

Digital Mine

This is the Digital Mine Collision Management System Above Ground







How can you make your mining operation safer and more reliable while helping to ensure optimal performance at a lower sustainable cost?

As a mine site operator, this Collision Awareness System for open pit mines enables your mine to enhance production and efficiency, while increasing safety and control. Using advanced technology field hardware and communications software, along with best-practice business processes, the Digital Mine's safety technology provides industry-proven reduction in vehicle interaction risk.

Further features include GPS-based equipment positioning, equipment health monitoring, maintenance tracking, blending, and production reporting. With over 12 years of recognition for its optimization algorithm, and over 10,000 installations worldwide, the Digital Mine's safety technologies are considered your go to source for helping mine sites operate safer and reliably.



Digital Mine Collision Awareness Systems

Driving Towards 'Zero-Harm' and Maximum Productivity

Help safeguard your people, equipment and infrastructure with the Wabtec Collision Awareness Solutions Suite, a sophisticated and adaptable collision awareness and reporting system developed specifically for the mining industry.

Above Ground...

Wabtec's Collision Awareness System – Surface offering can be deployed with a variety of proximity detection methods including GPS, radio frequency (RF), VLF magnetic and cameras to provide one of the most effective high integrity systems on the market. With Wabtec's Collision Awareness System reporting and analytics tools to monitor and manage operator behavior, you can also improve safety culture and compliance at your mine site.

Differentiating Features

- High integrity proximity detection
- 360° protection for vehicles, equipment and personnel
- GPS tracking and real-time health monitoring surface solution
- Real-time data connectivity
- Back-to-base reporting
- Safety adherence technology
- Proven in use over 12 years and 370 million hours of operation

Optimized Outcomes

- Help reduce vehicle interaction risk
- Help increase safety performance
- Increase production
- Reduce financial risk
- Lower ongoing ownership cost

Our Main Products

Surface Collision Awareness System



| | |
|-----------------|--------------------------------------------------------------------------------------------|
| Accurate | <ul style="list-style-type: none"> • Multiple technologies and self-test |
| Reliable | <ul style="list-style-type: none"> • 10+ years 370 M/hrs of operation |
| Fast | <ul style="list-style-type: none"> • Real time monitoring and reporting |
| Smart | <ul style="list-style-type: none"> • Remote monitoring and troubleshooting |
| Simple | <ul style="list-style-type: none"> • Integration and expansion capability |
| Flexible | <ul style="list-style-type: none"> • Configurable to mine site requirements |
| Low Cost | <ul style="list-style-type: none"> • Lower total-cost-of-ownership |



CAS-CAM



CAS-RF



CAS-GPS



CAS-WEB

Personnel Heavy
Vehicle EmitterDriver Fatigue
MonitoringIntervention
Controls

Personnel Tag

Our Commitment

Achieve 'zero-harm' and
enhance productivity

↓ Safety incidents

↑ Safety performance

↑ Production

Our Solutions

- 360° protection
- GPS tracking
- Data connectivity
- Back-to-base reporting
- High integrity proximity detection
- Protect personnel
- Safety adherence technology

**Improve safety performance,
production loss, and repair costs
from vehicle collision**




Digital Mine Collision Awareness Systems at a Glance

The Benefits at a Glance




- Proven proximity detection technology that sets new standards for workplace safety and facilitates 'zero harm' objectives.
- Improve operator situational awareness and reduce the incidence of injury.
- Fully configurable and adaptable to site-specific requirements.
- Real-time and historical reporting.
- Supported worldwide by expert Wabtec Mining teams.
- Effective, reliable and intuitive operation.
- Whole of mine safety aid:
 - OEM independent
 - Stand-alone system
 - Low "total cost of ownership"
- Proven in use over 12 years and 370 million hours of operation.




GPS tracking

Provides real-time predictive proximity alerts and vehicle tracking via web based reporting. GPS augmented with TOF RF for high integrity tracking.




