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ADVANCEDNETWORKSOLUTIONS
MULTI-TIER NETWORK
SMART NETWORK MANAGEMENT

MULTI-TIER NETWORK

MiMOMax Wireless has a long history of delivering exceptional quality narrowband radios enabling customers in the Utility and Public Safety industries to deploy products that are reliable and spectrally efficient.

This is a new era where customers are demanding more. When your Field Area Network converges on the Internet of Things (IoT) to drive the next wave of efficiency brought about by smarter grids you need more than an exceptional radio. You need an exceptional network solution, MiMOMax have that.

The two-tier network approach provides the best of both worlds. The Tornado Tier I provides high spectral efficiency and density of communications near the base station while the Tier II Pyxis offers economical coverage out to the periphery of the network.

Benefits of a Multi-Tier Solution

Better coverage – Utilizing the Tier II Pyxis to provide access to peripheral devices from a Tier I Base, substantially reduces the radio path lengths and makes it much easier to access difficult locations.

Cost Savings – The cost effectiveness of the Tier II Pyxis allows for a high performing network at an affordable price.
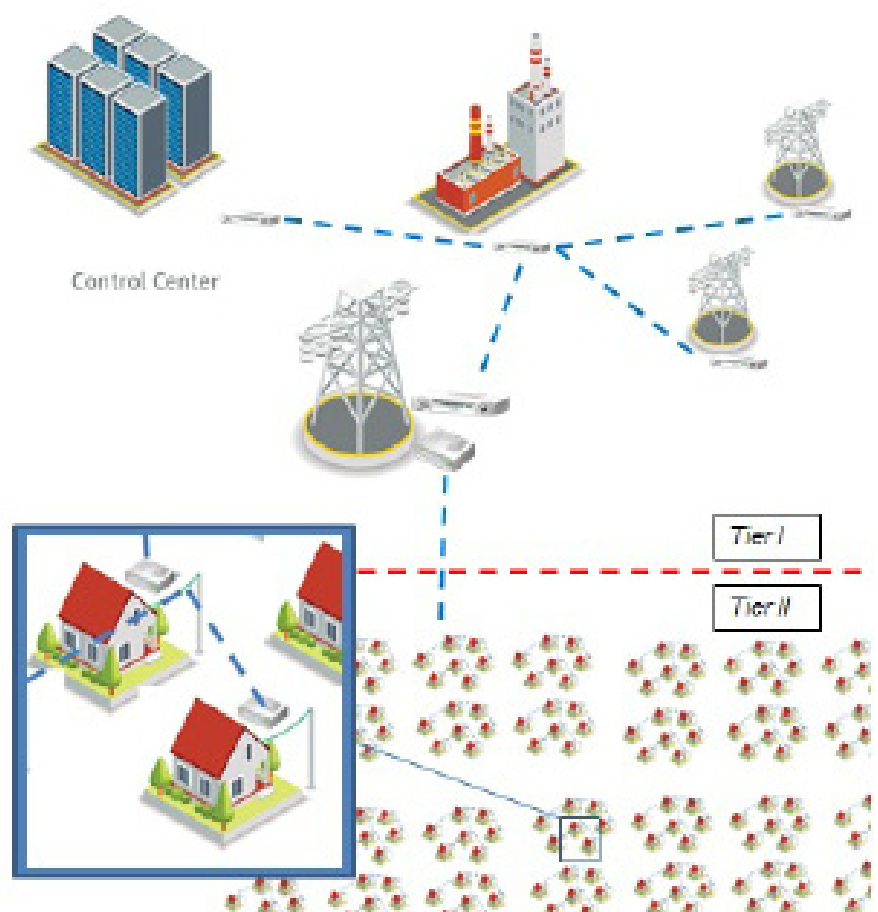
Easier deployment – The second tier is self-organizing allowing a simple plug and play approach to deployment.

Greater data capacity – The very high spectral efficiency of the Tier I Tornado network provides maximum aggregate data capacity where it is needed at the base stations and the multiple Tier II base stations extend this capacity to the end devices.

Better spectrum reuse – Directional antennas at Tier I, short paths at Tier II and smart interference avoidance across the network ensures a very high reuse of channels.

Provision for expansion – The ability to add Tier II base stations to any of the Tornado remotes provides a simple way to allow for additional end points.

