MDS Mercury 3650

High Throughput, Standards Based Networking

The MDS™ Mercury 3650 is a highly secure, industrial-grade communications platform for mission critical, industrial applications. The MDS Mercury 3650 supports Ethernet, serial, and WiFi communications, offering extended range and high throughput of up to 30 Mbps. MDS Mercury provides a scalable solution to meet your growing bandwidth needs and has the capacity, service prioritization and deployment flexibility to facilitate your immediate and long-term wireless networking requirements.

Key Benefits

- Industrial hardened with flexible deployment options that are designed to deliver mission critical data for business applications such as AMI, DA, and SCADA communications.
- Reduces infrastructure requirements to simplify deployment and maintenance.
- Provides application flexibility by providing multiple Ethernet ports and WiFi options packaged with serial and USB ports.
- Management ready for MDS PulseNET Network Management System to proactively monitor communication networks.

Application Specific Wireless Solution

Energy
- High capacity, point-to-multipoint wireless network for AMI collectors, aggregation site locations, RTUs, voltage regulators, enclosures, cap banks and switches

Oil & Gas
- High capacity wireless network for SCADA and aggregation site locations
- Well-head monitoring and video surveillance

Water & Wastewater
- Monitor vital water flows
- Transmit real-time, fast scan rate video surveillance

Advanced Networking

- Technology for high speed, long range, point-to-multipoint communications
- Multiple-in, Multiple-out (MIMO) antenna technology for robust communications
- Sub-channelization, to permit optimization based on coverage or capacity
- Quality of Service (QoS) profiles tailored to applications and data flows
- Hybrid Automatic Repeat reQuest (Hybrid ARQ)

Designed for Industrial Applications

- Ethernet, Serial and WiFi Options
- AMI-ready with Power over Ethernet (PoE)
- Uplink biasing for AMI backhaul, SCADA polling, and Substation Automation
- Time-Division Duplexing (TDD) synchronization for deterministic communication
- Subscriber RF robustness (23 or 30 dBm Tx/Rx, depending on model)
- -40⁰ C to +70⁰ C operating range
- CSA Class 1 / Div 2 and IEEE 1613

Robust Security

- AES 128-bit encryption
- RADIUS and 802.1x EAP/TLS authentication
- VLAN tagging
- Advanced Network Management capability with MDS PulseNET

Designed to Meet Industrial Application Requirements

Implementing a private communications network requires a solution that utilizes the latest technology to obtain the maximum signal range while supporting high data capacity. The full 2×2 Multiple-in, Multiple-out (MIMO) antennas on the MDS Mercury Base Station and Subscriber units provide a 3dB+ advantage.

Uplink biasing permits more data throughput for the uplink rather than the downlink – a requirement for industrial deployment. Superior processor speed accommodates subscriber unit interrogation and the use of remote network management systems such as GE's MDS PulseNET.

All MDS Mercury radios provide extreme operational temperature ranges of -40º C to +70º C. The rugged, aluminum chassis has been tested for shock and vibration according to military standards and are IEEE 1613 certified and CSA Class 1 / Division 2 approved.

The MDS Mercury 3650 provides Quality of Service (QoS) for data prioritization and use of scalable OFDMA modulation which provide robust communications at higher bandwidths. The MDS Mercury radios also provide sub-channelization to permits signal optimization based on coverage or capacity. Hybrid ARQ (Automatic Repeat reQuest) is utilized to provide better connection in poor RF Conditions.

Application Specific Design

The high Ethernet throughput (30 Mbps) allows an organization to deploy an MDS Mercury solution for communications to mission critical polling and monitoring devices with enough capacity to provide additional services such as video surveillance and Voice over IP (VoIP).

The MDS Mercury was designed to support Ethernet, Serial, and WiFi applications. Serial protocol support, both active and transparent, provides communications to legacy and proprietary solutions as easily as to Ethernet communications. The MDS Mercury radios are equipped with 2 Ethernet ports, reducing the need for cabling when used for multiple Ethernet applications. Additionally, the optional WiFi module supports application such as field force automation, reducing the need for additonal equipment.

Provides a Secure Environment

Sensitive communications must be protected from over-the-air capture and deciphering, and networks must be protected from unauthorized access. The MDS Mercury platform provides AES 128-bit encryption to protect data as it travels the air waves. Secure network access is provided by EAP-TLS authentication and MAC address filtering. Finally, sensitive data may be segregated using VLAN tagging.

Network Management Ready

Once the MDS Mercury radio network is operational, the user is able to utilize the MDS PulseNET comprehensive network management system for end-to-end management. MDS PulseNET provides pre-built workflows along with intuitive graphical representations of the communications network. It provides real-time availability, performance, and configuration management of the MDS Mercury radios allowing Operations Personnel to create customizable, pro-active support processes.


Designed with Flexibility in Deployment

GE MDS manufactures and deploys solutions exclusively designed for mission critical, industrial applications. The MDS Mercury has been designed with comprehensive security controls and various packaging options for flexible deployments that meet a variety of application requirements.

