MDS Orbit Platform

The Next Generation Industrial Wireless Networks

As industrial SCADA and automation applications have evolved, corresponding requirements for security, reliability and performance of the underlying communication network have become more demanding. Furthermore, the diversity of topography and wireless spectrum conditions across regions is often difficult to address with any single wireless technology.

The GE MDS™ Orbit industrial wireless router platform offers the security, reliability, performance, and wireless flexibility required for next-generation industrial networks. Orbit enables customers to deploy advanced communications using diverse options of wireless technologies and frequencies.

Orbit allows for communication over licensed spectrum, unlicensed spectrum, cellular technologies, and Wi-Fi in various form factors with single or dual radio options. Its advanced cyber security capabilities enable customers the power needed to secure and protect their networks and assets.

Unifying network deployments on the Orbit platform with a common user experience, networking and security capabilities across various RF technologies helps customers simplify operations, reduce learning curves and save on cost.

Key Benefits

- Simplify operations, reduce learning curves and reduce cost by unifying the deployment of multiple wireless technologies on a single platform
- Repurpose narrowband spectrum for more bandwidth demanding applications using QAM modulation
- Deploy latency sensitive applications on high speed unlicensed 900MHz ISM
- Expand network coverage reliably across multiple cellular carriers and countries
- Minimize network downtime and maximize application availability with redundant radio uplinks
- Protect network and assets with powerful cyber security capabilities

Applications

- **Oil & Gas**
  - Well Head and Production
  - Pad Controllers & Metering
  - Automation
  - Remote Field Office Connectivity

- **Water & Wastewater**
  - Monitoring and Control
  - Maintenance Workforce Mobility

- **Emergency & Utility Vehicles**
  - Law enforcement connectivity
  - Utility Workforce Mobility

- **Electric Utilities**
  - Field Area Network
  - AMI Backhaul
  - Workforce Mobility

- **Smart Cities & Municipalities**
  - Traffic Signals Control
  - Video Security
  - Weather Monitoring Stations

- **Heavy Industrial**
  - Train Control and Machinery Monitoring
  - Excavation Machine Control

**Advanced Networking & Security**

- Enterprise-class cyber security capabilities including VPNs, firewallsing and centralized authentication ensure advanced network protection
- Integrated routing and bridging support a variety of network designs
- Flexible Quality of Service allows for application-based prioritization and bandwidth allocation for deterministic network performance

**Industry Leading Reliability**

- 30 years of experience in building rugged radios with over 1.5 million sites connected
- Certified for IEEE1613, IEC61850-3, ATEX and CSA Class 1 Div 2 standards for deployment in harsh environments
- Fanless, no moving parts with extended temperature range (-40°C to +70°C)
- 5-year standard manufacturer warranty
MDS Orbit Platform Key Capabilities

Flexible Networking
MDS Orbit’s support for dynamic and static routing as well as managed switch capabilities facilitate the deployment in a multitude of network architectures. To achieve maximum uplink and application uptime, Orbit supports a variety of High Availability mechanisms such as interface bonding, Spanning Tree, Layer 3 failover, VRRP as well as latency and packet-loss based failover. GRE tunneling coupled with IPsec VPNs and DMVPN further enable the establishment of secure Virtual Private Networks (VPN) across any wireless technology.

Enterprise-Class Security
The MDS Orbit platform is built on a comprehensive cyber security framework to enable the deployment of highly secure environments. It offers standards-based IPSec VPN and DMVPN capabilities with X.509 certificate management to allow the encryption of network paths and interop with non-GE devices. As an added layer of security, Orbit supports the encryption of private radio links at the RF layer. RBAC and RADIUS enable local and centralized user authentication into the network. MDS Orbit’s stateful firewall as well as MAC-filtering capabilities ensure that only valid traffic is permitted through the network. Its secure boot and secure firmware protect against meddling with the hardware and software, and its magnetometer provides tamper-detection to secure against theft.

Advanced QoS (Quality of Service)
Orbit supports advanced QoS functionality with fair and priority queuing to enable deterministic latency and throughput performance with up to 16 application priority queues. Orbit’s Traffic Shaping allows applications such as SCADA to have a dedicated throughput on the uplink for predictable performance. Orbit further supports classification based on DSCP, 802.1p, and other Layer 2-4 header information.

Network Management and User Interface
The MDS Orbit platform supports standards-based SNMP and Netconf network and device management protocols for easy integration into MDS PulseNet as well as 3rd party network management software. It supports Command-Line Interface (CLI), an intuitive web-based Graphical User Interface (GUI) as well as wizards to simplify and speed the configuration of complex tasks. Orbit’s user experience is identical regardless of radio technology or form factor.

Diverse Radio Technology Options

Licensed Spectrum
MDS Orbit’s Licensed radio technology offers multiple narrowband spectrum options with QAM modulation that maximize available throughput for modern IP-based applications. It allows for raw data rates of up to 120Kbps in a 25KHz channel, which expands the ability to handle higher performance IP-based applications. IP header and payload compression as well as per-packet, per-remote, bi-directional adaptive modulation further optimize throughput on a per-remote basis to ensure the network isn’t penalized for its lowest common denominator remote.

