RAISING THE BAR

Chris Fischer, Mine Site Technologies, Australia, explores the fundamental shift in baseline productivity that is underway in today's digital mine.

The mobile age has delivered a world where every individual is immediately contactable. In most business environments, employees are expected to be on constant alert, ever-ready to respond to a call or text. Some might lament the downside of being always on call, but productivity benefits continue to be derived from evolving communication technologies. These days it would be almost unheard of for a company to operate a business without fast and easy access to their resources – both personnel and assets.

In stark contrast, the challenges of the mining environment – particularly underground mining – have resulted in a slower evolution and adoption of technologies in this area. Simple scenarios become problematic in an underground mine: Where are my people? Where are my vehicles? How can I get in touch with a specific individual now?

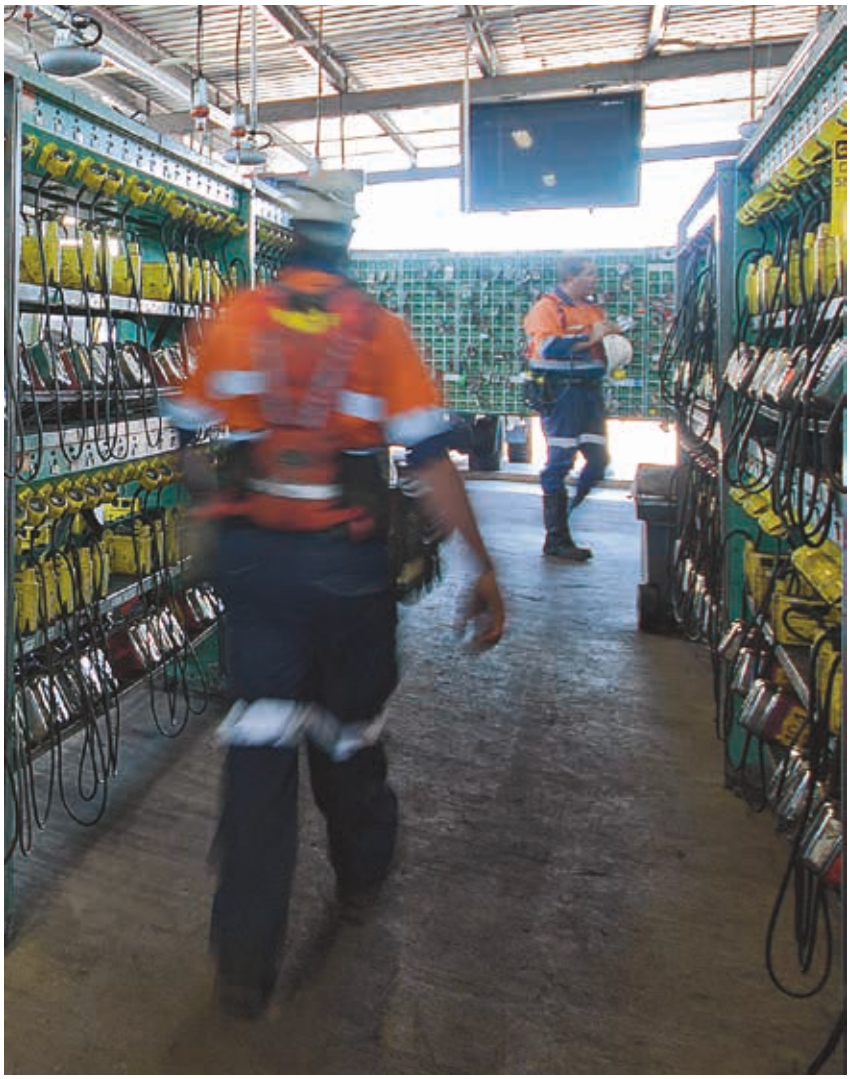
As mines increasingly recognise the benefits of deploying mobile operational voice and data networks underground, the industry is beginning to see corresponding and dramatic shifts in the speed of communications and the visibility of operations with consequent boosts to operational productivity.

Visibility in mine operations

An Australian customer recently implemented Mine Site Technologies' (MST) ImPact Wi-Fi network and ImPact Communications Appliance (ICA), replacing the ultra-high frequency tracking system previously used within its underground longwall mining operation.

The ICA is an integrated hardware and software platform that provides a holistic view of voice, tracking and networking solutions. Data can be accessed in real time via MineDash, an intuitive browser-based tracking and reporting application that allows operators and mine controllers to accurately and efficiently monitor, track and allocate personnel and resources. MineDash provides the control room user with a single interface to view all of the mine's tracking, communications, vehicle health and payload data.

