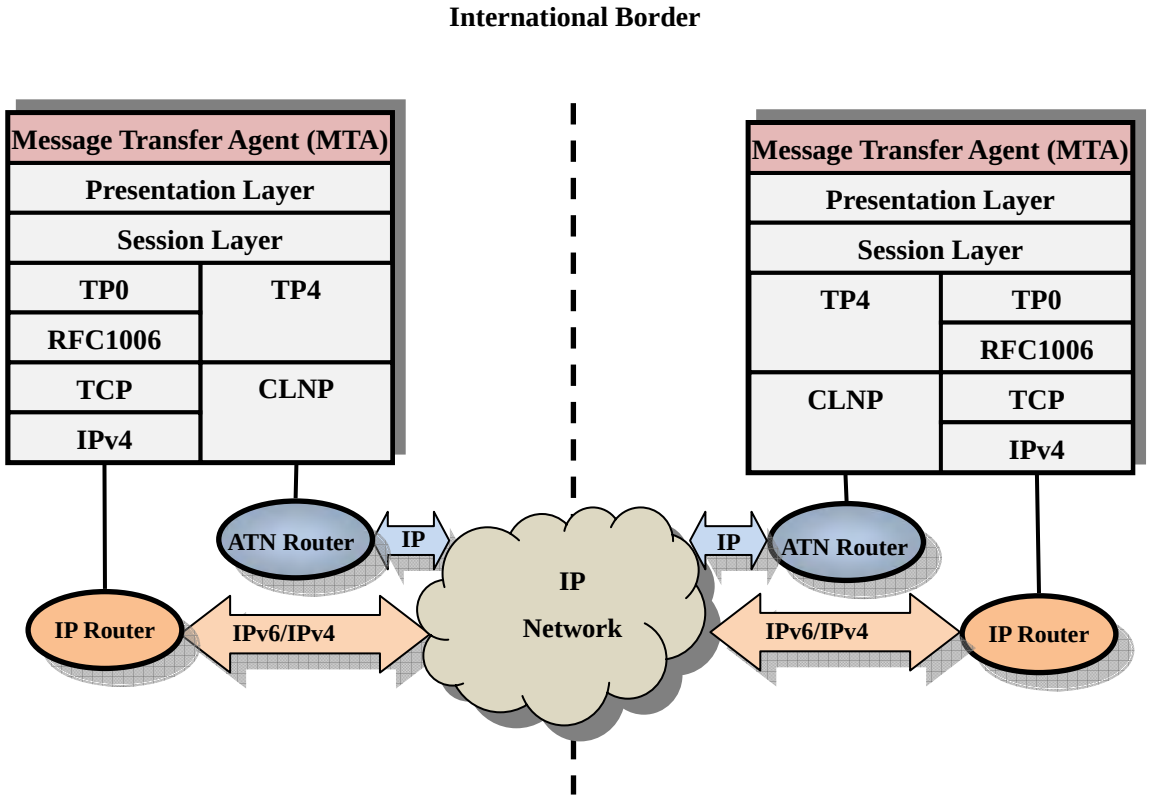
2.1 During transition from AFTN to an AMHS environment, the use of an AFTN gateway and an AMHS MTA to route traffic is acceptable and performs like an AFTN environment. The routers are limited to point-to-point routing and any alternative routing is based on bilateral agreements.

Message level routing follows the AFTN scheme.

**International Border**



2.2 Asia-Pac is phasing out an X.25 sub-network and implementing an IP sub-network to support AMHS. The strategy is to first use IP as a sub-network, and eventually support a direct IP interface using IP as routed network.




2.3 The Asia-Pac Region should move forward to using XML formatted data over AMHS to support OPMET data and other traffic. XML is platform independent that can be easily supported by the AMHS network.

2.4 The use of the public internet should continue to be separate from AFS. However, States can take advantage of public internet to improve network performance using IP security, such as VPN, on a case by case basis. The States with Backbone Boundary Intermediate System (BBIS) responsibility should not use public internet to interface with other BBIS.

## 3. Action requited by the Meeting

3.1 The current network protocol used by various ICAO regional AFS networks will continue to evolve into an IP based network. During transition from AFTN to an AMHS environment, the use of an AFTN gateway and an AMHS MTA to route traffic between different network protocols will be sufficient. AMHS may be used to provide additional services such as use XML to transport OPMET data and other ATC related messages.

3.2 The meeting is invited to note the information under Section 2 and take appropriate action to expedite transition to AMHS.

ACRONYMS

| | |
|---|---|
| AFTN | Aeronautical Fixed Telecommunication Network |
| AFS | Aeronautical Fixed Services |
| AMC | Air Traffic Service Management Center |
| AMHS | Air Traffic Service Message Handling System |
| APANPIRG | Asia Pacific Air Navigation Planning and Implementation Regional Group |
| ATC | Air Traffic Control |
| ATN | Aeronautical Telecommunication Network |
| ATNICG | Aeronautical Telecommunication Network Implementation Coordination Group |
| BBIS | Backbone Boundary Intermediate System |
| CAR/SAM | Caribbean and South America |
| CLNP | Connectionless Network Protocol |
| CPDLC | The Controller-Pilot Data Link Communications |
| HTML | Hyper Text Markup Language |
| ICAO | International Civil Aviation Organization |
| IP | Internet Protocol |
| IPv4 | Internet Protocol Version 4 |
| IPv6 | Internet Protocol Version 6 |
| IPS | Internet Protocol Suite |
| MTA | Message Transfer Agent |
| NAT-PT | Network Address Translation - Protocol Translation |
| OSI | Open System Interface |
| OPMET | Operational Meteorological Data |
| SNDCF | Sub Network Dependent Convergence Function |
| VDL | Very high frequency Data Link |
| VHF | Very High Frequency |
| WAFS | World Area Forecast System |
| WIFS | WAFS Internet File Service |
| XML | Extensible Markup Language |