

Tropos 4310-XA

Mobile mesh router for extreme applications

Tropos 4310-XA mobile mesh routers interoperate seamlessly with Tropos fixed routers to deliver a robust, high-performance wireless connectivity solution for mobile workers and equipment. At vehicular speeds, the mobile routers support voice, video and data connectivity and extends the Tropos fixed network to provide access for handhelds, laptops and other endpoint devices.

The Tropos 4310-XA uses a standard, unlicensed 2.4 GHz radio to connect with clients and other Tropos mesh routers. It is packaged in a rugged, weatherproof enclosure especially suited to extreme applications such as rail transport, mining and other applications subject to harsh operating temperatures, vibration and weather.

An easily deployed solution for increasing the productivity of mobile workforces and enabling mobile machine-to-machine (M2M) communications, Tropos 4310-XA mobile mesh routers can turn any vehicle into a mobile node. When deployed in rail cars, military vehicles or heavy equipment, the mobile router improves operational efficiency and enhances communications.

Tropos 4310-XA mobile routers can transport video streams from vehicle mounted cameras to an operations center. Real-time of the area around vehicles increases supervisors' situational awareness to ensure efficient equipment operation while avoiding accidents, injury and property damage. Cameras providing video from vehicle interiors can be used to monitor that well-being of the vehicle operator as well as any passengers that are on board.

When used for mobile M2M communications, Tropos 4310-XA mobile mesh routers can, via a fixed Tropos mesh network, relay telemetry data from moving vehicles to a centralized operations center. Telemetry data enables supervisors to verify that vehicles are being operated with specified parameters, optimally schedule routine maintenance and determine if preventative maintenance is required. Benefits of analyzing telemetry data include minimizing unscheduled maintenance and equipment downtime while increasing efficiency and productivity.

The routers provide a connector suitable for use with a GPS puck. GPS data transmitted using Tropos 4310-XA mobile routers can be used by automated vehicle location (AVL) and positioning systems. AVL systems can be used to monitor the safety of employees in the field while positioning systems can increase efficiency and productivity, as well as enhance safety, in applications such as open pit mines.



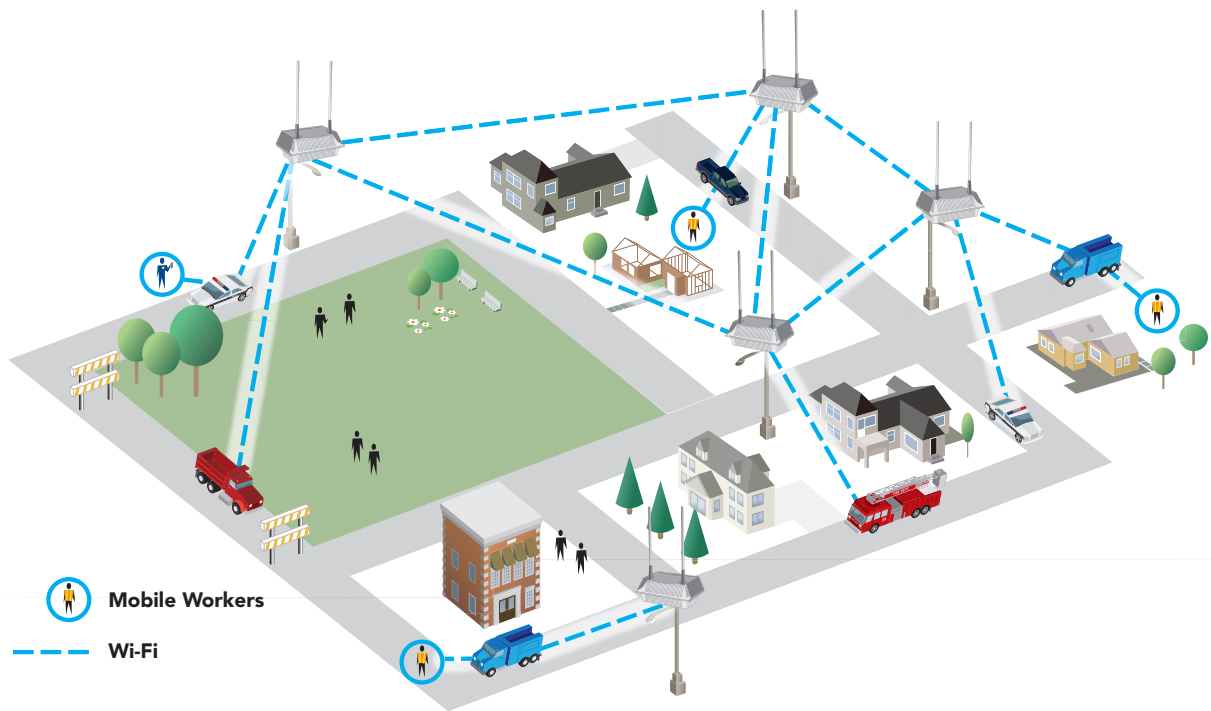
Features and benefits

Software

- Routing algorithms optimized for mobility provide connectivity at vehicular speeds
- Maximizes performance to automatically find optimum end-to-end paths across the network
- Session persistent cross-subnet roaming at vehicular speeds
- Creation of stand alone mobile networks in areas where coverage is unavailable

