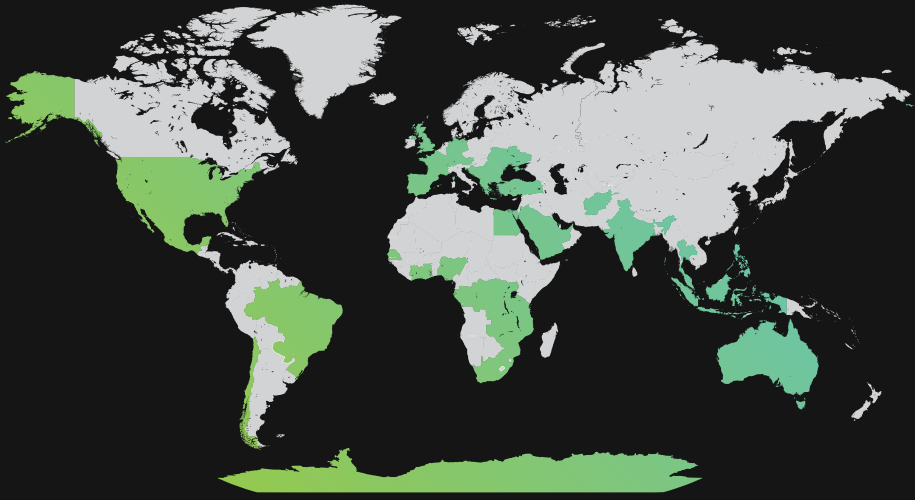


EXERON
by IP5



IPS SYSTEMS IN OPERATION



58 countries on all 7 continents

ABOUT IPS

As a leading specialist and manufacturer of energy conversion systems and turn-key power solutions, **International Power Supply (IPS)** has devoted its more than 30 years of experience to research and development, providing groundbreaking and robust technology.



ELECTRIFY BY INNOVATION

IPS' mission to electrify the world with sustainable energy is projected in the variety of its solutions across various sectors: Utility & Electrification, Oil & Gas, Telecom, Defense & Security, etc. Our core tradition is the constant research and development of sustainable innovations and the invention of flexible, smart and robust solutions.

RELIABILITY

To reach our mission, our solutions must be reliable and able to withstand the harshest conditions. Such capacity to holdout extreme temperatures, humid, desartic or freezing environments, made our products present all over the world, reaching the 7 continents.



APPLICATIONS



Oil & Gas

- ⊗ Oil & Gas wellheads
- ⊗ Drilling sites
- ⊗ Cathodic protection
- ⊗ Telemetry



Telecom

- ⊗ Diesel replacement
- ⊗ OPEX reduction



Electrification

- ⊗ Mini Grid
- ⊗ Smart Grid



Defense

- ⊗ Mobile military stations
- ⊗ Temporary field camps
- ⊗ Border control



Critical Power

- ⊗ Utilities
- ⊗ Railway
- ⊗ Data centers



EXERON

EXERON, THE BEGINNING OF THE OFF-GRID REVOLUTION

EXERON is a patented all-in-one modular power conversion system, developed by IPS to withstand the harshest conditions while keeping its flexible architecture.

- ⊗ from 2 kW up to unlimited;
- ⊗ Ability to work in the harshest conditions, from -40°C up to +80°C, high level of dust, sand and humidity;
- ⊗ EXERON can simultaneously manage different power sources - solar, grid, diesel genset and use battery storage for back-up;
- ⊗ Provides uninterruptable AC and DC power;
- ⊗ Proven and reliable technology;
- ⊗ Unlimited back-up time;
- ⊗ Battery life extension.



All In One

EXERON incorporates:

- ⊗ Solar Charge Controllers
- ⊗ DC/DC converters
- ⊗ DG/Grid rectifiers
- ⊗ Cathodic Protection controllers
- ⊗ Inverters

All of them, controlled under the Monitoring and Control Unit (MCU) - the X's brain.

Hot-Plug Scalability

The uniqueness of EXERON is in its modular structure and the hot-pluggable modules that makes it easy for installation. Exchange of modules or power upgrade is easily performed in seconds without special skills. The EXERON remains powered and operational during module exchange or upgrade.

TECHNICAL DESCRIPTION

Power Distribution Unit (PDU)

- Containing all I/O connection terminals, different types of circuit breakers, SPD's (Surge Protection Devices) and other protections. Fully pre-cabled and ready to operate.

