

Legacy analog and TDM-based voice communication systems are reaching end-of-life, creating interoperability challenges, high maintenance costs, and limited scalability for modern Air Traffic Management. **DICOM ICS2020** delivers a fully ED-137C compliant VoIP solution that enables seamless IP migration while exceeding industry performance benchmarks.

VOIP IN ATM - THE EVOLUTION

Convergence of voice and data into one multimedia network made the ATM community consider evolution towards a common modern IP infrastructure. **EUROCAE Working Group 67 (WG-67)** defined criteria, requirements and guidelines for ground-ground and air-ground ATM communications, resulting in four complementary standards:

ED-136

VoIP ATM System Operational and Technical Requirements

ED-137

Interoperability Standards for VoIP ATM Components

ED-138

Network Requirements and Performance for VoIP ATM Systems

ED-139

Interoperability Standards - Controller Audio Endpoints

ED-137 Anatomy - Four Volumes

The ED-137 standard consists of independent volumes, each dealing with different aspects of VoIP in ATM. The latest version (ED-137C) provides comprehensive coverage of all communication options: **Note: Volume 3 does not exist in the ED-137C version.**

Volume 1 - Radio

- ✓ Air-ground radio communications
- ✓ SIP-based session establishment
- ✓ RTP header extensions for PTT
- ✓ Best Signal Selection (BSS)
- ✓ Multi-site radio management

Volume 2 - Telephone

- ✓ Ground-ground telephony
- ✓ Direct/Indirect Access calls
- ✓ Conference & hotline calls
- ✓ Call forwarding & transfer
- ✓ MFC/ATS-QSIG interworking

Volume 4 - Recording

- ✓ RTP-based recording streams
- ✓ Call Recording Data (CRD)
- ✓ Ambient recording support
- ✓ RTSP session management

Volume 5 - Supervision

- ✓ SNMP-based monitoring
- ✓ MIB-2 object groups
- ✓ Alarms and events management
- ✓ Performance monitoring

<20ms

PTT Latency

<100ms

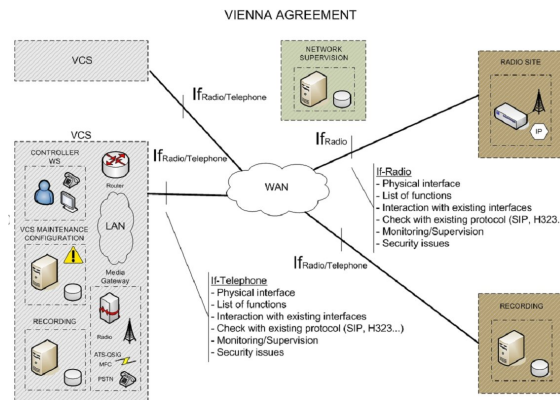
Call Setup

99.9999%

Availability

<50ms

Failover Time



Version C of ED-137 introduced significant enhancements over version B. Systems implementing different versions can coexist and interoperate through automatic version negotiation. ICS2020 fully supports ED-137C with backward compatibility to ED-137B.

Radio (Volume 1) - New Features

- Version identification and negotiation
- RX IDLE mode (in addition to TRX, RXonly, Coupling)
- SELCAL tones via SIP messages
- TEST PTT for transmission test during inactivity
- New error codes for connection/transmission failures
- Frequency ID from non-VoIP keying sources
- BSS delay difference compensation
- Dynamic delay compensation for multiple TX

Telephone (Volume 2) - New Features

- Version identification and negotiation
- Independent focus in multi-party calls
- Preset conference call
- Extended call forward / Basic call forward
- Hotline access call / Voice call
- Radio intercom call
- Multi-destination call / Call pickup
- Call type indication in SIP header
- Loop & Echo detection algorithms

Recording (Volume 4) - New Features

- Audio only mode (without CRD metadata)
- R2S Header Extension Recording
- Radio Selection CRD
- RTSP Session Keep Alive
- Recording Server Liveliness monitoring
- Proprietary CRD Metadata support
- Ambient recording capability

Supervision (Volume 5) - New Features

- Clear identification of supervised components
- Identification of applicable RFCs
- MIB-2 object groups specification
- Clarification on MIB structure/architecture
- VCS, Radio, Recorder, Gateway, 3rd party (UPS, Switch, Router)
- Standardized alarms and events
- Performance monitoring metrics

ICS2020 ED-137C COMPLIANCE & KEY BENEFITS

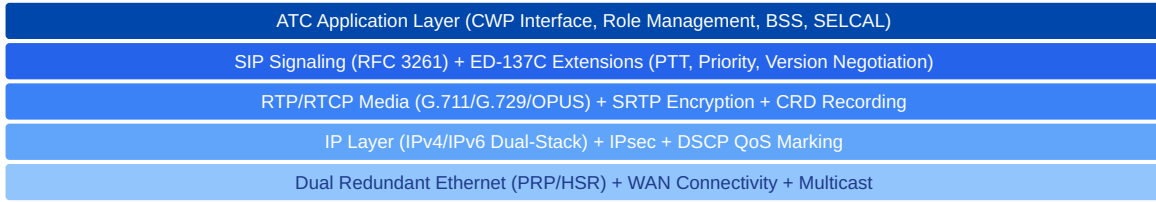
Full ED-137C Capabilities

- ✓ SIP-based architecture (RFC 3261)
- ✓ R2S & T2S gateway integration
- ✓ QoS: DSCP marking, adaptive jitter buffer
- ✓ Codecs: G.711, G.729, OPUS
- ✓ PTT latency: <20ms end-to-end
- ✓ SRTP media & IPsec network encryption
- ✓ Backward compatible with ED-137B

Key Benefits

- ✓ Multi-vendor interoperability guaranteed
- ✓ 40-60% infrastructure cost reduction
- ✓ 99.9999% system availability (N+1)
- ✓ Bypass function for emergency
- ✓ Future-proof IPv6 native support
- ✓ SNMP support for all device types
- ✓ Simplified migration from legacy TDM

ED-137 VoIP Protocol Stack - ICS2020 Implementation



SYSTEM SPECIFICATIONS

Performance

- ✓ PTT/SQ delay: <10ms (excl. radio/network)
- ✓ Call setup time: <100ms for DA calls
- ✓ Main/Standby transfer: <200ms
- ✓ System startup time: <90s
- ✓ MTBF @ 25°C: >15 years
- ✓ MTTR: <30 minutes

Capacity

- ✓ Operator positions: Unlimited
- ✓ Radio frequencies: 100 per system
- ✓ Frequencies per CWP: 32 (48/64 optional)
- ✓ DA keys: Up to 192 buttons
- ✓ Simultaneous calls: 50+
- ✓ Preset conference groups: 100

Audio Quality

- ✓ Frequency response: 300-3400 Hz
- ✓ Noise: <-65 dBm (idle channel)
- ✓ Harmonic distortion: <2%
- ✓ Crosstalk: >75 dB
- ✓ Impedance: 600Ω or 900Ω balanced

Environmental

- ✓ Operating temp: -10°C to 55°C
- ✓ Storage temp: -20°C to 70°C
- ✓ Humidity: 5-95% non-condensing
- ✓ Availability: >99.99995%
- ✓ Continuous operation: 24/7

STANDARDS COMPLIANCE

EUROCAE

ED-136, ED-137B/C, ED-138, ED-139, ED-153

ICAO

Annex 10 Vol III, Doc 4444

IETF

RFC 3261, RFC 3550, RFC 3711

Ready to modernize your ATC voice infrastructure?

Schedule a live demonstration and discover how ICS2020 can transform your operations with full ED-137C compliance.

Contact Us

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