

ASARCO Ray Mine Deploys Private Wireless Network, Makes Significant Data Collection Improvements with Rajant



ASARCO Ray Mine is a well-established, large open pit copper mine – with historical underground operations dating back to the 1880’s. The Ray Operations consist of a 250,000-ton per day (tpd) open pit mine equipped to support both a 30,000 tpd concentrator and a 20,000 tpd concentrator.

The operation also includes a 103-million pound per year Leach solvent extraction/electro-winning (L-SXEW) operation and all the associated maintenance, warehouse, and administrative facilities.

The Challenge

ASARCO Ray covers an area of about 21-sq. miles and is located in a valley, with a staggering 2,400 ft. deep pit that presents a major challenge for implementing any type of mine-wide wireless network. Space constraints and little to no line-of-sight are additional hurdles the site geography presents. Due to the geography, the mine haulage operation involves lifting material out of the pit to the dumps or crushers (vertical hauls up to 1,800 ft.). The elevation change adds an additional complexity that must be accounted for to support communications, due to its depth. As a result, communication with trucks, shovels and other equipment can be difficult.

The private legacy wireless network did not help matters. The additional demand for wireless communication increased as a result of increased use of new technologies. As a result, the legacy network did not work as required. The network could barely support a fraction of its designed capacity of eight megabytes per second.

Plagued with an inability to prove it was collecting all the data needed to make critical business decisions, ASARCO Ray invested the time to ascertain the cause of its communication issues. Senior technology Engineer Bob Wingle solved the mystery. The operation’s wireless network was the culprit.

Company Profile

- ASARCO was organized in 1899 and has evolved over the years into a fully integrated miner, smelter and refiner of copper which produces approximately 350 – 400 million pounds of copper per year. ASARCO operates the Ray open pit mine in Pinal County, Arizona, which has an onsite concentrator and L-SXEW facilities.

Solution Components

- 159 Rajant BreadCrumb® Nodes – the first to use Rajant’s “N” standard with MIMO antenna configurations.
- Rajant InstaMesh® Protocol.

Kinetic Mesh Partner (KMP)

- SITECH: a worldwide distributor of network, which offers consultative advice on construction technology solutions, customized training, data services, installation, service and technical support.

Outcome and Impact

- Full network implemented in three sections over 11 days.
- Provided solution to overcome environmental networking challenges and collect complete, reliable, accurate data from 14 different sources.
- Enabled ASARCO Ray to elevate its mine-to-mill process oversight to an entirely new level – able to now track the amount of energy it takes to drill and determine best ways to blast the rock.

The Solution

The mining company's primary concerns were coverage, throughput and dealing with its challenging geography. During the period ASARCO Ray spent shopping for a new wireless network, it discovered that Rajant had a proven track record of success implementing Kinetic Mesh networks at other operations facing similar needs for scalability and mobility. As officials evaluated Rajant and other providers, decision makers at ASARCO Ray discovered positive reviews from Rajant's current customers.

Rajant's wireless BreadCrumb® nodes enable voice, data and video communications to "hop" from node to node with very little administrative overhead burdening the network. Workers at the mine "chase" the ore, while advancing as efficiently as possible. The network infrastructure is a key component required to support this strategy.

For this reason, finding a way to avoid network disruptions was paramount. The team was impressed by the way the Rajant network could rebuild and "heal" itself based on whatever wireless nodes were available. The fact that the network intelligence is distributed across all BreadCrumb nodes, rather than relying on a single controller node to drive communication, was a significant differentiator from other mesh vendors that ASARCO had evaluated. BreadCrumbs, coupled with Rajant's InstaMesh protocol, offered stability in even the most rugged environments and the flexibility to transmit and receive data through a myriad of connectivity solutions including LTE, satellite, point-to-point wireless or wired networks.

"We found Rajant's solid track record in military operations reassuring. Its mesh networks have delivered many benefits in those rugged, dynamic environments," Wingle said.

Based on these factors, ASARCO Ray selected Rajant and deployed its network in May 2014, using solar trailers to accommodate the expansion. Technical leadership divided the mine into three sections during implementation so that two sections ran on the legacy system as the third section went up. Rajant replaced the existing 30 nodes in nine days. Seven of the nine days were spent monitoring the two systems' simultaneous operations. The remaining two sections of the mine were implemented over the final

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ASARCO Ray Mine

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two days. Currently, ASARCO Ray has deployed 159 BreadCrumb nodes and is the first to use Rajant's "N" standard BreadCrumbs with MIMO antenna configurations.

Rajant's network nodes or radios, known as BreadCrumbs®, are installed outside the cabs of the.

The Results

ASARCO Ray's investment has already paid off. The Rajant wireless network has allowed the mining operation to overcome their geographical challenges, such as terrain and interference, to collect complete, reliable data from 14 different source systems with confidence in its accuracy. In fact, the Rajant network has fostered a more favorable view of the process control systems across business units. Those outside of the technology team are now lauding its effective utilization of the new technology. "Using Rajant mesh technology, Kinross has reduced the need for technical staff to deploy repeaters.

"We were not able to trust all of the data we collected until we implemented the Rajant network," said James Stewart, Technical Services Manager at ASARCO Ray.

The company also has accomplished a highly beneficial feat in the mining industry – managing material movement from the mining phase to the mill. Rajant's wireless mesh network has allowed ASARCO Ray to elevate its mine-to-mill process oversight to an entirely new level.