MDS Intrepid P2MP

High Capacity Point-to-Multipoint Wireless

The MDS™ Intrepid P2MP high capacity point-to-multipoint backhaul solution is ideal for commercial-grade applications where longer distance and higher capacity with multiple sites is necessary. Intrepid P2MP provides highly secure, time sensitive and mission critical communications, and backhauls this information back to a central point.

The MDS Intrepid P2MP Series supports Ethernet communications, offering extended range (up to 25 miles) and aggregate throughput of up to 50 Mbps per subscriber. MDS Intrepid P2MP also enables scalable solutions by deploying sectored base station capabilities, 60, 90 and 120 degree sectors, with up to 16 subscribers and up to 200 Mbps aggregate throughput per sector.

Key Benefits

- Point-to-multi-point communications infrastructure with high base station capacity (up to 200 Mbps aggregate) and multiple subscribers (up to 16) within a coverage sector
- High performance and throughput under Non-Line-of-Sight / near-Line-of-Sight conditions using advanced OFDM and 2×2 MIMO technologies
- Flexibility in asymmetric traffic demand to optimize application efficiency
- Capable of guaranteed bandwidth for securing Service Level Agreement (SLA) performance
- Small base and subscriber units provide for improved ascetics and minimal visual appearance

Application Specific Solution

Energy

- High capacity, point-to-multipoint wireless network for AMI collectors, aggregation site locations, RTUs, voltage regulators, enclosures, cap banks and switch controllers
- Video surveillance of remote substations

Oil & Gas

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

Transportation / Public Safety

- Traffic and intersection monitoring
- Transmit real-time, fast scan rate video surveillance

Mining / Water and Wastewater

- Video surveillance and monitoring of remote sites

Protection and Control

- Phase segregated line current differential with adaptive restraint, ground differential, in-zone transformer and stub bus protection
- Phase & ground distance (5 zones) with independent compensation settings
- Thermal overload, phase, neutral & negative sequence directional overcurrent, broken conductor and reverse power

Advanced Communications

- 3 independent Ethernet ports for simultaneous & dedicated network connections with IEEE 1588 support
- Advanced IEC 61850 Edition 2 implementation with complete settings via SCL files and IEC 61850-9-2 process bus support
- Wide range of supported protocols: IEC 61850 Ed. 2, SFTP, MMS File Transfer Service, DNP 3.0, Modbus Serial/TCP, IEEE 1588, IEC 60870-5-104 and 103, PRP, SNTP, HTTP, TFTP
- Increased network availability by reducing failover time to zero through IEC 62439-3 PRP Support

Cyber Security

- CyberSentry™ provides high-end cyber security aligned to industry standards and services (NERC® CIP, AAA, Radius, RBAC, Syslog)

Monitoring & Metering

- Multi-ended fault location consistently providing 2% accuracy
- Advanced recording with high capacity event recorder, waveform capture, and data logger

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System Solution Flexibility

MDS Intrepid P2MP provides high capacity and scalable solutions for deployment within multipoint communication networks. By selection of the base station's sector angle (60, 90 or 120 degrees) multiple subscriber systems can installed within a given area to optimized efficiency and maximize sector throughput up to 200 Mbps aggregate. Time-Division Duplexing (TDD) synchronizes Intrepid P2MP base stations to accommodate multiple co-location systems and coverage overlap without introducing self-inflicted interference. MDS Intrepid P2MP is optimized as an Ethernet bridge for IP traffic operating with 10/100/1000Base T at the base station and with 10/100BaseT at subscriber units.

Advanced Security and Low-Latency Features

Secure and time-sensitive communications require special handling to meet customers' needed. Intrepid P2MP products provide security and over-the-air protection via AES 128-bit encryption which prevents capture, deciphering, and unauthorized access. Superior processor speeds and algorithms accommodate high data processing rate within Intrepid P2MP minimizes typical end to end latency performance to 4-10 msec.

Ease-of-Use Network Management

Like other GE MDS products, Intrepid P2MP utilizes 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 radios, allowing operations personnel to create customizable, proactive support processes.

