Grid Solutions

MDS™ ORBIT X INDUSTRIAL 5G/LTE

Next Generation Wireless for Mission Critical Applications

MDS™ Orbit X is the next-generation GE Vernova wireless industrial field router, designed to support both public and private 5G/LTE networks. Featuring an updated processing subsystem and Gigabit data ports, Orbit X delivers secure and reliable broadband wireless connectivity to remote assets, enabling the digital transformation of critical infrastructure. This ensures that even the most distant and challenging locations remain connected and operational.

As initiatives such as smart grids and digital oilfields drive increased connectivity and higher demands on OT communication networks, wireless bandwidth requirements are experiencing exponential growth. This presents a significant challenge in planning for future capacity needs while supporting existing critical infrastructure in remote, difficult-to-reach locations. Seamless migration from LTE to 5G and from Non-Standalone (NSA) to Standalone (SA) networks is crucial to avoid costly and disruptive truck rolls.

MDS™ Orbit X addresses these challenges with advanced features including LTE carrier aggregation and 5G NSA or SA supporting 3GPP Release 16. The industrially hardened platform includes the Orbit operating system with a comprehensive networking and cybersecurity framework and scalable device management tools, significantly reducing the learning curve for users and simplifying network setup and commissioning. With Orbit X, organizations can future-proof their networks, ensuring seamless connectivity and reliable performance for years to come.

Key Benefits

- Prepare for future data demand with performance designed for 5G/LTE
- Enable real-time control and monitoring with low latency and high reliability
- Isolate traffic flows with advanced routing features including Virtual Routing & Forwarding (VRF) and zone-based firewall
- Protect network assets and access with hardware Trusted Platform Module, and enterprise-class security
- Overcome harsh environments with IEC 61850-3 and UL/CSA Class 1 / Div 2 certifications

Electric Utilities
- Smart Grid Communications
- Advanced Metering Backhaul
- Distributed Energy Resources

Oil & Gas
- Well head automation
- SCADA and remote monitoring
- Remote field office connectivity

Water & Wastewater
- Pressure monitoring
- Pipeline monitoring and control
- Maintenance workforce mobility

Smart Cities & Municipalities
- Traffic signals control
- Video security
- Weather monitoring stations

Performance Built for 5G
- 5G NR (SA or NSA), 4×4 MIMO, and 4G fallback.
- LTE CAT 20 with carrier aggregation
- 3GPP Release 16 Features
- Up to Gbps data rates
- 4x Gigabit Ethernet interfaces and 2x serial data ports with a built-in terminal server
- Supports CBRS, B26/n26, B106 Anterix Active™, FirstNet* planned

Enterprise-class Cybersecurity
- Trusted Platform Module (TPM) for hardware-based data protection
- Zone-Based Firewall for advanced threat protection
- Secure Architecture verifies every user and device before granting access
- IPsec/GRE/DMVPN/OpenVPN and VRF for recure communications and isolated routing
- Signed firmware and Firmware Over The Air (FOTA) for secure updates
- IEC 62443-4 security standards for industrial control systems

Ease of Use & Scalability
- Flexible network design with integrated routing and bridging
- New intuitive Web UI with fewer clicks for accelerated configuration and deployment
- Enhanced processing and memory for more tunnels and endpoints
- Efficient updates with delta firmware
- MDS™ Orbit PulseNET and MDS™ Orbit LaunchNET for radio network management & automatic provisioning at scale

Enhanced Reliability
- Dual-SIM, GSMA eSIM compatible with roaming and multi-carrier auto-switching
- IEEE1613, IEC61850-3, UL/CSA Class 1 Div 2 for harsh environments
- EMP hardened per MIL-STD-461G, RS105
- 5-year manufacturer warranty

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GE VERNOVA

Future Proof Platform

Orbit X 5G/LTE supports global deployment across carriers and regions, offering seamless connectivity from LTE to 5G and from NSA to SA networks. Scalable to meet growing bandwidth requirements with LTE carrier aggregation, 5G Release 16 features, and the processing power to support more tunnels and endpoints. GPS support enables position reporting for asset tracking and GIS integration.

5G Performance

5G Sub 6GHz Release 16 enables Ultra-Low Latency & High Reliability Communications (ULLHRC), crucial for real-time control and monitoring of critical infrastructure. Enhanced with 4×4 MIMO for superior signal reliability and Gigabit Ethernet interfaces for high-speed data transfer, these features ensure robust performance for mission-critical applications

Flexible Networking

Orbit X supports advanced features for secure network designs. Advanced QoS handles various applications while preserving priority and performance. VRF creates isolated routing tables for enhanced security. Integrated routing and bridging enable point-to-point VPNs and tunnel Layer 2 protocols like IEC 61850. It supports applications in electric utilities, oil & gas, and smart cities.