For customers looking to upgrade legacy licensed networks, the Orbit Licensed radio technology supports 3-FSK modulation mode, which provides backwards compatibility with legacy x710 as well as SD base stations on the A Modem. Furthermore, the MDS Master Station with Evolution Technology* supports seamless at-your-own-pace migration of any legacy licensed modems.

Unlicensed Spectrum
MDS Orbit’s unlicensed radio offers cutting edge performance in the 900MHz ISM spectrum with its advanced Media Access Control (MAC) technology. Orbit’s patented MAC prevents ingress collision at the access point by synchronizing the network and allocating time slots for one remote to transmit at a time. It enables communication at 1.25Mbps with a latency as low as 5msec for latency-sensitive automation and protection applications. Orbit’s unlicensed 900Mhz radio can be deployed in various topologies including point to point, point to multipoint, and a self-healing store-and-forward network.

Cellular
A variety of cellular modems are supported on Orbit covering 2G, 3G and 4G LTE technologies on most carriers and continents. Furthermore, Orbit supports communication over private LTE bands in the US and overseas**. Orbit’s cellular modem can be used as a primary uplink, as backup for a primary licensed or unlicensed radio, or in tandem with the primary radio. GPS is supported on select cellular modem options.

WiFi
A Wi-Fi radio option can be selected as a standalone, or as a secondary radio for licensed, unlicensed or cellular WAN-radios. Orbit’s Wi-Fi is based on 802.11 b/g/n and supports speeds of up to 54 Mbps, and up to 7 clients/hosts per AP.
The MDS Orbit Platform Models & Radio Support

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<th>MDS Orbit Models</th>
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<th>MCR High Port Density</th>
<th>ECR</th>
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### MDS Orbit Hybrid Network Example

Industrial customers depend on more than one wireless technology to extend connectivity to their field assets. The Orbit platform offers a rich portfolio of wireless technologies in various form factors, as well as single or dual radio options to facilitate the deployment in various applications and scenarios. The common platform offers a seamless and unified user experience regardless of the wireless technology used. It simplifies radio operation and management, and helps reduce learning curves and operational costs.
GE MDS™ Orbit Platform Data Sheet

UNLICENSED RADIO SUMMARY
- Frequency Bands: 802-915 MHz FHSS
- Occupied Bandwidth: 152 to 1320 kHz, up to 80 channels
- Modulation: CCK, OfDM, QPSK, 16QAM, 64QAM
- Duplex Mode: Half-Duplex, Full-Duplex
- Compression: IP Header and Payload
- Data Rate: Up to 120 Kbps in 25KHz
- Backward compatibility with MDS SD Series and x710
- Modulation: CPFSK, QPSK, 16QAM, 64QAM, Bi-Directional
- Duplex Mode: Simplex, Half-Duplex
- Operation Modes: Access Point, Remote, Store & Forward

LICENSED RADIO SUMMARY
- Narrowband Frequency Bands:
  - 330-406 MHz
  - 406.1-470 MHz
  - 450-520 MHz
  - 757-783, 787-788 MHz
  - 896-960 MHz
- Channel Size: 6.25 KHz, 12.5 KHz, 25 KHz, 50 KHz
- Operation Modes: Access Point, Remote, Store & Forward
- Duplex Mode: Simplex, Half-Duplex
- Modulation: CCK, QPSK, OFDM, Adaptive
- Operating Temp: -40⁰ to +70⁰ C (-40⁰ 158⁰F)
- Vibration: MIL-STD-810F Method 514.5
- Shock and Vibration: EIA RS374A

MECHANICAL
- Case: Die Cast Aluminum
- No Fans, No Moving Parts
- Mounting Options: Integrated DIN Rail mount and Standard
- Input Voltage: 10 to 60 VDC
- Typical download (Idle) 4.3W 310mA
- Maximum 780mA
- Connected (Idle) 4.8W 350mA
- WITH 4G LTE + WI-FI POWER 13.8V

ELECTRICAL & POWER CONSUMPTION
- Input Voltage: 10 to 60 VDC
- Power Consumption Calculations with nominal 25C at 13.8V

WITH 3G GSM WORLD
- Connected (Idle) 2.5W 182mA
- Typical download 3.2W 235mA

WITH 4G LTE
- Connected (Idle) 4.0W 292mA
- Typical download 4.3W 310mA

WITH 4G LTE + WI-FI
- Connected (Idle) 4.8W 350mA
- Typical download 5.5W 400mA

WITH 800/900/2100 MHz GSM
- Connected (Idle) 3.2W 235mA
- Maximum 5.3W 385mA

WITH LICENSED NB
- Idle 910mA 350mA
- 50% Duty Cycle 950mA 780mA

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