GroundProbe®

APRIL 2018

GROUND BREAKING NEWS

PRESENTING THE GMS

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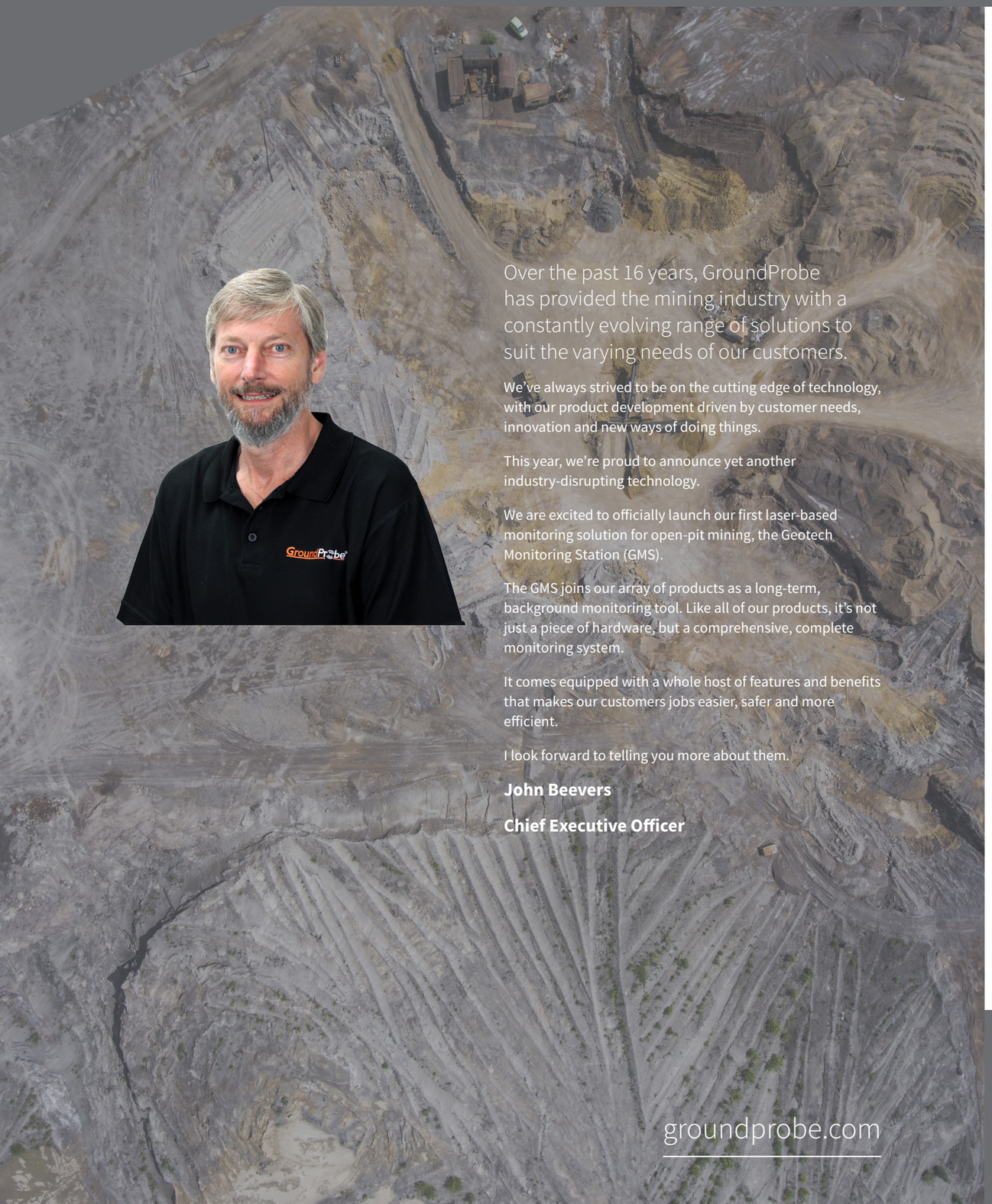

Over the past 16 years, GroundProbe has provided the mining industry with a constantly evolving range of solutions to suit the varying needs of our customers.

We've always strived to be on the cutting edge of technology, with our product development driven by customer needs, innovation and new ways of doing things.

This year, we're proud to announce yet another industry-disrupting technology.

