RAJANT

CASE STUDY

Mosaic Four Corners Capitalizes on Phosphate Production Through Its Powerful Kinetic Mesh Network

Mining phosphate rock from a total of more than 200,000 acres of company-owned land in Central Florida, the Mosaic Company is a leading producer and marketer of concentrated phosphate and potash.

Its products are processed into crop nutrients and then shipped to major agricultural centers around the world. Mosaic focuses on maximizing efficiency to reduce its environmental footprint and has won multiple awards in recognition of its efforts. They recognize opportunities and focus remains on continuous improvements.

The Challenge

Mosaic's Four Corners mine and facility span 60,000 acres at the crossroads of Hillsborough, Manatee, Hardee and Polk counties in Florida. This location is its largest center of operation for mining and processing phosphates as well as the most complex, with multiple critical applications that must run simultaneously to maximize efficiency. Operating 24 hours a day, 365 days a year, Mosaic ships its phosphate products to major agricultural centers of the world, driving a significant amount of economic activity in North America.

Prior to installing Rajant's Kinetic Mesh® network, Four Corners operated on a rudimentary mesh network. Running at about 900 MHz, its standard point-to-point radios had very low bandwidth and were spaced as far as a mile apart from one another, resulting in frequent network communication breaks, which slowed operations and delayed phosphate production.

Additionally, Four Corners' phosphate production is dependent upon draglines, which are constantly moving and come with a high capital cost. Actively monitoring dragline operations via ruggedized cameras can minimize costs and user error, but with its low-bandwidth network, Mosaic Four Corners could only support two cameras, making it difficult to pinpoint problems or failing procedures.

Company Profile

- Headquartered in Plymouth, Minn., Mosaic Company is one of the world's leading producers and marketers of concentrated phosphate and potash crop nutrients.
- Mosaic's Four Corners network of mines, located in Central Florida across four counties, consists of 60,000 acres, 10,000 of which are currently in the active mining process.

Solution Components

- Rajant Kinetic Mesh® private wireless network enabled via 192 LX5 and LX4 BreadCrumb® wireless network nodes.

Kinetic Mesh Partner (KMP)

- Rapid Systems: a full-service internet and information technology company providing fixed wireless, wireless mesh, internet access, outsourced IT services and more.

Outcome and Impact

- Enabled Mosaic's Four Corners mine to gain an end-to-end view of mining operations for timely analysis and decision-making.
- Provided the network adaptability needed to prevent the mine's formerly frequent breakdowns in network communication.
- Helped the mine optimize processes and generate higher yields by deploying – and operating concurrently – a multitude of new applications, including a company intranet, VoIP phones and video monitoring systems for dragline excavators.

The Solution

To improve the Four Corners communication network, Mosaic partnered with Rapid Systems, a full-service provider of wireless solutions.

"Mosaic Four Corners is a complex environment because of its large size and infrastructure. It was imperative that we install a resilient wireless network that could support multiple mobile applications without a break," said Dustin Jurman, CEO of Rapid Systems.

To update Four Corners' previous mesh network, Rapid Systems leveraged Rajant's Kinetic Mesh® network, a type of wireless network that has been successfully deployed in other mining facilities and has been battle-tested by similarly demanding environments.

In a Kinetic Mesh wireless network, there is no static infrastructure; each radio, or node, serves as singular infrastructure, which enables all devices and the network itself to be mobile – a critical component in a mining facility, where vehicles and equipment are constantly on the move. It employs multiple radio frequencies and any-node-to-any-node capabilities to continuously and instantly transmit data in real time via the best available traffic path and frequency.

Because there is no central control node – and thus no single point of failure – routes are built automatically, and are evaluated for quality and performance with every received and sent packet. If a certain path becomes unavailable for any reason – due to power loss to a piece of equipment, for example – nodes on the network use an alternate route to deliver data.

This allows the network to adapt to node location, local interference and congestion dynamically, eliminating downtime even in the most rugged conditions.

The Results

Once Mosaic Four Corners had a structured wireless network in place, it deployed – and now operates concurrently – a multitude of new applications, including a company intranet, VoIP phones and video monitoring systems for dragline excavators.

"The use of video, in particular, has been extremely helpful in our operations," Hartley said. "Using Rajant's wireless network, we have implemented highly functioning command centers with detailed dashboards that allow us to monitor even our mobile gear such as draglines and pit cars, ensuring that nothing ever sits idle to maximize productivity."

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> **— Dustin Jurman**
> CEO, Rapid Systems

"Ivan and his team are continually innovating and improving their processes, which makes Mosaic Four Corners a unique mining site. The opportunities to add value are endless," Jurman said.

Hartley noted that Rajant radios are easy to work with. "Even a technician with little experience can replace a radio quickly and easily, and, if it's moved, reconfigure or repoint the radio antennas," he said. Jones is the mine's go-to mesh expert.

Perhaps most importantly for mining operations, Rajant's Kinetic Mesh® network has allowed Mosaic to create and install new applications that aid in the company's commitment to safety. Wireless information transmitted via the network enables continuous tracking and monitoring of key performance indicators. Static and mobile devices placed at strategic locations help operators track miners and maintain computerized attendance. This monitoring equipment not only improves productivity, but also reduces the risk of failures and warns miners of adverse conditions and equipment malfunctions. In the event of a failure, the equipment contributes to a speedy repair operation.

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