Mine Site Wireless Ethernet Mesh

The proliferation of mining support systems, such as computer aided earthmoving, assisted drilling, production monitoring and machine health all pose new high-bandwidth requirements on communication infrastructure. Based on this, traditional telemetry systems are being progressively replaced with broadband networks, tailored to the specific mining conditions.

Mining support systems are used extensively in mining due to the operational efficiencies they bring, allowing a mine site to operate with fewer personnel and with less idle time for planning or unexpected occurrences.

However, providing mobile communications to support these systems in open pit mines pose significant challenges, due to the dynamic nature of mining areas, radio propagation due to mine topography and environmental constraints.

Mining operations are like moving cities; as the mining material is extracted, the mine sites change and grow. Hence, fixed communications networks are often not feasible alternative – the communication networks on mine sites need to be mobile and easily redeployed to suit the operating environment.

Wireless LAN mesh networks fit mining requirements, due to their redundancy, scalability and ease of re-deployment. Motorola MOTOMESH Solo, in particular, combines broadband data rates with cellular mobility, thus being a suitable choice for demanding mobile broadband users.

Mobile data communications based on the Motorola MOTOMESH Solo wireless LAN mesh has been extensively proven and is widely adopted, both in Australia and overseas. The system is particularly suited to mining due to its ruggedness, resilience and survivability.

Other relevant features of the mesh are resistance to interference and fast route convergence, which are essential for low and deterministic latency, for distribution of RTK GPS corrections and other timing critical applications.

STI Engineering specialises in wireless data communications with extensive experience in designing systems for industrial environments. The systems are designed to meet the availability, throughput and quality of service requirements of mining systems.

The wireless mesh Ethernet networks can be designed to support a common radio infrastructure across the mine site for all the mining support systems. Traditionally, on-site communications staff were required to maintain many disparate communications technologies for each separate system supporting the mining function. Now a single site-wide network, based on Ethernet, can be used to support all the legacy data systems and allow expandability to future services.

Sharing the communication infrastructure with operations functions, maintenance and other support systems such as environmental monitoring and safety systems means the investment on the wireless infrastructure can be fully realised over a number of different services.

Choosing a wireless mesh network means that although many mining systems are sharing the infrastructure, a single point of failure will not affect normal operations. The mesh networks allow for redundancy with overlapped coverage, adaptive mesh communications and multiple access points to cabled services in case of primary link failure. Utilising these features, networks can be planned to survive equipment outages with minimal impact on mining support systems.

The remote and mobile modems deployed in the network can allow connection of multiple IP addressable devices using standard Ethernet connectivity. This allows for devices that are not wirelessly enabled to function transparently on the wireless mesh network without the need for additional drivers. Serial devices can also be added to the network with serial modems designed for use with the mesh LAN or Ethernet serial device servers.