

SIMOCO CONNECTED MINING

**NEXT GENERATION WIRELESS
CONNECTIVITY FOR THE
MINING SECTOR**

simoco
wireless solutions



The Connected Mine

Introduction

For decades, mining has been an important element in the makeup of an economy. No longer just about meeting our demand for fuel, mining has long been vital to meet the demand for all kinds of goods. The mining industry extracts an array of elements from coal, iron, nickel and a huge range of other raw materials that is collected every year. Globally the mining industry produces \$1.5 trillion worth of materials according to the World Mining Data 2020 report. With the ongoing demands for this geological foundation of our goods, there is no doubt that the mining industry is here to stay.

However, the mining industry is facing a number of intensifying challenges. The volatility of the commodity market, declining ore grades, rising energy costs, sustainability and extreme operating conditions have reinforced mining organisations to leverage reliable and flexible communication systems. Leading mine operations have already started on a digital transformation, as they look to create the 'Connected Mine.' Building on the necessary communications required for everyday workings of the mine with layers of applications and systems leveraging massive scale Internet of Things (IoT) networks, the future of mining needs to be safer, smarter and far more productive.

Discover how Simoco Wireless Solutions can help your organisation realise the 'connected mine' vision by building smarter, safe and more productive mines with our revolutionary wireless technology.

Overview of Connected Mine technology

The mining industry is constantly challenged to provide safe environments, lean operations and optimal efficiency even more so with rising commodity prices. However, it is difficult to monitor and control production for large mines that are located in harsh and constantly changing environments. Managing equipment, automating heavy fixed assets and protecting workers is challenging especially when assets and workers might spread out and become disconnected. How quickly can you respond to new conditions at the mine, such as safety issues, or to changing market demands?

Getting complete visibility in every site in real time is the dream for all mining organisations. The IoT is the latest evolution of technology that is bringing together people, processes, data and things to drive powerful business outcomes. The portfolio of solutions that Simoco has to offer can potentially solve the mining industry's ongoing challenges by helping to raise safety, reduce environmental impact, while still helping raise overall productivity.





A unique solution for the **mining** industry

Currently, mining automation is rapidly accelerating and this trend sets to continue with mining organisations adopting autonomous operations. Drone inspections, autonomous vehicles remote-controlled drilling rigs and real time condition monitoring have been identified as significant mining use cases in the realisation of mining transformation with 'smart' technology. The need for reliable connectivity is key in harvesting large scale data in the 'connected mine' that attribute employee safety, production efficiency, cost saving and improved productivity.

Velocity, an intelligent communications device provides mining organisations a platform complemented to provide a solution for high speed, reliable communications with broadband bandwidth and low latency. Additionally, Land Mobile Radio (LMR) provides great coverage and reliable instant mission critical two way voice and data communications across mine sites. GPS, man down and lone worker functionality provides increased occupational health and safety (OH&S) ensuring workers are kept safe at all times. Producing live video feeds that can be transmitted to a remote operations system can be a reality. To function properly, ample bandwidth and a highly reliable connection is required. Velocity is natively equipped with 4G LTE and 5G-ready capabilities perfectly positioned to deliver on all of these requirements.

As an asset-intensive industry, mining entails a wide-array of equipment from drills, excavators, diggers and conveyors to pumps, motors and fans which are widely dispersed both above and underground. NodeRED workflows can be customised allowing the management of numerous wireless IoT sensors that typically monitor and track critical asset parameters such as pressure, vibration, flow rate and temperature as well as engine telemetry devices, enable real-time remote diagnostics, troubleshooting, predictive maintenance and asset tracking across the entire mine.

Simoco's 'connected mine' solution provides mining organisations a secure, reliable and excellent communications coverage platform. Connecting people, equipment, data and insights across the mine provides mining operators a whole new world of intelligence and predictive insights to enable faster, smarter decision making for better outcomes. And these technologies mean intelligent operations are safer, sustainable an efficient. One thing for certain is mines of the future will be built on solid wireless connectivity.

Wireless solutions built to drive efficiency



All in one intelligent communication solution

Our solutions provide an affordable and best-in-class intelligent communications solution that consolidates all your devices and peripherals, providing your organisation with the reliability and resilience it needs from a mission critical communication network.

Wi-Fi for reliable connectivity

Whether drones are used for mine inspections or workers requiring reliable Wi-Fi connectivity in the mine, Velocity's native wireless access point is a feature which is fundamental to a robust wireless communications network.



Real time video surveillance streaming

We understand that whatever network infrastructure a mining organisation deploys, it must be capable of handling large amounts of data that is generated, whether that is a vehicle, equipment or workers. Our solutions rely on constant mobile connectivity which makes it possible to process live video feeds. For instance a remote drilling system or unmanned aerial vehicles (UAVs) are typical examples in mining operations and for it to function properly; the network needs ample bandwidth and a highly reliable connection. A robust communications network is a key enabler for such a system. The emergence of technologies such as 5G that boast high resilience, availability, and low latency can provide the coverage, capacity and responsiveness required in these types of situations.