Back-to-base reporting

Provides interaction reports, journey replay, hot-spotting, geofenced exclusion zones/alarm events, safety adherence reports and system health monitoring.




Vehicle display unit

Touch screen HMI with graphics display of remote objects showing ID, range, speed and heading with configurable audible and visual alarms.




Protect personnel

Personal Tags/Protection Units alert workers in close proximity to heavy mobile equipment, substantially reducing the risk of personal injury.



360° protection

Strategically placed proximity units afford operators unparalleled situational awareness—contributing to improved safety levels on-site.




Visual aid

Robust wide-view cameras eliminate blind spots with auto switching on direction of travel and to zones of object detection.



Safety adherence technology

Monitor and correct unsafe operator practices to improve your mine site's safety culture and compliance.



Highly accurate proximity detection

The proximity detection system provides unparalleled accuracy for improved protection and two-way alarming between vehicles, personnel and infrastructure.



Data connectivity

Real time data connectivity allows for personnel tracking and messaging, and asset tracking.



Value Pillars



Safety



Enhance mine site safety. Workplace injuries due to Vehicle Interactions are unacceptable and with effective mine site controls and Wabtec's Collision Awareness System suite of solutions they can be preventable.

The global mining landscape is fluid and dynamic.

Technological advancements have led to fundamental changes on the ground and the developing world's need for resources has impacted the industry greatly. But the very real risks associated with mining remain.

Our Collision Awareness Suite (CAS) is an integrated risk management system for mines. A sophisticated operator's aid that allows for enhanced situational and proximity awareness, the Collision Awareness Suite improves safety on site by reducing vehicle interaction risks. Proven in open cut environments, CAS allows for detection between people, vehicles and infrastructure.

Specifically, CAS is effective in reducing the incidence of collisions between:

- Vehicles and people
- Vehicles and vehicles
- Vehicles and infrastructure



Managing Operator Behavior



Monitor and correct unsafe operator practices with Wabtec's Mining Collision Awareness System

The Collision Awareness System offers mining companies the technology to manage operator behavior with effective reporting tools that improve safety culture and compliance. This represents a highly cost-effective way of avoiding disruptions and productivity losses.

In addition to being a market-leading safety system, the Collision Awareness System is also a valuable reporting tool. The system allows mine site personnel to monitor key statistics regarding vehicle interactions and near misses, providing site and corporate personnel with valuable insights into on-site safety as well as data that may be used to improve individual operator behavior.

The Collision Awareness System is an Original Equipment Manufacturer (OEM) independent system allowing for easy site integration. It is adaptable, meaning that mine site employees only need to learn one system for use across a variety of applications and environments.



Industry Leaders in Compliance



Set new standards in workplace safety and compliance

Death and injury through workplace collisions are unacceptable and may be prevented.

At Wabtec Mining, we believe that workplace safety is not simply a matter of ticking boxes; it is good business practice.

To that end, we are matching the commitment shown by our clients to workplace safety by investing in technologies that improve on-site safety.

Wabtec's Digital Mining Collision Awareness System is the most sophisticated proximity detection and collision avoidance system on the market today. The system offers the mining industry a unique opportunity to improve on-site safety and demonstrate their safety credentials to employees, clients and the regulatory bodies.

Wabtec's Digital Mining Collision Awareness System has been proven in use for over 12 years and over 370 million hours of operation.



Service and Support



Ensure year-round reliability

With Wabtec's Digital Mining service and support team at your disposal you can ensure that Collision Awareness System runs seamlessly all year round.

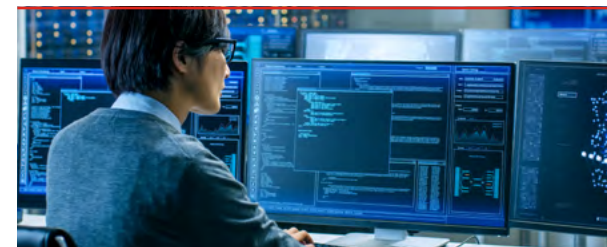
With unsurpassed service and support, Wabtec's Digital Mining will keep your Collision Awareness system in excellent condition.

