

Next Generation Engineering Solutions

Company Profile





ONUR's areas of expertise can be summarized as follows :

Voice Communication Systems

- Voice Communication & Recording Solutions for Air Traffic Management
- Voice Communication & Recording Systems for UAS Applications
- Voice Communication System for Transportation Applications
- Integrated Communication Sytems for Military Platforms (Ship/Vehicle)
- Command and Control Centers Communication Solutions
- Mobile Air Traffic Control Tower

Data Communication Systems

- Tactical Mesh Networking System
- Wireless Communication Solutions
- Network Design Solutions
- Software Based Modem Solutions

CNS & ATM Systems Integration

Executive Summary

Founded in 1980, ONUR provides mission-critical systems and solutions for defence and civilian sector, with the vision of “having unique and advanced technology, to be a regional leader with professional engineering in Voice Communication and Data Communication Systems.”

ONUR; had a long history and extensive experience in the integration and installation of voice communication systems, radars, air traffic control equipment, sensors and etc. ONUR successfully undertook, completed, and delivered multiple critical projects to government organizations as a sub-contractor. In the course of time; ONUR developed its own in-house production capabilities, specialized in the design, manufacturing and the software development of complex communication systems, and became a main contractor for important projects.

Today, ONUR is one of the very limited number of companies in Turkey which has the necessary know-how, expertise and resources to undertake projects as a main contractor at Presidency of Defence Industries (SSB).

ONUR has the ability to realize projects for Turkish Air Navigation Service Provider (DHMI), Moroccan National Airports Authority (ONDA), General Directorate of Turkish State Railways (TCDD), Turkish Air & Naval Forces Command, Turkish Coast Guard Command, and Turkish Aerospace Industries (TAI).

ONUR provides value added solutions in software development, mission critical communication systems design, complex voice communication and



VOICE COMMUNICATION SYSTEM • VOICE/DATA RECORDING AND REPLAY SYSTEM • VOICE COMMUNICATION & RECORDING

cyber security applications, adaptation of legacy radio and telephony systems into IP networks, operator consoles, voice communication and recording systems, radio over IP (ROIP) systems, IP over radio (IPOR) systems, voice over IP (VOIP) systems, training and simulation systems, and mobile air traffic control towers.

ONUR R&D Center is in the collaborative product development efforts with The Scientific and Technological Research Council of Turkey (TUBITAK) and universities.

As a result of its successful development projects, ONUR has become a permanent member of EUROCAE Working Group (WG-67), that defines the first VOIP in Air Traffic

Management standard. In addition, ONUR takes part in EUROCAE Working Group (WG-105) Unmanned Aircraft Systems (UAS) to develop standards and guidance documents for the safe operation of UAS in all types of airspace, at all times and for all types of operations.

ONUR Voice Communication System (VCS) and Voice/Data Recording and Replay System (VRS) are fully compliant to the VOIP ATM System Operational and Technical Requirement (ED 136), Interoperability Standards for VOIP ATM components (ED 137) and Network Requirements & Performance for VOIP ATM systems (ED 138).

Apparently, ONUR VCS & VRS meet the international standards in this field. The systems are now in use by Turkish Air Force, DHMI and TAI UAS Program. As of Q4 2023; ONUR has delivered over 600 VCS & VRS systems with more than 1750 controller working positions (CWPs). More than 5.000 A/G & G/G gateway assets have been integrated as part of these projects.

ONUR is also participating to Federal Aviation Administration (FAA) VOIP Interoperability Events, testing the voice communication and recording systems according to ED 137 interface test scenarios.



NG SYSTEM FOR UAS APPLICATIONS • MOBILE AIR TRAFFIC CONTROL TOWER • NETWORK SUBNET ROUTER SOLUTION

Executive Summary

In addition to ATC Applications, ONUR VCS & VRS solutions have been integrated into external components such as public announcement system, alarm and GSM-R systems for very prestigious and mission critical transportation projects like, MARMARAY.