Solar Charge Controller [SML2000]

- The solar charge controller is basically a DC to DC converter with a state-of-the-art MPPT [Maximum Power Point Tracking] with efficiency of up to 99%.

Cathodic Protection Module [XCP]

- Used in the Oil & Gas industry. IPS's XCP module efficiently controls the corrosion of metal surfaces, with the highest power density in the market.

Inverter [I4000B]

- The inverter is responsible for the DC to AC conversion of the system. The inverter's main function is to uninterruptedly supply the load.



Monitoring and Control Unit [MCU]

- With state-of-the-art software and unique communication protocol, the MCU makes the most proper decisions for the system's behavior. It communicates to the main system components. It has an integrated web server, 4G router, Ethernet port and provides local, remote and cloud-based monitoring and control.

Grid/DG Charge Controller [ML2000]

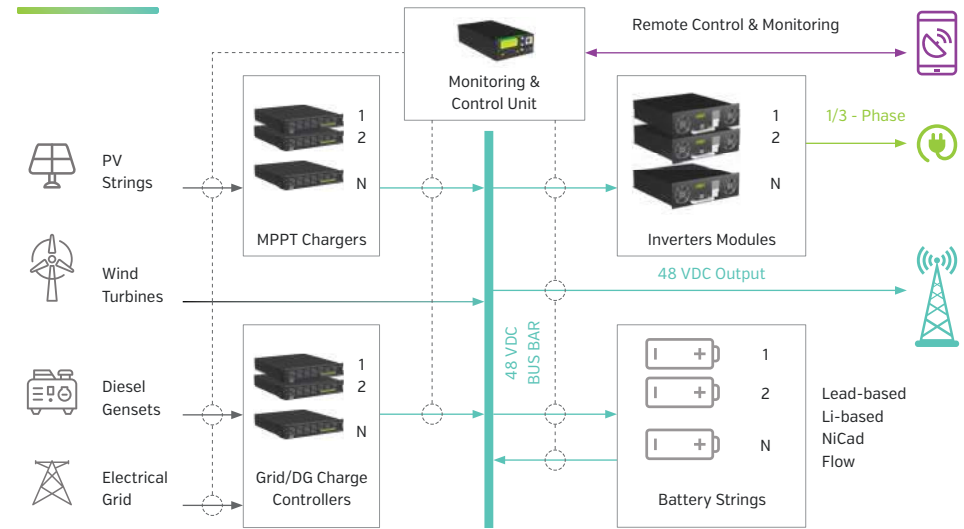
- The rectifier is a power conversion unit, converting AC to DC voltage. The rectifier is switch mode type with perfect PFC [Power Factor Correction].

DC/DC Converter [XDC]

- The DC to DC converter is usually used for powering low voltage DC equipment or to charge the battery of the diesel generator.

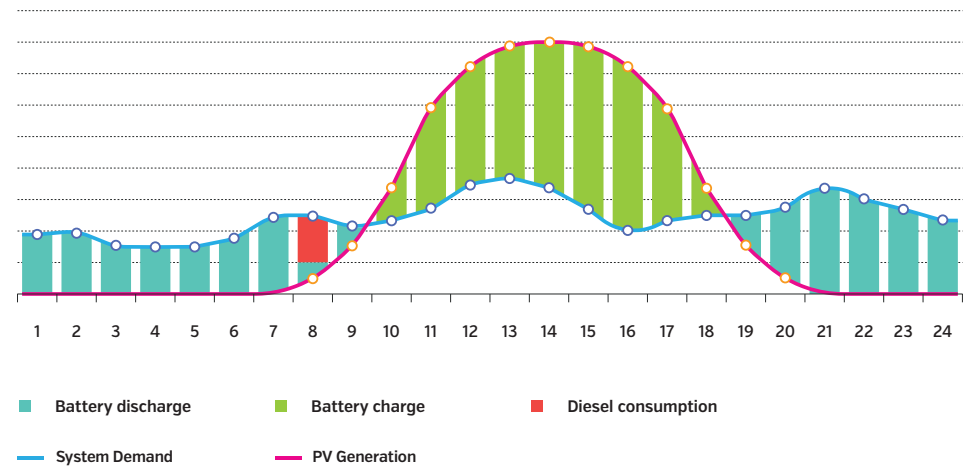
EXERON'S STRUCTURE

EXERON'S INNOVATIVE AND PATENTED STRUCTURE



Legend: Inputs → Connections to DC Bus Bar → AC Power Output → Monitoring and Control spots

