

mimomax

# Cost Effective Rural Connectivity for Utilities





# Connectivity to Rural and Remote Areas

Utilities servicing rural areas face a different set of communication challenges to urban utilities.

Sparse populations can make economies of scale impossible to achieve for high cost projects like microwave or fiber installation. Furthermore, terrain complications such as mountains or tree cover can prove challenging to overcome. Yet utilities with rural service areas still share the same requirement for mission critical connectivity for their teams and their grid assets as their urban counterparts. The challenge is to find the most cost-effective way to meet these communications needs.

Mimomax's high capacity, low latency, narrowband radios are engineered to offer the communications resilience and availability that all utilities require but with the affordability and ease of install to make those last mile, isolated rural connections possible.

Our radios are the ideal choice for rural electric utilities, cooperatives or municipalities who require a communications solution which can be rolled out quickly using existing infrastructure and offers superior coverage ability across long paths and challenging terrain

## APPLICATIONS

### AMI BACKHAUL

high capacity backhaul for AMI collection points.

### VOICE BACKHAUL

ultra-reliable backhaul to keep your team connected

### SCADA

high data throughput to gain visibility over your grid assets

### TELEPROTECTION

latency as low as 3ms for near real time response

### LAST MILE

cost-effective, easy installations for those isolated locations

### REDUNDANCY

backup communications network to ensure connectivity in emergencies

### TERRAIN CHALLENGES

ideal solution for hard to reach or non-line of sight paths

### LEASED LINES REPLACEMENT

step away from rising OPEX by swapping out Tornado radios for leased lines

### NETWORK SPURS

ideal for final hop spurs from microwave or fiber network



# TORNADO FAMILY

## Tornado

Our award-winning Mimomax Tornado radio is pushing the boundaries of what can be achieved in narrowband channels. Utilizing MIMO technology, full duplex communications and high order modulation, the Tornado radio can achieve aggregate data rates of up to 1280kbps in a 50kHz channel and latency as low as 3ms with our Optimized Protection Variant and sub 10ms in a standard point-to-point configuration.

**Tornado OPV** – an optimized protection variant of the Tornado radio, designed to provide stable, ultra-low latency links for utility teleprotection circuits. The ultra-low latency requirements of teleprotection can be supported by enabling our Optimized Protection Variant software on either Tornado or Tornado X.



## Tornado X & Tornado XR

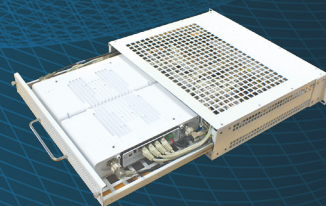
Tornado X is a high transmit power addition to our full duplex, MIMO product range. Offering a transmit power which remains stable across all modulations, Tornado X is fully compatible with the Tornado radio allowing for a mix of radios in the network to suit terrain or meet network requirements.

Tornado XR is a full duplex, high Tx power remote radio for use in Multipoint networks only. Tornado XR is an ideal remote radio for networks where traffic is uplink predominant. It can also be integrated at weak remote sites to boost uplink performance.



## Tornado 1+1

Tornado 1+1 provides automated support for both a warm and hot standby system with the Mimomax Tornado 1+1. If one radio fails, a second standby radio is automatically switched in to take over, with no loss of data. An ideal product for mission critical links with the highest availability requirements.



## KEY BENEFITS OF OUR TECHNOLOGY

### MISSION CRITICAL FOCUS

Designed to meet the most stringent communications requirements for our mission critical customers.

### HIGH SPECTRAL EFFICIENCY

Highest spectral efficiency (16b/Hz/s) in narrowband channels, Mimomax allows customers to fully optimize their investment in spectrum.

### BETTER COVERAGE

Where microwave and satellite can struggle with terrain and weather events, our narrowband radios can perform even in near or non-line of sight and poor weather conditions.

### ULTRA-LOW LATENCY

Providing sub 10ms latency in a standard point-to-point link offers near real-time communications when it is really needed.

