

Gerais, Brazil. The document also provides for social responsibility actions in the region. Block 8 will produce 27.5 Mt/y (dry basis) of 66.2% Fe iron ore pellets.

According to Jin Yongshi, CEO of SAM, the company has directed all its efforts to create an extremely safe mining project and one of the possible solutions is unmanned mining by implementing an autonomous or remotely operated mine. "Today there are already trucks and autonomous drilling machines and some other equipment necessary for the mining operation can be controlled remotely. However, we will need to integrate huge autonomous trucks and remote control equipment into a network system. It will be necessary for huge machines to communicate with the command centre, efficiently with low latency and operate safely in a single pit. Compared to the 4G network, 5G has the advantage of much higher speed and bandwidth and much lower latency (data slowness). This type of fast, reliable and real-time network can break the bottleneck of today's autonomous operations." The company has stated it intends to use unmanned trucks, drill rigs and excavators.

Rajant on providing the network which mining operators crave

Sagar Chandra, VP of Sales – Americas for wireless mesh major **Rajant Corporation** points out that mining landscapes are amongst the most



If a path becomes blocked or broken by interference, the Rajant network can redirect traffic accordingly to ensure operations never slow down or seize

dangerous on earth, and installing and maintaining communications infrastructure is particularly challenging in these locations. "Despite this, both open-pit and underground mines are beginning to reap the benefits of using communications technology to deliver efficiency savings, to protect valuable assets better, and to enhance worker safety. In dynamic environments, unfailing connectivity is vital to keep operations running smoothly, to monitor and track applications in real-time, and to prevent the risk of unfortunate and often catastrophic downtime."

He argues that having access to real-time visibility of personnel and equipment will ensure that the security and safety of the workforce is maximised. "With enhanced real-time visibility and improved situational awareness, operators can track workers across the site, prevent them from entering dangerous areas, and

fundamentally improve their wellbeing. This will also significantly help reduce the underlying risk of incidents."

In addition to personnel, equipment and vehicles are also constantly on the move across a vast environment and keeping track and monitoring assets can prove problematic. "Operators should be wise to utilise personnel and asset tracking technology which robust connectivity can accommodate. With the introduction of IIoT and the considerable benefits which it enables, equipment fleets can be equipped with wireless technology and sensors to stream real-time data directly to the operation centre. For example, mining vehicles such as haul trucks and shovels have hundreds of conditioned

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Ambra private LTE helps miners through COVID-19

Ambra Solutions says COVID-19 has been a good test for its industrial private LTE technology. It says its solutions have enabled mining clients to continue operating during the global shutdown - for example thanks to teleoperated mining equipment retrofitted with its technology, enabling mines to operate machinery from a safe location, where health and safety regulations could be respected.

"Not only has teleoperation been able to increase mining customer production throughout quarantine periods, it has also made it possible for clients to send equipment to recover material located in seismic zones not accessible to people once again proving that its LTE solution combined with remote operation ensures staff safety in any situation. Between 10% to 20% of the tonnage hauled by Ambra's mining customers is now being done using remotely operated or autonomous machines."

Deploying 5G-ready rugged solutions, Ambra says it is at the forefront of 5G technology, and is constantly evolving to improve automation, teleoperation and better overall communication between personnel, equipment, and assets. The Ambra underground tracking solution allows to optimise in real-time the flow of machines, personnel and other assets.

monitoring points on them. Traditionally, those sensor points could only be accessed when those vehicles had a failure or when it went into the repair bay for maintenance. That lack of communication could be limiting the visibility of assets and restricting mining operations from functioning as optimally as possible."

Chandra says the problem is that installing a wireless network system for applications and mining equipment can be challenging. Deploying technology in varying climatic conditions can be troublesome, and with mining assets always on the move, connecting them to the communications infrastructure isn't a straightforward task. Due to the complex environments of mines with significant depth and differing designs, wireless signals can be impaired considerably.

"Mining operators find great benefit in adding equipment to their networks as operations grow. But traditional wireless networks, such as Wi-Fi and Point-to-Multi-Point (PMP), cannot be easily relocated and are not suitable connectivity solutions for such environments where equipment is always in motion. If a network suffers a drop-off, whether that be just for a short period of time, there can be notable implications. A significant outlay of costs can be spent on accommodating technician visits to the site if the technology at hand isn't self-healing, robust, or future-proof enough. This can, therefore, be cost-prohibitive and result in productivity waning, which will be felt across the entire site. Operators must choose a wireless network which can seamlessly meet the stringent demands of data-driven mining

applications. With a reliable and unfailing network infrastructure, it will help ensure optimum productivity at all times."

Providing unwavering and unrestricted network availability, Chandra argues that Rajant Kinetic Mesh® networks enable mining operators to meet the productivity demands of the mining sector. "Providing total mobility and autonomy, Rajant's industrial connectivity enables real-time operational optimisation for mines across the globe. Its network can adapt to the varying mining topographies and share information over a mobile, highly adaptable web of communications."

He adds: "With the ability to place Rajant BreadCrumbs® directly onto mining equipment, such as autonomous vehicles, shovels, drills and even pumps, operators can easily and seamlessly link all their assets together as part of the Kinetic Mesh. This systematically provides the real-time information necessary for operations to function as productively as possible. The Kinetic Mesh network has any-node-to-any-node capabilities to instantaneously route data via the best available traffic path and frequency. If a path becomes blocked or broken by interference, the Rajant network can redirect traffic accordingly to ensure operations never slow down or seize. Without causing any network downtime, the Kinetic Mesh architecture allows

open-pit and underground mines to easily introduce, relocate, or remove network infrastructure to deliver highly adaptable coverage and the continuous connectivity needed."

He concludes: "Mining operators must embrace the opportunities that IIoT enables to ensure they pull ahead of the global competition. By having access to a reliable and dynamic wireless network, they can ensure that their operations never dwindle or stop. By adopting a communications system with the adaptability and mobility needed, 24/7, 365 days a year, mining operators can ensure they remain at the forefront of their industry for years to come."

Eldorado works with Meglab & Bell for Lamaque LTE

In order to improve the conditions of its workers, optimise the productivity of operations and reduce the risk of accidents and injuries, Eldorado Gold has set up a private underground LTE network at the Lamaque gold mine in Quebec in collaboration with **Meglab** and Bell. The company states: "Increasing the speed of decision-making and our productivity, improving flexibility for instrumentation and simplifying operations represent only a few concrete advantages of this network."

This initiative to increase the speed, security, reliability and flexibility of operations was to be finalised in August 2020. "The success of the network providing audio and video communications can already be seen in the work of our employees through several systems. This connectivity allows real-time management and



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