

# COMMUNICATIONS IN UNDERGROUND MINING

FOR OPTIMUM SAFETY, PRODUCTIVITY AND EFFICIENCY

**NAUTITECH<sup>®</sup>**  
DEVOTED TO SOLUTIONS IN HAZARDOUS AREAS

Underground mines are continually driven to improve safety, productivity and efficiency, which makes real time data capture and communications between underground locations and the surface an integral part of a mine's operation. Reliable transfer of information needs to address the following needs which will allow for predictive and preventative measures:

## Efficiency

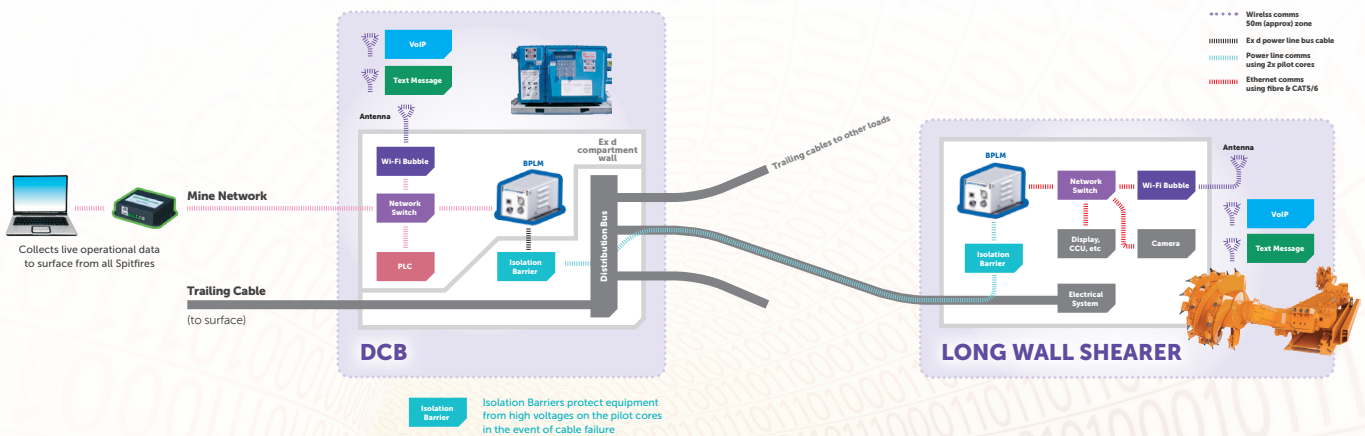
- Fleet optimisation
- Remote monitoring from surface
- Early warning of maintenance issues
- Diagnostics
- Potential remote automation
- Maintenance records

## Safety

- Human movements underground
- Health and Safety hazards
- Emergency communications
- Incident reports

## Productivity

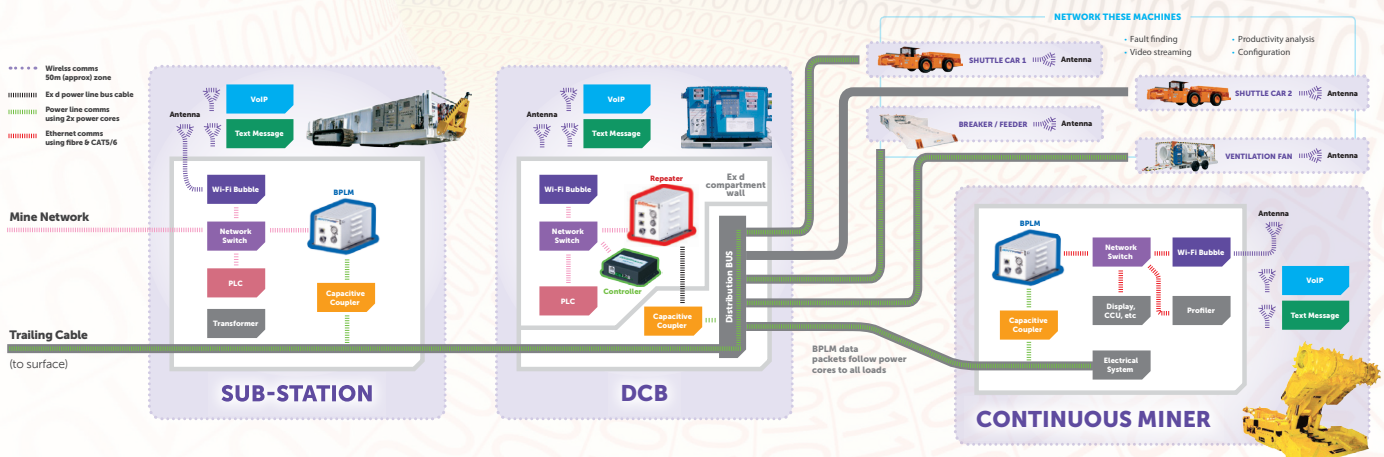
- Operational monitoring, shift and maintenance reports
- Real time machine data logging and fault analysis
- Historical data capture with time stamp
- Coordination of personnel
- Communication (voice/messaging) without fixed infrastructure
- Preventative maintenance
- Live video streaming



