



 **IQseries**
INTELLIGENT VEHICLE

Remote Control Systems

STANDING BEHIND EVERY PRODUCT WE SELL, FOR LIFE.

CANADA | USA | MEXICO | PERU | SOUTH AFRICA | AUSTRALIA

macleanengineering.com

 **MacLean**
Performance. Reliability. Innovation.

Our commitment to excellence through research and testing runs deep.

MacLean has had the honour of supporting many of the world's leading mining companies over the past nearly 50 years – these shared learnings have positioned us to now design and purpose build a suite of MacLean remote control products that deliver operating excellence in each of their unique mining applications. At the core of our design thinking is the operator – giving them the tools they need to work safely and efficiently so that they get back home to their loved at the end of a shift, while also benefiting the overall productivity of mining operations.

The first package of commercialized products from our Advanced Vehicle Technology group, under the MacLean IQ Series product line banner, consists of three levels of remote-control technology.

From basic line-of-sight to surface operation packages, MacLean can deliver and support the appropriate remote-control solution for your unique underground mining environment. These remote-control systems are an excellent addition to the MacLean Ore Flow product line, to safely bring down draw point hang-ups and make block caving operations, in particular, safer and more productive.

Line of Sight Operation

- Increased Operator Safety

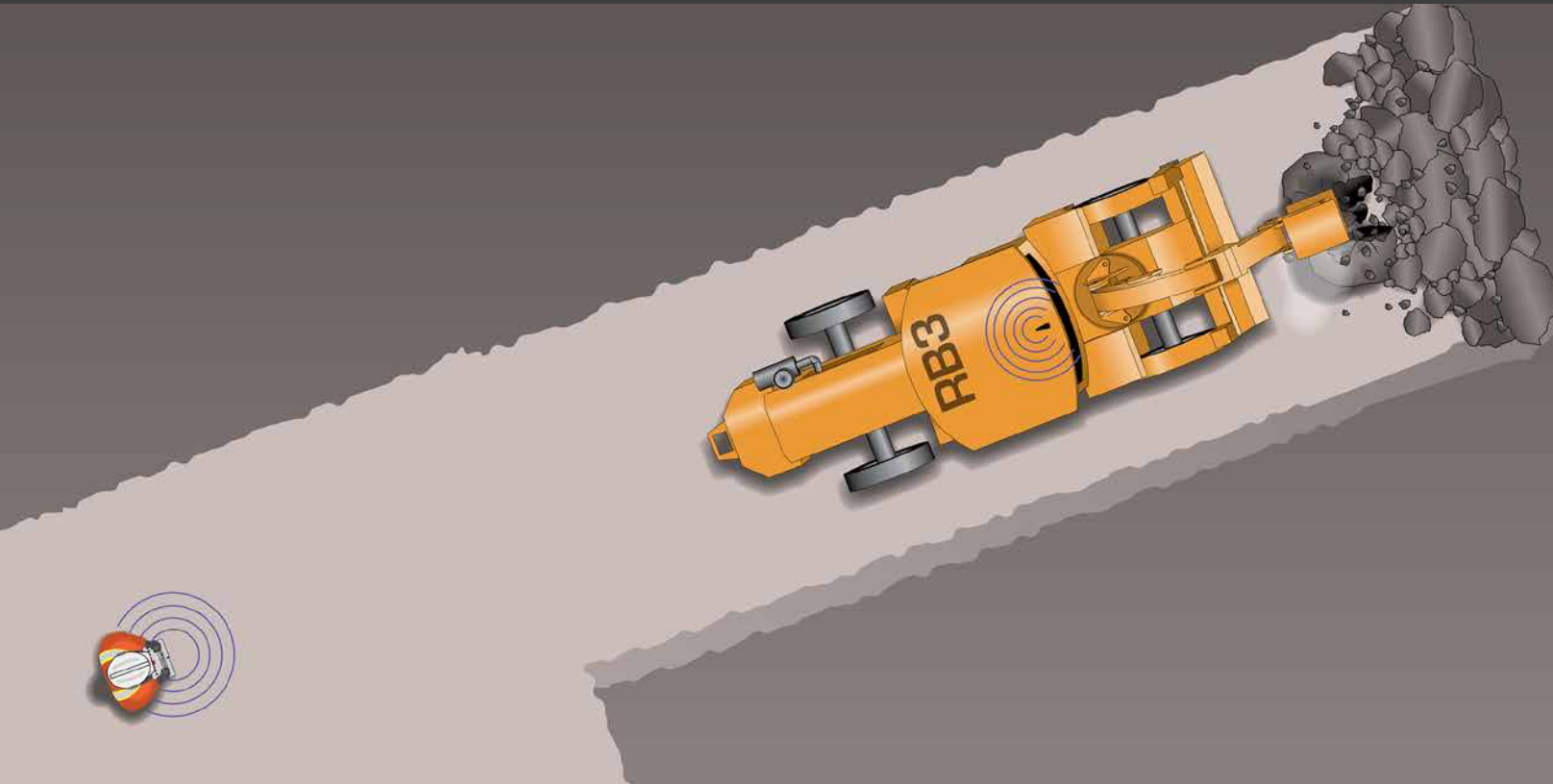
Tele-Remote Underground

- Enhanced Health and Safety
- No Boots on Ground

Surface Tele-Operation

- Highest Safety, Utilization, Operator Comfort and Production
- Interoperability

Line of Sight Operation



Features:

- Line of sight remote operations of MacLean mining vehicles, via radio signal in the underground environment
- Proportional controls allowing precise operation
- 900MHz radio communication
- 100m+ operation in visual line of sight, a uniquely paired transmitter and receiver ensures the machine responds to only one transmitter
- Status lights on the machine provide feedback to the operator

Benefits:

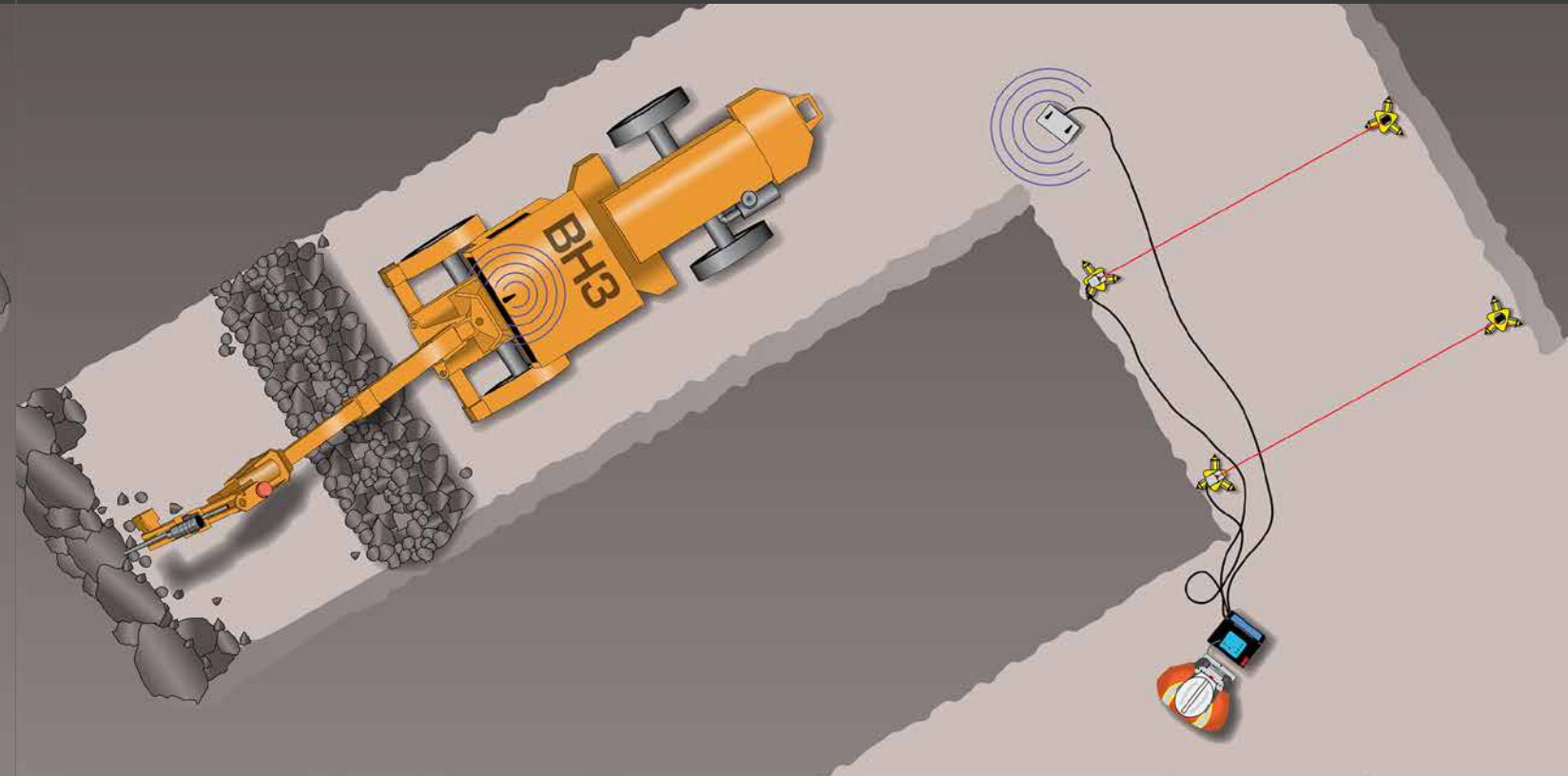
- Enhanced operator safety, especially in hazardous operating situations that would otherwise require working near large unstable fragmentation
- Improved operator ergonomics and reduced fatigue
- Increased productivity and reduced operating costs

