

CAT[®] MINESTAR[™]

DETECT FOR UNDERGROUND

PEER-TO-PEER
COLLISION AWARENESS



CAT MINESTAR DETECT FOR UNDERGROUND

PREVENT UNINTENDED INTERACTIONS BETWEEN PEOPLE AND ASSETS



Operators have spatial awareness to the front and rear of their machines. They know when other machines are in close proximity and receive alerts that aid in the prevention of incidents. Operators and on-foot personnel have awareness of each other and their positioning in real time.

These are just a few of the outcomes you can expect when you implement Cat® MineStar™ Detect for underground into your operation.

Caterpillar combines this proven technology with the global support of the Cat dealer network to help you take the safety of your underground operation to the next level.

HIGH-PRECISION RANGING DETECTION

- » Uses active Wi-Fi to calculate distance between assets
- » Equips personnel and machines
- » Superior signal propagation compared to passive technologies

OEM MACHINE AGNOSTIC

PROVIDES OPERATORS REAL-TIME ALERTS

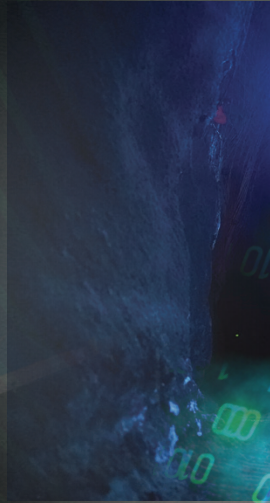
ENHANCES OPERATOR SITUATIONAL AWARENESS

LIMITS RISKS ASSOCIATED WITH PERSONNEL AND VEHICLE INTERACTIONS

ENABLES OPERATOR DECISION-MAKING

PROVEN IMPLEMENTATION APPROACH

- » Change Enablement
- » Coaching & Consulting



HOW DOES IT WORK?

DETECT ENHANCES OPERATOR VISIBILITY



Cat MineStar Detect for underground utilizes a proprietary Time of Flight technology to enable high-precision ranging of assets without an on-site network via machine-to-machine communication. The system delivers excellent signal propagation for longer range and visibility.

- + Uses Active Wi-Fi to propagate signal, covering corners and calculating distance between assets.
- + If equipped with the Detect for underground display, the system allows personnel to broadcast emergency messages (panic button) to assets that are in close proximity.

OPERATOR AWARENESS

Provides operators continuous awareness of their surroundings, accurate to within one meter.

- + Audio and visual alerts
- + Multiple warning levels
- + Ability to see around corners





WHY SHOULD WE CONSIDER IT?

WHAT MAKES DETECT FOR UNDERGROUND RIGHT FOR MY OPERATION?

Detect for underground is a proven technology-enabled solution that makes it possible for underground mines to operate more safely. Detect limits risks associated with vehicle interactions by helping you see potential hazards, mitigate collisions before they happen and manage traffic safety throughout the underground environment.

- + Keeps machine operators and on-foot personnel aware of each other and their positioning in real time.
- + Alerts operators and personnel when machines come into close proximity to aid in collision awareness.
- + Gives operators spatial awareness: front or rear direction and distance.
- + Enhances operator decision-making ability by providing quality information on the proximity of other assets.

WHY CATERPILLAR?

PROVEN SOLUTIONS BACKED BY EXPERTISE & SUPPORT



MINESTAR: A PROVEN SOLUTION

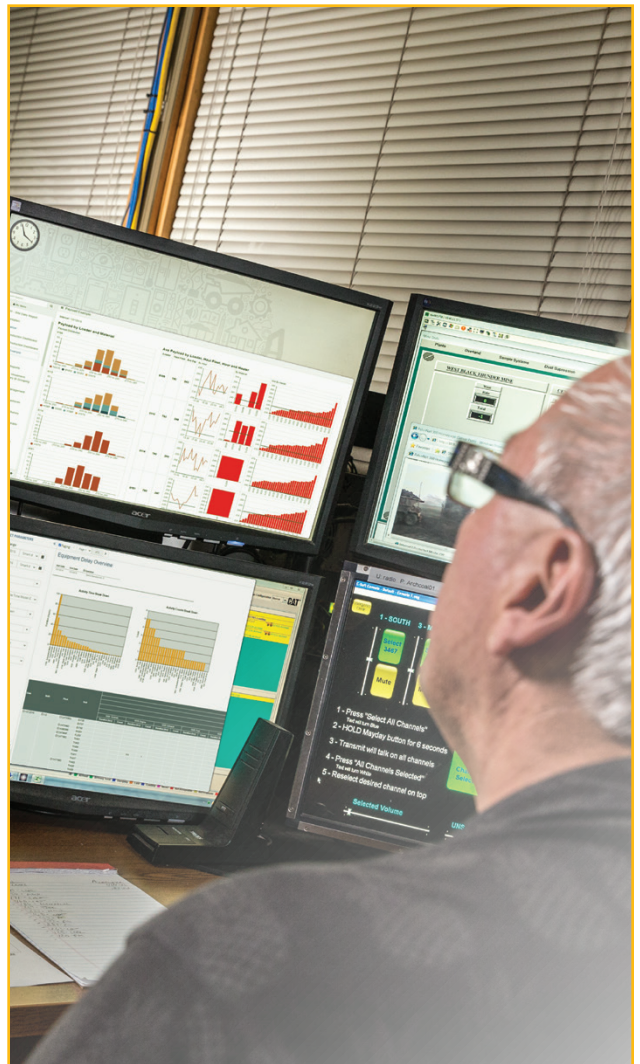
- + Robust testing and validation process
- + Designed for challenging environments
- + Validated across multiple applications



