

RAJANT KINETIC MESH®

For a Fully Mobile, Multi-Radio Wireless Mesh Network Underground

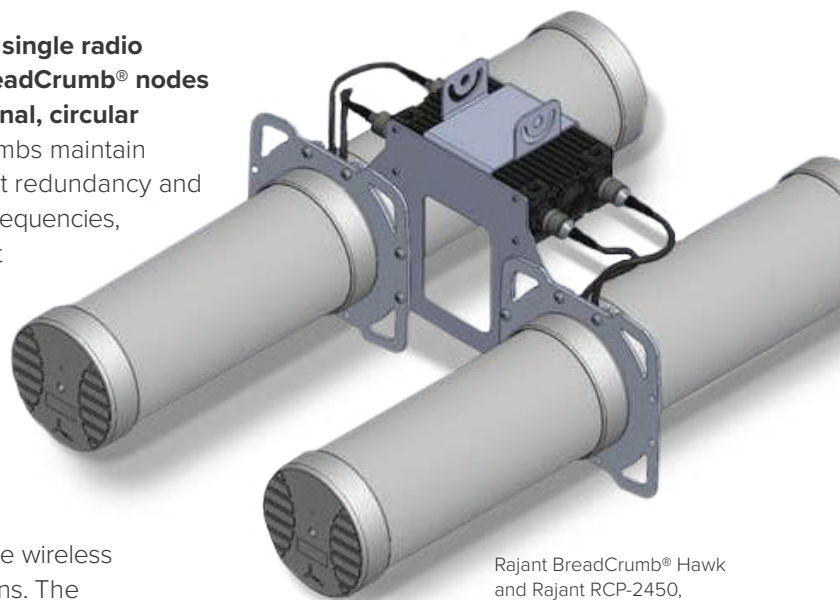
Rajant's industrial wireless mesh networks **bring mission-critical connectivity to underground mines without the need for fiber throughout most of your mine.** Save significant OPEX and maintenance costs while adding more network capacity and mobility for capabilities beyond what fiber can effectively support.

Underground mines and tunnels are some of the most challenging environments in which to deploy network systems. Connectivity and throughput demands are high, but circular ramps and declines, stopes, and mine layout place limitations on how far wireless signals can travel. Many mines, therefore, depend on fiber to achieve reliable underground communications, but installing fiber in active drives, panels and declines is difficult to schedule and can create operational and maintenance nightmares. In addition, development and drill and blast areas can rarely support any fiber infrastructure. It is not uncommon for trucks to accidentally catch and rip down sections of fiber and when that happens connectivity across the entire underground mine can be lost.

An Underground Solution Above the Rest

Rajant provides a robust alternative to fiber and traditional single radio wireless systems using our multi-radio, multi-frequency BreadCrumb® nodes combined with our Rajant RCP-2450 wide-band, bi-directional, circular polarized antenna system, powered by Poynting. BreadCrumbs maintain multiple simultaneous connections between peers for inherent redundancy and can simultaneously send and receive information on different frequencies, mitigating issues due to interference, congestion, and equipment outages. This also increases transceiver capacity to ensure low latency and enables mines to cascade BreadCrumbs together as many as 10 hops or more without throughput degradation. Rajant RCP-2450 antennas, powered by Poynting, provide bi-directional coverage with dual-band Wi-Fi connections to assist in propagating signals around tunnel bends and to and from moving machinery.

Together they create a complete underground and tunnel-wide wireless network for mission-critical data, video, and voice communications. The system can also be used to supplement existing fiber and cable "hot spot" networks, provided via vertical shaft access levels, portals and tunnels.



Rajant BreadCrumb® Hawk and Rajant RCP-2450, powered by Poynting, Dual Frequency Bi-Directional Mine and Tunnel Antenna System.

Enable Next-Gen Applications, No Fiber Needed

With the Rajant-Poynting solution, underground mines can enhance network capacity and mobility to run advanced applications that power greater safety, efficiency, and autonomy—all without the use of expensive fiber. Part of this performance comes from Rajant's patented InstaMesh® networking software, which is loaded onto every BreadCrumb node. InstaMesh enables the network to dynamically and automatically adapt to quickly- or constantly-moving network elements, providing reliable network-wide mobility.

The protocol directs traffic via the fastest path over the multi-hop network, switching radios at each hop for minimal latency over long distances to enable and support applications including: operations and fleet management, automated haulage, conveyor and train equipment, automated drilling, personnel and asset tracking, AeroScout Tags, seismic and gas monitoring, ventilation control, mobile surveying and scanning, and mine-wide SCADA/pumps and control monitoring.

Capabilities and Applications

- Voice at the Face
- Combine Existing Radio and Rajant Networks Seamlessly
- Tagging and Tracking Built-In
- Instant Mobile Machine Telemetry
- Video Radio Remote Control
- Autonomous LHDs, Drills, and Haulage Trucks
- Blasting Over the Rajant Network
- Wireless Auxiliary Fan Controls
- Air Quality Management
- U/G Survey Drone Control
- Mucking Between Shifts
- Fast and Simplified Post Blast Reentry
- Wireless Belling in the Shaft
- Independent Shaft Communications
- Wireless Geotechnical Monitoring



Australian Droid + Robot's Explora droids for underground inspections has Rajant's BreadCrumb technology integrated



Enables tele-operation of an LHD between shifts and autonomous control from the muck pile to the ore pass.

The #1 Choice for Mine Networking Around the World

Rajant and our infrastructure partners provide comprehensive surface and underground solutions to mines seeking to make transformative gains in safety, efficiency, and cost savings along their path to mine digitalization.

“The multi-radio Rajant BreadCrumbs allowed us to cascade several radios together wirelessly while maintaining max throughput and minimal latency at two underground mines in Mexico.”



Want to see how Rajant can connect your underground mine to new value?

Visit rajant.com/markets/mining/ to discover how Kinetic Mesh powers mission-critical mining operations.

Tel: 484.595.0233 | www.rajant.com

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If it's moving, it's Rajant.
Industrial Wireless Networks **Unleashed.**