Utility to Customer Premise SCADA Application

Control Center

Tier I

Tier II

MiMOMax Radio Family

MiMOMax Tier II Pyxis

- Low Cost
- Small Form Factor
- Easy Deployment
- Auto Frequency Discovery

MiMOMax Tornado

- High Data Throughput
- Spectrally Efficient
- Low Latency

MiMOMax Series II

Legacy Product

- Spectrally Efficient
- High Data Throughput
- High Power

See back page for more detailed specifications on MiMOMax Tornado & Tier II Pyxis

Not only have MiMOMax developed an innovative multi-tier solution, we have also ensured that the Network is simple to configure, manage and upgrade through smart network management solutions.

NETWORK MANAGEMENT SOLUTION (NMS)

MiMOMax have partnered with a third party provider to deliver a narrowband radio ready network management system that is scalable, flexible, easily maintained, well supported and will continue to evolve.

The application, offers the latest in network management features and functionality. MiMOMax has worked closely with the third party to ensure that this NMS solution will work seamlessly in this type of multi-tiered radio deployment.

Custom features include the integrating of solutions that enable auto-population of visibility tools from location data generated from integrated GPS within the network. Advanced Analysis and Monitoring options are currently being developed for future release.

This solution is capable of supporting tens of thousands of end points proving to be an attractive scalable option for large utility customers.
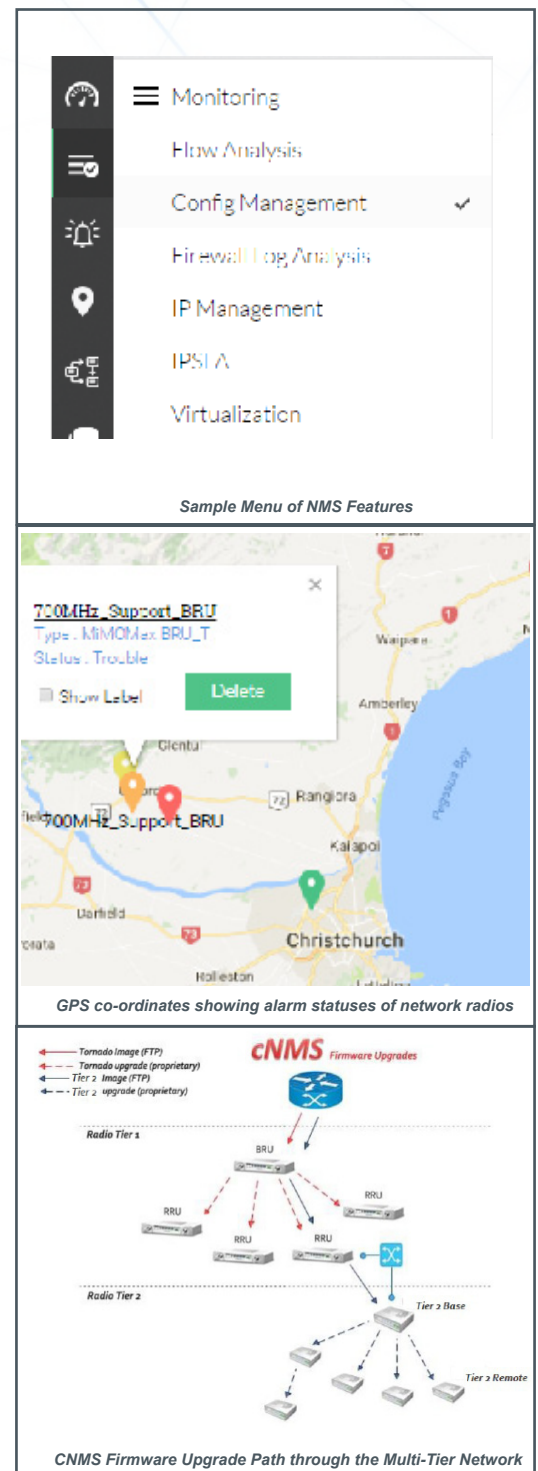
CNMS SUITE

MiMOMax's Centralised Network Management System (CNMS) provides a user friendly interface to network data is used to:

- Manage and maintain software releases for various radio variants
- Provide seamless and scheduled 'broadcast' firmware upgrades
- Generate configurations which can then be dispatched and executed using the NMS
- Support RADIUS authentication
- Manage radio network encryption and remote key distribution

The CNMS allows the creation of scripts to execute the full spectrum of changes in the radio configuration. This is applied via MiMOMax's Command Line Interface (CLI). This is just another feature MiMOMax has added to make network management simple and efficient.

