



The European Organisation for Civil Aviation Equipment
L'Organisation Européenne pour l'Équipement de l'Aviation Civile

INTEROPERABILITY STANDARDS FOR VOIP ATM COMPONENTS

ADDENDUM 5 TO VOLUME 2: VOICE CALL

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ED-137/2C-5

March 2019

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FOREWORD

1. This document forms Addendum 5 “Interoperability Standards for VoIP ATM Components – Volume 2 Addendum 5: Voice Call” to ED-137C Volume 2: Telephone, and was prepared by EUROCAE Working Group 67 and was accepted by the Council of EUROCAE on 23 March 2019.
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3. The findings of EUROCAE are resolved after discussion among its members and, where appropriate, in collaboration with RTCA Inc, Washington D.C. USA and/or the Society of Automotive Engineers (SAE), Warrendale, PA, USA through their appropriate committee.
4. This version of the document represents “the minimum European specification required for Manufacturers and Users to assure Interoperability from/to VoIP ATM Telephone Components to/from Legacy systems”.
5. This version is taking into account the EUROCONTROL VoIP in ATM Test Case Specification.
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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Ground-Ground (G-G) ATM voice systems have been based upon analogue and more recently, digital Time Division Multiplexing / Pulsed Code Modulation (TDM/PCM) technologies for many years.

Nowadays, however, convergence of voice and data into one multimedia network is a popular trend with a variety of technical solutions available on the market. Following in this direction ATM communication networks are adopting, by a process of gradual evolution, a common infrastructure for voice and data services.

As the technology has developed IP Technology has now the true potential to fulfil operational and technical ATM communication requirements - including those of voice / data convergence, Quality of Services (QoS), security and safety. There is also the possibility that IP may deliver solutions that will, over time, bring about true savings in investment and operating costs.

EUROCAE Working Group 67 (WG-67) undertook the mission to assess the feasibility of using Voice over Internet Protocol (VoIP) for providing ATM voice services. The group defined criteria, requirements and guidelines based upon the following operational needs and constraints:

- Operational and Technical Air-Ground (A-G) and Ground-Ground (G-G) ATM Voice system requirements;
- Existing IP Voice protocols and signalling standards;
- IP network capabilities for Voice services;
- Security, Quality of Service (QoS), and Convergence (infrastructure, protocol, applications);
- Existing IP Voice ATM system capabilities and service interfaces.

The following tasks were identified to fulfil the WG-67 mission:

- Define ATM Systems and identify their components (Voice Communication System / VCS, Ground-based Radio Station / GRS)
- Determine possible additional operational and technical ATM requirements for new ATM voice systems, also taking into consideration A-G communications.
- Make recommendations to upgrade current standardisation documents.
- Develop a Technical Specification for a VoIP Voice ATM System including:
 - Minimum performance and safety/security requirements for the system and, if appropriate, for components;
 - Interoperability requirements between IP components of the VoIP ATM system;
 - Minimum performance requirements of an IP Network to support ATM Voice services;

Consequently, the following three documents were delivered:

ED-136 - VoIP ATM System Operational and Technical Requirements

ED-137 - Interoperability Standards for VoIP ATM Components

ED-138 - Network Requirements and Performances for VoIP ATM Systems

The contents of all three documents are premised on the “**Vienna Agreement**” which defines the different components of a VoIP ATM system and their mutual interfaces as depicted in FIGURE 1.1.

