

Next Generation Engineering Solutions

Voice Communication System

OCS-NG4000



Overview

Voice Communication Systems (VCS) the backbone of any command and control application, where similar to other subsystems, they are continually being developed to reach the highest standards to fulfill operational requirements. Technology has come a long way from mechanical switches to Internet Protocol (IP) based switching systems. The latest adoption of IP based interoperability standards is now bridging the communications gap in existing legacy communication devices and network centric operational requirements.



Application Areas

- Civilian and Military Air Traffic Management
- UAS/RPAS Ground Control Stations
- Remote Tower Applications
- Coastal Surveillance and Vessel Traffic Applications
- Voice Communication System for Transportation Applications
- Network Enabled C2 Applications & Command and Control Centers
- Public Institutions Communications Applications
- Disaster and Emergency Management Communications
- First Responder Systems
- Integrated Voice Communication System for Naval Platforms
- Integrated Voice Communication System for Mobile Land Platforms
- Simulator and Training Systems

**OCS-NG4000
IN 40+ AIRPORTS
WITH
1500+ CWPs**



Overview

ONUR OCS-NG4000 is designed from ground up with an IP based VOIP architecture and network centric operation concept in mind. With its state-of-the-art technology, the system differs from other classic TDM based VCS products by serving under fully end-to-end IP based architecture. The OCS-NG4000 is a reliable, effective, fully redundant, highly available and easily adaptable solution for all voice communication requirements for military and civil applications. System has proven its success in civilian and defence sector projects, not only by as stand-alone but also as a component of a bigger command and control system.

With the recent adoption of EUROCAE VOIP ATM System Operational and Technical Requirement (ED 136), Network Requirements and Performance for VOIP ATM systems (ED 138), and with its full compliance to the Interoperability Standards for VOIP ATM components (ED 137), our solution also assures interoperability among other components. The system also fulfills ICAO and EUROCONTROL recommendations, therefore adheres to the international criteria and regulatory measures in this regard.

Due to its flexible design, 7/24/365 continuous operation capability, redundancy and conformity to the international standards; the system can be used for:

- Air Traffic Management Operations (ACC or TWR)
- Remote Tower Applications
- Unmanned Aerial Vehicle (UAV)/ Unmanned Aircraft System (UAS) and Remotely Piloted Aircraft (RPAS) communication systems

OCS-NG4000 comprises of the following subsystems:

- Voice Communication Server
- Operator Terminals/Controller Working Positions (CWP)
- Analog Radio Gateways (RIG-200)
- Radio Servers
- Telephony Gateway (TGW-NG200)
- Time Server
- Maintenance and Configuration Terminal



The system can also be used in combination with the ONUR Voice/Data Recording and Replay System (ORS-IP2000).

The system enables full-featured HF/VHF/UHF radio communications, including specific radio remote control operations, communications resource sharing and telephone communications with external analog and digital telephone networks with variety of interfaces. It also supports additional services like intercom and telephone communications for internal users, interconnection/internetworking with additional third-party services like GSM and SATCOM. Plus, system allows operators to use advanced features like video conference, text messaging, alarm system management.

VOIP radio/telephone integration is directly made through network switches and therefore requires no extra interface elements. Legacy analog radios can be integrated to the system through ONUR RIG-200 (Radio Over IP Gateway), and analog telephones can connect through the system to LAN/WAN by using ONUR TGW-NG200 (Telephony Gateway).

The system with its vertical and horizontal scalability, allows addition of new servers to increase redundancy, addition of new operator terminals, integration of additional radios and telephone lines and also gateways to answer customer needs. The System enables sharing of the communications resources and services between the operators/stations based on the

user requirements and priorities, and basically executes the IP based PBX system functions since integrated into analog PBX systems via telephone gateway component.

To increase availability and reliability, the system is designed to smart use of COTS products, where appropriate. This approach also supports flexible life cycle support and deployment, reduces gives pay as you grow scalability.

