



International Civil Aviation Organization

**THE FIFTH MEETING OF AERONAUTICAL
TELECOMMUNICATION NETWORK (ATN)
IMPLEMENTATION CO-ORDINATION GROUP
OF APANPIRG (ATNICG/5)**



Kuala Lumpur, Malaysia, 31 May – 4 June 2010

Agenda Item 16: Any other Business

VOICE OVER IP FOR ATM GROUND TO GROUND COMMUNICATION

(Presented by Secretariat)

SUMMARY

Voice over IP protocol is being adopted by the commercial applications because of the operational and financial benefits it provides over the traditional means of voice communication. This paper provides a brief report on the works being carried out for adoption of this protocol for ATS communications.

1. Introduction

1.1 At present, for ground-ground ATM voice communication requirements, mainly digital (Time Division Multiplexing (TDM)/Pulse Code Modulation (PCM)) or analogue technologies are being used. There is, however a large move towards convergence of voice and data into one multimedia network by the commercial network providers. It has been noted that Voice over IP technology may fulfill and improve operational and technical ATM communication requirements. With Pan European Network Services (PENS) foreseeing integration of ATM IP Voice by 2010, a group (WG67) was formed by EUROCAE to examine the use of VoIP in ATM. This Group included European ANSPs, European ATM Suppliers of VCS equipment and Ground Based Radio Systems, FAA, EUROCONTROL, Telecom equipment suppliers and Telecom Operators.

1.2 A draft version of VoIP report was presented to the Tenth Meeting of Aeronautical Communications Panel (ACP) Sub-Working Group N-1 held from 16 to 20 January 2007. The meeting concluded that ICAO should develop SARPs, Technical Manual and Guidance Material to support VoIP service in the ATN.

2. Discussion

2.1 Voice communication is transiting from Time Division Multiplex (TDM) to Voice over Internet Protocol (VoIP) over last two decades. It is expected that this transition will result in cost saving both in personnel and in infrastructure resulting from digitization of analogue voice signals and the possibility of merging the telephone services with the data network services. Further low bandwidth capability of packet data service of X.25 has made it inefficient for use and has resulted in migration to TCP/IP protocol and services in the commercial communication.

2.2 Feasibility of using Voice over Internet Protocol (VoIP) for ground to ground and air to ground communications was considered by the Aeronautical Communication Panel Working Group of the Whole (ACP WG-W) Meeting held from 21 to 29 June 2005. The meeting noted that EUROCAE, through its Working Group 67 (launched in March 2004), was developing technical interface specifications and standards for introducing VoIP in ground-ground communications and agreed that ICAO should consider the possibility of incorporating VoIP standards for aeronautical communications in Annex 10 based on the work being done in EUROCAE and adopted the following recommendation:

Recommendation 2/4 – Use of Voice over Internet Protocol (VoIP) in aeronautical telecommunications

That, ICAO studies the development of standardization activities on VoIP protocols with the view to recommend their use in aeronautical communications. In understanding this task, the following will apply:

- a) study the feasibility of using VoIP in aeronautical ground-ground voice communications, on the basis of available internationally agreed standards and recommend on the need to develop relevant SARPs and guidance material;
- b) depending on the outcome of this study develop SARPs and guidance material, as necessary ; and
- c) study the feasibility of using VoIP in air-ground communications

2.3 The key advantages associated with the use of a packet network for the transmission of digitized voice are:

- a) Bandwidth allocation efficiency
- b) Ability to use modern voice compression methods
- c) Associate economics with shared network use
- d) Reduce costs
- e) Enhanced reliability of packet networks
- f) Ability to use multiple logical connections over single physical circuit

2.4 Acting on the Recommendation 2/4 adopted by the ACP Working Group of the Whole meeting, Rapporteur of ACP Working Group N recommended to the Aeronautical Communication Panel First Meeting (ACP/1) held from 10 to 18 May 2007 that ICAO should modify SARPs and develop a Technical Manual and Guidance Material to support VoIP services in the ATN before the current voice communication systems become obsolete and are no longer supported by equipment vendors.

2.5 Aeronautical Communication Panel (ACP) in its First Meeting held in Montreal from 10 to 18 May 2007 agreed that should ANC decide to task ACP to develop SARPs and guidance material for VoIP, this work needs to be undertaken by ACP-I. ANC directed ACP WG-I to reference external mature standards for VoIP requirements, rather than developing standards at ICAO. In line with this direction, WG-I has been coordinating with EUROCAE-67 to determine if the VoIP standards being developed can be referenced by ICAO for member states' implementation of VoIP.

2.6 Voice over Internet Protocol, also called VoIP, IP telephony, Internet Telephony and Voice over Broadband is the routing of voice conversation over the public Internet or through a private IP based network. Protocols used to carry voice signals over the IP are commonly referred to as VoIP protocols. Most cable TV and satellite TV service providers are migrating and offering to their subscribers VoIP and this is due to network convergence, proven technology and cost savings.

2.7 Paragraph 7.0, *Manual for the ATN using IPS Standards and Protocols* (Doc 9896) informs about EUROCAE publishing a series of documents on VoIP for ATM which may be used as an additional specification material. These documents are numbered ED 136, ED 137, ED 138.

- a) ED 136 (SG1) Voice over Internet Protocol (VoIP) ATM System Operational and Technical Requirements
- b) ED 137 (SG2): Interoperability Standards for VoIP ATM Components
 - i. Part 1: Radio
 - ii. Part 2: Telephone
 - iii. Part 3: Recording
 - iv. Part 4: Supervision
- c) ED 138 (SG 3): Network Requirements and Performance for VoIP ATM Systems
 - i. Part I: Network Specifications
 - ii. Part II: Network Design Guidelines
- d) ED 139 (SG4): Qualification tests for VoIP ATM Components and Systems

2.8 Interoperability between different Voice Communication Systems (VCS) and different Ground Radio Stations (GRS) is the key to the success of this technology. The Second EUROCAE VoIP for ATM Plug tests interoperability event organized by ETSI at its headquarters in Sophia Antipolis, France (25 March to 3 April, 2009) has confirmed the robustness of the EUROCAE interworking specifications (ED 137) for VCS and GRS. Eleven equipment manufacturers participated in the test, which was conducted in the presence of two ANSPs as observers.

2.9 There are two standardized frame works for implementing VoIP, H 323 and SIP. Although both protocols may be used for this application, the original focus of each protocol is different. The focus of H 323 has been to handle voice multimedia calls, including supplementary services, while SIP was designed as a generic transaction protocol for session initiation not bound to any specific media (e.g. audio or video). Both H323 and SIP operate in the application layer to support multimedia data and signaling protocol.

2.10 In the Third Meeting of Aeronautical Communication Panel Working Group of the Whole, held from 18 to 22 January 2010, it was informed that the work on VoIP additions to ATN/IPS Manual will be completed by ACP Working Group I in the Third Quarter of 2010.

3. Action Required

3.1 The meeting is invited to note the developments that are taking place in the deployment of VoIP for ATM ground-ground communication requirements.