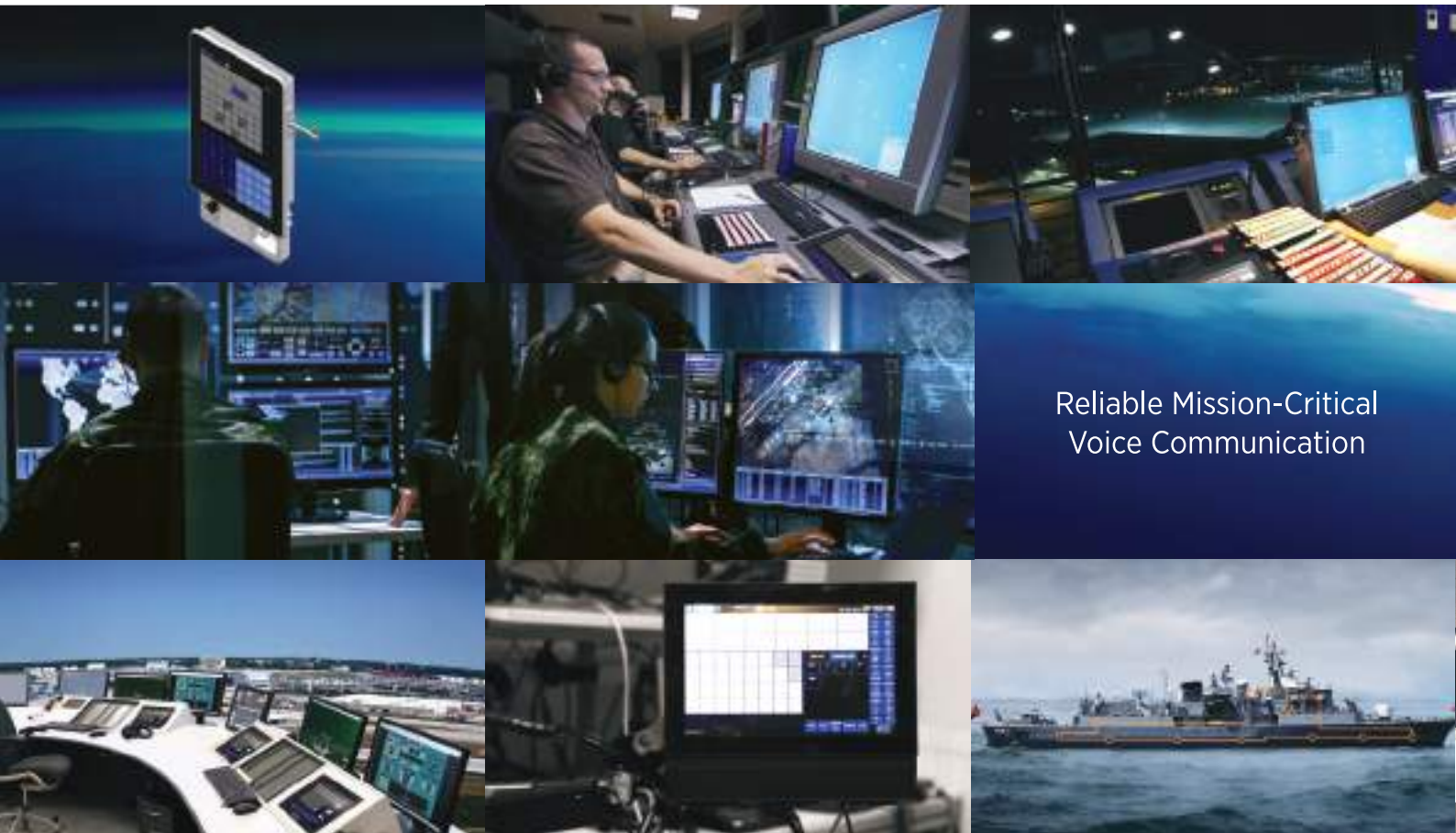
The other areas that ONUR gives the utmost importance is the Unmanned Aircraft Systems (UAS) and Remotely Piloted Aircraft (RPAS) Communication Systems. ONUR VCS & VRS are being used more than 60.000 hours in Tactical Class UASs and more than 30.000 hours in MALE Class Satellite Controlled UASs Ground Control Stations. The other solution, in this respect, is the ONUR's Airborne Radio Gateway (RIG-200R), which enables

access to airborne radios over the UAS/RPAS datalink or SATCOM line. This solution enables the operators to use airborne radios as an integrated part of the VCS, with features of radio cross-coupling between radios, voice relay over radios (even on the same frequency), cross band radio relay, relay of data devices such as Personnel Locator System (PLS) and Voice Crypto Equipment.