OVER THE AIR PROGRAMMING

The solution also includes Over The Air Programming (OTAP), which allows the user to upgrade at anytime over the air based on preset rules. This can be completed across the network or on individual branches. MiMOMax offer a proprietary application and protocol that has been specifically adapted to maintain high quality of service of the network while upgrading firmware. *See upgrade path diagram to the right.*

Sample Menu of NMS Features

GPS co-ordinates showing alarm statuses of network radios

CNMS Firmware Upgrade Path through the Multi-Tier Network

"The MiMOMax installation went very well as it was plug and play. It was the easiest link install we have ever done."

-Mike Munafo, President at Southern Communications

SMART TECHNOLOGY

REDUNDANCY

The MiMOMax 1+1 Base Radio system provides fully hot swappable features. The standby radio can be replaced and upgraded without affecting the link operation. The system is designed for dual power supplies, and circuit protection to each power source is included to support a fully redundant solution.

SECURITY

All security is managed through the RADIUS server as per industry best practice for providing security management.

MiMOMax offer CIP compliant encryption AES256 in CBC and CCM Mode This is coupled with the extensive security features that include HTTP Tunnel TLSv2, password level control, change passwords with measureable strength and block accounts, password and image upload protection with Open SSL security, audit logs and syslog that provide peace of mind security protection for your network.
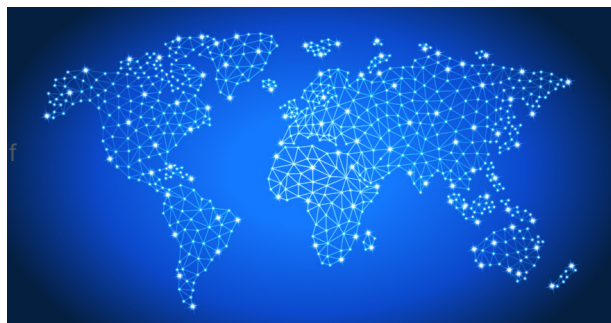
AUTOMATION

MiMOMax Tornado Point-to-Multipoint network offers full adaptive modulation which adapts based on signal conditions, and will ramp up to the highest modulation and data rate that the channel will reliably support. This approach will always optimize the opportunity for a successful transmission at the best possible data rate.

QUALITY OF SERVICE

MiMOMax Data Acceleration Protocols (M-DAP) are designed to massively enhance effective data throughput by use of compression and traffic management. MiMOMax has implemented robust and efficient header and payload compression techniques that are customized for wireless point to multipoint environments. The smart traffic management feature enhances the QoS of the system to ensure time critical traffic latency/jitter is not affected by large background traffic tasks e.g. file downloads/uploads.

DSCP, TOS, 802.1Q CoS and MiMOMax Data Acceleration Protocol (M-DAP) which support two options of traffic priority: statistical QoS with guaranteed bandwidth to the different classes of service or provide a dedicated physical data channel for real-time critical data which demands a bounded latency.

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RADIO SPECIFICATIONS

MiMOMax Tornado	
Frequency	148-175MHz,400-470MHz, 757-788MHz & 806-960MHz
Modulation	QPSK, 16QAM, 64QAM, 256QAM
Maximum Power Consumption (active Tx and Rx)	26w (at 13.8V), 20W typical
Channel Size	12.5KHz, 25KHz or 50KHz Channel
Ambient Temperature	-22F to 158F (-30C to 70C)
Dimensions (L x W x H)	7.1 x 10.6 x 1.7 inches (180 x 270 x 44mm)
Gross Data Rates (256 QAM)	50kHz 1280kb/s Full-duplex
	25kHz 640kb/s Full-duplex
	12.5kHz 320kb/s Full-duplex
Weight	4.4 lbs (2 kg) (radio unit only, excl. mounts)

MiMOMax Tier II Pyxis	
Frequency	757-758MHz, 787-788MHz
Modulation	4 GFSK
Power Consumption	<10W Max Typical at 13.5VDC input, 1W RF output with Serial, Ethernet and GPS active <8W
Channel Size	25kHz, 50kHz
Operating Temperature	-40F to 149F (-40C to 65C)
Dimensions (L x W x H)	5 x 6 x 1.75 inches (127 x 150 x 44 mm)
Gross Data Rates	38.4kb/s in 50KHz - 4GFSK
Weight	1.70 lbs (770g)

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