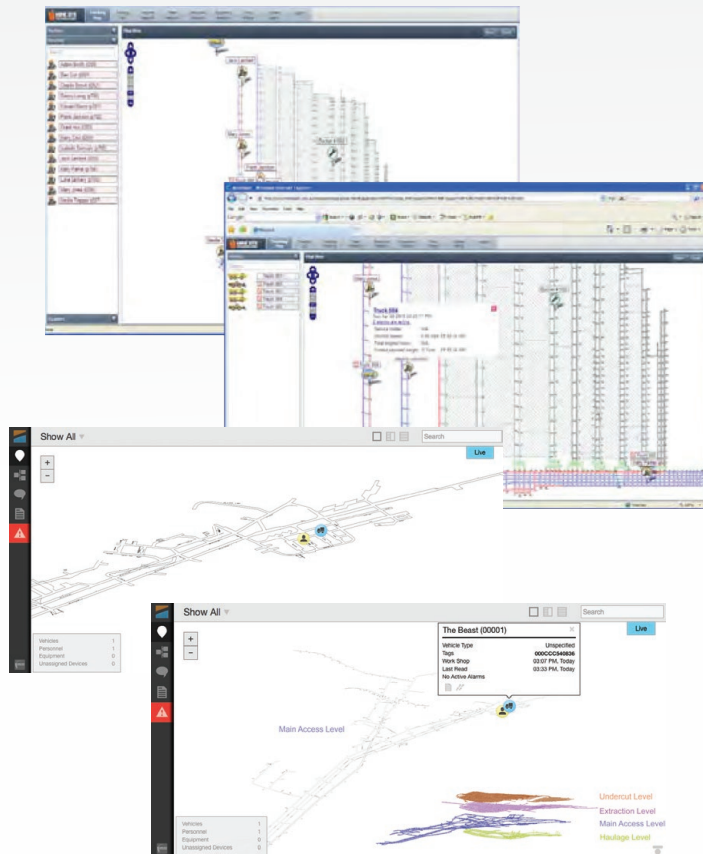




Productivity and Safety through  
Mine-Spec digital applications

# IMPACT<sup>+</sup>

asset tracking



Asset Management

Personnel Safety

Traffic Management

Scalable system

Time and attendance reporting

## Applications

**ASSET LOCATION**  
**MOVEMENT TRACKING**  
**BOTTLENECK IDENTIFICATION**  
**TRAFFIC MANAGEMENT**  
**ACCESS CONTROL**  
**ELECTRONIC TAG BOARD CONTROL**  
**INTELLIGENT VENTILATION CONTROL**

**The IMPACT technology suite is designed to lead mining communications and digital infrastructure into the future. The IMPACT tracking system has been specifically created for the mining industry to operate within the harsh environments encountered in all types of mining from underground to surface.**

The IMPACT tracking system is a cost-effective method of asset and personnel tracking, ensuring the whereabouts of underground staff is always known, and that vehicles and equipment can be quickly located, particularly at shift changes.

Active RFID tags are carried by personnel or attached to assets such as vehicles and other implements. These tags are detected

by strategically placed Wi-Fi access points, typically installed at section entries, load points ore passes, draw points, and refuge bays. Location and movement data can be monitored and tracked, in real time, throughout the mine and presented in list format or as overlays on mine plans and maps.

The IMPACT application software (called MineDash) provides users with a customisable viewer and powerful sorting, filtering, and searching tools, with comprehensive logging and extensive report generating facilities.

The system can be expanded to drive signs, lights and sirens for access control, traffic management systems, electronic tag boards and diesel token management. The software can also be integrated with automated mustering, ventilation and process control systems.