Typical EXERON performance profile



ADVANTAGES AND BENEFITS

All in One

- All type of power conversion modules
- Power Distribution with all I/O
- Intelligent DG control
- Bypass module
- Full monitoring

Battery Life Extension

- Intelligent and precise charge-discharge process extends the battery life ~30%
- Automatic capacity test for maintaining the battery in best condition
- EXERON is compatible with Lead - Lithium - and Nickel - based batteries

Plug & Play Hot-Swappable Modules

- Exchange and upgrade <5s
- Light and small power modules
- No special skills are needed
- Scalable from 2 kW up to 65 MW

Full System Redundancy

- Load sharing between the power modules
- Fault tolerant software and hardware
- N + N redundancy

I/O Power Flexibility

- 100% flexible input and output configurations
- Higher input for fast battery charge and longer discharge

Smart & Predictive Control

- Dynamic control of input power sources
- Criteria based decisions
- Adaptive battery charging
- Energy flow control

KEY-BENEFITS:



Best in Class Technology & Unique Architecture



Military Certified



Advanced Battery Management



Modular



Quick and Easy Deployment



Unmatched Reliability



Hot Swap Technology



No Maintenance Required



25+ Years Design Life



Future Proof

MONITORING AND CONTROL




IPS can offer

- 24/7/365 remote monitoring and maintenance
- Live Network and Operation Centre (NOC)
- Hot line technical support
- A wide international network of certified providers
- Training and Commissioning
- IoT management platform

For more information visit:
www.monitoring.exeron.com


INDOOR APPLICATIONS

EXERON can operate for indoor applications as well as for outdoor. For indoor use, EXERON is available in three standard configurations. Each type can be modified depending on client's needs and desires, using the unique plug and play principle of the modules.




SX
Up to 4 kW

- 1 x PDU
- 1 x MCU
- 2 x SML2000
- 2 x ML2000
- 1 x I4000B



MX
Up to 12 kW

- 1 x PDU
- 1 x MCU
- 6 x SML2000
- 6 x ML2000
- 3 x I4000B



FX
Up to 24 kW

- 1 x PDU
- 1 x MCU
- 12 x SML2000
- 12 x ML2000
- 6 x I4000B



Systems bigger than 24 kW

- 1 x PDU
- 1 x MCU
- N x SML2000
- N x ML2000
- N x I4000B

OUTDOOR APPLICATIONS

EXERON has been designed for demanding defense applications and can therefore operate in environments from -40° C up to 80°C. The system is available in various cabinets and shelters for outdoor applications. Depending on the battery type and customer's requirements, the EXERON outdoor solutions are equipped with several cooling options: free cooling, heat exchanger, air conditioning or the special IPS's non-compression-based cooling.

COOLRACK

CoolRack system presents an air-conditioned outdoor cabinet, with front and rear door and maintenance-free A/C unit.



- Maintenance-free A/C
- Anti-corrosion surface
- Closed air flow
- Protection: up to IP 65
- T-range: -20°C up to +55°C

COOLFLOW

CoolFlow series presents an outdoor cabinet with a build-in high-technological cooling unit for battery and power equipment, providing a constant-controlled temperature.



- Double walled
- Anti-corrosion surface
- Closed air flow
- Protection: up to IP 55
- T-range: -40°C up to +45°C

FREECOOL

The FreeCool series has been developed by IPS for budgetary applications. Single or double wall cabinets with various mounting kits for ground, wall and pole installations.



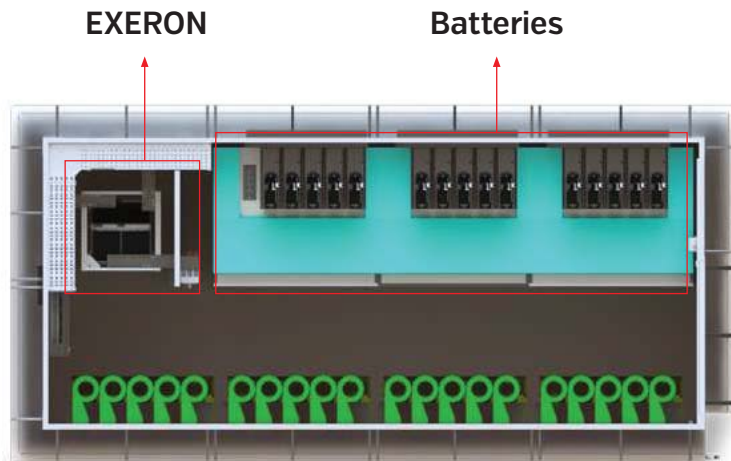
- Low-cost solution
- T-range: -40°C up to +45°C
- Protection: up to IP 55
- T-range: -40°C up to +45°C

NOMAAD

The ultimate desert-proof power system

NOMAAD is a unique solution developed specially for extreme temperatures and desert conditions. It provides full power independence for remote off-grid areas, by converting them to green, efficient and totally autonomous sites, enhancing the robustness and reliability of the power supply system.