VIENNA AGREEMENT

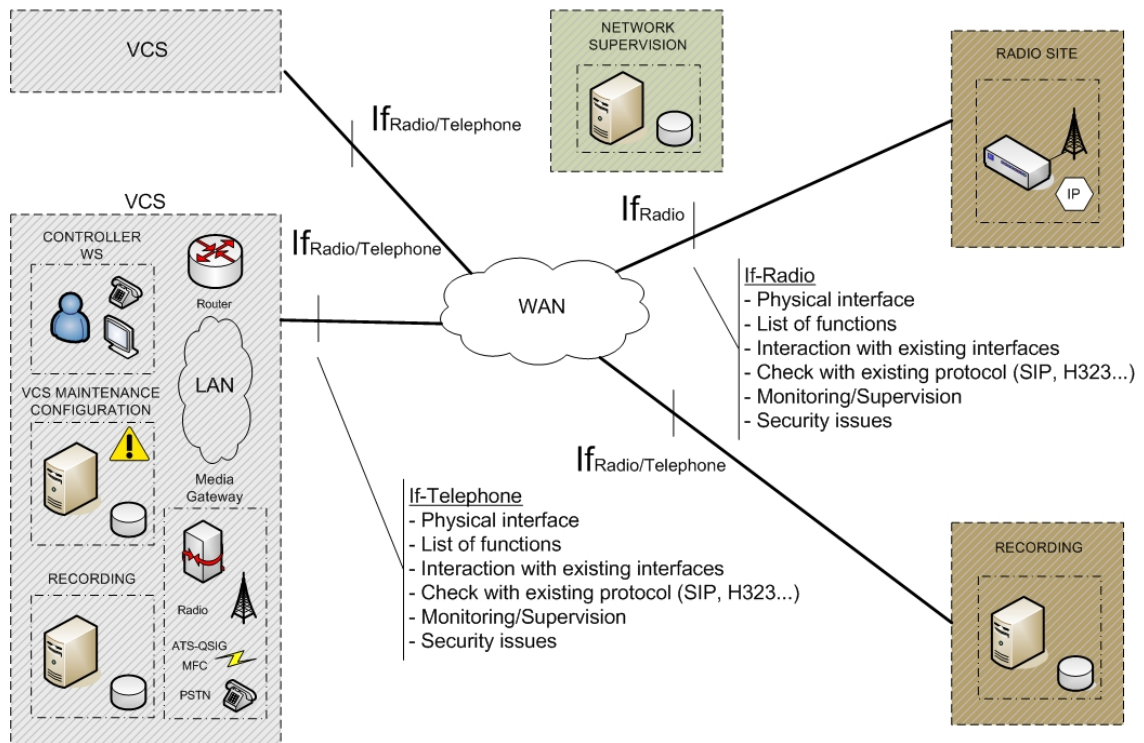


FIGURE 1.1: VIENNA AGREEMENT

VoIP components are interconnected through an IP network and suppliers are free to define their internal architecture (IP/Ethernet, TDM/PCM - Time Division Multiplexing/Pulsed Code Modulation, etc.) Between VoIP components, required interfaces are defined to guarantee their functional and technical interoperability.

Therefore, VoIP ATM Systems are composed of:

- **VoIP VCS Components** performing Radio and / or Telephone functions, including:
 1. Controller Working Positions, assuring HMI including voice devices (microphone and loudspeaker);
 2. Possible local VCS Maintenance and Configuration stations;
 3. Possible local Recording devices;
 4. Possible LAN for local interconnection;
 5. Possible Media Gateways to legacy systems (ATS-QSIG, ATS-R2, ATS-No.5, PSTN, Radio analogue lines, etc.)
- **VoIP Ground Radio Station Components** performing DSB-AM VHF and UHF Radio functions.
- **VoIP Supervision System Components** performing monitoring and control functions.
- **VoIP Recording Components** performing recording functions.
- **IP WAN Components** performing interconnection services between two or more different

1.2 ED-137 VOLUME 2 ADDENDUM 5 PRESENTATION

The scope of the WG-67 ED-137 Documents is to define the rules for VoIP implementations to support ATM communications:

- Radio for the Volume 1
- Telephone for the Volume 2
- Recording for the Volume 4
- Supervision for the Volume 5

This includes the performances requested for the related communications.

The present document, ED-137 Volume 2 Addendum 5, proposes a profile standard for a Voice Call Type that is based on the DA/IDA Call Type from the ED-137C Volume 2 [6] Core document.

1.3 TERMINOLOGY FOR REQUIREMENTS, RECOMMENDATIONS AND OPTIONS

The terminology for requirements, recommendations and options in this document is based on RFC 2119 [2], which specifies Best Current Practice regarding the use of Key Words for the Internet Community. As such, the following terminology is applied:

- The word **SHALL** denotes a mandatory requirement;
- The word **SHOULD** denotes a recommendation;
- The word **MAY** denotes an option.