Platform

- Intelligent 2.4 GHz mobile node supports 802.11b/g or 802.11a mesh and client connectivity
- IP67 rated packaging
- Vibration-resistant Ethernet and power connectors
- Best-in-class link budget for superior RF propagation
- Vehicle-mounted with integrated high-power radio
- FIPS 140-2 compliant



Tropos mobile routers also support the creation of tactical mesh zones, an empowering solution for emergency response teams. Multiple vehicles equipped with mobile routers can mesh with one another to create a wireless network capable of increasing tactical effectiveness through enhanced communication. Even if the response team is operating in a rural region that does not have access to the fixed Tropos network, the team member vehicles still benefit from enhanced communication capabilities to coordinate their efforts. When parked in a tactical situation, mobile-node equipped vehicles use their high-power and high-sensitivity 2.4 GHz radio to provide connectivity to authorized handheld and laptop users nearby.

Tropos Mesh OS

The Tropos Mesh OS is the foundation of the decentralized Tropos mesh architecture. A common software platform that runs on each router across the network, the Tropos Mesh OS leverages the router's on-board intelligence to monitor and maximize performance. Unlike controller-based architectures that suffer bandwidth losses as control traffic is passed back and forth between network nodes and the central site, the distributed Tropos mesh architecture uses efficient on-board processing at the device level to minimize network congestion and adapt on a real-time, packet-by-packet scale. This distributed approach optimizes performance and throughput by minimizing control traffic, delivers a highly scalable solution, and helps provide a quality user experience for network clients.

PWRP

The cornerstone of the Tropos Mesh OS is the patented Predictive Wireless Routing Protocol (PWRP™), which continually analyzes the quality of active and inactive mesh links to dynamically configure the ideal combination of paths to optimize network performance. Upon deployment, the routers automatically discover one another, and quickly determine the optimal route to the gateways that inject capacity into the network. Optimal links are chosen on the basis of throughput, packet success, signal-to-noise ratios and other key criteria.

PWRP performs a range of key tasks across the wireless network:

- Streamlines deployments and preserves performance by dynamically configuring and optimizing mesh connections
- Improves overall throughput by selecting optimal routing paths
- Enhances network resiliency by providing graceful rerouting of traffic in the event of RF interference, backhaul failures, or other disruptions in the wireless mesh
- Enables the network to be scaled to thousands of nodes covering the largest geographical areas in the industry

Seamless mobility and cross-subnet roaming

Tropos Mesh OS provides seamless, session-persistent roaming within the mesh coverage area at vehicular speeds. Tropos networks employ make-before-break connections when Tropos 4000 series mobile mesh routers transition from being connected to one Tropos fixed mesh router to being connected to another Tropos fixed mesh router. Make-before-break connections contribute zero delay to application session handoffs. This handoff timing permits Tropos mobile routers to support seamless voice, video and data connectivity at vehicular speeds.

Clients, including those with established IPsec VPN connections, can maintain connections when the Tropos mobile mesh routers providing their connections move between Tropos mesh nodes and gateways as well as between IP subnets. When the Tropos mesh router providing a client's connection moves from a Tropos mesh router in one subnet to a Tropos router in another subnet, Tropos Mesh OS uses tunneling and other techniques to enable the client to maintain its connectivity without changing its IP address.

Advanced network management platform delivers optimized edge-to-edge visibility

Tropos Control is a standards-based network management system designed to achieve peak performance and reliability. Designed around an intuitive web-based interface, the software facilitates the remote management of Tropos mesh networks, and is ideal for dynamically deploying and configuring networks ranging in size from tens to thousands of Tropos mesh routers. Tropos Control minimizes planning, deployment, and operating costs, and increases the efficiency of management personnel by performing complex tasks such as global provisioning and software updates across the network in a single session.

- Streamlines tasks such as monitoring network health, statistical network performance analysis and performance optimization
- Provides macro-level visibility as well as granular real-time and historical detail on usage, link quality, capacity and network reliability
- Network health dashboard provides at-a-glance views of network traffic, performance and alarms with links to instantly drill down to relevant statistical information
- Wireless-aware provisioning for guaranteed configuration changes and software updates over dynamically changing links
- Detailed historical database of RF environmental data, network performance and client connectivity enables fast root-cause diagnosis
- Assists network managers to plan future expansions and optimization strategies based on analysis of network trends and detailed historical information

Resilient, high-performance networks from ABB Tropos – the wireless IP broadband market leader

As the leader in wireless IP broadband mesh networking solutions, ABBTropos is the right choice for organizations interested in deploying a robust infrastructure capable of withstanding the harshest outdoor environments. Designed to contain costs and enhance productivity, Tropos technology provides the backbone for top-performing outdoor wireless IP networks across the globe.