NOMAAD is an all-in-one maintenance-free containerized solution with integrated power management system EXERON and energy storage system placed in a special passive-cooled compartment, providing a max. temperature of 30 °C to the batteries independently to the ambient temperature outside.



Key Features



NATO Military Certification (AQAP 2110)

The complete manufacturing process of IPS is under NATO military certification for quality (AQAP 2110), which is a guarantee for safe and reliable operation in harsh ambient conditions.



Non-compression-based Battery Compartment

NOMAAD has a special battery compartment with passive cooling inside the container. The system maintains a constant temperature of less than 30°C, regardless of the outside temperature, which often reaches up to 70°C.



Kinetic Cyclone Air-Filtering

Dust and sandstorms are a common natural phenomenon in desertic areas, and they can occur at any time without warning. As a result, the polluted air could seriously damage the equipment placed inside the container and hence compromise the safe operation of the system. Our engineers developed a special kinetic cyclone air filtering with no fans, filters or any other moving parts that usually require frequent repairs. Test results had shown air filtration of up to 99.9% of all particles larger than 3µm. No power requirement.



Anti-Theft Locking System

Burglaries occur often with batteries and other electrical equipment being stolen from remote, unmanned stations. This results in unexpected maintenance costs, frequent site visits and pricy downtime of the infrastructure. Our team developed a high security locking system using heavy-duty electromagnets. We equipped our container with an anti-vandal keyless entry accessible via an RFID card, remotely or using a mobile phone.



Patented

IPS owns a patent registered in the US for the hardware and software of EXERON decentralized power generation technology. In addition to that, our all-in-one decentralized autonomous power solution NOMAAD specially developed for desert applications is patent pending.



Battery Life Extension System

EXERON has a built-in patent-pending battery management system, that extends the life of the batteries with 30% through sophisticated algorithm that controls the charge and discharge cycles of the battery.



Remote Monitoring and Control

PV, energy storage and diesel generator systems are equipped with remote monitoring and control to monitor real-time PV power production, battery charge and discharge rate, facility load power demand, battery and ambient temperature, wind speed, solar irradiance, battery container cooling system, inverter and charge controller operating status and alarms.



Anti-Solar Shielding

NOMAAD is equipped with specialized anti-solar shielding that reflects the sunlight and prevents the container from overheating. The panels have the additional benefit of camouflaging the container, making it nearly "invisible" from a distance.

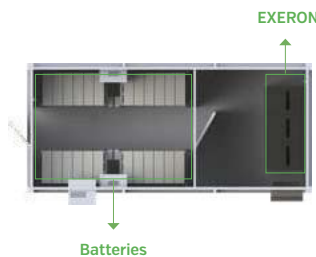
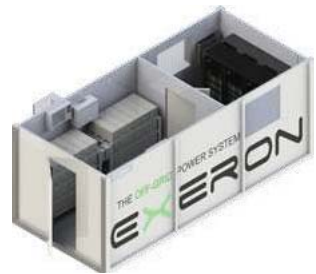
X-SMART

Containerized Solutions with Integrated Battery Storage

IPS has developed containerized weatherproof outdoor solutions with integrated EXERON and battery storage systems. The shelter has separate compartments for the power conversion system and for the battery bank. The power system compartment is ventilated and filtered, and the battery compartment is air-conditioned to maintain optimal operating temperature and extend battery life. The container is pre-cabled, with pre-installed battery distribution boxes and fuses, pre-installed input and output distribution panel containing connection for PV strings and input and output AC distribution.

