



Productivity and Safety through
Mine-Spec digital applications

IMPACT

proximity
detection



Visible and audio alerts

Multiple detection zones

Personal proximity tag: variety of placement options

Vehicle proximity tags: multiple can be used simultaneously

Robust IP66

Applications

- UNDERGROUND MINES
- SURFACE MINES
- INDUSTRIAL SITES
- CONSTRUCTION SITES



The **IMPACT** technology suite is designed to lead mining communications and digital infrastructure into the future. **MSTs' Proximity Detection System** provides additional engineering control to risks associated with mobile equipment in underground and surface mines, as well as industrial and construction sites. Highly reliable and repeatable detection zones quickly raise alerts to both vehicle driver and the pedestrian.

IMPACT Proximity Detection provides warning and alerts to both personnel (with Tags) and to vehicle operators in their cabins, of other vehicles and personnel in their vicinity, reducing the risk of collisions and thus significantly improving safety and efficiency.

The personnel tag provides detection at 20m distance from a vehicle. Single or multiple proximity low frequency (LF) transmitter

units can be installed on the vehicle (depending on vehicle size) to provide complete coverage for larger vehicles.

The Proximity Detection system uses low frequency magnetics to ensure a repeatable detection range is possible in a variety of environments and around mine infrastructure. Up to fifteen transmitters and fifty tags can operate within the same coverage area.

Additionally, an automated Personnel Tag Checking Station can be provided to give access control into operational areas and allow personnel to check their tags are operating correctly before commencing their shift.

Unaffected by environmental low light, rain, dust or fog, IMPACT Proximity Detection for personnel and vehicles provides a combined system, offering a comprehensive proximity safety solution for both personnel and vehicles in real-time.