Advanced and Rugged Commercial-Grade Equipment for Unlicensed Applications

Implementing a private communications network while leveraging the cost benefits of an unlicensed band requires a solution that utilizes the latest technology to obtain the maximum signal range while supporting high data capacity. Intrepid P2MP's implementation of full 2x2 MIMO technologies on both the base station and subscriber units provide optimum performance in difficult, frequency dense and NLOS/nLOS systems. The use of scalable OFDM modulation provides robust communications at the highest bandwidth and throughput possible during path disturbances and fading events.
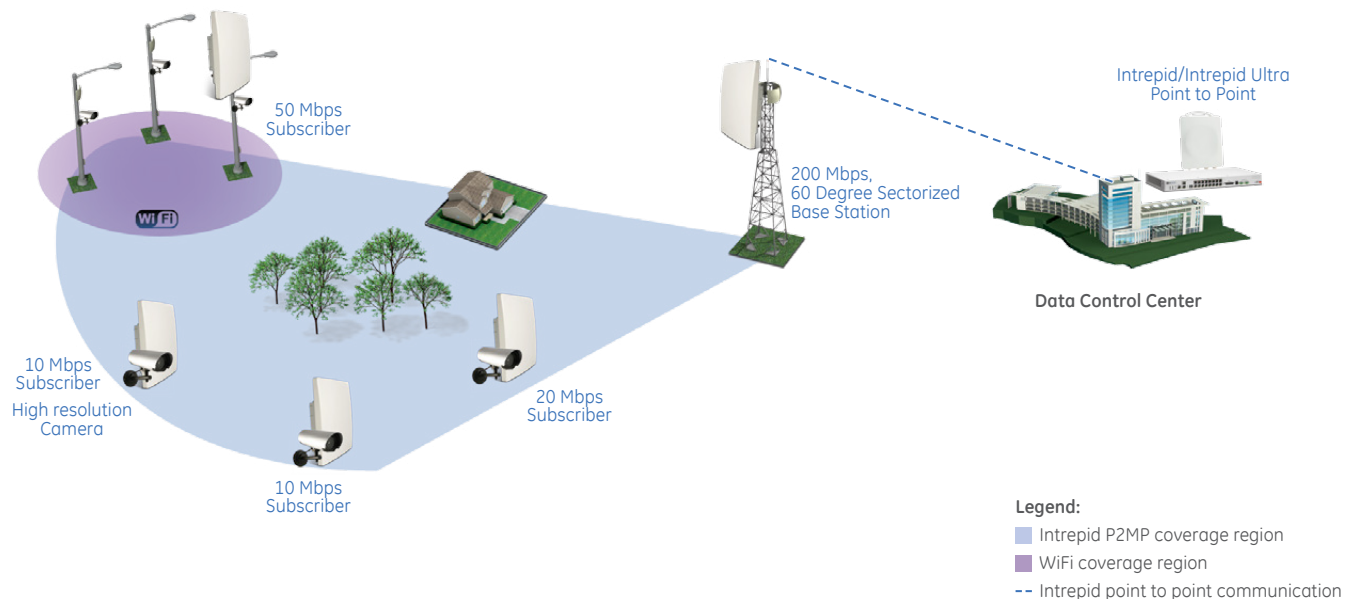
Capability of asymmetrical data bandwidth permits more data throughput for the uplink rather than the downlink – a requirement for high definition video and one-way high data rate deployment. The MDS Intrepid P2MP provides Quality of Service (QoS) for data prioritization and Service Level Performance.