Enterprise-Class Security

The MDS™ Orbit X platform is built on a robust enterprise-class cybersecurity framework incorporating advanced features such as Virtual Routing and Forwarding (VRF), VPNs, a zone-based firewall for network segmentation, X.509 certificates, secure boot, Firmware Over-The-Air (FOTA), and a hardware Trusted Platform Module. These features protect against a wide range of cyber threats proving comprehensive security for the device, network, and users

Intuitive User Interface

The new streamlined Graphical User Interface (GUI) allows for quick provisioning and maintenance from a web browser. Simplified navigation and setup wizards accelerate the deployment of complex network functionality by breaking down processes into simple, concise, and automated steps.

Industrial Reliabilit

Orbit X conforms to IEC 61850-3, IEEE® 1613, and UL/CSA Class 1 Div 2, ensuring it can overcome harsh environments. Its rugged industrial design is built to withstand extreme temperatures, avibration, and electromagnetic interference (EMI).

MDS™ Orbit X vs MDS™ Orbit

Model	Orbit MCR	Orbit X-MR
Photo		
Networking & Security Capabilities	**Orbit Networking and Cybersecurity:** • Enterprise-class networking and security including GRE, VPN, VRF, Firewall, RADIUS authentication, TACACS+	**Orbit Networking and Cybersecurity, plus:** • Hardware Trusted Platform Module • IEC 62443-4 standards for secure industrial control systems • Zone-based Firewall • Differential firmware for fast OTA update
Primary Wireless	**Cellular Options:** • 4GC: 4G LTE, 3G, Anterix Active , GPS, NAM • 4GB: 4G LTE-A Pro, 3G, CBRS, FirstNet, GPS, US • 4GD: 4G LTE/3G/2G, GPS, EMEA / LATAM • 4GF: 4G LTE, 450 MHz b31/b72 , EMEA / LATAM • 4GG: 4G LTE, 410 MHz b87, EMEA / LATAM • M1A: LTE-M 400MHz, EMEA / LATAM • M1B: LTE-M Australian	**Cellular Options:** • 5G1: 5G Global, 4G, B26/n26, CBRS, Anterix ActiveTM B106, FirstNetTM planned
Optional Secondary (factory configured)	Dual active LTE • 900 MHz ISM • Licensed narrowband • 2.4GHz Wi-Fi • 2.4/5GHz 2×2 MIMO Wi-F	**None. Future options for** • WiFi6 • 900 MHz ISM • Licensed narrowband
Port Options	Option 1: 2 Ethernet, 1 Serial, 1 USB • Option 2: 1 Ethernet, 2 Serial, 1 USB • Option 3: 4 Ethernet, 2 Serial, 1 USB • Option 4: 6 Ethernet, 1 USB • Option 5: 1 SFP, 2 Ethernet, 2 Serial, 1 USB	• 4 10/100/1000 Base-T Ethernet, 2 Serial, 1 USB
Form factor, Power	• 1.75 H x 8.0 W x 4.8 D inches ; 2 lbs. • 10-60	• 2.0 H x 8.0 W x 4.8 D inches; 2.5lb • 10-36V (standard), +/-48Vdc Isolated (future option)

Applications and Use Cases

The MDS Orbit X is engineered to excel in a variety of Operational Technology (OT) applications, providing robust performance and reliable connectivity over wireless Field Area Networks (FANs)