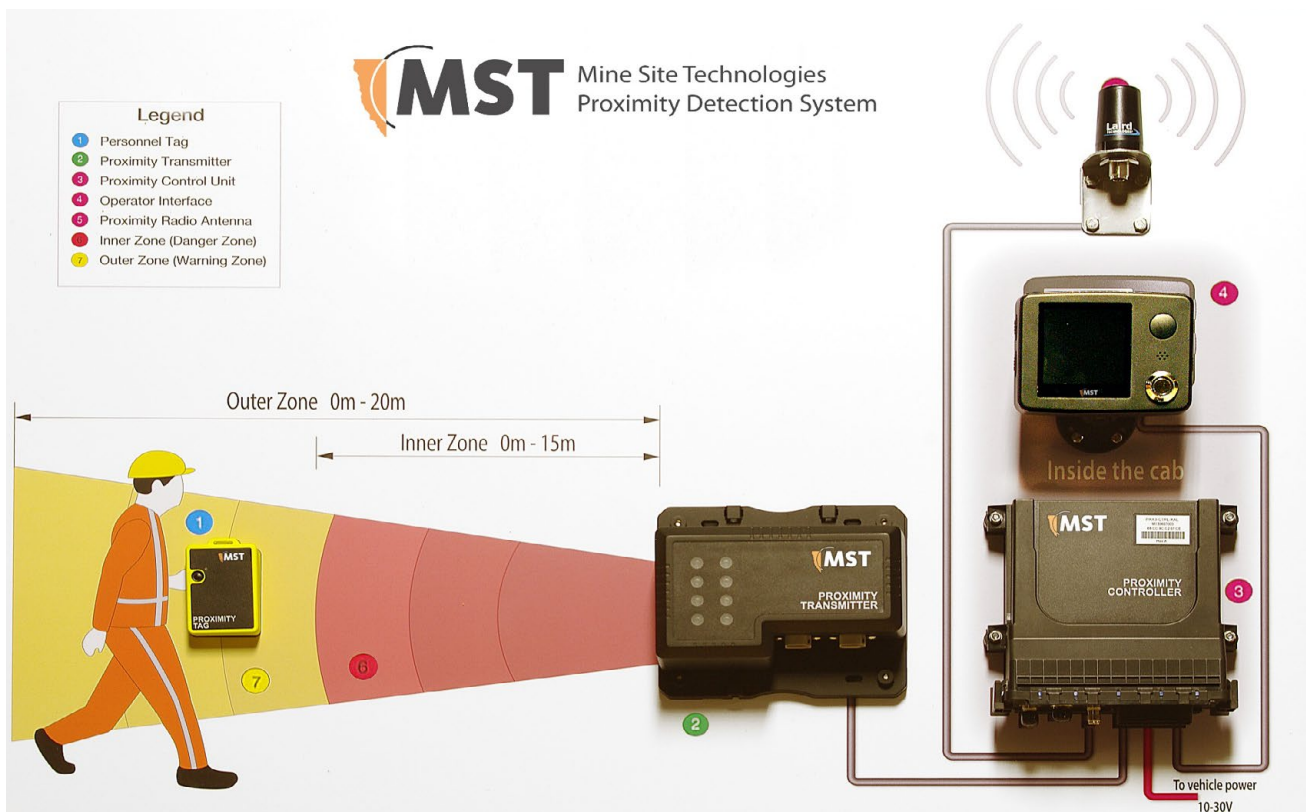


Fig1. Personnel Proximity Alert. Zones of up to 20m are configurable with for personnel safety.

Proximity Detection for safety and productivity

IMPACT personnel and asset Proximity Detection enables accurate tracking, increased personnel safety and, should the situation arise, a vital aid to emergency management. Using magnetic pulse technology the system alerts personnel and operators to dangerous proximity between machinery and personnel or light vehicles.

It consists of a controller, magnetic field transmitter, an operator's panel, and a number of personnel proximity tags (see back page). The Proximity Detection System allows up to fifteen transmitters and fifty tags to operate within the same coverage area.

Multiple detection/proximity zones can be provided, including Warning and Danger, configurable from up to 20 metres. Zones can collapse or vary in size, dependent on the vehicle/equipment speed or operation.

For heightened safety, automated Equipment Stop or Vehicle Speed Reduction can also be implemented when Tags breach the proximity zones. A Tag "Safe Zone" is provided in and around the driver's cabin, negating nuisance alarms. Additionally, the proximity vehicle tags use 12-24VDC power, so sit easily on any vehicle.

The Proximity Detection System incorporates the latest signal processing protocols for highly reliable and repeatable detection of the Proximity Tag carried by personnel or other vehicles.

MST's Proximity Detection System reduces the risk of serious injuries to personnel who work in close proximity to heavy machinery and equipment.

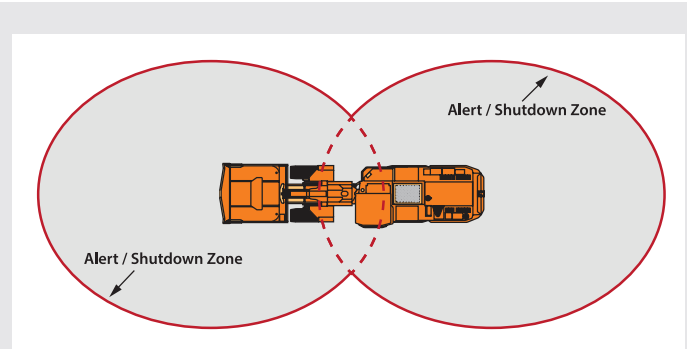


Fig2. Single Proximity Alert. Zones of up to 20 metres can be configured.

