AIR TRAFFIC MANAGEMENT

VOIP-BASED VOICE COMMUNICATIONS CONTROL SYSTEM

Supplying ATM systems around the world for more than 90 years

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Welcome to EUROCAE VoIP-Based VCCS

Indra VCCS is based on well-proven technology and the wealth of experience implementing successful innovations to Indra VCCS systems. This provides interoperability and connectivity to existing communication infrastructures as well as Ground-Ground and Air-Ground-Air voice communication networks. These characteristics, as well as its innovative design, make Indra VCCS one of the most advanced and capable VCCS in the world. The VCCS provides maximum operational flexibility by utilising modular configuration concepts. Each component of the system is a network node which operates autonomously.

What does this imply? A fully decentralized and distributed system thanks to the use of IP standards with possible immediate integration and interoperability with other network solutions.

Its exceptional standards of performance have become synonymous with Indra’s systems worldwide, both for military and civil applications.

The redundant architecture plus proven design and components provide outstanding reliability and availability.

Multiple high-quality Human Machine Interface; each of them providing any operator easy access to radio and telephone services.

VCCS core is fully compliant with EUROCAE standardization of the use of VoIP technology in ATM. This offers a quantum-leap in safety and efficiency for the provision and manipulation of communications through the use of advanced switching technology.

Not only does Indra VCCS adeptly manage both analogue and digital signalling methods but also encompasses state-of-the-art VoIP capability.
**Global Communication Solution**

Indra VCCS is routing every minute thousands of safety- and mission-critical communications of both civil and military operators all around the World.

It offers a user-friendly access to advanced communication features which satisfy any need by means of a complete radio and telephony services, which fulfil any operating requirement.

Enhanced safety requirements accomplishment due to a design, implementation, and maturity model focused on avoiding or minimising any hazard or human error.

**Flexibility**

Modular, scalable, fully decentralized, distributed, extensive use of COTS elements and standards, core based on ED-137 VoIP for ATM and the concept of stand-alone network node components build the most flexible VCCS solution ever existed.

**Safety**

Well-proven cutting-edge technologies over the robustness and redundancy of the architecture also a maturity model leading every single process of the system offer the safest solution for safety-critical communications.

**Customization**

User is able of configuring independently every single aspect of operator’s layout and services to access.

Multiple HMIs available for further adaptation to any need.

**Cost-Effectiveness**

The modular and scalable features of the system allow designing the perfect solution to fit tightly to customer needs.

This solution is based on COTS elements and standards bring the highest effectiveness.

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**Interoperability: the Gate to the Future**

VCCS have been based upon analogue and digital Time Division Multiplexing / Pulsed Code Modulation (TDM/PCM) technologies for many years.

Over 10 years ago, Indra’s VCCS was “born”, providing the convergence of voice and data into one multimedia network. It became fully decentralised and built with a strong focus towards maximum extendibility and compatibility with a variety of technical solutions available on the market.

Nowadays, all VCCS providers follow in this direction, but without the maturity and the worldwide successful references of the Indra’s VCCS model.

**Indra led the standardization of this VCCS concept in EUROCAE.** Working Group 67 (WG-67) undertook the mission to assess the use of Voice over Internet Protocol (VoIP) to provide ATM voice services.

The group defined criteria requirements and guidelines based upon:

- 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

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**VOIP-BASED VOICE COMMUNICATIONS CONTROL SYSTEM**
Real-time adaptation to work-load

The VCCS has integrated a powerful facility named sectorization consolidation. This consists of the capability to dynamically reconfigure logical users (control sectors) to physical positions (Sector Control Units - SCU) at any moment.

This facility allows resources to be added concentrating them in one or more consoles to adapt to the changing operational traffic load.

Military Operation

The SDC 2000 VCCS has integrated the Red and Black Concept providing separated classified and unclassified operations. Deploying full TEMPEST isolation if required.

Remote radio control capability is integrated within the GUI of each operator.

Local or remote from Data Planner System logging in and out.

Making it easy

The operator touch panels are provided with high quality COTS touch screens offering the following features:

- Integration of radio and telephone services and facilities on one single screen
- Powerful and friendly graphic user interface
- Customized layout satisfying user's needs

Integration and Interoperability

The VCCS provides powerful Integration and great interoperability capability:

- ED-137 (Interoperability Standards for VoIP ATM Components) in the core of the system
- Interface to ATM functions via FDP for sector reconfiguration
- Connectivity to A/G Voice Networks (AGVN)
- Connectivity to PSTN
- Interface to recording system

Highlights

Addressing multiple interconnections
Guarantees internal networking and external connections via a wide list of supported interfaces:

- ED-137 VoIP for ATM
- Radio Channels (VHF, UHF, HF)
- Instantaneous Access (IA)
- FXS, FXO
- ISDN lines (BRI, PRI)
- E&M lines
- LB, CB
- Q.23 Telephone
- ATS R2 lines
- ATS N5 lines
- ATS-QSIG lines
- FDP Interface
- Recording Interface

VOIP-BASED VOICE COMMUNICATIONS CONTROL SYSTEM
A friendly system

Choosing the best selection
• The main goal achieved by CLIMAX (off-set carrier operation) and BSS (Best Signal Selector) operation is to provide sufficient coverage in large zones with just one frequency and to avoid possible geographic obstacles. Therefore, several transmitters and receivers can be placed in one area to operate on the same frequency with a small offset
• Integrated into the VCCS these functions are automatically available for all those systems which demand quality reception analysis and off-set carrier systems
• The operator is able to manually select which radio sites are involved in the process

Enjoy system benefits
• Voice/data integration technology
• Network components sharing
• Extensive use of COTS
• Easy and low cost installation
• Non-blocking system
• High availability
• Hot swap and Plug&Play
• Easy maintainability
• Reliability system
• High quality voice performance (low distortion and noise)
• No compression
• Remote control and monitoring
• Short term voice recording and playback

A profitable business
Indra VCCS combines the advantages of easy system scalability with the wide use of consistent and solid COTS products. This results in substantial cost cutting in acquisition, ongoing maintenance and spare parts.

How to manage the system
The management system makes use of the voice and data integration system ability to perform configuration and supervision commands and data exchanges by sharing the same LAN with the VCCS.

Measuring the system
To obtain maximum exploitation of the VCCS, several facilities are available which allow the user/operator to obtain statistical measures, and detect trends and failures. Some of these facilities are the following:
• Communication logging
• Rate and length by interface and/or user
• Failure statistics
• Generation of alarms

More attributes
• FDP adapted automatic re-sectorization
• Operator positions and external interfaces voice recording
• Instruction-coordination functions

Features

Supervision and monitoring features
• Dedicated powerful tools to control and monitor the system
• Easy and intuitive environment presentations, based on graphic presentations with structured and colour coded information
• User information menu grouped as:
  - Element failure warning
  - Operative configuration advice
  - Event logging
  - Global and detailed system status monitoring
  - Statistical features
  - Reconfiguration
  - Online re-sectoring

Measuring the system

Last but not least: Interfaces clustering
Due to the new enhanced components added to the system, both software and hardware, VCCS is capable of managing multiple interfaces (two by default) in cluster configuration. The system can perform main/standby switchover without any external device or equipment, simply by commanding inputs and outputs of each interface card.
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