WORLD-CLASS SUPPORT FROM CATERPILLAR AND CAT DEALERS

Support options include online and remote support delivered by Caterpillar, on-the-ground support from Cat dealers, and consultation services provided by both Caterpillar and Cat dealer experts.

- + Realize the full potential of your investment
- + Achieve critical availability of your MineStar technologies
- + Sustain operational gains through continuous improvement





IMPLEMENTATION EXPERTISE

We're uniquely qualified to integrate our products into your environment and provide guidance for long-term success.

Installation and Deployment

We work with local Cat dealers to install, deploy and integrate MineStar hardware and software into your environment, and then ensure a smooth transition to your own team.

Training

Our comprehensive suite of training opportunities allows users to build skills through web-based, instructor-led, virtual reality and on-the-job courses.

Change Enablement

Caterpillar experts support initiatives to help your personnel prepare for the transition to technology.

Processes and Procedures

We work with site leaders to develop the operational processes and procedures that are essential to success.



MINESTAR: AN INTEGRATED AND SCALABLE ECOSYSTEM

MineStar allows you to follow a phased approach to your technology journey, leveraging any of the building blocks that are the foundational elements making up your site operating system. Additional building blocks for safety and surface management use key common system components, allowing for the interchange of planning, blending, survey and production data within the one system.

- + Integrates data across the operation
- + Enables operational execution by managing and optimizing all assets



MINESTAR REPORTING

This centralized data warehouse consolidates data from multiple MineStar products. Flexible, customizable reporting allows you to extract the information you want, whether you leverage Caterpillar's own purpose-built mining analytics platform or export to a third-party platform.

TRACK, MONITOR, AUTOMATE AND MANAGE YOUR ASSETS WITH CAT MINESTAR SOLUTIONS

Cat MineStar Solutions is one of the mining industry's most comprehensive and thoroughly integrated suites of technology offerings for surface and underground operations.

MineStar can track, monitor, measure, manage and optimize all types of assets—from material and people to production machines and light vehicles on site. Whether you deploy a single technology or a multi-purpose solution, you can expect a safer, more productive and more efficient operation.

MineStar capabilities include:



TERRAIN, which increases efficiency and reduces variability of drilling, dragline, grading and loading operations through the use of high-precision guidance technology.



FLEET, which is an integrated fleet monitoring and management system that helps you measure, manage and optimize the use of assets at your site. It automatically records and tracks data up and down your value chain, providing insights that help you identify what's working and fix what's not.



DETECT, which helps increase operator awareness, enhancing safety at your operation. It includes a range of capabilities designed to assist the operator, including collision awareness and fatigue risk management for mobile equipment.





HEALTH, which delivers critical event-based machine condition and operating data for your entire fleet. It includes comprehensive equipment health and asset monitoring capabilities, with a wide range of diagnostic, analytic and reporting tools.



COMMAND, which makes it possible for mines to automate a single mining process, remotely control a single machine, automate multiple types of equipment across a mixed fleet, or implement a completely autonomous fleet of haul trucks that operate around the clock with no human intervention.

PREVENT UNINTENDED INTERACTIONS — BETWEEN — PEOPLE & ASSETS

One of the biggest risks to safety in an underground mining operation is interaction between mobile assets and personnel. Cat MineStar Detect for underground addresses these risks by helping you see potential hazards, mitigate collisions before they happen and manage traffic safety throughout the underground environment.



Benefits are as compared to operations without a similar technology. Actual results may vary based on application, infrastructure, network connectivity, equipment maintenance and operating procedures, among other factors.

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