The MDS Mercury platform provides channel selection options to permit the use of the clearest channels available in a given area. This facilitates optimized and more consistent throughput and latencies. Additionally, Time-Division Duplexing synchronizes MDS Mercury Base Stations to facilitate
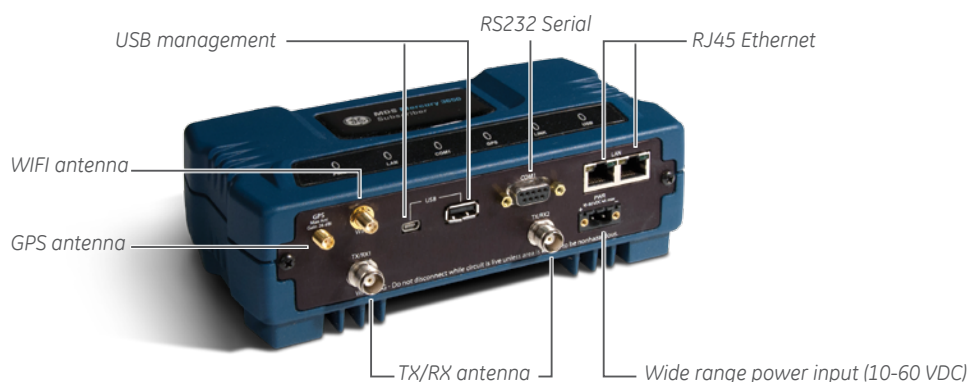
Application Example

Below is an example of a Smart Grid Advanced Metering Infrastructure (AMI) private wireless network utilizing MDS Mercury 3650s for communications backhaul.
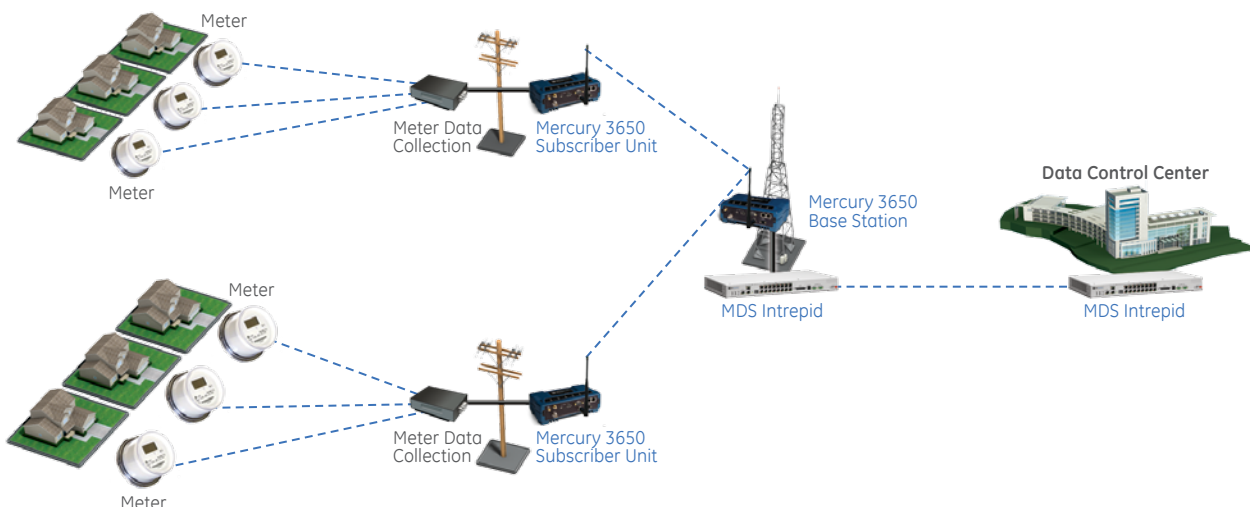
co-location and overlap of coverage without introducing self-inflicted interference. The MDS Mercury series has been specifically designed in three special packaging options for application flexibility and ease-of-use installation.

The MDS Mercury radios are equipped with an embedded spectrum analyzer to assist in deployment and troubleshooting, as well as an alignment tool for ODU deployment.

USB management | RS232 Serial | RJ45 Ethernet
WIFI antenna
GPS antenna
TX/RX antenna | Wide range power input (10-60 VDC)

MDS Mercury Enclosure Options and Installation Kits

The MDS Mercury Series has been specifically designed in three special packaging options for application flexibility and ease-of-use installation and have been designed and tested to meet stringent industrial specifications.

Cabinet Mount Base Station & Subscriber Unit - IDU

- 2 x 30 dBm conducted power
- 2 Ethernet ports, 1 Serial port, USB, GPS
- Optional built-in WiFi (Subscriber Unit only)
- MIMO Matrix A/B

- -40º C to +70º C
- IEEE 1613 compliant
- CSA Class 1 / Div 2 certification

Outdoor Subscriber Unit in Industrial Hardened Enclosure

- 2 x 30 dBm
- 2 Ethernet ports, 1 Serial Port, USB, GPS
- Optional built-in WiFi (Subscriber Unit Only)
- A/C input and 8-hour battery backup
- Hardened NEMA 4X Enclosure

- Pole mount ready
- MIMO Matrix A/B
- -40º C to +70º C
- IEEE 1613 compliant
- CSA Class 1 / Div 2 certification