For further information, visit us on the web at abb.tropos.com.

Wireless

- IEEE 802.11b/g/n
 - Frequency band: 2.4-2.483 GHz
 - Modulation: 802.11g - OFDM, 802.11b - DSSS
 - TX power FCC: 21-36 dBm (EIRP) set in 1 dB units; ETSI 5-20 dBu (EIRP) set in 1 dB units
 - Media access protocol: CSMA/CA with ACK
- RX sensitivity: -100 dBm @ 1 Mbps, -94 dBm @ 6 Mbps, -76 dBm @ 54 Mbps
- Multi-antenna system: 1-TX x 2-RX
- Support for 802.11n MRC

Networking

- TCP and VPN session persistent roaming across subnets
- Mobile tactical mesh operating mode
- Full 802.11b/g client compatibility
- IPv4; IPv6-ready
- 802.1q VLAN support
- Support for static and dynamic addressing for wireless and wired clients
- Layer 2 and layer 3 support
- DHCP server and relay
- NAT support
- Plug & play wired client support
- Autosensing 10/100BASE-T Ethernet ports (management and client connection)

Quality of service

- 802.11e WMM
- 802.1p/q with 4 queues per VLAN and ESSID
- 802.1p and DSCP
- VoIP and VoWiFi support
 - Heuristics-based voice classification
 - Call admission control
 - TSpec classification
 - Seamless mobility
 - Call reporting
- Rate limiting (airtime and throughput based)
- ACC - Airtime Congestion Control

Management

- RADIUS accounting
- Secure local and remote management tools via HTTPS
- Configuration save and restore
- Software upgrades with rollback
- Command line Interface (CLI) via SSH
- SNMP (standard MIBs)
- Wireless network and client monitoring, statistics and wireless capture capabilities
- GPS location tracking in Tropos Control

Security

- Authentication: WPA, WPA2, 802.11i, RADIUS, 802.1x (includes EAP-TLS, EAP-TLS, EAP-SIM, PEAP)
- Encryption: Open, WEP, TKIP, AES-CCM
- AES encryption of mesh and control traffic
- Multiple BSSIDs & ESSIDs (ESSID suppression)
- Full VPN compatibility (VPN filtering)
- Password and certificate-based HTTPS and SSH remote access
- Packet filtering & forwarding
- Client access control lists
- Router access control
- Evil twin detection and reporting
- Denial of Service (DoS) attack detection and reporting
- FIPS 140-2 compliant

Environmental specifications

- Operating temperature range: -40°C to 70°C
- Storage temperature range: -40°C to 85°C
- Shock & vibration: MIL-STD-202E, Method 204C; ETSI 300-19-2-4; T41.E class 4M3
- Humidity range: 0-100% condensing
- Water and dust resistance: UL579/IEC60529 IP67
- Transportation: ISTA 2A

Power

- Power input: 11-55VDC
- Power consumption: 8W typical
- Polarity protection
- Low voltage disconnect protection
- Network status LED

Physical

- Dimensions: 7.25 in (18.4 cm) height x 10.0 in (25.4 cm) width x 3.25 in (8.25 cm) depth
- Weight: 3 lbs (1.3 kg)
- Connectors
 - Ethernet: 4-pole, circular, Industrial Ethernet M-12 D-coded female (Two: one client device & one management)
 - Power: Industrial-type locking connector, 2-pin, male
 - Aux: Industrial-type locking connector, 7-pin, female
 - RF: 2 N-female
- Auxiliary port
 - Remote network status indicator
 - Serial GPS input

Wireless approvals

- FCC CFR 47 Part 15, Class B
- Industry Canada RSS 210 (Tropos 4310-XA only)

Safety approvals

- UL 60950-1
- CSA 22.1 No. 950
- EN 60950
- IEC 950

Warranty

- One (1) year on parts and labor; return to point of purchase
- Optional standard and premium support packages available

Protection

- Antenna protection: $\leq 0.5\mu\text{J}$ for 3kA @ 8/20 μS waveform
- Electrical protection:
 - EN61000-4-5 level 4 AC surge immunity
- Data protection:
 - EN61000-4-2 level 4 ESD immunity

For more information please contact:

ABB Inc.
Tropos Wireless Communication Systems
555 Del Rey Avenue
Sunnyvale, CA 94085, USA
Phone: +1 408 331 6800
E-Mail: tropos.sales@nam.abb.com

abb.tropos.com