

OCTOBER 2017

GROUND BREAKING NEWS

INTRODUCING

GML-UNDERGROUND





Since long before I joined GroundProbe, our customers have been asking us if we have a solution for convergence monitoring in underground mines. After many years of research and development, I'm proud to announce that we do.

We are excited to officially launch our first geotechnical convergence monitoring system for underground; the Geotech Monitoring LiDAR (GML-Underground).

Since the release of the SSR-SARx in 2015, we have prided ourselves on being the only radar technology agnostic company in the market; the only vendor in the world that offers all slope stability radar technology solutions – 3D Real Aperture Radar, 2D Real Aperture Radar and 2D Synthetic Aperture Radar.

This radar technology agnostic nature allows us to tailor monitoring solutions specific to our customers' needs and the addition of the GML-Underground further deepens this position, adding laser-based technology to our range of open-cut and underground systems.

In other news, GroundProbe is also excited to announce the launch of our newly re-designed website. This new website combines and streamlines all of our content in a clear and concise manner allowing users to find information about all our products and services in the one place.

I look forward to telling you more about the GML-Underground, our innovative solution for underground monitoring, and the features and benefits it can offer our customers.

John Bevers
MD and Chief Executive Officer

Presenting the GML-Underground

PRODUCT NEWS



As a global technology leader that provides advanced hardware and software solutions to the mining industry, GroundProbe is excited to announce the release of our first solution developed specifically for underground geotechnical convergence monitoring, the GML-Underground.

The GML is a high resolution and highly precise convergence monitoring system capable of detecting rock and ground support movement with sub-millimetre accuracy.

We have taken the best of radar – namely its precision – and added it to the benefits of laser. The results speak for themselves.

GML-Underground is a high resolution, sub-millimetre, full coverage system that is plug-and-play with SSR-Viewer. It has a huge 360° x 270° full dome scan coverage; it is not affected by metal, mesh or bolts; it's lightweight, portable and easy to use.

We figured out early on that radar is not the right technology for underground monitoring. It is bulky; it is affected by metal and mesh; and it can be affected by "multipath" – a ricocheting around the tunnel before being measured.

In addition, through significant development of existing technologies and the application of GroundProbe's signal and data processing techniques; the technology's accuracy, speed and resolution attributes are world-first. Using our patented processing technique and software, the GML is 170 times more accurate than existing solutions.

Features and Benefits

PRODUCT NEWS

UNRIVALLED SUB-MM 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 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.

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.



Three Different Ways to Monitor

PRODUCT NEWS

The GML offers three distinct ways to conduct geotechnical convergence monitoring.

PERIODIC MONITORING

Periodic monitoring allows users to scan large areas of a mine that are typically active. Periodic monitoring only requires the GML unit and mounting system below the surface. The data is then processed at the surface through the Processing Unit via memory card.

CONTINUOUS, STAND-ALONE MONITORING

Continuous, stand-alone monitoring can be employed when users suspect movement in a critical infrastructure area, yet no mine power or communications to that area are provided. This means a Power Supply Unit and Processing Unit are deployed along with the GML. Data can then be viewed locally, with stand-alone power provided for up to 12 hours, with swappable batteries or AC power input.

CONTINUOUS, AT-SURFACE MONITORING

Continuous, at-surface monitoring allows live monitoring of an area you suspect to be moving, with the benefit of being able to plug into mine power and communications. Data is processed underground and streamed through the mine network to the surface every few minutes. When deployed, convergence, amplitude, coherence, one photograph per scan and all monitoring data are transferred to the mine office or any remote location for real-time monitoring. With lightweight data of only 3MB per scan, the data transfer is fast and simple.



What is the Significance of Achieving Sub-Millimetre Accuracy?

PRINCIPAL GEOTECHNICAL ENGINEER, PETER SAUNDERS



The GML system is a precision instrument designed from the ground up specifically for geotechnical monitoring. Capable of detecting the slightest movement with unrivalled sub-millimetre accuracy, the GML is 170 more accurate than competing systems on the market.