In terms of Network Enabled Communication Systems / IP MESH Solutions, ONUR is now executing Tactical Mesh Networking Projects for both Turkish Naval Forces and Turkish Coast Guard. These projects have been developed in order to supply the concept of operations that is based on recent network centric communication

requirements. Projects enable a consolidated approach by utilizing legacy voice radios with IP based connectivity requirements and next generation high bandwidth technologies in order to provide network centric capabilities in naval platforms.

Network Enabled Communication Systems / IP MESH Solutions provide active data exchange channels between all elements by multi-hop relaying capability for beyond-line-of-sight communication, and share autonomous data communication channels with other platforms of the task force. The system can be used as a reliable and efficient network warfare communication infrastructure for tactical data exchange needs of all kind of platforms.



Reliable Mission-Critical
Voice Communication

ONUR's areas of expertise can be summarized as follows:

Voice Communication Management and Recording Solutions

- Voice Communication & Recording Systems for Air Traffic Management
- Voice Communication & Recording Systems for UAS Applications
- Voice Communication Systems for Transportation Applications
- Integrated Communication Systems for Military Platforms (Ship/Vehicle)
- Command & Control Centers Communication Solutions
- Mobile Air Traffic Control Tower

Network Enabled Solutions

- Tactical Mesh Networking System
- Wireless Communication Solutions
- Network Design Solutions
- Software Based Modem Solutions

CNS & ATM Integration Services Data

With its secret level security clearance, ONUR takes part in National/NATO level exercises. ONUR has a Basic Ordering Agreement (BOA) with NATO Communication and Information Agency (NCI), and is listed as a NATO Support and Procurement Agency's (NSPA) approved supplier.

In addition to the above, ONUR has certified its business processes with:

- ISO 9001-2015 Quality Management System
- ISO 14001-2015 Environmental Management System
- ISO 27001-2017 Information Security Management System



Main Solutions

VOICE COMMUNICATION SYSTEM OCS-NG4000



OCS-NG4000 Voice Communication System (VCS) is a flexible, reliable and effective solution for voice communication requirements. It is a state-of-the-art technology with proven components and highly intuitive user interfaces. It meets both military and civil Air Traffic Management (ATM) requirements.

The system differs from other classic TDM based VCS products by having end-to-end IP implementation. Based on voice over IP technology, it allows effective interconnection of multiple communication sources including legacy HF/VHF/UHF radios, analog/IP telephones, intercom systems and legacy audio distribution systems. It enables users to access all of the resources to enable reliable and secure Air-to-Ground (A/G) and Ground-to-Ground (G/G) communication.

OCS-NG4000 is a combination of subsystems, such as Controller Working Position (CWP), Radio Over IP Gateway (RIG-200), Time Server, Telephony Gateway (TGW-NG200), and Maintenance and Configuration Terminal.

Our VCS solution has been designed for vertical and horizontal scalability, redundant network topology, and redundant server architecture. System serves under an end-to-end IP based configuration, and its architecture complies fully with ED 137 standards.

ONUR VCS, is designed to serve 24/7 continuous operation without any interruption in voice communication.

The complete solution provides full range of features to meet demanding ATM/ATC scenarios to bridging the gap between analog and digital communication.

System architecture meets the latest industry requirements in air traffic management operations by having end-to-end IP network technology. Due to its flexible design, the system supports sharing of radio and telephony resources at the same time on the CWP.

The system is in use by DHMI, ONDA, TCDD, Turkish Air & Naval Forces, Turkish Coast Guard, and TAI.

**IN USE BY
TURKISH
AIR FORCE**

**WIDELY
USED BY
TURKISH
ANSP**

**MORE
THAN
40 AIRPORTS**



Main Solutions

VOICE/DATA RECORDING AND REPLAY SYSTEM ORS-IP2000



ORS-IP2000 Voice/Data Recording and Replay System (VRS) is a reliable, effective, fully redundant, highly available and easily adaptable solution for all legal recording needs.

The system has been designed with “open architecture” approach with modular hardware and software components. It employs state-of-the-art technologies to ensure the data is recorded in its original state with proper time stamps, as well as necessary security measures to ensure authorized access. ORS-IP2000 has been designed for vertical and horizontal scalability, with redundant network topology, and redundant server architecture. System serves under an end-to-end IP based

configuration and complies fully with ED 137.

ORS-IP2000 is able to interface with common analog and digital audio equipment. In addition, it supports recording of the ED 137 compliant voice streams. It can also be used in combination with the ONUR OCS-NG4000 Voice Communication System (VCS).