We are excited to officially launch our first laser-based monitoring solution for open-pit mining, the Geotech Monitoring Station (GMS).

The GMS joins our array of products as a long-term, background monitoring tool. Like all of our products, it's not just a piece of hardware, but a comprehensive, complete monitoring system.

It comes equipped with a whole host of features and benefits that makes our customers jobs easier, safer and more efficient.

I look forward to telling you more about them.

John Beevers

Chief Executive Officer

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Our Newest Solution

PRODUCT NEWS

Global technology leaders in geotechnical monitoring, GroundProbe is proud to launch our newest solution, the GMS.

Designed as a long-term, background monitoring tool, the GMS monitors vast mine areas for long periods of time of many months to many years.

It specialises in background monitoring in open cut pits and highly vegetated slopes, and detecting and measuring deformation on tailings dams, dumps and cuttings.

It monitors through automatically measuring hundreds or up to a thousand discrete points on a wall, in the form of physical and virtual prisms.

Traditionally, mine sites have relied on physical prisms or reflectors on the wall when monitoring with robotic total stations.

Yet prisms are dangerous to install, inflexible to changing ground conditions and their repair or replacement can be unsafe, time-consuming and expensive.

Our patent-pending visualisation technique that co-locates data and our various photos is a step change in data visualisation for prism monitoring. Automatically visualising data and heat maps on photos or in 3D sets the GMS apart from existing solutions, which often force users to view data in a table rather than more intuitive visualisations.

The GMS solves these shortcomings. It allows users to not only monitor prisms, but also add new 'virtual' points on the wall, reflecting the laser signal directly off the rock.

We are able to achieve excellent 'virtual point' precision by applying our patented radar signal and data processing techniques to the long-range laser.

Taking the GMS well beyond the capabilities of typical robotic total stations, the GMS is also fully compatible with our powerful analysis software, SSR-Viewer.

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Key Applications of the GMS

PRODUCT NEWS

The GMS is an Electronic Distance Measurement (EDM) LiDAR; a technology inherently affected by dust, rain, snow, fog, sunlight, the colour and angle of targets. That's why we see it as a background monitoring tool that gives long-term data to identify trends.

A GMS, and the prisms and points it monitors, complements Slope Stability Radar to provide a complete monitoring strategy.

BACKGROUND MONITORING

Wall movement can occur progressively over many years. With an effective background monitoring regime in place, new risks and hazards can be detected and managed.

Fitting in with current site practices, the GMS can monitor existing prisms, and new points can be added.

The GMS monitors long term, with trends developed over many months or many years able to be correlated and analysed.

TAILINGS DAMS

A breach of a tailings storage facility can have devastating effects on the environment and whole communities. Real-time monitoring of tailings forms a significant part of an effective management strategy.

The GMS is ideal for this application, being able to monitor a broad area for extended periods of time.

Whether the hazard is known or unknown, the GMS ensures movement is detected early, so timely action can be taken.

HIGHLY VEGETATED SLOPES

Areas of high vegetation can be difficult to monitor, with grass, trees and moss affecting the signal quality of any monitoring instrument. With its small pixel size and precision, the GMS only requires a small piece of exposed rock to target.

Using the vivid, high definition telephoto camera image, areas on the wall can be clearly viewed in the software, and virtual points easily created.

DUMPS

Waste rock dumps on mine sites can be subject to huge failures. Rather than collapsing fast, they often fail over long periods of time. Their natural structure makes it dangerous, and often impossible, to attach or access the area where reflectors are needed most.

With its ability to reflect its laser signal directly off the rock, the GMS can provide practical data on the stability of a waste rocks dump, and modifications to its structure can be modified as necessary in light of the identified trends.

Not Just a Piece of Hardware

PRODUCT NEWS

A complete, end-to-end monitoring solution.

It provides users with smart data capture, data processing, and analysis; all fully integrated into one robust, user-friendly system.

By applying GroundProbe's patented radar signal and data processing techniques to a long-range laser, the GMS's ability to detect movement early, with high precision, is unrivalled.

Because processing occurs at the unit in real time, there is minimal latency or delay in the transfer of data for analysis.

It's what also makes it robust. The GMS will continue to collect data, even if the data link to the Primary Monitoring Point or office is interrupted.