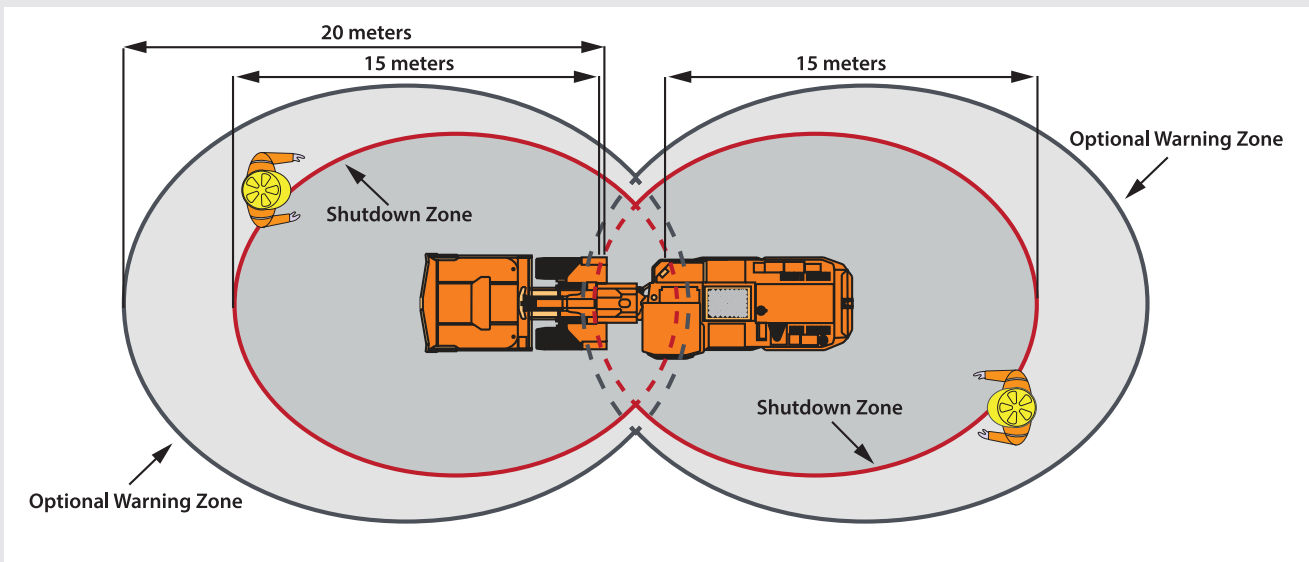


Fig3. Dual Proximity Alert. Zones of up to 20 metres can be configured with optional warning and automatic shut-down parameters.

Features and Benefits

PERSONAL PROXIMITY TAG

- Visible, audio and physical (vibrational) alerts
- Variety of options for flexibility of use, including stand-alone version and integrated into ICCL cap lamp

LOGGING AND AUDITING

- Provides "black box" functionality to facilitate the investigation of incidents.
- Ability to connect to server and upload logged events.

CONTINUOUS SELF DIAGNOSTICS

- System uses built-in feedback tags to continuously self-check critical system components.

DRIVER ALERT

- Visual and audible for increased safety

MULTIPLE DETECTION ZONES

- Flexible to modify for intended use
- Increase levels of alert and/or action
- Highly reliable to quickly raise alerts to both vehicle driver and the pedestrian

REPEATABLE DETECTION ZONES

- Low frequency magnetics ensure repeatable detection range in a variety of environments and around mine infrastructure.

OPERATORS DISPLAY PANEL

- Provides a Visual LED flashing on LED Screen:
Orange - Outer Zone Warning Alarm
Red - Inner Zone Danger Alarm
Blue Square - Tag present in Cabin "Safe Zone"
- Screen brightness adjustable for U/G or surface sunlight operation
- Currently Tag Warning is activated regardless of Tag location to vehicle or LF Transmitter that detects it (multiple Transmitter installation)
- Multiple Quadrant and Tag Location detection (planned) FWD or Behind
- Audible Alarm Provided with volume controls:
Slow Beep - Warning Zone; Fast Beep - Danger Zone
- Intelligent key function provides for disable of system (service etc)
- Incorporates its own magnetic pulse transmitter to detect if personnel are in the operator's cabin



PERSONAL PROXIMITY TAG

- Rechargeable, battery operated
- Flashing visual LED
- Audible buzzer
- Vibration
- Variable Alerts dependent on level of warning
- Alarms can be disabled as required
- Acknowledgement Button for Alarm (Acknowledgement = Off)
- Tag Testing or Access Control
- Can be worn on lanyard, in high-vis vest or on hard hat
- Tag operation 12-16 hours
- Charge rate 2-3 hours
- Operating Temp -20°C to +60°C
- IP66 Rating