Outdoor Subscriber Unit - ODU

- 2 x 23 dBm (3650 SU)
- 2 Ethernet ports, 1 Serial port
- Optional built-in WiFi
- Optional AC power input
- Integrated antenna

- Power over Ethernet (PoE)
- MIMO Matrix A/B
- -40º C to +70º C
- IEEE 1613 compliant
- CSA Class 1 / Div 2 certification

Accessories & Custom Enclosures

- Industrial strength packaging in standard and custom designs
- Antennas

- Field-rated power supplies
- Single source ordering process

Specifications

GENERAL

Technology	802.16-2009, WiMAX
Modulation	OFDMA with FEC and HARQ / ARQ
Frame Duration	5 ms
Max Throughput	30 Mbps
Duplex Method	TDD with GPS Synchronization
Output Impedance	50 Ohms
Available Configurations	Single Box Base Station Single Box Subscriber

MERCURY 3650

Frequency	3.65 – 3.70 GHz
Channel Size	3.5, 5, 7, 8.75, 10 MHz
Carrier Power	100 mW – 200 mW, 1 Watt
Range	Up to 15 miles

PHYSICAL INTERFACES

Ethernet	Dual 10/100BaseT, RJ-45 Integrated Switch
Serial	RS-232, DB9
USB	2.0 Management Port
WiFi (optional)	Built in 2.4 GHz 802.11 b/g
Antennas	TNC Female, SMA for GPS RP-SMA for WiFi
LEDs	PWR, LAN, COM1, GPS, LINK, USB

PROTOCOLS

Ethernet	IEEE 802.3, Spanning Tree (Bridging), VLAN, IGMP
TCP/IP	DHCP, ICMP, UDP, TCP, ARP Multicast, SNTP, TFTP
Serial	Active Modbus TCP and transparent TCP server, TCP client, Modbus TCP, Modbus RTU, UDP Unicast, UDP Multicast, BSAP and DNP3

MECHANICAL - BASE STATION & SUBSCRIBER

Case	Die Cast Aluminum
Dimensions	6.9 H x 20 W x 12.3 D cm. (2.75 H x 7.875 W x 4.875 D in.
Weight	IDU - 1.13 kg (2.5 lb) ODU - 4.08 kg (9 lb)
Mounting Options	Flat surface mount brackets, DIN rail, 19 " rack tray

MANAGEMENT

HTTP, HTTPS, TELNET, SSH, SSL, local console SNMPv1/v2/v3, MIB-II, Enterprise MIBMDS PulseNET compatible

ENVIRONMENTAL

Temperature	-40º C to 70º C (-40º F to 158º F)
Humidity	95% at 60º C (140º F) non-condensing

ANTENNA

Antenna Gain	18 dBi (3650)

MDS CYBER SECURITY SUITE

Encryption	AES-128 w, auto key rotation
Authentication	PKMv2, 802.1x, RADIUS, EAP/TLS, PKI, PAP, CHAP
Management	SSL, SSH, HTTPS

AGENCY APPROVALS

FCC Part 90
IC
CSA Class 1, Div. 2
IEEE 1613

ELECTRICAL

Input Voltage	10 – 60 Volt DC, Power over Ethernet (ODU only)

Current Consumption (nominal)

Operational & Associate

Base Station	12W
Subscriber	4W
ODU Subscriber	5W

Radio Sensitivity in dBm

Channel BW	3.5 MHz	5 MHz	10 MHz
MERCURY 3650			
QPSK FEC 1/2	-95	-93	-90
QPSK FEC 3/4	-92	-90	-87
16QAM FEC 1/2	-89	-87	-84
16QAM FEC 3/4	-86	-84	-81
64QAM FEC 1/2	-83	-81	-78
64QAM FEC 3/4	-76	-75	-72

Ordering

Mercury	MER	–	*	*	*	–	*	*	*	*	
Radio Model			B								Base Station
			S								Subscriber Unit (indoor)
			O								Outdoor Subscriber Unit (ODU)
Enclosure Type				I							Indoor
				O							Outdoor
Frequency					B						3650 MHz
Interface Package							0				Standard **
							1				WiFi (only available on ODU)
							2				WiFi + GPS (only available for Subscriber Unit)
Input Power								0			Standard (10 to 60 Volts DC)
								1			Power over Ethernet (only available for ODU)
Antenna									0		None (use for Base and Subscriber Units)
									2		3650 MHz 18 dBi Panel (ODU use only; 3650 MHz frequency)
Brackets										0	None
										1	Indoor brackets (Standard with Indoor units)
										2	Pole mount brackets (Standard with with ODU only)

Order Code Example
MER-SOB-0120

- Subscriber Unit model
- Outdoor enclosure
- 3650 MHz frequency
- Standard interface
- Power over Ethernet
- 3650 antenna
- No brackets

** *Standard Base Station includes 2 Ethernet, DB9 serial, USB, and GPS*
Standard Subscriber unit includes 2 Ethernet, DB9 serial, and USB
Standard Outdoor unit includes 1 Ethernet, DB9 serial, and USB

imagination at work