It is not to be confused with LiDAR survey tools available on the market that can suffer from error stacks between scans as high as +/- 6mm. With +/- 6mm of noise, critical deformation trends leading up to a collapse can be obscured within data noise.

It is common to see cumulative deformation up to only a few millimetres in stiff rock before a collapse. In squeezing ground conditions in a hard rock underground environment, typical deformation rates fall between 0.5mm-1mm per day.

These kinds of conditions are causing visible damage to ground support elements and present a real hazard to both

safety and productivity. However, without sub-millimetre accuracy it can take weeks or even months to measure the rate of deformation with any confidence.

In scenarios where a mine site may want to know the rate of floor heave occurring in a particular drive, it is simply not practical to restrict access to that drive for weeks or months. As a result, without sub-millimetre accuracy it is impossible to identify critical trends in velocity over short periods of time prior to a collapse. The wall may begin to accelerate and fail before a site is even able to measure a reliable velocity.

What GroundProbe has learnt from our history with radars in open pit mining environments, is that detecting very slight changes in velocity as early as possible ensures the best chance of a fast response. This is especially important when faced with safety critical situations.

This information can also feed directly into the short term mine plan, giving users the confidence to make the right operational decisions to minimise the potential financial impact of geotechnical hazards on an operation.

Does Inconsistent Time Between Scans Affect the Data?

UNDERGROUND GEOTECHNICAL CONSULTANT, TANYA LAW

When using the GML, changing how often you scan a particular area during a periodic monitoring campaign has very little effect on the data.

The heat maps generated in SSR-Viewer show the amount of movement and where the movement took place between any two points in time. This means the exact the same result in a heatmap between two points will be achieved, regardless of whether continuous or periodic monitoring is being used.

A periodic monitoring campaigns primary purpose is to check what has changed in a certain area, and is a much more effective means of gauging geotechnical changes over time than standard visual inspections. If a hot spot is detected and more data is required, the GML can simply be switched to a continuous monitoring campaign for a few days to monitor that area and manage the risk appropriately.

A downside with periodic monitoring is that fast failures that occur when monitoring is not taking place will not be detected. However, monitoring is just one avenue of risk management controls, so periodic monitoring can be applied to the parts of the mine where it is appropriate to manage those risks, and continuous monitoring can be implemented in higher risk areas.



+ GML-Underground

Unrivalled sub-millimetre accuracy for early detection



Real-time data streaming with multi-user functionality

Live, continuous or periodic monitoring of any work area

Download the 'Weavar' app from the App Store or Google Play and scan this page for a demonstration.





ENSURING MAXIMUM SAFETY AND PEAK PRODUCTIVITY

PLAY FEATURE ▶

GROUNDPROBE GLOBAL TECHNOLOGY LEADERS

GroundProbe is a global technology leader that provides advanced hardware and software solutions to the mining industry. With a focus on providing end-to-end solutions for open-cut operations, our technologies have been specifically developed for geotechnical deformation monitoring. Our specialised suite of products and services, and the invaluable data that they deliver, actively assist a global community of professionals to make confident, informed decisions to better manage risk, increase productivity, and ensure maximum safety.

[READ MORE](#) →

GroundProbe Launches New Company Website

INNOVATIONS

GroundProbe is proud to announce that we have officially launched our brand new website.

The new website can currently be viewed in three different languages; English, Spanish and Portuguese, with Russian and Chinese scheduled to be released in the near future.

The website caters to users of all knowledge levels through a unique navigation menu. This navigation system allows users to access all of our individual product pages by choosing to pick products based upon the industries in which they operate, the solutions or applications of each product, and the actual technologies of the products.

The website also includes a 'News' section where users can read all of GroundProbe's case studies, newsletters, press releases and blog posts.

If you would like any further information or need help finding any materials please visit the 'Contact Us' page of the website and complete an enquiry form.

From the products we develop, to the slope monitoring solutions we tailor, our vision is making mining safer.

MAKING MINING SAFER

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