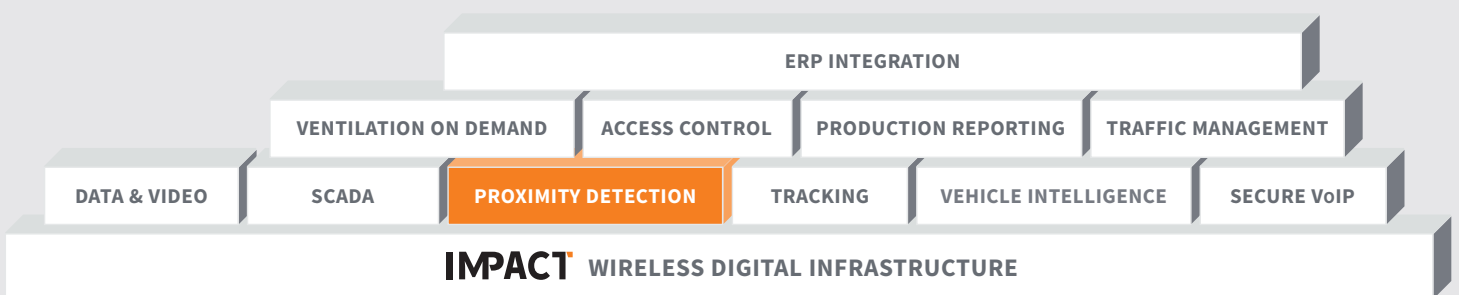
PROXIMITY CONTROL UNIT

- Primary logic component, coordinating all radio communications and magnetic transmissions
- Web server can be accessed via Ethernet or Wi-Fi
- Controls and Configures LF Transmission Fields
- Provides System Configuration, Authorization, Upgrades and Management
- LED Status Lights
- Automated Self Diagnostics
- Downloadable Proximity Events and Diagnostics History
- Cabin "Inert" Zone Access and Configuration
- Maintenance and Configuration via M12 Ethernet LAN
- All Connectors included with Control Unit, Magnetic Mounts recommended
- IP66K rating; Corrosion resistant; impact resistant
- -20°C to +85°C Operating Temp; 12-24VDC Power Input; 189mm x 200mm x 62mm



LOW FREQUENCY TRANSMITTER UNIT

- Generate encoded magnetic signature which is detected and measured by the Proximity Tag
- Minimum Requirement is 1 x LF Transmitter Unit
- Total of 4 x LF transmitters can be provided
- Multiple Quadrant and Tag Location detection (planned)
- Multiple LF Transmitters used for very large vehicles
- 2 x LED Arrays for Visible Alert to pedestrians at 30M in Bright Sunlight
- Connectors included with LF Transmitters
- LF Transmitter Cables will need to be customized per vehicle type and as per installation requirements, Connectors provided
- Magnetic Mounts recommended
- IP69K rating; Corrosion resistant; Impact resistant
- -20°C to +85°C Operating Temp; 340mm x 150mm x 110mm
- Power provided from Control Unit



MST offices and support centers are strategically located in the world's primary mining regions.

www.mstglobal.com
solutions@mstglobal.com

Australia
Sydney
Level 5, 113 Wicks Road
North Ryde
Sydney NSW 2113
Tel: +61 (0)2 9491 6500

United States
Denver
13301 W 43rd Drive
Golden, Denver
Colorado 80403
Tel: +1 303 951 0570

Chile
Santiago
Vitacura 2771, Of 503
Las Condes,
Santiago 7550134
Tel: +56 9 7772 3819

Russia
Moscow
Office 318a
Lesnaya, 43
Moscow 127055
Tel: +7 (499) 978 72 11

South Africa
Centurion
Unit 1, Oxford Office Park
3 Bauhinia St
Gauteng 0046
Tel: +27 (0) 12 345 6100

China
Hangzhou
Building 5
1413 Moganshan Road
Hangzhou 310011
Tel: +86 571 8580 3320 Ext 206