The underground communications system is a world first for underground coal, and since being installed has been faultless.



– Brad Price, Ensham Electrical Engineering Superintendent



## Robust Communications in Hazardous Areas

Virtually every application in an underground mine can benefit from the addition of reliable and real-time video and data monitoring. Whether it's a Continuous Miner, Longwall System, Shuttle Car or other mobile machinery, operational efficiency can be improved significantly by establishing clear surface-to-equipment communication.

It is well known that underground machines can log valuable operational data. However, it hasn't always been easy to extract the data from these machines and transmit it to the surface, where it can be analysed for fault logging, productivity, and perhaps ultimately, for remote operations. When an expensive machine asset breaks down or is not running optimally, the opportunity cost is hard to measure without reliable data.

Underground Broadband Powerline Modem (Spitfire® BPLM) solutions have proven to be extremely reliable for Longwall Systems in underground coal mines around Australia and abroad. That success has since been transferred over to Continuous Miners and more recently, Shuttle Cars.

## Reaping the Benefits – Case Studies

When the Spitfire® BPLM solution was tested on a Continuous Miner at Ensham Resources in Queensland, benefits included:

- Clear data communication to the CM
- Data link retained when CM turned a corner
- Successful data transfer across existing trailing cable lengths up to 500m
- Connectivity between network-enabled gear such as VoIP phones, protection relays, and cameras
- Protection from mining environment
- Use of portable equipment without wires through Wi-Fi hotspots
- Consistent high bandwidth
- Coverage in areas where it is needed
- Simple installation
- Reliable communication with the surface

More recently, the Spitfire® BPLM solution was tested on a Shuttle Car at Swanson Industries in New South Wales. Results of the test showed:

- Data could be transferred from a moving machine
- Data rate was 20 Mbps
- Distance tested 357 metres



## Mines of the Future

The underground broadband communications solution has great possibilities for use on other machinery that uses a trailing cable as a power source. Trials of the Spitfire® BPLM solution in Australia and the US show great results with enough data throughput for reliable real time operational monitoring and enough spare bandwidth to transfer video data for machines fitted with HD or Thermal cameras.

Applications such as Shuttle Cars, Feeder Breakers, Ventilation Fans, and Proximity Detection Systems can be networked to transfer data and video from the local system to the surface. Such valuable information provided to the mine control room in real time will no doubt offer additional opportunities to drive improvements in safety, efficiency and productivity.

The use of efficient communication systems can also minimise emergency response times, mitigate risks, and ensure efficient incident management. More importantly, the mines of the future will inevitably increase their reliance on consistent mine-wide communications, and can now include remote areas with no fixed infrastructure.

The challenges facing the mining industry are significant and increasing. Productivity must be maximised and sustained while operating costs are driven down. The cost of mine operations will remain a major challenge in the mines of the future, therefore effective and robust communications technology is essential to further enhance performance improvements in complicated underground terrain.. ■

*Nautitech Mining Systems offers a high-performing, reliable, tested solution for communications between underground mines and the surface. To learn more about the Spitfire® BPLM, Super Spitfire® repeater, and the Spitfire® Wingman controller, please contact:*

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