## Features and Benefits

### IDENTIFY AND LOCATE ASSETS THROUGHOUT THE MINE

- Improve management of mine assets
- Accurate reporting of location and cycle times

### VIEWABLE FROM ANY AUTHENTICATED PC

- Simple set up with simple support and operation
- No client software required

### TRACKING ENGINE

- “Tag Reader” are Wi-Fi access points for use by any other Wi-Fi device
- Proven, superior reliability and robust solution from the industry leader in tracking
- Mine specific customisations

### 2.4GHZ WI-FI TAGS

- Superior range ensures reliable tag read

### USE OF RAW LOCATION DATA

- Monitor and manage underground activities and processes for accurate alerts on deviations

### INTRINSICALLY SAFE FOR UNDERGROUND COAL MINES

- For use in gassy environments
- High IP, rugged construction

### ENABLES LOCATION AWARE DIESEL TOKEN MANAGEMENT APPLICATIONS

- Improved safety through accurate zone access control for personnel and vehicles

### BLOCK LIGHT ACTIVATION

- Improved safety and efficiency through optimised vehicle movements

### MULTIPLE FORM FACTOR OF TAGS

- Suit multiple applications
- ICCL tag is always with mining personnel and charged with lamp, allowing PED text or other communications
- Internal self-contained battery units no
- Vehicle powered tags

### OPEN STANDARD 802.11 b/g WI-FI PROTOCOLS

- Not just a dedicated tag reader but an open Wi-Fi network, allowing a myriad of other devices and applications to run from the IMPACT network



# Typical asset tracking system

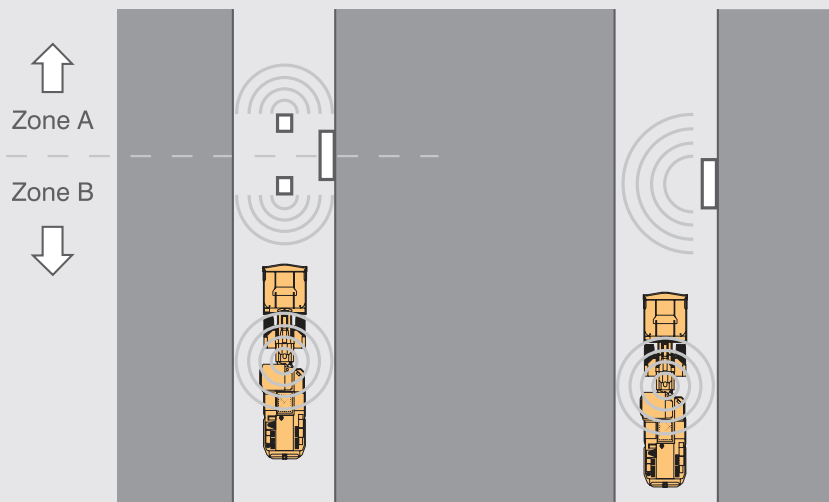
The IMPACT personnel and asset tracking solution enables accurate tracking, increased personnel safety and, should the situation arise, a vital aid to emergency management. The system uses active RFID tags attached to vehicles, assets and carried by personnel together with wireless access points to indicate movement and location within the mine.

The tags can be stand-alone or integrated into the MST Integrated Communications Cap Lamp (ICCL). The tags unique identification data is registered each time it passes a Wireless Access Point. This data is logged to the database and then displayed in the desired format, allowing the location to be known and tracked, at all times, throughout the mine. When using the optional web based viewer, location and movement data can be combined with user-defined rules to trigger a desired action.

The active tags use a 2.4GHz signal which propagates extremely well in an underground environment increasing the accuracy and reliability of tag reads.

The wireless access points can be configured to work with a single radio for presence detection or with two radios and directional antennas to determine the direction of travel. The latter method allows accurate 'zone boundaries' to be established. As a safety measure, in the unlikely event that surface communications are lost, the wireless points have the ability to display tag read data on underground signs and store it in a cache to be replayed when the network link is restored.

The tracking solution can be integrated into other systems to provide diesel token monitoring, access and ventilation control, traffic management and automated mustering systems.



