

International Civil Aviation Organization



**THE SIXTH MEETING OF AERONAUTICAL  
TELECOMMUNICATION NETWORK (ATN)  
IMPLEMENTATION CO-ORDINATION GROUP  
OF APANPIRG (ATNICG/6)**



Seoul, Republic of Korea, 16 - 20 May 2011

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**Agenda Item 5:           IPS Transition**

**INFORMATION ON EXPERIENCE GAINED WHILE MIGRATION OF  
AFTN FROM X.25 TO TCP/IP**

(Presented by India)

**SUMMARY**

This paper provides with India's experiences on implementing AFTN over TCP/IP to replace X.25 technology in its domestic circuits.

**1.           INTRODUCTION**

1.1           The Aeronautical Fixed Telecommunications Network (AFTN), established for aviation communication, provides a store-and-forward messaging service for the conveyance of text messages, using character-oriented procedures. Although the AFTN served its purpose well for many years, its technology has become outdated due to the fact that it remains bound to its telex/telegraphic origins.

1.2           To meet the operational requirement and to make use of modern technology, ICAO has recommended for the implementation of ATS Message Handling Systems (AMHS) to replace the AFTN. To take the benefit of the technology and be able to use IP protocol on the ground, ICAO SARPs also allow an AMHS system to use either TCP/IP or ATN OSI lower layers, or both.

1.3           During the transition phase of AFTN to AMHS, some AFTN systems may also continue to remain in operation. It has therefore been recommended that AMHS systems may include AMHS/AFTN gateways to support AFTN – AMHS transformation and vice-versa.

1.4           As India plays a key role in the international AFTN, bridging the gap between the eastern and western parts of the world, a project of introducing TCP/IP protocol in AFTN environment to replace X.25 protocol for point to point connectivity in its domestic circuits was taken up in 2008-09 to facilitate AMHS migration in TCP/IP environment.

## 2. DISCUSSION

2.1 To meet the objective of replacing the use of X.25 protocols in AFTN with TCP/IP between two Automatic Message Switching System (AMSS) installations, the following aspects & constraints were taken into account:

- (a) A total of 16 AMSS installations were available throughout India from same vendor;
- (b) Major change recommendation in hardware/software configuration was discouraged as it would affect all locations in India; and
- (c) The switch application on AMSS server did not support to process messages directly received from another AMSS server as the host name and the IP address of servers were the same at every location.

To take forward the TCP/IP implementation, AAI's in-house team took out an extensive study of the prevailing windows based system and its X.25 adapter hardware.

2.2 An application software was subsequently developed to run on the system for routing the AFTN messages through Network Interface Card instead of X.25 adapter hardware. After several months of iterative trials, the application was replicated at all the locations within India and thus X.25 protocol used in most of the circuits in India has been eventually replaced with AFTN over TCP/IP.

2.3 As a parallel initiative the in-house team also developed another application called Remote Workstation to cater to those AFTN end systems which were connected to AMSS over serial link. The communications to these end systems are presently on TCP/IP and has the capability of automatically delivering the inbound messages to the local ATS units based on the AFTN addresses contained in the messages.

2.4 By the implementation of TCP/IP communication at all these locations, the following benefits have been achieved:

- (a) Integrated Voice over IP (VOIP) on the same communication media replacing separate speech circuits for ATC coordination;
- (b) Replication of NOTAM database to the local servers for sharing of common pre-flight information;
- (c) Replacement of costly X.25 pack Assembler and Disassembler (PAD) cards for every X.25 circuits in India; and

2.5 The following constraints were experienced in the project implementation:

- (a) No ICD exists for AFTN over TCP/IP in Asia Pacific Region;
- (b) In the absence of ICD, two new AMSS introduced at two locations (Bangalore & Hyderabad) could not be linked over TCP/IP although these systems are capable of handling AFTN over TCP/IP.

- (c) The domestic circuits over TCP/IP could not be integrated with AMHS system at Mumbai; and
- (d) No international circuits could be tested for AFTN over TCP/IP connectivity except Mumbai-Muscat which is operating between identical AMHS systems.

**3. ACTION REQUIRED BY TH MEETING**

3.1 The meeting is invited to:

- (a) discuss on the need for ICD for AFTN over TCP/IP in the process of phasing out X.25 protocol in AFTN/AMHS Gateway environment;
- (b) note the above experiences of TCP/IP implementation in AFTN environment in India.

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