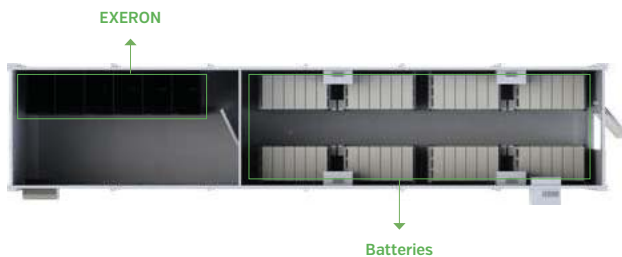
X-Smart 20

- Up to 60 kVA peak output power
- Up to 60 kWp solar PV input
- Up to 60 kW DG/Grid AC input
- Up to 260 kWh battery capacity



X-Smart 40

- Up to 120 kVA peak output power
- Up to 120 kWp solar PV input
- Up to 120 kW DG/Grid AC input
- Up to 520 kWh battery capacity

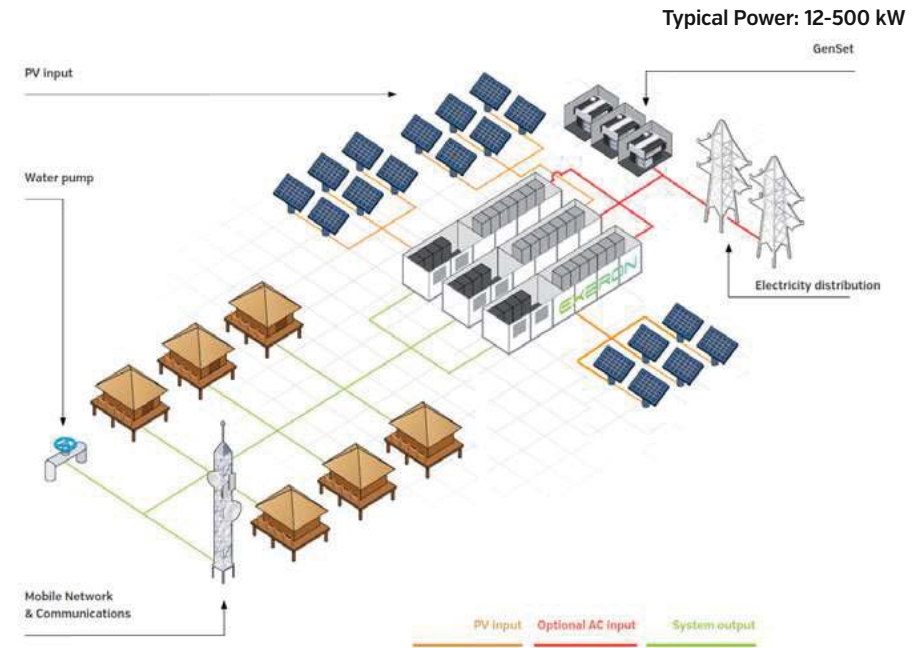


X-SMART GRID:

PATENTED CENTRALIZED OR DISTRIBUTED MINI-GRIDS ARCHITECTURE

The X-Smart Grid system concept is a combination of know-how, R&D, future-oriented thinking and extraordinary engineering skills. X-Smart Grid is an independent, off-the-grid power generation unit, which is distributed and attached to unlimited loads (residential or industrial).

The containerized solution allows scalability by connecting multiple containers (power clusters) with a synchronized AC output via a common LV distribution panel (X-Grid Technology). Developed and designed for communities and developments of mid-size to large number of single objects in remote or rural areas that can be interconnected to each other



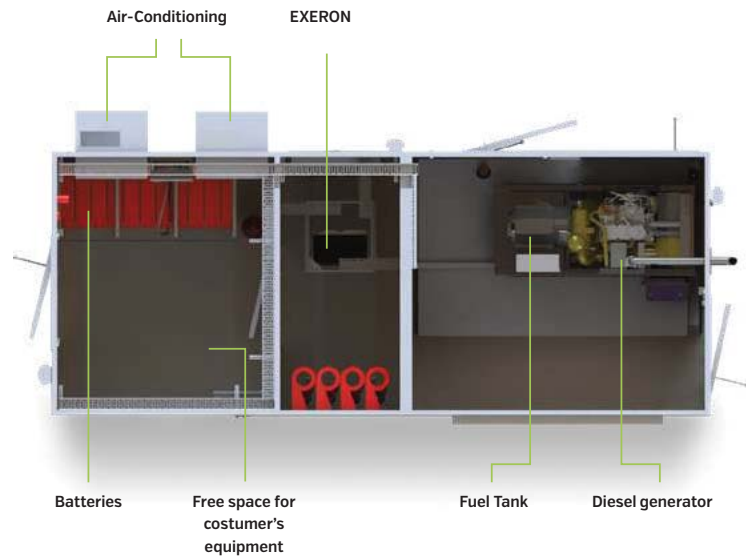
The X-Grid technology combines the benefits of both On and Off-Grid systems, while eliminating the disadvantages. The concept revolves around multiple individual power clusters operating in AC-synchronous mode via communication between the individual EXERON systems. Each power cluster consists of a separate EXERON system, battery storage and input power generation (PV, DG, Grid). The concept of distributed generation allows closed proximity of the power conversion equipment to the solar PV array, minimizing losses over DC cables.