**Fig1. Zone boundaries.** The left-hand example shows a truck moving from Zone B to Zone A. The truck will be detected by the directional antenna at the edge of Zone B, followed by the antenna at the edge of Zone A, giving a direction to movement. The right-hand image shows presence detection, whereby the truck is detected as having passed the antenna.

NOTE: The same methodology applies to people carrying tags as they move past Wi-Fi APs (Readers) to monitor their location in real time to support the mines' safety systems.

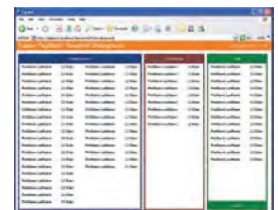
## MINEDASH TRACKING VIEWER

- Web based viewer - Use any viewer on any platform
- Customisable Groups
- Scalable - view any area from M's to KM's
- Powerful location tracking
- Easily add or remove assets
- Tracking of Tagged Equipment, Vehicles and MinePhones



## TAG BOARD VIEWER

- Customisable display
- Easy and rapid identification of personnel and vehicles



## ZONE DISPLAY UNIT

- Diesel token management tracks maximum permissible number of vehicles
- Location data can drive block lights or traffic control



## ACTIVE RFID TAGS

- Standalone or available as an integrated option with MST's Cap Lamp
- Transmits: unique ID, battery level and checksum data
- 60m - 120m range





## NETWORK INFRASTRUCTURE

- Takes your LAN underground cost effectively
- Forms the foundation of the IMPACT portfolio
- Enables remote monitoring and control of equipment
- Allows easy and modular design of underground networks
- Facilitates wireless data communications and VoIP
- Reads Wi-Fi tags to support location aware application
- Rugged IP66 housing designed for the mine environment



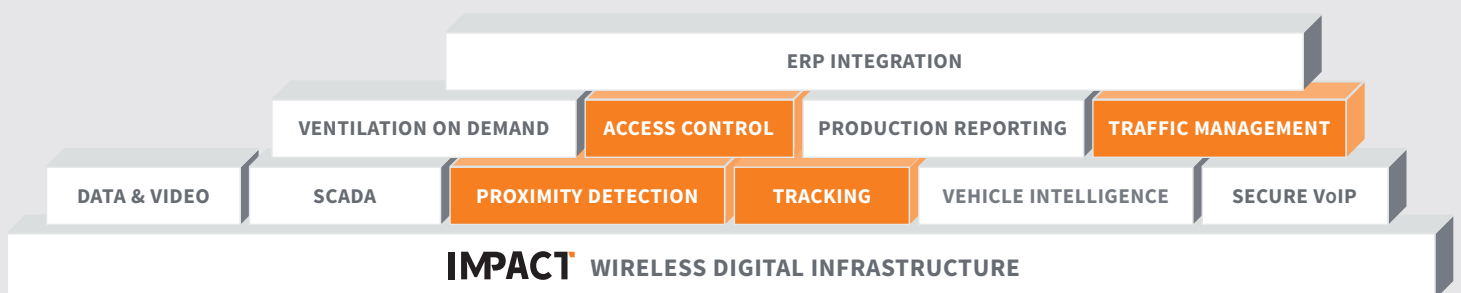
## VEHICLE INTELLIGENCE PLATFORM

- View vehicle diagnostics in real-time
- Payload data in real-time
- Acquire vehicle location data
- Report productivity information with greater accuracy
- Integrate with leading manufacturers' equipment (Such as Caterpillar etc)
- Compliments your existing Mine Site Technologies Ethernet system



## PROXIMITY AWARENESS

- Reduce risks in personnel / vehicle interactions
- Minimise communications to control room
- Notify operators instantly in-cab



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

[www.mstglobal.com](http://www.mstglobal.com)  
[solutions@mstglobal.com](mailto:solutions@mstglobal.com)

### Australia

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

### Russia

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

### United States

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

### South Africa

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

### Chile

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

### China

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