### EASY TO DEPLOY

Engineered for plug'n'play deployment to save time and cost during deployment.

### LONGER RANGE

Low frequency narrowband radios can cover hops as long as 80 miles, resulting in fewer hops required and an overall reduction in cost.

### LAST MILE CONNECTIVITY

Our high-capacity radios offer a cost-effective alternative to last mile fiber or microwave links to remote sites across difficult terrains.

### LICENSED FOR HIGH AVAILABILITY

Operates in licensed spectrum to ensure customers' communications links offer the dedicated availability required.

## RAW AGGREGATE DATA THROUGHPUT

Modulations	12.5 kHz	25 kHz	50 kHz	75kHz
QPSK	80 kbps	160 kbps	320 kbps	480 kbps
QAM16	160 kbps	320 kbps	640 kbps	960 kbps
QAM64	240 kbps	480 kbps	960 kbps	1440 kbps
QAM256	320 kbps	640 kbps	1280 kbps	1920 kbps

## ONE WAY LATENCY RATES (at QAM256)

Applications	12.5 kHz	25 kHz	50 kHz	75kHz
Teleprotection	8 ms	4.3 ms	2.7 ms	1.6 ms
IP Point-to-Point	13 ms	6.5 ms	3.7 ms	2.95 ms
IP Point-to-Multipoint	53 ms	26.5 ms	13.5 ms	N/A

# TORNADO FAMILY CUSTOMER EXPERIENCES

## VOICE BACKHAUL FOR REMOTE MOUNTAIN SITES - LGE & KU ENERGY

Following a 2.5-year conversion of their conventional UHF radio system to a trunked DMR network from Tait, LG&E and KU chose Mimomax 900 MHz Tornado radios for their voice backhaul for a selection of sites in remote mountainous areas of Kentucky and Virginia.

### SOLUTION:

Modelling showed that the paths could comfortably carry a DMR Control Slot plus three DMR Voice Slots and could utilize 64QAM in a 12.5 kHz channel as a minimum, while offering higher than Five Nine's (99.999%) two-way time availability.



## HIGH CAPACITY SCADA & ULTRA LOW LATENCY TELEPROTECTION - ORION

One of the predominant challenges Orion faced when specifying their network requirements was the need to transmit SCADA IP data through wireless links, over long distances, as rapidly as possible. In addition to SCADA communications, Orion also required ultra-low latency teleprotection to minimize the potential for major damage to their grid assets should a fault occur and a line trip

### SOLUTION:

Mimomax designed an Optimized Protection Variant of the Tornado radio for Orion so that the utility could benefit from complete substation protection in addition to SCADA and voice communications over one radio link and on one 25kHz channel. The high capacity offered by the Tornado radio also provided Orion with the option in the future to run multiple protection channels on the one link.

## COMBINED AMI BACKHAUL & SCADA NETWORK - NAVOPACHE

With their existing AMI backhaul nearing end-of-life, Navopache Electric Cooperative was looking for a vendor who could provide a private communications solution in 700MHz. The new network would need to offer the bandwidth required to be able to manage both the AMI backhaul and mission critical SCADA communications simultaneously plus cope with challenging mountain terrain.

### SOLUTION:

Navopache Electric selected Mimomax to provide a point-to-multipoint network based on the Tornado radio. The solution was designed to provide reliable ethernet connectivity plus backhaul from both AMI collectors and their upgraded SCADA controllers. Mimomax's Quality of Service allowed Navopache Electric to prioritize serial traffic over Ethernet to ensure the availability of the SCADA network.



# mimomax

## About

**Founded:** 2007

**Headquarters:** Christchurch, New Zealand

**Regional offices:** Phoenix, Arizona and Portland, Oregon

Combining a deep understanding of RF engineering with expertise gained from numerous deployments across the globe, Mimomax provides utility customers with cost-effective, wireless communications solutions to support grid modernization. Advanced communications technology coupled with sophisticated RF network design ensures our customers not only gain visibility right to the edge of the grid but also optimize their investment in spectrum.

## Contact Us Today

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