ONUR Voice Communication System is a fault tolerant solution, each system serves as a main system within geographically independent architecture. With its fully redundant architecture, no central point of failure can affect the entire system performance.



Overview

Key Facts

- End-to-End IP based VOIP Architecture, enabling separation of system components
- Fully compliant to EUROCAE ED 137 and upcoming updates
- Specifically designed for air traffic management solutions
- Suitable for military and civil applications and projects
- Suitable for mission critical command and control communication needs
- Designed for 7/24/365 continuous operation
- Effective interconnection and integration of multiple communication sources, HF/VHF/UHF Radios, Telephones, Alarm/Intercom Systems, Legacy Audio Distribution Systems, GSM, SATCOM, Wireless Network
- Integration into existing Air Traffic Management Systems
- Interoperability with conventional voice communication systems
- Interoperability with legacy and new generation IP systems
- Interoperability with existing radios/telephony systems
- Ability to integrate into third-party systems and equipment
- Compatibility with network-centric operations
- Easy maintainability, high availability
- Customizable to customer's needs
- Easy to deploy, upgrade and extend
- Military version supports crypto equipment integration
- Sharing of communication resources
- Synchronization between different VCS systems at different locations
- Available in rugged version to meet military requirements

Key Features

General

- Open system architecture
- Very low rack space requirement
- Comprehensive voice codec support

Redundancy and Availability

- Vertical and horizontal scalability
- Redundant network topology
- Redundant server architecture
- Main/hot stand-by VCS server configuration
- Redundant power supplies

Telephony Power Supplies Functions

- Supports all telephony interfaces (CB/LB/FXS/FXO/BRI/PRI/IP etc.)
- Integrated IP PABX functionality

Radio Functions

- Supports all radio types (analog, digital, EUROCAE ED 137 etc.)
- Radio remote control from any position (authorization based)
- Radio status information management, main/standby radio automatic and manual selection
- Use of multiple radio stations simultaneously
- PTT prioritization
- Best signal selection
- Remote and local echo suppression
- Dynamic delay compensation
- Local side tone generation
- Climax time delay

Controller Working Position (CWP) Functions

- Flexible CWP options
- Any mix of headset, phone handset, footswitch and loudspeaker/microphone interfaces
- Split headset operation for simultaneous G/A and G/G operation
- PTT switching on panels and/or in-line switches and/or footswitches
- Dual headset interfaces for trainee/instructor operation
- Dual headset interfaces for live handover operation
- Various forms of position-to-position intercom (break-in, call/answer, dial-up, etc.)
- Radio-Telephone conference feature
- Various radio cross-coupling options (simplex, duplex, etc.)
- Supports optional features such as messaging, ambient recording

Management Functions

- Central management functionality
- Operation-based user role management
- Centralized alarm/announcement management
- User role managements
- Subsystem monitoring
- Fault management

Optional Features

- Integrated recording capabilities
- Voice crypto integration ready architecture



System Components

Controller Working Position

Controller Working Position (CWP) is a touchscreen panel with integrated processing capabilities. It works as a human machine interface (HMI) component of any VCS System. CWP is designed according to the operator's requirements with a high level of functionality and user-friendly interfaces. Layout designs can easily be adapted to the operational requirements. Optimal size of the touch screens can be determined according to the operator's functional requirements, space constraints, and configuration. Starting from 5" up to 17" COTS product touch screens can be used.

From the CWP, operator can remotely set, select and use radios, can follow the radios status and communicate through telephone, GSM and SATCOM channels,

and manage intercom services. With its embedded directory, CWP interface layout gives the operator an opportunity to access quickly to telephone numbers and easy dialing.

CWP operations support radio-telephone-radio, cross-coupling, voice/data recording and replay, voice and video conferencing, short message exchange, alarm management, and multimedia features. All conversations and the operator's entries are recorded automatically with time stamping.

Roles and responsibilities for each CWP and/or the operator can be defined in the system according to their tasks, therefore, the system gives controlled access to CWPs. The operator profile table, stored in the VCS server's database, holds definitions of the user and his/her layout preferences, therefore,

at every start-up it remembers operator's CWP layout interface customization. Plus, CWP's are delivered with highly ergonomic consoles to guarantee the operators' comfort. CWPs have small but effective details that enable the operators to access all communication channels.