The implementation of mobile operational voice and data networks, such as Mine Site Technologies' (MST) ImPact solution, is changing the face of underground mining.



MST's ImPact solution supports full tracking of vehicles and equipment underground, together with tracking of personnel using Wi-Fi tags in the MST Integrated Communications Cap Lamp (ICCL).

After the network is deployed, the mining operation had resulting coverage throughout the mine industrial area (MIA), down both drifts to the pit-bottom area and along the main headings underground. It also included coverage along the main and tailgates of the active longwall panel, as well as along the two development panels ahead and along the face of the longwall.

The ICA supports full tracking of vehicles and equipment, while the existing MST Integrated Communications Cap Lamp (ICCL) fleet at the mine will have current UHF tags replaced with the latest Wi-Fi tags to allow tracking of personnel.

Tracking of personnel is undertaken for additional control and monitoring, should an emergency situation occur and an evacuation become necessary. It is also being leveraged to determine the location of deputies, electricians and fitters, as well as to assist in co-ordinating resources, particularly in response to breakdowns or other urgent maintenance events.

Immediate underground communications

A fundamental benefit of this solution is simply being able to communicate underground, using the MST MinePhone. The system provides continuous voice coverage from the MIA to the development faces, including the longwall area. Using a single MinePhone device, users can choose either the phone function (each phone is an extension of the mine's private branch exchange via the ICA) or select MST's push-to-talk (PTT) function, which allows open channel communication on multiple available channels.

The combination of the PTT and mobile phone features on a single device opens up a new world where simple actions that once took considerable time can instead be achieved in minutes, decisions can be made faster and communication with the surface is immediate.

A typical source of delay for the underground superintendents in this mine was the ability to locate and contact key people before making certain decisions. The only way to locate

the person previously was to call the control centre from a fixed phone point and ask them to send a PED pager message, then wait for the target person to walk to a phone and establish contact. Though reliable, this could take considerable time depending on the person's location. Now, all key people have a phone with them. At any time, up to 30 phones might be underground and in use. All the superintendents need do is call the number of the person with whom they wish to speak. In some cases, they can look up their location and also determine where they are physically located, using the locator application on their own phone.

In relation to emergency preparedness, the mine now has in place a powerful and highly resilient emergency management capability. This includes real-time visibility of the location of all personnel via the tracking system, two-way voice and texting via the MinePhone and mine-wide emergency warning capability provided by the current through-the-earth (TTE) PED paging system.

Built-for-purpose mobile communications technology for the underground not only makes life easier and safer for miners, but also drives significantly higher asset and resource utilisation.

Better use of personnel and assets

A constant challenge in the underground environment is locating vehicles. A vehicle may be left parked underground while an individual performs a task, only for that individual to return and find that the vehicle has been moved. Previously, personnel would have to locate and make their way to a fixed phone (in this case located approximately every 500 m or so along the walls of the tunnels), call the control room and have them either send a replacement vehicle or help locate the original vehicle and organise its return. Either way, the process took considerable time – two or more hours – during which work was delayed.

Now using the ImPact system, personnel are able to use the locator application on their phones to see where their vehicle is, and either walk to it, or have someone near the vehicle bring it back. This saves many hours of time on a daily basis – time that can be used to complete other productive work.

The system has also streamlined the start of shift process. Before the system was deployed, the control room was besieged by miners at the start of each new shift, trying to locate where they needed to go to start their work: i.e. the last known location of their assigned equipment.

With the system now in place, the miners can simply walk to the large, touch-screen kiosk located in the lamp room and search for their assigned equipment on the screen. Without needing to consult the control room, they can proceed directly to the actual location of their assignment, rather than to a vague guidance location. This again saves considerable time and has the miners underground and productive much faster than previously.

Raising the productivity baseline

In terms of the impact to overall mine operations, productivity benefits have rapidly been delivered to those in production supervisory roles, to the control rooms, and throughout the mine. However, it is during the complex and time-critical tasks associated with a longwall move that the benefits of tracking and mobile communications have most clearly been demonstrated. The mine is undertaking its first longwall move since the system went live. According to the minesite's superintendents, the PTT features have "revolutionised the process". The indications are that the process will be several days faster as a result, which directly translates to tangible cost savings.

There is clear recognition from mine management that baseline productivity for the mine has been significantly raised as a result of deploying the MST system.

The implementation of mobile operational voice and data networks and tracking solutions are changing the face of underground mining, as they have done in many other industrial environments. These solutions are not only making life easier – and safer – for those working in this harsh environment via improved communications, but they are also proving successful in achieving significantly higher personnel and asset utilisation, driving increased mine productivity. WC