Options:

- Wireless video system – 2.4 GHz line of sight transmission



Tele-Remote Underground



Features:

- Allows underground operation of the machine beyond visual line of sight
- All data traffic passed over a single 2.4GHz Wi-Fi link
- In standard configuration, the system is self-contained with no requirement for network infrastructure in the mine
- HD camera system configured for each machine
- Machine feedback package to monitor carrier and task signals from the control station
- Hardwired link from operator unit to communication hub and wireless link from communication hub to the machine

Benefits:

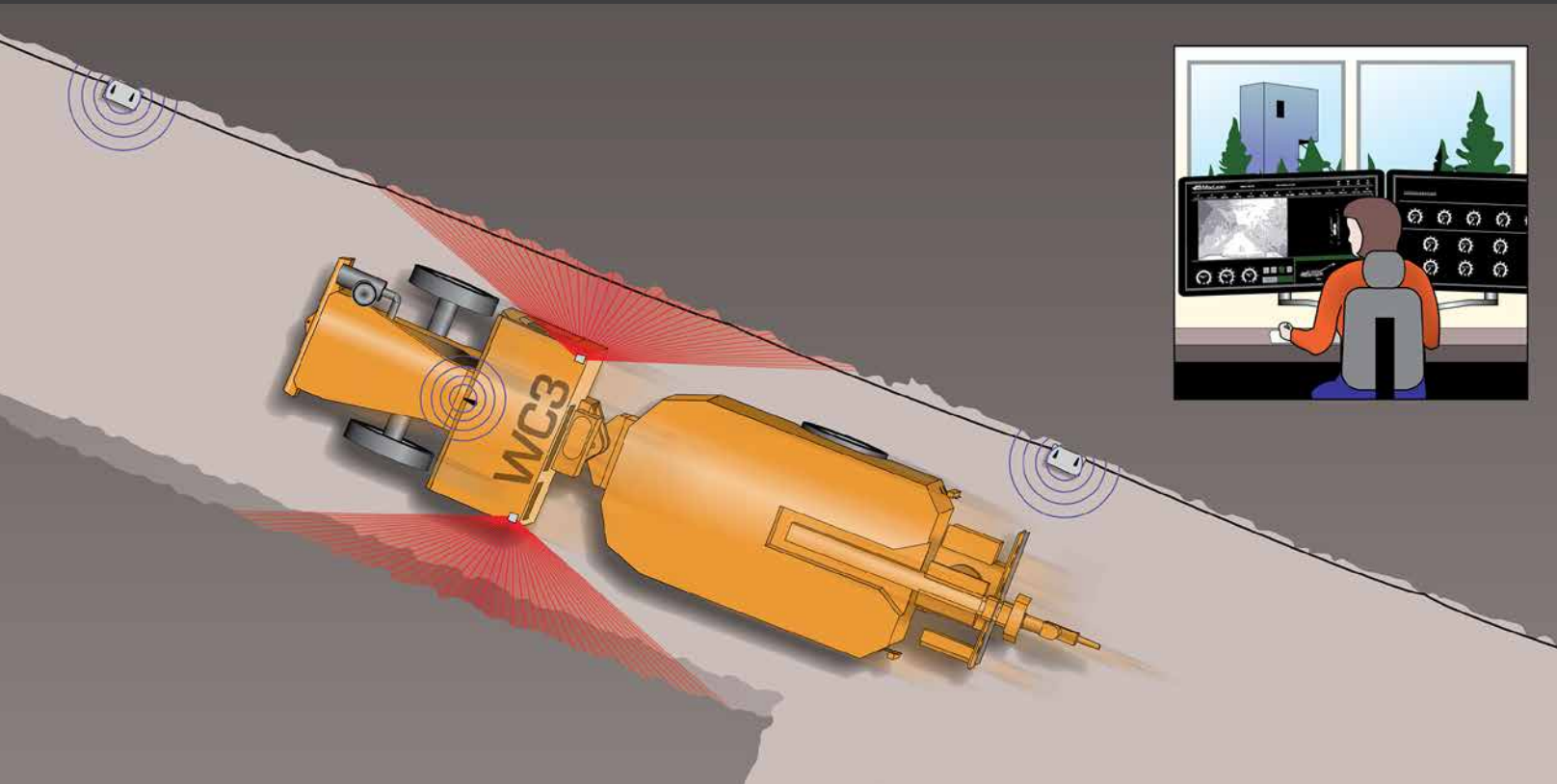
- Enhanced operator safety, especially in hazardous operating situations that demand 'No Boots on Ground'
- Improved safety with further distancing from the exposure to heat, dust, noise, and other risks such as mud-rush
- Improved operator ergonomics and reduced fatigue
- Increased productivity and reduced operating costs

