



International Civil Aviation Organization

**THE SEVENTH MEETING OF AERONAUTICAL
TELECOMMUNICATION NETWORK (ATN)
TRANSITION TASK FORCE OF APANPIRG**

Shanghai, China, 18-22 April 2005.



**Agenda Item 1: Review latest developments in the Aeronautical Communication Panel
(ACP)**

**PROGRESS OF ACTIVITIES IN ACP ON
THE AERONAUTICAL TELECOMMUNICATIONS NETWORK
(NOTE: FULL REPORT OF THE ACTIVITIES OF ACP ARE AVAILABLE ON THE ACP
WEBSITE WWW.ICAO.INT/ANB/PANELS/ACP, WORKING GROUP N (N3 AND 4)**

(Presented by the Secretariat)

SUMMARY

This paper provide a summary of the activities in ACP working group N (networking) in 2004 on the ATN and ATN-related tasks.

1. Ground-Ground communications

1.1. TCP/IP

1.1.1 The developments of ATN Standards had started in 1989 and were predicated on the predominant networking technology at that time, the OSI/ISO protocol suite. Since then, significant changes have occurred with the worldwide acceptance of the Internet Protocol (IP). This has led industry away from providing OSI-based commercial products. This is one of the main reasons for ACP to study possible introduction of TCP/IP in the ATN in addition to, or as an alternative to the OSI/ISO protocol suite.

1.1.2 In various States or Regions, the use of TCP/IP protocols (in stead of OSI/ISO) for ground-ground communications is the preferred approach. The US/FAA is planning to migrate from OSI to the TCP/IP platform for ground-ground communications. Europe has decided to implement AMHS over TCP/IP. This would require dual stacks to be implemented at the boundaries of the EUR Region, to ensure interoperability with Regions where ATN in full compliant with the SARPs is being or has been implemented. The ASIA/PAC ATNTTF had clarified that TCP/IP may only be used as an encapsulation sub-network of the ATN under bilateral agreement between States. Administrations in the ASIA/PAC region are expected to provide AMHS over ATN infrastructure that complies with provisions of Doc. 9705.

1.1.3 ACP working group N reviewed the validation activities for the SND CF for the internet protocol (IP). In the validation activities both IP version 4 (IPv4) and IPv6 were considered. Based on the conclusions of the validation activities, sufficient confidence was gained to agree that

the technical provisions for the IPv4 and IPv6 SND CF were mature and could be incorporated in Doc. 9705.

1.1.4 AMHS implementation and testing in Europe resulted in a number of amendments to Doc. 9705 for further review by ACP in June 2005.

1.1.5 So far, AMHS has been tested in Europe mainly in a TCP/IP environment. Dual stack (TCP/IP and ATN) systems have been tested locally but not in a network configuration. Further testing work may be necessary, in case (or before) ICAO will introduce TCP/IP protocols as an alternative to the ISO/OSI suite in particular to test when messages travel from a TCP/IP environment to an ISO/OSI environment and vice versa.

1.1.6 There may also be some work necessary to define network addressing plans in a TCP/IP environment (IP addresses) and in ISO/OSI environment (NSAP addresses). Whether this can be performed on a Regional basis or Global basis should be considered by the ATNTTF

1.1.7 AMHS address management (X.400 O/R addresses and AMHS MD identifiers) is an essential requirement that needs to be in place before AMHS is deployed on a wide scale. This requires a joint effort from the ICAO Secretariat (Headquarters and Regional Offices) with the view to publish and maintain the ICAO register of AMHS MDs.

2. Air-ground communications.

2.1 In Europe, full SARPs compliant air/ground data over VDL Mode 2 is being implemented for CPDLC. Current planning is to require mandatory carriage of VDL Mode 2 for new aircraft as well as for ACC's by 2009 and for all aircraft by 2014. Applications in addition to CPDLC are foreseen to be implemented between 2008-2011. Introduction of air/ground data transmissions for CPDLC in the US is foreseen by 2010.

2.2 ACP WG N is considering a proposal to implements an application level checksum to CPDLC exchanges (protection of message exchanges by an application level integrity check), to mitigate the risk of undetected corrupted messages and of undetected mis-delivery (to the wrong aircraft) of messages used for separation. Implementation would require amendments to already installed equipment. This would apply to Protected Mode CPDLC (PM-CPDLC). Also changes to the Context Management (CM) application (CM Extensibility), which would not be compatible with the current version, are being considered.

2.3 To date no TCP/IP air-ground communication infrastructure is being considered for implementation. It is expected that this issue will be addressed in ACP at the WG N and the ACP working group of the whole level.