MDS Intrepid P2MP is available with IP67 rated enclosures and operate in temperature ranges of -35º C to +60º C, 100% condensing humidity conditions.
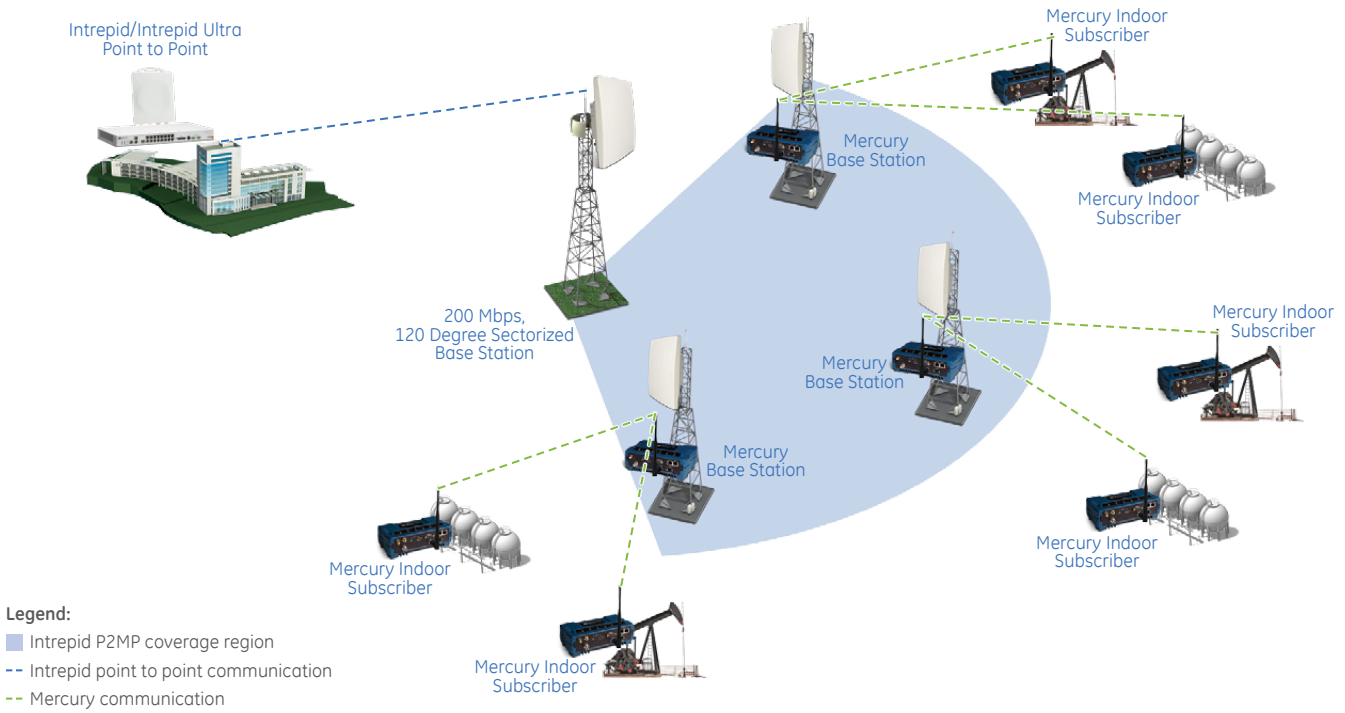
Application Example: Video Security – Transportation and Public Safety

Transportation and Public Safety are using more and more high-definition video security system. Below is an example of a secure wireless backhaul system for a high capacity video security system requiring software adjustable asymmetric upload traffic assignment and loading.