To avoid confusion with their natural meanings in the English language, the words **SHALL**, **SHOULD**, and **MAY** take on the meaning stated above only where printed in boldface. When printed in normal (Arial) typeface, the natural English meaning is meant.

Detailed description of terminology:

1. **SHALL**: This word has the same meaning as the phrase "REQUIRED" and means that the definition is an absolute requirement of the specification.
2. **SHALL NOT**: This phrase means that the definition is an absolute prohibition of the specification.
3. **SHOULD**: This word, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
4. **SHOULD NOT**: This phrase, or the phrase "NOT RECOMMENDED" mean that there may exist valid reasons in particular circumstances when the particular behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label.
5. **MAY**: This word, or the adjective, "OPTIONAL", means that an item is truly optional.

1.4 VERSION TRACKING

The present document, ED-137/2C Volume 2, Addendum 5, **SHALL** be referenced as **phone.add05.02** in the WG67-Version SIP header field described in ED-137 Volume 2 [6].

CHAPTER 2

COMMUNICATION MODEL

2.1 DEFINITIONS

The following terms are used in this document:

- **Pre-connection:** A one-way RTP connection from the Focus of a Multi-Destination Voice call to the Pre-Connected user agent. This pre-connection is established before a call is initiated in order to ensure the respective receiving user agent maintains the ability to immediately receive a Voice call page from a calling party without delay due to SIP dialog establishment. A Pre-connected state consists of a Focus sending digital silence to each pre-connected called party.
- **Pre-Response Termination:** A scenario where the calling party of a Voice call terminates the call while in the Ringing state.
- **Voice Call:** A DA/IDA call that is modified so as to provide RTP audio from calling party to called party that is intended to replace locally generated ringing at the called position.
- **Voice Page:** A one-way RTP from calling to called party during the ringing state of a Voice call and is routed to alert the called user, replacing local ringing.

CHAPTER 3

PROFILE STANDARD FOR THE USE OF SIP IN AN AGVN

An Air Traffic Services VoIP Communications System **SHALL** support SIP version 2 as specified in RFC 3261 [4]. The requirements of RFC 3261 [4], RFC 6665 [5], and ED-137C: Volume 2 [6] **SHALL** apply with modifications as specified in the following sections and in EUROCAE ED-137 “Interoperability Standards for VoIP ATM Components, Volume 2: Telephone” [6].

3.1 SUPPORTED REQUESTS

The basis for Supported Requests is provided via Table 3.1 of ED-137C: Volume 2 [6]. The table below only provides updates that are necessitated by the Voice call. Therefore, entries in the table below **SHALL** replace the corresponding values in Table 3.1 of ED-137C: Volume 2 [6].

TABLE 3.1: SUPPORTED REQUESTS

Method	Logical SIP Entity									
	User Agents		Registrar		Proxy Server		Redirect Server		Focus	
	Support Sending	Support Receiving	Support Sending	Support Receiving	Support Sending	Support Forwarding	Support Sending	Support Receiving	Support Sending	Support Receiving
SUBSCRIBE (RFC 3261 [4])	m	-	-	-	-	-	-	-	-	m
NOTIFY (RFC 6665 [5])	-	m	-	-	-	-	-	-	m	-

m: mandatory; o: optional; x: prohibited; n/a: not applicable; -:no update necessary in this addenda

3.2 SUPPORTED HEADER FIELDS

3.2.1 PRIORITY

This addendum requires the use of the following Priority header value in reference to those included in Table 3.6 of ED-137C: Volume 2 [6]:

TABLE 3.2: PRIORITY HEADER VALUES

Priority	Type of Call	SIP Priority header field value
Routine	Voice call	normal

3.2.2 SUBJECT

For the Voice Call Type, the Subject header **SHALL** be included in all requests. The values of the Subject header **SHALL** be set by call type in accordance with TABLE 3.3 below.

TABLE 3.3: SUBJECT HEADER FIELD VALUES

Type of call	SIP Subject header field value
Voice call	VOICE call