



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

INTEROPERABILITY STANDARDS FOR VOIP ATM COMPONENTS

VOLUME 5: SUPERVISION

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ED-137/5B

January 2012

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FOREWORD

1. This document “**Interoperability Standards for VoIP ATM Components – Volume 5: Supervision**” was prepared by EUROCAE Working Group 67 and was accepted by the Council of EUROCAE on 19 January 2012.
2. EUROCAE is an international non-profit making organisation. Membership is open to manufacturers and users in Europe of equipment for aeronautics, trade associations, national civil aviation administrations and non-European organisations. Its work programme is principally directed to the preparation of performance specifications and guidance documents for civil aviation equipment, for adoption and use at European and world-wide levels.
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 document is part of a series of EUROCAE Documents, composed of 5 volumes:
 - ED-137/1 “Interoperability Standard for VOIP ATM Components – Volume 1: Radio”
 - ED-137/2 “Interoperability Standard for VOIP ATM Components – Volume 2: Telephone”
 - ED-137/3 “Interoperability Standard for VOIP ATM Components – Volume 3: European Legacy Telephone Interworking”
 - ED-137/4 “Interoperability Standard for VOIP ATM Components – Volume 4: Recording”
 - ED-137/5 “Interoperability Standard for VOIP ATM Components – Volume 5: Supervision”.

Together the 5 volumes, edition B, replace ED-137A, published in September 2010.
5. This version of the document represents “the minimum specification required for Manufacturers and Users to assure Interoperability from/to VoIP ATM Supervision Components”. EUROCAE WG-67 has updated the previous version of ED-137:
 - following a series of plug tests, performed by many suppliers in Arlington in May 2011 and in Sophia Antipolis in June 2011, improving ED-137 concerning the understanding of interoperability requirements between the ATM VoIP components,
 - following discussions with FAA for taking into account US requirements agreeable within the European context.
6. This version is taking into account the EUROCONTROL VoIP in ATM Test Case Specification.
7. EUROCAE performance specifications are recommendations only. EUROCAE is not an official body of the European governments; its recommendations are valid statements of official policy only when adopted by a particular government or conference of governments.
8. Copies of this document may be obtained from:

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Components of Ground - Ground ATM voice systems have used digital (TDM/PCM - Time Division Multiplexing / Pulse-Code Modulation) or analogue technology for a long time.

Convergence of voice and data into one multimedia network is observed on the market. As a consequence, the ATM communication network is evolving into a common infrastructure for voice and data services.

As a result of the above described technological trends, the capability of Voice over IP Technology may fulfil and improve operational and technical ATM communication requirements, including voice / data convergence, specific Quality of Service (QoS), security and safety requirements.

So after analysing the situation regarding:

- 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, QoS, Convergence (infrastructure, protocol, applications), and
- Existing IP Voice ATM systems and their service interfaces,

the following tasks were achieved for ground-ground ATM communications and ground-ground segment of air-ground ATM communications:

- Define IP Voice 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 IP Voice ATM systems, also taking into consideration A/G communications;
- Accordingly, make recommendations to upgrade current standardisation documents;
- Develop a Technical Specification for an IP Voice ATM System including:
 - o Minimum performance and safety / security requirements for the system and, if appropriate, for components;
 - o Interoperability requirements between IP components of the IP Voice ATM systems;
 - o Interoperability requirements between IP components of the IP Voice ATM systems and the current non-IP voice ATM systems;
 - o Minimum performance requirements of an IP Network aimed to support Voice in ATM;

So, three documents with a common reference to "Vienna Agreement" were provided:

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 "**Vienna Agreement**", settled during the 4th WG67 meeting in Vienna, defines the different **physical components** of VoIP ATM Systems. 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, ...). Between VoIP components, required interfaces are defined to guarantee their functional and technical interoperability.