50 Mbps Subscriber

WiFi

10 Mbps Subscriber
High resolution Camera

10 Mbps Subscriber

20 Mbps Subscriber

200 Mbps, 60 Degree Sectorized Base Station

Intrepid/Intrepid Ultra Point to Point

Data Control Center

Legend:
- Intrepid P2MP coverage region
- WiFi coverage region
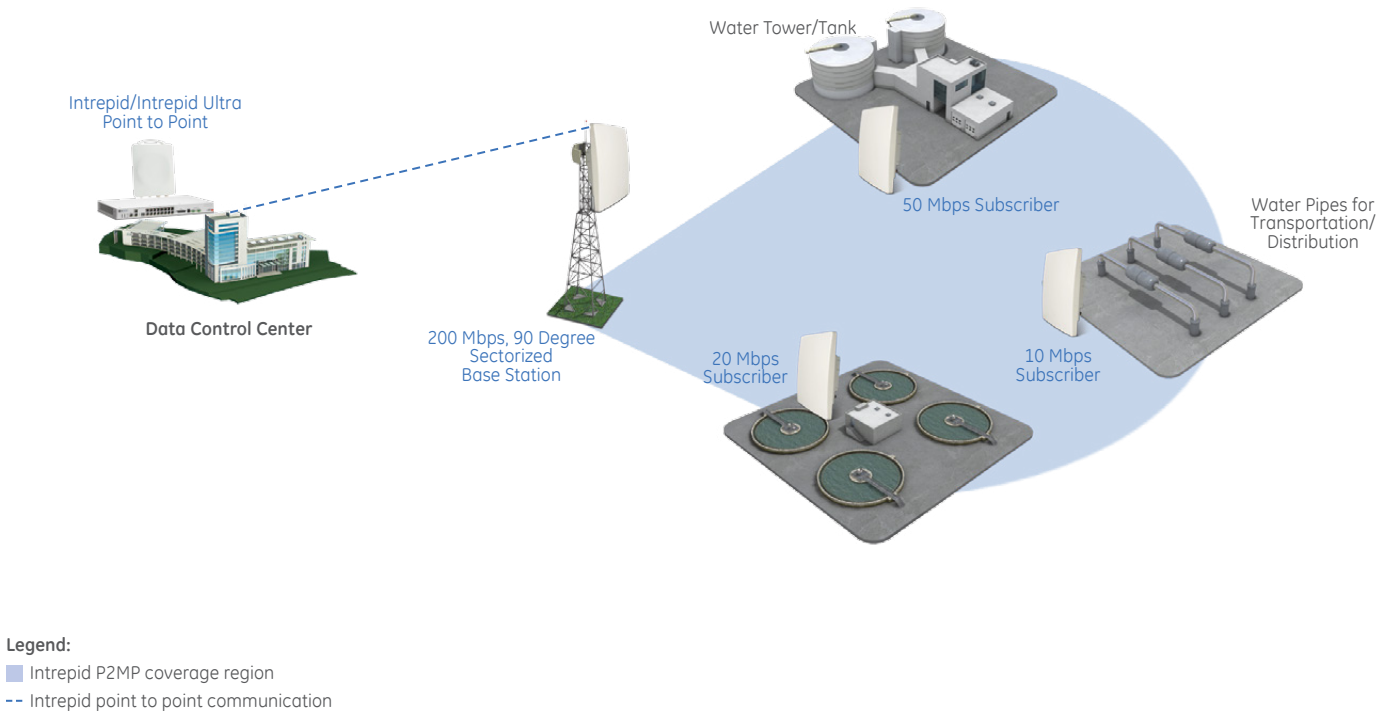- -- Intrepid point to point communication

Application Example: Oil & Gas Facilities

Below is an example of an oil well-head application utilizing the MDS Mercury™, Intrepid P2MP and Intrepid Ultra as a complete and universal solution for SCADA and video traffic at well-head sites.

Intrepid/Intrepid Ultra
Point to Point

Mercury Indoor
Subscriber

Mercury
Base Station

Mercury Indoor
Subscriber

200 Mbps,
120 Degree Sectorized
Base Station

Mercury Indoor
Subscriber

Mercury
Base Station

Mercury
Base Station

Mercury Indoor
Subscriber

Mercury Indoor
Subscriber

Mercury Indoor
Subscriber

Legend:

▪ Intrepid P2MP coverage region

-- Intrepid point to point communication

-- Mercury communication

Application Example: Water & Wastewater Facilities

Below is an example of a wireless network utilizing Intrepid P2MP and Intrepid Ultra to aggregate data from devices that monitor vital flow, pressure and temperature measurements, and video surveillance.

