



## TAKE YOUR MAINTENANCE FROM REACTIVE TO PROACTIVE



Cat® MineStar™ Solutions can help you take your maintenance approach from reactive to proactive — helping you improve equipment availability and reliability.

MineStar solutions for maintenance help keep you connected to your machines so you can avoid problems before they significantly impact your operations, run machines as efficiently as possible for as long as possible, and keep unplanned downtime to a minimum.

MineStar integrates directly with the machine's electronics, monitoring and reporting on all aspects of its health and performance. This data allows you to compare each machine to the rest of your fleet or to established benchmarks and enables you to detect issues early and correct them—often with simple, routine procedures instead of the long and costly repairs an undetected issue can cause.

Maintenance products and services enable you to collect and transmit equipment data, monitor critical machine parameters, obtain real-time alerts, analyze operational trends and patterns, predict failures and receive repair recommendations — assisting you with proactive maintenance services and predictive equipment analysis.

- Boost machine availability
- Reduce unplanned downtime
- Prevent costly failures
- Make informed decisions
- Track performance

### COLLECTION: GATHER DATA

Electronic sensors and control systems on your equipment generate large volumes of critical data, which you can use to monitor machine health and condition, track equipment hours and usage, improve work flows and production cycles, and improve machine uptime. But that information doesn't become useful until you have access to it.

Our robust MineStar connectivity solutions collect and transmit this critical data so you can use it to make the right maintenance decisions — decisions that allow you to improve reliability, reduce unplanned downtime and prevent failures. This data becomes even more valuable when leveraged in our off-board applications and services.

#### Product Link™ Elite

Product Link Elite (PLE) is designed as a factory standard or as an aftermarket retrofit option to transfer machine electronic data from Cat surface and underground mining equipment as well as equipment from other manufacturers. This remote monitoring solution:

- Allows simultaneous data transfer to the local server and the Cat Cloud.
- Is compatible with both Caterpillar and third-party radios to accommodate site preferences.
- Enables firmware remote flashing capabilities.
- Allows for data store-and-forward in case of poor connectivity.
- Leverages low-precision Global Navigation Satellite System (GNSS) for equipment location/positioning on site.





### Product Link Elite — Data Streaming

PLE Data Streaming enables the transfer of over 150 machine health and operating data points via ethernet communication with up to 1Hz sample rate. This offering pushes data out in an open and accessible format into an off-board AVEVA® PI System™ to be consumed by third-party applications.

Buffering capabilities safeguard data in the event of poor or no connectivity on site.

### VIMS Converter

This server-based application allows efficient conversion of VIMS data files from a proprietary format to a non-proprietary readable format (Comma Separated Value .csv) for ingestion into a system of choice.

### VIMS Telemetry

This offering enables third-party access to all Cat equipment operating parameters and events via a serial communication port at a 1Hz sample rate. Parameters can be requested in groups of 16 at a time by the 3rd party system provided ECM and ingested into their application for further visualization and analysis.