Our technicians and software engineers work behind-the-scenes so that the system is upgraded as necessary and are available for site call outs.

Wabtec's Digital Mining Collision Awareness service offering includes help-desk support, on-site maintenance, service level agreements, end-user training, remote equipment monitoring and data analytics.



Technology



Advanced collision awareness technology

The Collision Awareness Suite from Wabtec's Digital Mine represents benchmark technology in collision awareness systems.

Embodying the spirit of Thomas Edison who famously said, "I find out what the world needs, then I proceed to invent it," Wabtec's Digital Mining produces technology driven solutions for mine sites around the world. Employing GPS technology for surface operations, radio communications, blind spot cameras, proximity sensing and smart two-way proximity alerts that function in realtime, Collision Awareness is the most sophisticated high integrity system on the market.

With in-vehicle displays, a user-friendly interface and the capacity to collect data that may be used to manage operator behavior and improve a site's safety culture, the Collision Awareness System is the market leader in collision avoidance.



Product Overview



CAS-CAM



CAS-RF



CAS-GPS



CAS-WEB



Personnel
Tag



Personnel Heavy
Vehicle Emitter



Self
Test



Intervention
Controls



Driver Fatigue
Monitoring

CAS – SURFACE

Product Portfolio

- **CAS-CAM** – camera system for blind spot vision
- Proximity Detection:
 - **CAS-RF** – Radio Frequency (RF) based proximity solution for heavy and light vehicles
 - **CAS-GPS** – GPS based proximity solution for heavy and light vehicles
- **CAS-WEB** – Web based reporting system
- **Personnel Tag** – personnel protection solution
- **Self-Test** – real-time system health monitoring and reporting

CAS Extensions

- **Advisory Controls (level 8) and intervention Controls (level 9)** – global EMESRT initiative using industry standard PDS-OEM interface
- **Driver Fatigue Monitoring** – integration with third party systems (SmartCap – complete, others – as requested by customers)
- **Fleet Management System** and Dispatch – integration with third party system
- **Digital Mine Integrated Solutions** – integrated CAS, Machine Performance

Value Proposition and Competitive Advantage

Improve safety performance, production loss, and repair costs from vehicle collisions

- Configurable to mine site requirement
- High integrity using multiple technologies and self-test
- Graphics displays shows alarm logic – ↑ level of operator confidence and ↓ levels of nuisance alarms
- Proven-in-use 12+ years and 370 million hours of operation
- Real-time monitoring and reporting
- Credible roadmap to L8 and L9 solutions
- 360° situational awareness
- Integrated safety, productivity, and efficiency solutions
- Whole-of-mine solution
- Lower 'total-cost-of-ownership'

**Drive operator behavior to achieve 'zero harm' objectives.
Platform for Digital Mine Integrated Safety-Productivity-
Efficiency Solutions**



About Wabtec

Wabtec Corporation (NYSE: WAB) is a leading global provider of equipment, systems, digital solutions and value-added services for freight and transit rail. Drawing on nearly four centuries of collective experience across Wabtec, GE Transportation and Faiveley Transport, the company has unmatched digital expertise, technological innovation, and world-class manufacturing and services, enabling the digital-rail-and-transit ecosystems.

Wabtec is focused on performance that drives progress, creating transportation solutions that move and improve the world. The freight portfolio features a comprehensive line of locomotives, software applications and a broad selection of mission-critical controls systems, including Positive

Train Control (PTC). The transit portfolio provides highly-engineered systems and services to virtually every major rail transit system around the world, supplying an integrated series of components for buses and all train-related market segments that deliver safety, efficiency and passenger comfort.

Along with its industry-leading portfolio of products and solutions for the rail and transit industries, Wabtec is a leader in mining, marine and industrial solutions. Wabtec has approximately 27,000 employees in facilities throughout the world.

Visit the company's new website at:
WabtecCorp.com

For more information

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