Announcements and signage

The nature of a mine environment requires clear and reliable signals to protect people, equipment in the event of safety issues or equipment malfunctions. Velocity can work with a range of visual and audible signalling devices providing protection to your workers and equipment.



Improving safety and reducing incidents

Mining often involves putting workers into potentially hazardous environments and is ranked as one of the most dangerous professions. Stronger safety regulations and advanced technology features such as man down and lone worker found in Simoco equipment have reduced the fatality rate in the mining industry. These safety improvements have not come at the expense of productivity, in fact productivity has improved resulting in both a safer and more profitable mine. The addition of Velocity in a mine enhances the features of a typical mobile radio system by leveraging data about employee location and environmental conditions from fixed and mobile sensors, enabling real-time operational insights and essential collaboration.

Real time monitoring, maintenance and updates

Using Velocity Remote Manager allows firmware updates, configurations and maintenance to your wireless on board device from a remote location while ensuring that sensitive data stays safe.



Emission and groundwater level monitoring

Diesel exhaust emitted from underground excavating equipment and drilling machines contain toxic gases and fine particles that present serious health risks. With the adoption of stationary and mobile gas detectors, as well as particle sensors, emission levels and threshold limit values can be effectively controlled to sustain a secure working environment that complies with safety standards. Chemical residues from mining operations threaten to contaminate groundwater and incur serious environmental issues. With data from level sensors hooked up to Velocity, mining operators can keep track of real-time changes in groundwater levels at mine shafts, especially during rainfalls. Timely and effective pumping can be performed to prevent excessive inflows, thus avoiding contamination and underground flooding.



Wearable based event reporting



Mines are commonly renowned to be among the most dangerous working environments with high risk of explosions, equipment accident and toxic exposure. Ensuring miner's health and safety has remained a big challenge. With the help of IoT wearable technology connected to Velocity, miner's health and working environment such as temperature, humidity, radiation, noise and gas levels can now be tracked in real time. Managers are immediately notified of fatigue, exhaustion and incidents experienced by their workers.

Asset tracking, remote diagnostic and predictive maintenance

Mines are harsh environments and as result a number of machinery, vehicles, and equipment influence operator's safety. Mining accidents are often related to equipment and maintenance account typically accounts for a fair chunk of a mine's equipment costs. Yet machine-specific malfunctions can be prevented by collecting and analysing machine data. Velocity can significantly reduce maintenance costs by ensuring assets are monitored, managed, and analysed continuously before issues start to arise. Predictive maintenance can prevent asset downtime and help mining organisations stay ahead of expensive production losses.



Support for Ventilation on Demand (VoD) systems



Ventilation accounts for around 30-40% of energy consumption in underground mines. Supporting implementation of VoD systems, IoT sensors working in conjunction with Velocity can be leveraged to constantly monitor air quality and air flows at different areas in the mine for remote adjustment of the fan speed. Transmitting data from occupancy sensors or worker registration data from NFC tags also ensures that ventilation is activated in work zones where miners are present. This results in significant energy savings, thereby remarkably reducing operational costs and environmental footprint.

Network Security

Velocity is designed with security in mind and includes the use of advanced security protocols such as virtual private networks (VPN). Other security features include setting up Demilitarized Zones (DMZ), MAC filtering, IP filtering, port filtering and port forwarding provide a standards-based security solution for connecting and managing remote assets, enabling a guard against malicious access to sensitive data.



Converged Multi bearer platform

Velocity's multi bearer platform allows mining organisations to stay connected with a range of common communication networks such as LMR, LTE or even satellite communications transforming operation and efficiency in the mine. The beauty of Velocity is the aggregation of data managed on business rules, resulting in bandwidth efficiency.

Experienced in delivering communications solutions in the mining sector

Simoco Wireless Solutions have decades of experience and expertise in delivering communication solutions for the mining sector.



BHP

BHP is among the world's top producers of commodities, with a simple and diverse portfolio of global tier one assets, including iron ore, copper, nickel, and metallurgical coal. They operate in more than 90 locations primarily throughout Australia, Chile, the United States and Canada. Simoco Wireless Solutions has been working with BHP at their Olympic Dam mine in South Australia over the last decade, supplying reliable and effective communication systems in complex mine environments. Recent work includes the design, supply and install of a digital trunked mobile radio network. The radio network meets the requirements for a high-quality high capacity voice and data radio network at Olympic Dam, which is one of the world's most significant deposits of copper, gold, silver and uranium. Located 560 kilometres north of Adelaide, Olympic Dam comprises underground and surface operations, and is a fully integrated processing facility from ore to metal.

Rio Tinto

Rio Tinto works across 35 countries globally and is the world's second largest metals and mining corporation producing iron ore, copper, diamonds, gold and uranium. Simoco Wireless Solutions has been supplying mobile and portable radios to all Rio Tinto Iron Ore (RTIO) sites for many years. Simoco products have become preferred technology choices for Rio Tinto based on the advanced feature set of Simoco Radios. In addition Simoco provide remote technical support as required and have assisted Rio in providing many custom-built radio solutions such as customised locomotive radio kits, solar powered remote site radios and hands free vehicle kits. We work closely with their technical teams to provide a solution that exactly meets the unique requirements found in remote mine site operations.



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