Smart Grid Communication: Orbit X enables real-time data exchange between substations, sensors, transformers, and the control center. Its advanced QoS ensures that critical data is prioritized, maintaining performance even during network congestion. The substation-hardened design, compliant with IEC 61850-3 and IEEE 1613 standards, ensures reliable deployment in harsh environments. With Gbps Ethernet interfaces, 5G capabilities, and LTE carrier aggregation, it delivers high-speed, reliable connectivity
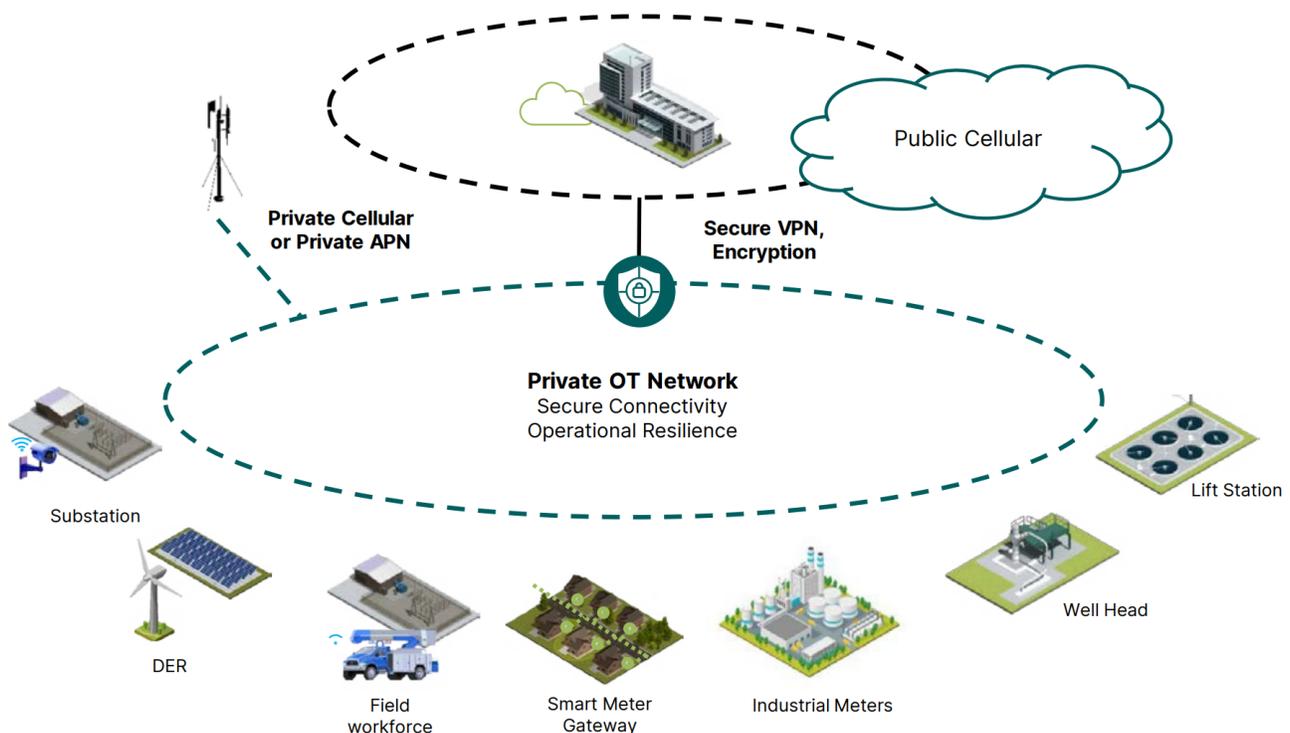
Advanced Metering Infrastructure (AMI): For AMI, the MDS™ Orbit X provides secure and scalable connectivity for millions of smart meters. Its robust networking capabilities and advanced security features, including Virtual Routing and Forwarding, IPSec VPNs, and a Trusted Platform Module (TPM), ensure the secure transport of critical data.

Distributed Energy Resource (DER) Integration: Orbit X facilitates seamless communication with solar panels, wind turbines, and battery storage systems. Its flexible networking interfaces with integrated routing and bridging capabilities enable efficient integration of diverse DER components. The device supports dual APNs for public and private traffic routing

Digital Oil Field: For oil and gas applications, Orbit X is UL/CSA Class 1 Div 2 compliant, allowing for safe installation in hazardous locations such as wellheads and pipelines. Its integrated active GPS enables real-time fleet management and asset tracking, essential for mobile or nomadic applications. The device ensures secure data transmission with features like IPSec VPNs, RADIUS authentication, and a zone-based firewall.

SCADA & Remote Access: For SCADA and remote access, Orbit X offers reliable low-latency links. Its advanced QoS capabilities ensure that data from remote sites is transmitted efficiently and reliably. The device's robust security features, including a zone based firewall and compliance with IEC 62443-4 standards, ensure secure industrial control systems.

Water & Wastewater: MDS™ Orbit X offers a robust M2M solution for water and wastewater applications. It facilitates the interconnection of various sites for SCADA, video security, and other critical operations. The integrated GPS functionality enhances GIS applications by providing real-time asset tracking.