Options:

- Light barrier – controls access to the work area, safely stops the machine if personnel enter the work area
- Integration with mine network – if a network is in place at the mine, the tele-remote system can use this as a data link to operate over greater distances
- Battery-operated communication hub - removes the requirement for a hardwired link from operator unit to communication hub but requires a visual line of sight instead
- Options available for machine feedback packages tailored to machine types and customer workflows



Surface Tele-Operations



Control of all machine functions performed from an office-based operator station at the mine site or remote location.

Features:

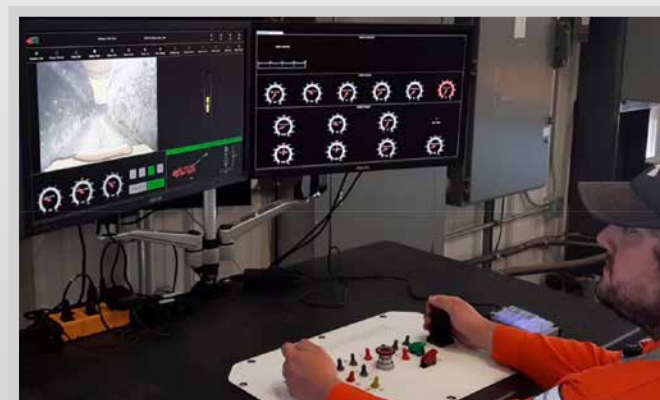
- Joystick Control Package with workstation and chair
- Two (2) or more widescreen displays (specification dependant on application)
- Comprehensive machine feedback package to give an in-cab experience
- Localization and Autonomous packages available as options

Options:

- Machine localization within mine map
- Integration with mine safety system/automation safety system
- Integration with automation traffic management/dispatch system
- Integration with existing mine network
- Driver assistance features – obstacle detection, collision avoidance, speed limiting

Benefits:

- Office like work environment to completely remove operators from underground mining environment in critical ground conditions
- Increased productivity as operator availability increases due to reduced commute times
- Increased machine utilization leading to a reduction in total capital equipment requirement
- Improved productivity and operator ergonomics
- Allows for further automation and use of multiple units from single operator stations



Stay tuned for the next chapters of MacLean IQ Series product development, with mining robotics and autonomous vehicle operations coming fast through the R&D pipeline at our underground test facility.



360 – a number you can rely on.

WHEN WE SAY WE'VE GOT YOUR BACK, WE MEAN IT. OUR MACLEAN 360 PROMISE ENSURES YOU ARE SUPPORTED WHEN AND WHERE YOU NEED IT.

MacLean invests heavily in a global infrastructure of customer and technical support, field mechanics, operator and maintenance trainers, virtual reality training, product managers and engineering staff. The result: increased machine productivity and operator safety and a lower Total Cost of Machine Ownership (TCO) for you.



Visit macleanengineering.com
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