These are:

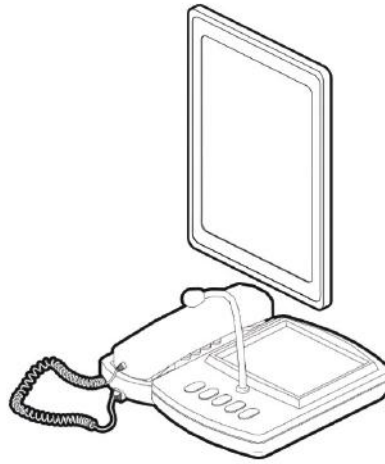
- Handsfree PTT options
- Footswitch capability
- Wireless headsets

Like the other components of the system, CWPs run Linux operating system and are designed to run open source code application software, so they are efficient in terms of using system resources.



CWP applications also enable advanced functionalities such as:

- Operation-based user role management
- Various forms of position-to-position intercom (break-in, call/answer, dial-up, etc.)
- Radio-telephone conference feature
- Various radio cross-coupling options (simplex, duplex, etc)
- Radio remote control
- Radio status monitoring
- Intercom management
- Text messaging
- Monitoring of essential services
- Split headset operation for simultaneous G/A and G/G operation
- PTT switching on panels and/or in-line switches and/or footswitches, PTT prioritization
- Dual headset interfaces
- Centralized alarm/announcement management



Technical Specifications

- Wide selection of CPU modules based on customer specifications
- Variety of screen sizes
- Redundant power supply options
- AC/DC power options
- Redundant network connections
- COTS, Industrial or MIL-SPEC versions available

Variety of audio interface options:

- Loudspeaker
- Headset
- Handset
- Hand Mic
- Noise cancelling options

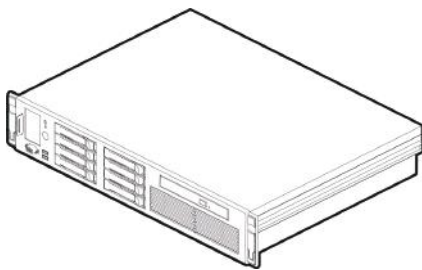


System Components

VCS Server

VCS server provides functional features for the system, such as component registration, configuration and control, device monitoring, authentication authorization and accounting features on the system level.

System software services are designed to be hardware independent so that COTS server platforms, industrial or MIL-SPEC servers meet any type of environmental conditions and EMI/EMC compliance can be utilized.



Technical Specifications

- Wide selection of CPU modules based on customer specifications
- Hardware level redundancy
- Redundant power supplies
- AC/DC power options
- Redundant network connections
- Integrated server monitoring
- COTS, Industrial or MIL-SPEC versions available

Radio Over IP Gateway (RIG-200)

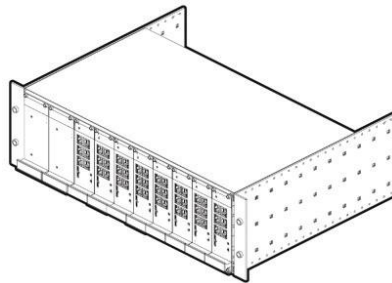
The RIG-200 Radio Over IP Gateway converts analog signals that are available on legacy systems to industry standard IP format. With its flexibility and reliability, RIG-200 gives the system an opportunity to use existing legacy radio systems in IP based communication solution approach.

Since it has IP interfaces, access to both local and remote radios are possible over standard network connections. Furthermore, if the interface control information provided, RIG-200 allows the operators to remotely control the radios for over network interfaces, serial lines and discrete I/O lines, and helps the system to bring all necessary functions to the CWP.

Each RIG-200 module is independently powered for redundancy and feature redundant network interfaces for network availability.

