



## + GML-Underground

Developed specifically for geotechnical convergence monitoring, the GML system is GroundProbe's industry-disrupting underground monitoring solution.

Capable of detecting rock and ground support movement with sub-millimetre accuracy, the GML offers a range of unprecedented features and benefits for underground monitoring.

**UNRIVALLED SUB-MILLIMETRE ACCURACY FOR EARLY**

**DETECTION**

Boasting unrivalled precision, the GML provides sub-millimetre accuracy of 0.01mm to 0.4mm, making it capable of detecting the slightest rock and ground support

## MAKING MINING SAFER

movement and 170 times more accurate than competing systems on the market.

Without sub-millimetre accuracy, it is impossible to identify critical trends in velocity over short periods of time prior to a collapse. As proven by our history of monitoring deformation in open-cut operations, detecting very slight changes in velocity as early as possible ensures the best chance of a fast response.

### LIGHT-WEIGHT, LIVE DATA STREAMING

In-built processing at the unit allows live data streaming to the surface, in real-time. Convergence, amplitude, coherence, one photograph per scan and all monitoring data are transferred to the mine office for real-time monitoring.

With lightweight data of only 3MB per scan, the data transfer is fast and simple. The fully-processed data, immediately available at the end of every scan, can be accessed by multiple users at any one time, on-site or remotely.



# Features and Benefits

## BEST-IN-CLASS SOFTWARE

The GML is fully compatible with GroundProbe's patented SSR-Viewer software, offering the rapid, precise analysis of data to detect trends, the precise tracking of areas of interest and fast reporting to invested parties. SSR-Viewer processes the complex data collected by the GMS, and makes it easily understood.

Intuitive and easy to use, the software's real time hazard detection with powerful analytical capabilities, renowned by Geotechs in monitoring deformation in open cut operations, has been proven to accurately monitor convergence underground.

## ACCURATE ALARMING WITH REAL-TIME NOTIFICATIONS

Offering world-class alarming capabilities, users can set a range of alarm parameters that are networked, stackable and accurate.

Dedicated and specifically developed for monitoring, alarms can be set on convergence, coherence, amplitude, velocity, inverse velocity, and our patented velocity ratio, allowing the user to correlate data to identify trends. They all trigger on any device, anywhere in the world, in real-time.

## FULL COVERAGE

With large scan area coverage of 360° in azimuth and 270° in elevation, the GML is perfectly suited to be deployed in any work area.

With an all-encompassing horizontal movement, the GML can effortlessly monitor the breath of a crusher chamber or long sections of wall, while its elevation angles ensure the floor of a drive and its backs or roof above can be monitored without difficulty.

## OPERATES IN INHOSPITABLE ENVIRONMENTS

Like all our systems, the GML is extremely durable; proven to reliably operate in the inhospitable environment of an underground mine which commonly experience intense heat, humidity and dust.

Mechanically sound and delivering reliable data, the GML can be deployed and operated in sites that range in temperatures from -5°C to +45°C.

## CAN SEE BETWEEN MESH AND METAL

With near real-time automated data, interference from mesh and other mining infrastructure is all but eliminated. Unlike interferometric-based underground radar technology, the GML sees between the mesh and metal reinforcement of an underground shaft, allowing more areas to be scanned more precisely.

## FAST DEPLOYMENT, MAXIMUM REPEATABILITY

The GML can be deployed quickly and easily, with minimal time between deployments to live, continuous or periodic monitoring of any work area, including drives, workshops and critical infrastructure. Its custom-designed mounting system is quickly deployed, and when not in use, collapses to sit very close to the wall, ensuring it does not obstruct passing vehicles or machinery, or interfere with the workings of an active drive.

Designed to reduce mechanical inaccuracies whilst allowing for maximum repeatability, the GML system rescans an area with sub-millimetre accuracy, with no loss in precision between monitoring campaigns.

## MICRO-FRACTURE DETECTION

With SSR-Viewer's renowned coherence measurement, micro-fracturing of rock and fibrecrete can be detected early, with ultra-high precision.

Whether detecting new cracks, or tracking the progression of ones you already knew existed, the coherence measurement can accurately assure its users how much the area of interest is moving, and if action needs to be taken.

## DATA AND IMAGE CO-REGISTRATION

Real-time, ultra-high definition images are co-registered with the data generated by the system, a technique unique to GroundProbe. When visualised, the deformation heatmap of the data is draped directly over the image, giving spatially co-located information.

By clicking on any part of the image, movement can be reviewed and assessed live. Furthermore, for historical analysis and trend identification, deformation data can be revisited using playback along the timescale.