Public Cellular

Private Cellular or Private APN

Secure VPN, Encryption

Private OT Network
Secure Connectivity
Operational Resilience

Substation

DER

Field workforce

Smart Meter Gateway

Industrial Meters

Well Head

Lift Station

Technical Specifications

CELLULAR 5G GLOBAL

5G with 4G LTE fallback, 3GPP Release 16

- **Network:** 5G sub-6 FDD and TDD, SA and NSA, 4G LTE

- **Max Throughput (DL/UL Mbps):** 5G NSA (3400/460), 5G SA (2500/ 900), 4G (1600/211), 3G (42/11)

- **Carrier Aggregation:** 5G 120 MHz DL, 2CC UL. 4G up to 100MHz (5CC) DL, 40MHz (2CC) UL

- **5G FR1 bands:** n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, n66, n71, n75, n76, n77, n78, n79

- **4G bands:** B1, B2, B3, B4, B5, B7, B8,B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29(DL), B30, B32(DL), B34, B38, B39, B40, B41, B42, B43, B46(LAA), B48(CBRS), B66, B71, B106

- **HPUE:** CBRS and C-Band
  - PC2(26dBm)—Bands B41, n41, n77,n78, n79
  - PC1.5(29dBm)—Bands n41, n77, n78, n79

- **Regulatory:** PTCRB, GCF, FCC (US), ISED (Canada), CE/RED (Europe), RCM (Australia), Anatel (Brazil) Module Only: NCC (Taiwan) , KCC (Korea), JATE/ TELEC (Japan)

- **Private 5G/LTE:** CBRS EUD, CBRS OnGo[1], Anterix Active

- **Public Safety:** FirstNet Trusted option[1]

- **Carrier Certifications:** AT&T[1], Verizon[1], Southern Linc[1], Bell[1], Telstra[1]

- **Module certifications:** AT&T, Verizon, T-Mobile, US Cellular, Telstra[1]

- **Device certification not required:** Telus, Rogers Per Demand: Telus IoT Certified

- **APN/PDN:** single/dual APN support

- **SIM:** 2 external (Nano-4FF)

- **GNSS:** GPS, Galileo

- **4×4 MIMO DL support on bands:**
  5G FR1: n1/n2/n3/n7/n25/n30/n38/n40/n41/ n48/n66/n75/n77/n78/n79
  4G: B1/B2/B3/B4/B7/B25/B30/B38/B39/B40/ B41/B42/B43/B48/B66

- **2×2 MIMO UL support on bands:**
  5G FR1:n38, n41, n48, n77, n78, n79

NETWORKING

- **TCP/IP Throughput:** 1 Gbps

- **Routing:** static routing with failover, dynamic routing including OSPFv2, RIPv2, BGPv4, virtual routing and forwarding (VRF)

- **Bridging:** Managed switch, IEEE 802.3, 802.1Q/ VLANs, 64 VLANs, IGMP v2/v3, STP, concurrent bridging & routing

- **Tunneling:** GRE tunneling layer 2 (Ethernet) and layer 3

- **High Availability and Failover:** Virtual Routing Redundancy Protocol (VRRP), advanced failover between any wireless or Ethernet interfaces, failover on route/path performance, link loss, latency degradation or packet loss thresholds

- **Quality of Service:** 16 egress queues, priority queuing, fair queuing, traffic shaping, classification based on DSCP, 802.1p and layer 2-4 classifiers

- **IP Protocols:** TCP, UDP, ARP, DHCP, ICMP,NTP, FTP, SFTP, TFTP, DNS, configurable HTTP and HTTPS, SSH

- **Serial Data Handling:** TCP server, Modbus/TCP, Modbus RTU, TCP client, UDP Unicast and Multicast

- **SCADA / Automation Protocols:** Modbus RTU, Modbus ASCII, NP3, Allen-Bradley DF1, BSAP, IEC 101, Modbus TCP, Modbus via TCP, Modbus, UDP, DNP3, IEC 104

VIRTUAL PRIVATE NETWORKS

- **Throughput:** 335 Mbps with IPSec AES128-CBC TCP/IP

- **VPN Protocols:** IPSec VPN Server (responder) and Client (initiator), DMVPN, OpenVPN, FlexVPN, and VPN Dead Peer Detection (DPD)

- **Authentication:** Public Key, EAP TLS, Pre-Shared, Ike 1-2

- **Encryption:** 3DES, AES 128/192/256, CBC, CTR, CCM, GCM, SHA 256/384/512 HMAC

- **Concurrent Tunnels:** 25 or more IPSec VPNs (LAN-to-LAN or remote access Host-to-LAN)

CYBER SECURITY

- **Trusted Platform Module** (TPM)

- **AAA:** 802.1x / RADIUS, TACACS+

- **Zone Based Firewall:** stateful L3-4 Access Control List, NAT, Source NAT (Masquerading), Static NAT, Port Forwarding, rule violation notifications

- **Device Security:** Secure Boot, Secure Firmware, Digitally Signed Hardware and Software, Magnetometer Tamper Detection