Product is manufactured by entirely using industrial components. This ensures that it has long service life and support, as well as compatibility with the industrial working environment. CPU, signal processing, voice and data interfaces are grouped under a single product.

The RIG-200 has interface modules, designed with software centric approach, which allows the user to upgrade new features as they become available via simple software upgrades. This approach also allows the system to adapt customer specific requests through software development efforts.



Technical Specifications

- Modular architecture
- No module dependency between components
- Legacy analog and IP radios are supported
- Redundant power supplies
- AC/DC power options
- Redundant network connections
- Integrated device monitoring
- MIL-SPEC version available
- Comprehensive codec support

Each module supports:

- 2 redundant ethernet ports
- 2 analog audio ports
- 2 RS232/422/485 serial communication ports
- 1 USB Host port, 1 UST OTG (On the go) Console port
- Analog I/O, Discrete I/O, Serial I/O for deeper integration requirements

Telephony Gateway (TGW-NG200)

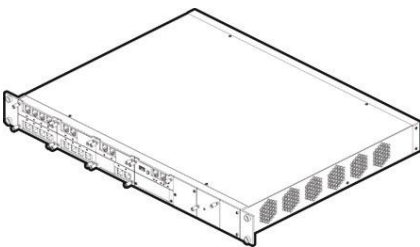
The gateway integrates analog and/or digital telephone lines to the system. With its software-based architecture, it is possible to upgrade to new features and specifications.

Telephony Gateway device uses SIP/RTP protocols to communicate with the other components of ONUR VCS. It can connect to VCS via LAN and also it can connect to the phones located at other VCSs via WAN.

TGW-NG200 supports:

- IP trunk or subscriber lines
- FXS, FXO, LB, CB, E&M lines
- Support for ATS-QSIG and MFS-R2 lines
- ISDN or E1 PRI digital lines

In addition to standard telephony functions, advanced functions such as multi-way conferencing, telephone-radio coupling, supervisory monitoring are offered as standard features when connected to the VCS system.



Technical Specifications

- 1U low and 6U high capacity versions available
- Redundant power supplies
- AC/DC power options
- Redundant network connections
- Integrated device monitoring
- Comprehensive codec support
- Comprehensive telephony interface

Integrated Recording Service (Optional)

One of the most distinctive features of ONUR Voice Communication Systems (OCS-NG4000) is its optional integrated recording capability. Without the necessity for external recorders, the system, out of the box, supports integrated recording capability for all communication over the CWPs.

Two-way conversation voices are combined in the phone calls and recorded in integrated recording service. In addition to voice packs, Incoming / Outgoing Call Direction, Search Priority, Caller ID, Dialed Number, and Start time of a conversation are also recorded with time stamps.

If requested, the system can also be used in combination with the most advanced ONUR Voice/Data Recording and Replay System (ORS-IP2000). With ORS-IP2000 system's recording capability can be expanded to include other datas such as:

- Radar video screens
- Avionic screen recording
- CCTV systems
- Payload video streams
- Recording of datalink messages
- System security and warning events
- Access control systems
- Information coming from external systems

Technical Specifications

- Works as a software service on VCS servers
- Ability to record voice, video and data
- 3rd party interfaces can be implemented
- Time stamped for legal compliance
- Comprehensive playback application software delivered for replay requirements

Time Server

An accurate time reference among all system components is critical and crucial. Time server as a supplementary element, provides all devices in the network with a highly accurate reference time over IP. The benefit of using time server is to compare events in the system log of different devices that uses the same synchronized time stamps.

Ethernet Switch

Ethernet switches are used to connect OCS-NG4000 components to the network. Various models of Ethernet Switch for different system scenarios are available. System uses proven COTS products from leading manufacturers depending of the configuration requirements.

Maintenance and Configuration Terminal

The system is used to configure, manage and monitor all the OCS-NG4000 components from a central point. All critical services like user management, role management, numbering assignments, line configurations etc. are done through MCT.

MCT is designed not to be on the critical path to prevent any MCT failure from disconnecting the VCS System.

Voice Communication System OCS-NG4000



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