The system can record and replay all voice communication, radar screens, radar exchange data such as Synthetic (Asterix, AIRCAR 500, etc.) and Raw Radar Data. It is able to interface with 3rd party systems to record and replay industry standard VGA/DVI/HDMI screen captures. The system can record

information coming from legacy interfaces such as synchronous and asynchronous serial data.

ONUR ORS-IP2000 supports recording capabilities to IP cameras such as ambient video recording or CCTV Surveillance Systems so that accurate reconstruction of actual environment is achieved.

**ED 137
COMPLIANT**

**MORE THAN
5000
A/A & G/G
ASSETS**



All of the recorded data can be replayed using ORS-IP2000's integrated web-based interface. Recorded data can be filtered using parameters such as source attributes, network address, time, caller-id information for more precise investigation. Even the metadata of the network-based protocols can be searched for more in-depth analysis.

Recorded audio and video can be exported to external storage devices using common audio and video containers so that they can be played in other medium such as regular PCs. Streaming the recorded data to another external system is always an option.

The system is in use by DHMI, ONDA, TCDD, Turkish Air & Naval Forces, Turkish Coast Guard, and TAI.

Main Solutions

MOBILE AIR TRAFFIC CONTROL TOWER OMT-M2000



OMT-M2000 Mobile Air Traffic Control Tower is equipped for autonomy and transportability, and fully compliant with the required air traffic management and control standards for both civil and military applications.

The system is a proven solution for the airports, where infrastructure for ATC Tower does not exist. ONUR OMT-M2000 can be used in disaster/emergency response operations and/or in case of ATC Tower is unusable or unable to operational requirements .

ONUR Mobile Air Traffic Control Tower can be produced as vehicle mounted or as trailer.

It has two main components; lifting system, and the tower cabin.

The tower cabin has all essential communication sub-systems such as Voice Communication System, Digital Voice/Data Recording and Replay System, Radios, Tower Information System, Power Supply, GPS Clock & CCTV Surveillance Systems.

All other meteorological, ancillary solutions can be integrated to the system. All equipment is compliant with ICAO (International Civil Aviation Organization) standards.

The tower cabin can be designed to support different working heights as per customer's requirements. The system has a stand-by generator and other supply systems that allow self-sufficient continuous operation. The Mobile ATC Tower is designed to provide flexible and rapid operational air traffic control services complying with high performance requirements and can be transportable by air, sea, road and rail.

**IN USE BY
TURKISH
AIR FORCE**

**EQUIPPED
WITH
ONUR VCS/VRS
SYSTEMS
(EUROCAE
ED 137)**

**COMPLIANT
WITH ICAO
STANDARDS**



Main Solutions

TACTICAL MESH NETWORKING SYSTEM OSR-IP1000





ONUR Tactical Mesh Networking System (OSR-IP1000) provides mobile data networking technology for network-centric operations in remote locations or mobile platforms.

The System is designed to be operated as an IP over Radio with HF/VHF/UHF radios and/or other wireless systems works on under local network topology. System is based on direct, dynamic and ad-hoc network communication infrastructure and consists of critical components developed by ONUR, such as Wireless Communication Module, Network Subnet Router and Software Based Modem.

ONUR OSR-IP1000 enables sharing of the communication resources between the platforms based on the user requirements and priorities. It can automatically utilize all available communication lines, and with dynamic selection of relays and bandwidth provisioning, delivers the data package to target address. OSR-IP1000 sets up active data exchange channels between all elements by multi-hop relaying capability for beyond-line-of-sight communication.

ONUR Tactical Mesh Networking System has autonomous and reliable messaging infrastructure using delivery confirmation algorithms and data periodization, and allows any kind of IP data such as web browsing, e-mail, messaging, chat, video stream transmission etc. It delivers appropriate bandwidth over the communication channels available and provides autonomous share of the data communication channels with other platforms of the task force.

The System is a simple and cost-effective solution providing reliable, mobile IP networking capability between platforms such as ships, UASs, ground vehicles. It can also be used for deployable bases and forward operation bases communication needs at remote locations.

It enables a long-range, point-to-point, point-to-multipoint, medium and high data rate communication networking, and be used as a substructure of all command and control systems network requirements.

ONUR OSR-IP1000 will continually evolve, be reliable and efficient network warfare communication infrastructure for tactical data exchange needs of all kind of platforms. It will provide tomorrow's Armed Forces the fastest, and the most capable wireless IP network.

Services

ONUR has extensive capabilities on providing services to civil and military customers.