VIENNA AGREEMENT

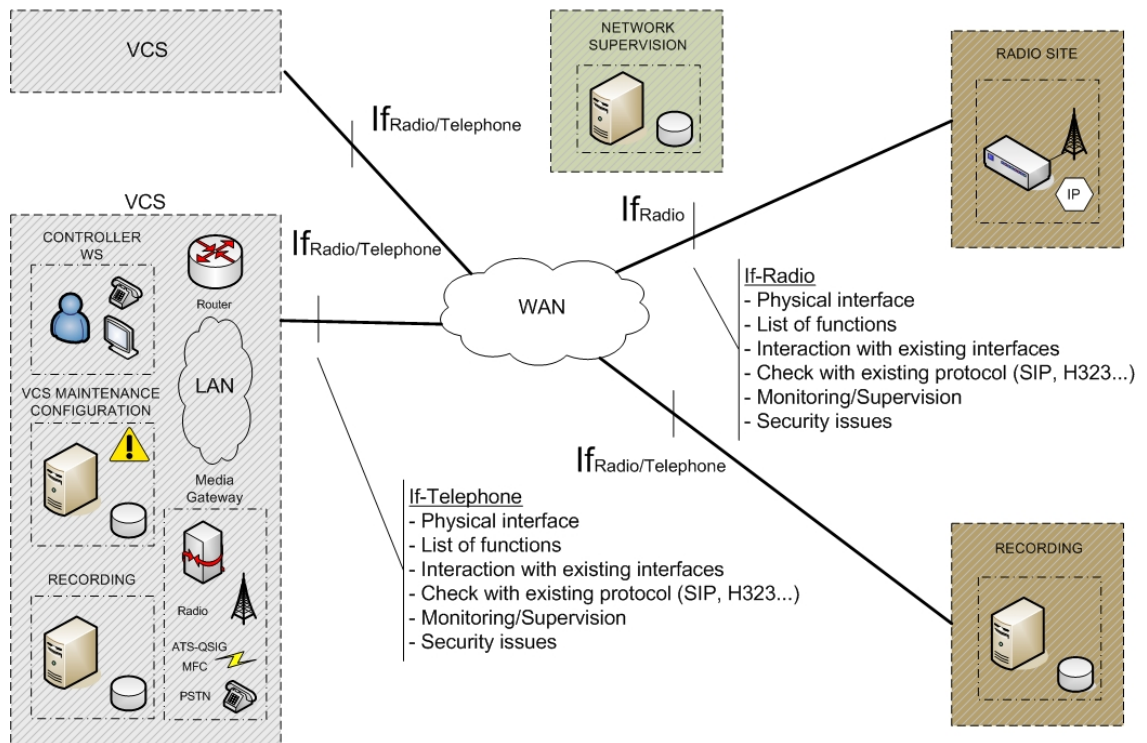


FIGURE 1: VIENNA AGREEMENT

So VoIP ATM Systems are composed of:

- **VoIP VCS Components** performing Radio and / or Telephone functions composed of:
 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, ...).
- **VoIP Ground Radio Station Components** performing A/G voice communications using amplitude-modulated 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 physical components.

1.2 ED-137 VOLUME 5 PRESENTATION

The scope of the WG67 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
- European Legacy Telephone Interworking for the Volume 3
- Recording for the Volume 4
- Supervision for the Volume 5

This includes the performances requested for the related communications.

The present document, that is the ED-137 Volume 5, proposes:

- A supervision model (chapter 2)
- General supervision and monitoring & control requirements (chapter 3)
- VCS supervision requirements (chapter 4)
- A minimum set of requirements for ensuring VoIP supervision, monitoring and basic control messages between VCS and GRS via SNMP (chapter 5).

1.3 TERMINOLOGY FOR REQUIREMENTS, RECOMMENDATIONS AND OPTIONS

The terminology for requirements, recommendations and options in this document is based on RFC 2119, 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", mean that an item is truly optional.

CHAPTER 2

SUPERVISION MODEL

2.1 CENTRALIZED SUPERVISION

According to Vienna Agreement the supervision system **SHALL** be a centralized system capable to perform supervision and monitoring tasks of several components involved in the VoIP ATM system.

The centralized supervision **SHALL** have enough capacity to guarantee the data exchange and storage. It **SHALL** provide redundancy in order to guarantee higher level of availability to avoid loss of data.

2.2 ALARMS AND EVENTS

Alarms and events are indications that **SHOULD** require attention from the maintenance staff.

- An alarm **MAY** be active for a period of time. Alarms **SHOULD** be removed automatically when the error situation ceases.
- An event states that something has happened. Events **SHOULD** be manually removed from the supervision application.

2.3 BACKGROUND AND ARCHITECTURE

The Networking Supervision **SHALL** be limited to monitoring and supervision tasks and its performance **SHALL NOT** interfere in the management and voice requirements.

The centralized supervision **SHALL** be capable to exchange data info with the local supervision system belonging to each VCS.

CHAPTER 3

GENERAL REQUIREMENTS

3.1 SUPERVISION PROTOCOL

The communication between the centralized supervision and the VCS local supervisions **SHALL** be performed through the standard protocol SNMPv3, as it is described in the RFC 3411 [11].

3.2 MONITORING FUNCTION

The main goal of the supervision system **SHALL** be to evaluate and report upon the VoIP communication equipments, links and network status. It **SHOULD** also provide statistical data for the purpose of monitoring and aid in the behaviour correction and be useful for planning and analysis phases.

3.2.1 Network Performance Monitoring

The supervision system **SHALL** provide data about the performance of the network. The following parameters **SHOULD** be supervised:

- Bandwidth utilization (MIB-2)
- Packets per second (MIB -2)

3.2.2 Traffic Measurement

The supervision **SHALL** collect traffic data from the different equipments. Reports from these data **SHALL** be sent on demand.

3.2.3 Systems and Network availability

The system **SHALL** be capable to monitor operational status in near real time. The exact maximum delay for monitoring updates is left as an ANSP-specific operational requirement.

The system **SHALL** provide the following operational status values:

- Operational (Up) – the unit is operational or in case of redundancy all redundant units are operational
- Degraded (Down) – not all the redundant units are operational (in case of redundancy)
- Non-operational (Testing) – none of the redundant units are operational

3.2.4 Set of Elements

The following set of elements **SHALL** be supervised:

- Network Links
- Radio Gateways
- VCS Gateways
- Server (Proxies...)
- VoIP Radios
- VoIP Terminals (Positions)
- VoIP Recorder
- Switches/Routers