3. Voice-over-Internet Protocol (VoIP)

3.1 ACP is also considering possible usage of VoIP. If feasible, the introduction of VoIP could reduce the need for communication links with adjacent centres. Currently, at least two dedicated links are required, one for voice and another one for data. VoIP, together with TCP/IP data, could reduce these links two one. Similarly, use of VoIP over air/ground links may, if feasible, allow for

more parties to use the same frequency, including data communications. So far, the studies are based on following what is happening in EUROCAE on this matter.

4. Workplan on TCP/IP

4.1 Subject to a positive recommendation from WG N on introducing TCP/IP in the ATN SARPs, the ACP working group of the whole meeting in June 2005 is expected to formulate a recommendation to request the Air Navigation Commission to place this issue on the work program of the panel. In the mean time, the panel, through working group N will start developing SARPs material. Since one of the main requirements in this activity would be to make use of existing standards, it may be expected that core SARPs be completed in working group N within a year. At the same time, the manuals, in particular Doc. 9705 needs to be amended and, taking into account experience with ongoing TCP/IP implementations in Europe and North America, and possibly other Regions as well, this work could be completed in two years. Taking into consideration that the adoption process for SARPs takes at least 18 Months (as is prescribed through the Convention and several decisions of the Assembly), SARPs may be incorporated in Annex 10 by 2007/2008. The Manuals (in particular Doc. 9705) can be amended in a shorter time frame, since these require only approval by the Secretary-General of ICAO and could be issued by ICAO in the same time frame. These are optimistic estimates of the Secretariat and have not yet been addressed in ACP.

4.2 Introduction of material on the use of TCP/IP in the air-ground data links require significant technical work that may only be completed in a three to five years time frame. Initial operational deployment of an air/ground TCP/IP internet can only take place when this work is completed.

5. Other issues.

5.1 Migration to BUFR coded OPMET messages

5.1.1. The ICAO Aerodrome Meteorological Observing Systems Study Group (AMOSSG), which had a meeting from 11-14 April 2005 in Montreal, reviewed the progress with respect to the migration to BUFR coded OPMET messages.

5.1.2 Through the EANPG, ICAO has been requested to provide guidance to achieve a uniform global approach to the implementation of binary universal form for the representation of meteorological data (BUFR) coded OPMET messages, including early advice on the likely time-frame for ATSMHS extended services to accommodate BUFR coded messages. The time frame for this transition is from 2007 to 2015.

5.1.3 The ACP will be invited by the AMOSSG to develop a global plan for the introduction of BUFR coded OPMET messages.

5.1.4 An outline, proposed by the secretariat, is as follows:

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| 2007: | Provision to allow BUFR coded messages between States under bilateral agreements |
| 2010: | Provision (as recommended practice) for the exchange of OPMET data in BUFR code between the international OPMET databanks in Brasilia, Brussels, Dakar, Pretoria, Vienna and Washington and regional OPMET data banks in Bangkok, Brisbane, Nadi, Singapore and Tokyo as well as SADIS and ISCS uplink sites. |

2013: Provisions as indicated for 2010 become Standard; recommended practice for all States to issue OPMET data in BUFR to the appropriate OPMET data bank

2016: Provisions as indicated for 2013 become Standard.

5.1.5. Although it would be the primary goal to transport these messages over the ATN, consideration can be given to use the public internet as transport medium.

5.2 NOTAM

5.2.1 At the request from the user community, the Air Navigation Commission is considering to allow for the inclusion of lower case letters, in addition to upper case letters, in the NOTAM text. It has been noted that this change may cause problems for AFTN/CIDIN terminals, circuits and switches, especially where ITA-2 codes and teletype writers are being used. The cost of the upgrade of those terminals as well as re-programming of systems on a worldwide scale could therefore be quite high.

5.2.2. In order to provide the Air Navigation Commission with information on which basis the decision could be made whether there is a need for an amendment proposal to the relevant SARPs. The Secretariat would appreciate if the extent of the necessary hardware/software changes (to AFTN/CIDIN) on a regional scale could be estimated by the appropriate regional ASF/ATN groups. Any additional comment on potential technical, operational and economic implications of the subject changes would also be helpful and welcome.

6. Pending the wide scale availability of the AFS capable of handling the new MET formats (e.g. BUFR codes) and other possible new features (e.g. NOTAMS with lower case letters), the use of the public internet on a bilateral/multilateral/regional basis could be considered.

7. Action proposed

The meeting is invited to provide comments on the various issues raised in this paper with the view to assist and support ongoing work in ICAO.