- **Certificate Management** X.509, PEM, DER, RSA, and SCEP with auto renewal/re-enrollment

- **User Authentication** Local RBAC, AAA/RADIUS

- **Secure industrial control systems:** IEC 62443-4-1 certified, 62443-4-2 compliant. EN 18021, EU CRA and Indian CEA standards

DEVICE AND NETWORK MANAGEMENT

- Secure Web UI via HTTP/HTTPS

- Juniper-style command line interface (CLI) via SSH or local console

- Event logging, Syslog over TLS

- Iperf throughput diagnostics, packet capture

- Netconf, SNMPv1/v2/v3, MIB-II, Enterprise MIB

- Device/Network management using MDS PulseNET

- Zero- / One-touch provisioning using MDS LaunchNET

PHYSICAL INTERFACES

- **Ethernet Data:** 4 × 10/100/1000 Ethernet RJ45

- **Serial Data** (COM1): 1x RS-232/RS-485 RJ45

- **Serial Data** (COM2(: 1x RS-232 RJ45

- **USB Management:** 1 x USB-C 3.0 port

- **IO:** 2 x DI/DO, 1 x DI/DO/AI on 6 pin power connector

- **Antenna Interface:** 4 x SMA, Female (Cellular) + 1 x SMA Female (GNSS)

- **LEDs:** PWR, ETH (LINK/ACTIVITY + SPEED), , COM (TXD + RXD), RADIO

MECHANICAL

- **Dimensions:** 2.00 H x 8.0 W x 4.8 D inches (5.08 H x 20.3 W x 12.2 D cm)

- **Weight:** 2.4lbs (1.1 Kg)

- **Mounting:** Vertical DIN Rail, Horizontal DIN Rail, Standard Bracket (hole patterns match Orbit MCR)

- **Case:** Die cast aluminum, No Fans, No Moving Parts

ELECTRICAL & POWER CONSUMPTION

- **Input Voltage:** 10 to 36 VDC

- **Power Consumption:** 4.25W Typical @ 13.8V - Connected (Idle)

AGENCY APPROVALS AND STANDARDS

- **Safety:** IEC 62368-1 CB Scheme

- **HazLoc:** UL 121201 C1D2, CSA 22.2 No. 213-17 C1D2

- **Wireless:** FCC, IC/ISED, PTCRB, GCF, CE/RED, RCM, Anatel1

- **Cybersecurity:** EN18031-1 Common security requirements for radio equipment

- **Immunity:** IEEE 1613, IEC 61850-3

- **EMC:** ETSI EN 301 489-1, ETSI EN 489-52

- **Environmental:** RoHS (2011/65/EU, 2015/863/EU), REACH, WEEE, California Prop 65, TSCA

- **EMP:** MIL STD 461G, RS105 Electromagnetic Pulse

ENVIRONMENTAL

- **Operating Temp:** -40° to +70°C (-40° to 158°F)

- **Storage Temp:** -40° to +85°C (-40° to 185°F)

- **Humidity:** 95% at 60°C (140°F) non-condensing

- **Shock and Vibration:** EIA RS374A

- **Military Specification:** MIL-STD-810H1 (Shock, Vibration, Thermal Shock, Humidity)

ACCESSORIES

Antennas

- **97-3194A54:** Antenna, Omni, 5G/LTE Global, 4×4 MIMO, GPS, 1.5m coax, SMA

- **97-3194A55:** Antenna, Omni 5G/LTE Global, 4×4 MIMO, GPS 5m Coax, SMA

- **97-3194A56:** Antenna, Omni, 5G/LTE Global, 4×4 MIMO, 5m Coax, SMA

Mounting

- **03-4123A14:** Standard Mounting Brackets for Orbit X-MR/MCR/ECR and SD Qty 2

- **03-4125A06:** DIN Rail Mounting Kit for Orbit X-MR/MCR and TransNEXT

- **84-4232A04:** Horizontal DIN kit for Orbit X-MR and TransNEXT

Power Input

- **01-3682A03:** Power Supply AC-12VDC for Orbit X-MR and TransNEXT

- DC Power Plug Orbit X-MR and TransNEXT, 6-pin, lever lock (73-1194A85)

- •DC Power Plug Orbit X-MR and TransNEXT, 6-pin, screw retention (73-1194A84)

Data Ports

- **73-2434A25:** COM Port Adapter

RELIABILITY AND WARRANTY

- 115 years MBTF @30C

- 5 year standard manufacturer warranty

[1] planned, contact sales for availability

For more information visit
gevernova.com/grid-solutions

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