ALL-IN-ONE EXERON

The mobile solution

As a result of our continuous R&D and careful observation of our customer-specific needs, we, at IPS, have developed a containerized hybrid power conversion system that provides full power independence by gathering in one portable container the PV solar power, the diesel generator with the integrated fuel tank and the battery storage. It also provides A/C free space for any other customer's equipment.

This all-in-one EXERON system is a versatile solution for turn-key-solutions with loads under 30 kVA.



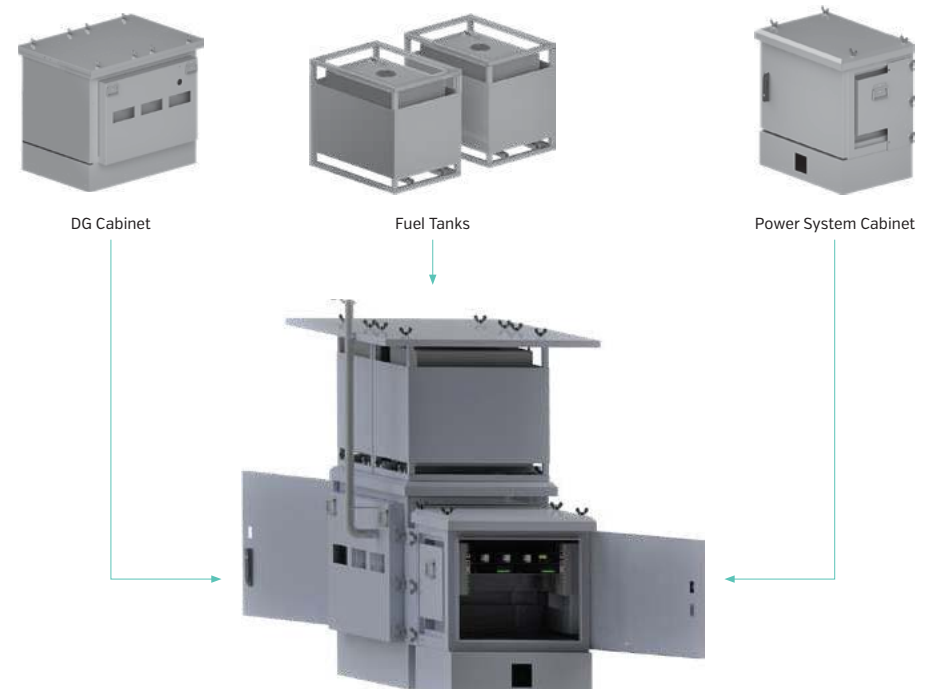
PORTABLE POWER SYSTEM

Continuing with our focus on custom-oriented needs, IPS has developed a portable power solution for emergency situations.

It is a modular power system consisting of a power system cabinet, diesel generator's cabinet and fuel tanks that can be easily transported and deployed. Such solution is key-oriented to situations when critical loads must be powered independently of the conditions, providing an uninterruptable & efficient supply, keeping a high OPEX reduction.

Advantages

- ⊗ Easy transportation
- ⊗ Fast deployment and installation
- ⊗ Remote monitoring and control
- ⊗ Ready to operate in a few minutes
- ⊗ Portable and light components



KEY CLIENTS



Telecommunications

 Telekom Austria Group	 STC	 Deutsche Telekom	 Edotco Group	 Telenor
 Emirates Integrated Telecommunications Company	 Safaricom	 EADS	 Ericsson	 Nokia Siemens Networks



Energy

 Saudi Aramco	 Total	 Lukoil	 Enel	 The AES Corporation
 ABB	 Siemens	 Thales Group	 Dubai Electricity and Water Authority	 EVN



Defense & Security

 NATO	 Ministry of Defense of Bulgaria	 Abu Dhabi Police	 Armed Forces of Egypt	 Armed Forces of Kazakhstan
 Armed Forces of China	 Nigerian Air Force	 Ministry of Defense of Paraguay	 Indonesian Marine Corps	 Ministry of Interior Kingdom of Saudi Arabia

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