Water Tower/Tank

Intrepid/Intrepid Ultra
Point to Point

50 Mbps Subscriber

Water Pipes for
Transportation/
Distribution

Data Control Center

200 Mbps, 90 Degree
Sectorized
Base Station

20 Mbps
Subscriber

10 Mbps
Subscriber

Legend:

▪ Intrepid P2MP coverage region

-- Intrepid point to point communication

Technical Specifications

RADIO

Frequency bands	5.4 and 5.8 Unlicensed ETSI, IC, and FCC Bands	
Capacity	Base Stations	Up to 200 Mpbs Aggregate/sector
	Subscriber Units (three versions)	Up to 50 Mbps Aggregate
		Up to 20 Mbps Aggregate
		Up to 10 Mbps Aggregate
Available Base Sectors	60, 90 and 120 degrees	
Number of Subscribe per Base Station/Sector	Up to 16 subscribes per base station/sector	
Range	Up to 40 km / 25 miles	
Max Tx Power	25 dBm Max (limited by FCC/ETSI regulations)	
Channel Bandwidth	Configurable: 5, 10, 20, 40 MHz	
Modulation	2x2 MIMO-OFDM (BPSK/QPSK/16QAM/64QAM)	
Adaptive Modulation & Coding	Supported	
Sector Bandwidth allocation	Configurable: Symmetric or Asymmetric	
DFS (FCC & ETSI)	Supported	
End to End Latency	Typical: 4msec to 10msec	
Diversity	Supported at both base and subscriber units	
Spectrum Viewer	Supported at both base and subscriber units	
Duplex Technology	TDD	
TDD Synchronization	Inter and intra site synchronization	
Encryption	AES 128	

INTERFACES

Ethernet Interface	Base Unit	10/100BaseT, 1000BaseT
	Subscriber	10/100BaseT

NETWORKING

Sub - Layer	Layer 2
QoS	Supported packet classification to 4 queues according to 802.1p and Diffserv
VLAN	Supported 802.1Q, 802.1P, QinQ

MANAGEMENT

Management Application	PulseNET or Web based management
Protocol	SNMP and Telnet
NMS Application	PulseNET

MECHANICAL

ODU Dimensions	Base Station	19.5(w) × 27.0(h) × 8.0(d) cm (10.6"×7.6"×3.1")
	Subscriber - Connectorized	19.5(w) × 27.0(h) × 8.0 (d) cm (10.6"×7.6"×3.1")
	Subscriber with high gain antenna	37.1(w) × 37.1(h) × 11.0(d) cm (14.6"× 14.6"×4.3")
ODU Weight	Base Station	1.8 kg/3.6 lbs
	Subscriber - Connectorized	1.8 kg/3.6 lbs
	Subscriber with high gain antenna	3.5 kg/7 lbs

POWER

Power Feeding	Power provided over PoE interface (PoE device ordered separately)
Power Consumption	Base <25W, Subscriber < 20W

ENVIRONMENTAL

Enclosure	IP67 all weather
Operating Temperatures	-35°C to 60°C / -31°F to 140°F
Humidity	100% condensing

RADIO REGULATIONS

FCC	CC 47CFR, Part 15, Subpart C and Subpart E , FCC 47CFR, Part 90, Subpart Y, FCC 47CFR, Part 90 Subpart Z – Restricted Mode, FCC 47CFR, Part 27, Subpart M
IC	IC RSS-210 issue 7, IC RSS-111 issue 3, IC RSS-192 issue 3, IC RSS-197 issue 1-Restricted Mode
ETSI	ETSI EN 302 502, ETSI EN 301 893, EN 302 326-2 V1.2.2
WPC	WPC GSR-38
MII	MII for 5.8 GHz

SAFETY

FCC/IC (cTUVus)	UL 60950-1, UL 60950-22, CAN/CSA C22.2 60950-1, CAN/CSA C22.2 60950-22
ETSI	EN/IEC 60950-1, EN/IEC 60950-22

EMC

FCC	47 CFR Class B, Part15, Subpart B
ETSI	EN 300 386, EN 301 489-1, EN 301 489-4
CAN/CSA-CEI/IEC	CISPR 22-04 Class B
AS/NZS	CISPR 22-2004 Class B

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