Contract & Program Management

ONUR is among a very limited number of companies which has the capability and experience to work with SSB. Diverse range of ongoing projects include ATM, Communication, Network-Enabled Solutions, Navigation, Modernization and Command & Control Systems.

Design & Manufacturing

ONUR is specialized in the design and manufacturing of complex bespoke electronic and software systems for use in demanding civil and military platforms.



System Integration

ONUR that has core competence in the integration and installation capabilities especially for military applications, successfully utilizes its expertise for civil platforms as well. Also, it has an outstanding know-how on communication, radar and navigation systems integration.

Software Development

ONUR has extensive experience on software development such as operator consoles and HMI design, Voice and Data Communication Systems, Radio Over IP (ROIP) Systems, Voice Over IP (VOIP) Systems, Training and Simulation, RF Systems.

After Sales Support

ONUR provides a variety of tailored technical services focused on critical technical advice & specialist services to our partners.

After sales support that has provided as follows:

- Research & Development
- Technical & Feasibility Studies
- System Prototyping & Evaluation
- Provision of System Simulators & Stimulators

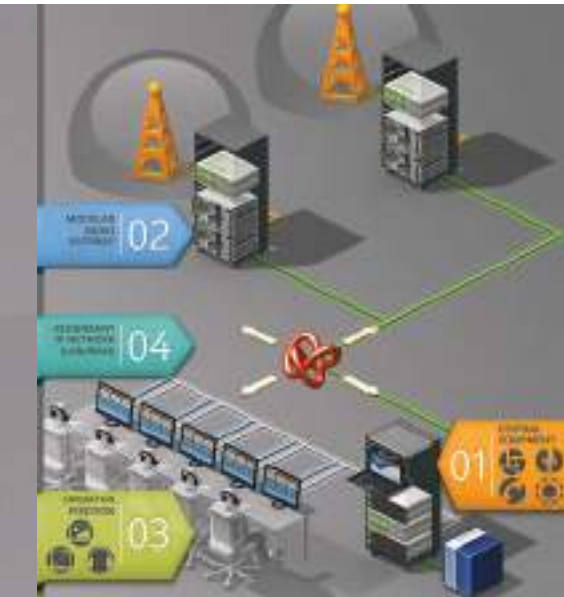
Integrated Logistic Support

ONUR provides integrated logistic support for all of its products/systems. In this regard, offers regional support for international business partners.

- Availability, Reliability & Maintainability
- Initial Spares Provisioning
- Human Factor Integration
- Supportability Test, Evaluation & Verification
- Packaging, Handling, Storage & Transportation



Key References



Turkish Air Force Command Air Defence Radio Network Project

ONUR signed a contract with SSB in 2012, regarding the design, development, test and installation of Air Defense Radio Network. In the first phase of the project, ONUR designed and implemented a tactical Radio Over IP (ROIP) solution consisting of:

- Over 500 radio channels
- Over 200 CWP's
- Software based voice/data switching systems
- VCS & VRS
- Radio and network management systems
- Maintenance and monitoring systems
- HQ TOD distribution network

In 2017, Phase-2 was signed to cover 26 Air Traffic Control Towers along with additional ACCs.



Turkish Air Force Command Mobile Air Traffic Control Towers

ONUR is the manufacturer of Mobile Air Traffic Control Tower for Turkish Air Forces.

The systems are equipped with:

- VCS & VRS
- Air traffic operator consoles
- Meteorological systems
- VHF/UHF radios
- GPS system
- Power generator



Turkish Aerospace UAS Program Ground Control Stations VCS & VRS Project

ONUR signed a contract with TAI in 2013. As part of the project, ONUR delivered new generation voice communication and recording systems for the ground control stations of TAI ANKA UAS.

Turkish ANSP (DHMI) VCS & VRS Project

ONUR signed a contract with DHMI on October 2015 for the delivery of Voice Communication, Recording & Replay Systems.

Even the project started with 4 airports, the success of ONUR VCS & VRS Solutions, which are compatible with ED 137 Standard, paved the way to additional 7 airports.



Turkish Meteorological Service C-Band Radar Projects

ONUR signed contracts to deliver a total of 13 Weather Radar Systems.

ONUR provided following services in this project:

- Radar site design and construction
- Installation of radar equipment
- Provision and installation of radomes
- Design and erection of radar tower
- System Integration
- Security systems solutions
- Data communication and power infrastructure



Turkish Aerospace UAS Program Airborne Radio Gateway Project

Signed in September 2015, ONUR has delivered new generation avionic certified Airborne Radio Gateways (RIG-200R) to the ANKA UASs.



