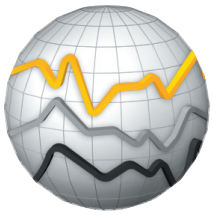
# TRIMBLE MONITORING SOLUTIONS: MINES



## KEY FEATURES

- Automated, real-time monitoring system
- Monitoring high wall stability
- Monitoring tailings dams integrity
- Multi-sensor support

## Solutions for Safe Mining Operations

### THE ROLE OF MONITORING

Monitoring installations are essential for safe mining operations.

For mining projects it is important to detect movement, the rate of movement and the rate of increase of the movement in order to identify potential failure modes.

Monitoring provides the information needed to support a safe working environment and economic and efficient mining operations whilst mitigating the associated risk.

### THE FOCUS OF MONITORING

Highwalls, excavated faces and potentially unstable slopes which create hazardous work environments will be monitored by the system.

Vibrations and movements of mine infrastructure and assets caused by mining activities such as blasting, drilling or excavating will be detected by the system.

The early detection of potential failure of stockpiles and tailings dams which may dramatically impact short and long term mining operations is yet another monitoring objective.

### TRIMBLE 4D CONTROL

Trimble® 4D Control™ software is the key element of the Trimble Monitoring system. The modular design facilitates an industry specific solution capturing data from GNSS, optical, geotechnical, seismic and atmospheric sensors.

The data is processed using advanced, state-of-the-art algorithms and presented in a powerful, yet user friendly, locally-hosted Web Interface. It provides a variety of visualization and analysis tools to identify potential failure scenarios.

Data from atmospheric or geotechnical sensors may be combined with displacement indicators like change in slope distance, settlement or lateral movements to detect common failure modes.

A fully featured computation parser can be used to create customized observables presenting information of specific interest to the analyst.

Significant events such as blasting, drilling, instrument maintenance, sensor replacement and related activities may be logged and displayed on the charts.

Boolean comparators are used to integrate data from GNSS, optical, geotechnical, seismic and atmospheric sensors to create complex alarm conditions.

Alarm notifications are issued by email and SMS to selected recipients and the system may also activate audible and visual alarms.

### DESIGNED FOR DEMANDING ENVIRONMENTS

The Trimble Mine Monitoring Solution is designed specifically for the geotechnical, seismic and survey monitoring analyst.

Intricate data from multiple sensor types is converted into meaningful information from which informed decisions can be made with confidence.

The solution accommodates a smooth transition from periodic monitoring surveys using Trimble Access™ software and Trimble 4D Lite software into complex automated systems using Trimble 4D Control software.

## TRIMBLE NETR9® TI-M GNSS RECEIVER

A full-feature, top-of-the-line receiver with an industry-leading 440 channels for unrivaled GNSS multiple constellations tracking performance intended for monitoring applications.

## TRIMBLE S8 TOTAL STATION

An advanced total station that combines Trimble FineLock™ technology with long-range, distance measurement to provide fast and precise monitoring measurements.

## TRIMBLE 4D CONTROL MONITORING SOFTWARE

A powerful monitoring software that integrates GNSS, optical and geotechnical sensors to collect and manage data, provide computation and analysis, visualization and mapping and alerts and alarms.

## TRIMBLE 4D LITE SOFTWARE

A cloud-based web application designed with the same advanced web interface and back-end stability as Trimble 4D Control, with the advantage that this is available for the analysis of any form of data time series

## TRIMBLE ACCESS MONITORING APP

A monitoring module to guide surveyors through a step-by-step process that speeds up setup, data collection, reporting, and return visits to the same monitoring projects.

## TRIMBLE DiNi® DIGITAL LEVEL

A digital height measurement sensor for any job site where fast and accurate height determination is required.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