this quickly becomes an important asset to increase the speed of decision-making. By enabling better communication through the LTE signal, confidential group communications with workers underground and others on the surface are facilitated and result in instant decision-making. In fact, this system is resistant to cyber attacks, making audio communications and data transfers even more secure. It therefore also becomes possible to call in external experts from underground to solve problems."

The company adds: "Beyond audio calls, Facetime-type video calls are even more of an asset for our employees. The ability to show a fault in real time to an expert or an employee on the surface, to order a part or even to expose the state of the machines directly to his supervisor are just a few advantages of this technology. Providing crisp, fluid vision is a huge complementary resource to audio. The flexibility for instrumentation is also greatly improved thanks to the mobility as well as the ease of deployment that the LTE network allows. This is because the LTE solution does not require any wires or major installations to operate, which simplifies access and makes operations less complex for employees."

Moreover, as this system allows to have one cable for three systems, the workload is reduced. With the tools offered by this technology, the employees also have the possibility of telemetry of the equipment, that is to say of seeing the state of the machinery in real time, which contributes to the improvement as well as troubleshooting installations. The latter is possible, among other things, thanks to HMI (Human Machine Interface) which allows employees to interact with machines, notably used in the control room, for pumping, ventilation, backfill and electrical networks.

"Not only are communications and flexibility improved, but the implementation of this technology also increases our productivity and reliability by going beyond established QoS (Quality of service) standards. The LTE solution allows you to access data sheets from anywhere with phones, but also to complete reports directly on tablets, improving the speed of execution of our operations. In short, the continuity of operations in a safe and efficient manner is therefore strongly ensured by the reliable LTE solution. It will also be possible to go even further in terms of improvement, among other things, by combining this system with the VOD (Ventilation on demand) system in future projects."

Maestro advances Plexus PowerNet

Maestro Digital Mine says it continues to work with global underground mines to address the challenges associated with traditional communication backbone solutions resulting in their Plexus PowerNet™ – last mile communications solution; a Gigabit network providing both power and data using flexible coaxial cable.

Maestro's Plexus PowerNet™ is typically added to either the existing fibre patch panel or network switch located on the level entry

Maestro designed a communication network that simplified the installation, extension, and maintenance, while enabling high bandwidth, low latency, low jitter data and endpoint power using tried-and-true coaxial copper cable. The termination process now becomes easy and cost effective, utilising basic tools. A termination can be completed by any tradesperson in less than 5 minutes.

Michael Gribbons, CEO and Co-Founder told ***IM***: "By applying this enabling backbone technology to an existing fibre network, the entire mine infrastructure can have a new life. In a mine, fibre has its place but needs to be well protected from the high traffic areas where LHDs and trucks can damage the cable. The Plexus PowerNet™ is typically added to either the existing fibre patch panel or network switch located on the level entry. The durable coaxial cable is the most effective at providing data to the face of the mine. The Plexus PowerNet™ simplifies the advancement and repair of the network. When the communication cable is damaged by the either the mobile fleet or fly rock, a simple splice repair can get the network up and running saving precious production time. Having both power and data on single coaxial cable reduces advancement time as well as multiple trades reducing both CAPEX and OPEX. Bringing data to the surface allows short interval control that improves both production rates and miner safety."

For example, a global nickel mining company in Ontario had existing fibre optic infrastructure that ended at critical substations underground but no additional network beyond. The mine wanted a "last mile" solution to support their paste fill operation since this ultimately is a production bottle neck. The mine decided to use the Plexus PowerNet™ since it combined both DC power and data so that PoE+ Ethernet cameras and PoE+ LED lights could operate on a single cable. The camera is used to monitor the paste fill operation from surface assuring that the paste is arriving to the stope. Many mines using paste fill have broken or worn out pipe and fittings during a stope filling sequence causing both safety and production concerns.

Already, several other levels and applications are being added. Gribbons added: "The Plexus PowerNet™ can be connected to any device that is Ethernet based. Whether it be process controls, tracking, tele-remote automation, ground control, ventilation monitoring, analytics, or seismic. If the backbone is there, it can be implemented. Downtime is minimised."

3D-P's Osprey Intelligent Endpoint leverages Rajant InstaMesh to complement LTE

LTE provides distinct benefits in meeting the network requirements for autonomous applications in open pit and underground mining with its predictability and Quality of Service (QoS) capabilities. **3D-P** argues, however, that experience at multiple sites worldwide, however, has highlighted a number of challenges around the cost of 'filling' in shadows with more LTE infrastructure, limited uplink bandwidth and needing a L2 fabric on top of LTE's L3 architecture, especially when mission critical performance of your wireless network is a requirement.

Leveraging the multi-radio meshing capability of Rajant's InstaMesh technology, 3D-P says it is proud to introduce its new Hybrid LTE/InstaMesh® Osprey Intelligent Endpoint® (IEP). Designed to complement LTE technology, the Hybrid Osprey