Key References



MARMARAY VCS & VRS Project

ONUR has delivered Digital Universal Telephone System (DUTS), which integrates various communication services at all levels of operational communication. The Operation Coordination Center, stations, platforms, yards, depots (workshops), stabling yards, power supply substations and equipment rooms provided with VCS & VRS systems and Controller Working Positions (CWPs) so that all

communication adapted into one integrated system which is also integrated with TETRA and GSM-R.



ASELSAN VCS & VRS Project

ONUR, signed a contract with ASELSAN in 2018 to deliver VCS & VRS solutions to Air Traffic Radar System Development Project. Within this project, ONUR will provide VCS & VRS Systems which allows users to have synchronized replay of audio and screen recordings for operational purposes.



Turkish Meteorological Service HF Wave Radar Systems Project

ONUR, signed a contract with Turkish Meteorology Organization in 2013 to deliver 2 HF Radar systems for wave height measurement and tsunami early warning purposes.

As part of the HF Band Radar Project, ONUR provided the following services:

- Radar systems provision
- Shelter design and integration
- Radar systems integration with the existing meteorological systems
- Security cameras & systems
- Data transfer and power lines infrastructure

Turkish Naval Force Command Development of Naval Tactical Radio Network Project

ONUR signed a contract with SSB as the main contractor. The project aims to develop Network Enabled Communication Capability, which can be used for voice/data/video transfers of the Turkish Naval Forces. ONUR will be responsible for the development, establishment, procurement and installation of the system to the designated naval platforms, shore sites, and headquarters.

Turkish Coast Guard Command Development of Naval Tactical Radio Network Project

ONUR signed a contract with SSB as the main contractor. The project aims to develop Network Enabled Communication Capability, which can be used for voice/data/video transfers of the Coast Guard platforms. ONUR will be responsible for the development, establishment, procurement and installation of the system to the designated coast guard platforms, shore sites, and headquarters.



Moroccan National Airports Authority (ONDA) VCS & VRS Project

Following its successful domestic projects, ONUR has signed a contract with Moroccan Airports Authority (ONDA) in 2019. Within the scope of the project, ONUR Voice Communication, Recording and Replay Systems will be used in 6 different airports which are Tit Mellil, Beni Mellal, Benslimane, Bouarfa, Laayoune and Ifrane.



Turkish Air Force Mobile and Fixed TACAN Systems

ONUR has signed a contract with SSB to supply a total of 14 TACAN systems (fixed and mobile) to be provided and installed for various Turkish Air Force Bases.

ONUR has provided services as follows:

- Provision of TACAN systems
- Integration of TACAN's with existing systems
- Design and implementation of antenna towers
- Shelter integration and civil constructions
- Power generator and UPS systems
- Security cameras and systems
- Data communication and power infrastructure



Systems and Products



Systems

OCS-NG4000	Voice Communication System (VCS)
ORS-IP2000	Voice/Data Recording and Replay System (VRS)
OMT-M2000	Mobile Air Traffic Control Tower System (MATCT)
OCS-NG4000-RPS	Voice Communication & Recording System for UAS Applications
OSR-IP1000	Tactical Mesh Networking System
OIC-MP2000	Integrated Communication Systems for Naval Platforms (ICS)
OTC-IP2000	Voice Communication System for Transportation Applications
OCS-NG2000	Voice Communication Systems for Tactical Platforms

Products

RIG-200	Radio Over IP Gateway
RIG-200R	Airborne Radio IP Gateway
TGW-NG200	Telephony Gateway
WCM-500	Wireless Communication Module
HSNR-500	Network Subnet Router
OSBM-200	Software Based Modem
OMC-100	Mobile CWP

“We are determined to deliver the most critical projects with success by advancing our capabilities & technologies.”

Company Profile

Next Generation Engineering Solutions



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Headquarters

Mutlukent Mahallesi 1942. Cadde No:39
06800 Çankaya Ankara TURKEY
t. +90 312 235 15 50 f. +90 312 235 15 40
www.onur.net info@onur.net
marketing@onur.net

R&D Center

Mutlukent Mahallesi 1942. Cadde No:41
06800 Çankaya Ankara TURKEY
t. +90 312 235 15 50 f. +90 312 235 15 40
www.onur.net info@onur.net
marketing@onur.net