## VISUALIZATION: EASILY ACCESS YOUR DATA

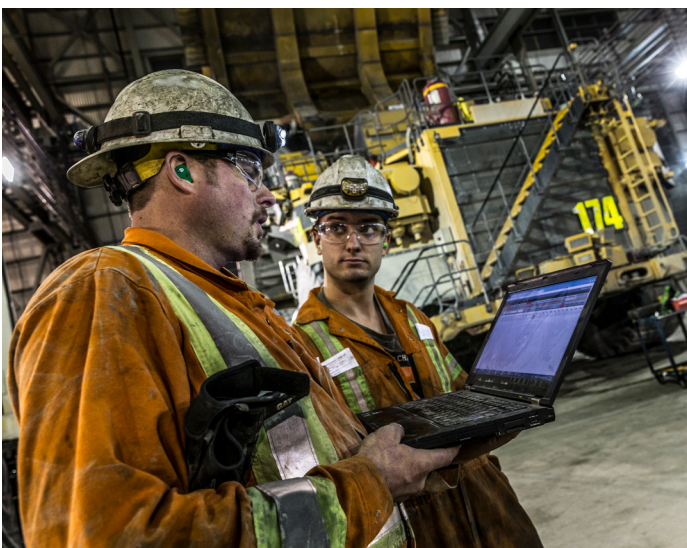
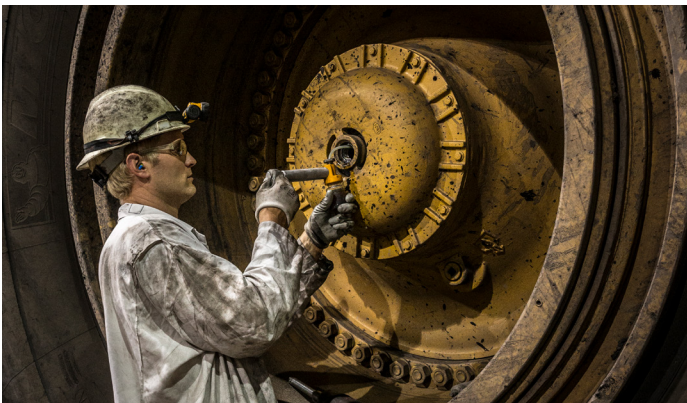
MineStar applications provide visualization and reporting of machine electronic data — from diagnostic tools for technicians and a site-based visualization and reporting tool, to innovative offerings that deliver insights you can use to take your maintenance organization from reactive to proactive.

### Health Equipment Insights

Cat MineStar Health Equipment Insights is a cost-effective and user-friendly cloud-based data visualization and reporting system that you can access from any web browser with a simple activation, using hardware already installed on your machine. It empowers you to efficiently view, manage and use machine data — so you can make informed maintenance decisions that will help maximize the availability of your equipment.

Health Equipment Insights visualizes, analyzes and reports on Machine Electronic Data (VIMS and Product Link) from Cat and select other OEMs; productivity data; fluids data from Cat SOS or third-party fluid sampling providers; and inspection data when Cat Inspect is used.

- User-customizable.
- Interactive dashboards and intuitive drill-down functions.
- Powered with over 40 data widget options.
- Automated email reports scheduling.
- Compatible with VIMS data transferred through PL cellular radios, established SFTP transfers or any MineStar Health applications.







## Health Office

Housed on the dealer or mine server, this data visualization and reporting tool enables real-time event notification for immediate visibility of abnormal machine conditions. It helps you see and analyze machine data you can use to make important maintenance decisions that help reduce unscheduled stoppages, improve the efficiency of the maintenance organization and increase availability of equipment. Office monitors machine health and production and manages and analyzes maintenance events.

- Interfaces with Cat machines and those from other manufacturers.
- Collects machine data such as trends, datalogger, production, cumulatives, snapshots, histograms and alarms.
- Performs live channel polling.
- Generates health reports, charts and KPI analysis.
- Visualizes maintenance events on your mine map.
- Allows for automatic data merging and reporting, and automatic delivery of reports via e-mail or web.

## Technician Toolbox

This service and diagnostics tool empowers technicians — making it possible for them to perform individual machine configurations on the spot and review data through a customizable and user-friendly dashboard. In addition, users can trigger snapshots and activate dataloggers to gather critical machine health data.

- Leverages a new software architecture to deliver a more reliable machine connection, so you can get equipment back to work faster.
- Delivers a modern, enhanced user experience.
- Provides advanced interactive reporting with widgets and dashboards powered by Health Equipment Insights.
- Integrates with Cat Cloud, providing an option to directly upload data for visualization in Health Equipment Insights.



## ANALYSIS: GAIN INSIGHTS

Cat Health Equipment Insights and Office applications provide the tools to analyze your machine health and make informed decisions to improve your maintenance and repair activities as well as your equipment's performance.

You can also collaborate with your Cat dealer to take advantage of condition monitoring services. With access to a global database of machines, dealers can provide timely maintenance recommendations that let you focus on mining while they focus on the health of your equipment.

Condition monitoring combines the strengths of your maintenance organization with those of your local Cat dealer and Caterpillar. It leverages analytics to deploy a predictive maintenance initiative that:

- Utilizes machine condition monitoring data for analytics.
- Improves availability and reliability through predictive maintenance.
- Empowers reliability engineers to improve maintenance planning.
- Extends machine life.



For more information, go to [cat.com/minestar](https://cat.com/minestar) or contact your local dealer.