The fully-processed data is then available in SSR-Viewer for analysis and alarming.

It's this comprehensive, complete geotechnical monitoring system that enables its users to make confident decisions that streamline operations, improve safety and reduce costs.

DATA COLLECTION

DATA PROCESSING

DATA ANALYSIS AND ALARMING

The Power of the Points

PRODUCT NEWS

Providing total monitoring flexibility, the GMS monitors using both prisms and virtual points placed directly on the rock.

We actually created two types of virtual points, Pixel and Precision, each with its own benefits.

A Pixel Point allows for the measurement of areas that are difficult, dangerous or even impossible to reach using prisms.

Their quantity and placement is at the whim of the user, with the capacity to use as many points as required, in as many locations as required. It has a fast scan time, is accurate and can save valuable time.

Precision Points are ideal for pinpointing and observing key areas of concern, especially on rough, jagged rock faces and areas on the wall with a low incidence angle to the laser.

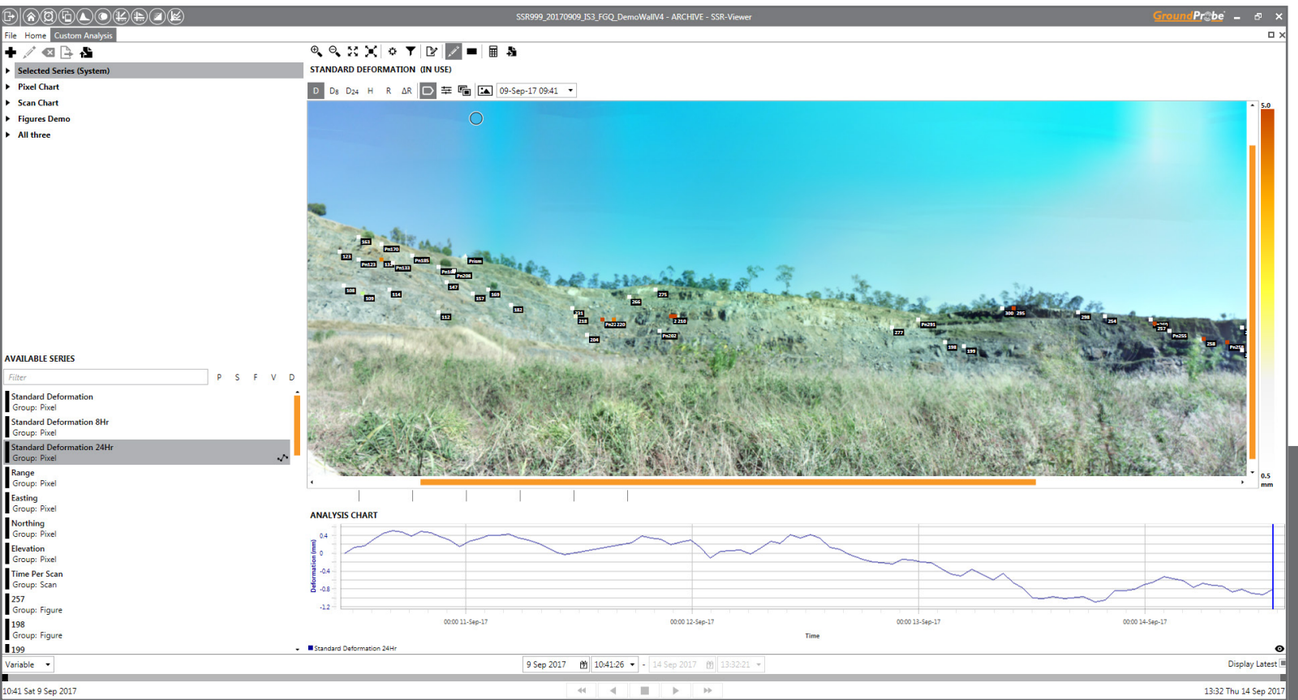
Although taking longer to scan, the resultant accuracy in these scenarios is unmatched. Closed groups can be created to zero in on emerging trends.

Existing prism coordinates can also be imported and tracked. In a matter of minutes, hundreds of prism points can be added and verified, with just one click.

Prism Points are highly accurate, can be scanned from long ranges, and are the fastest to scan.

No matter which points are chosen, all are visualised together in the software.

Deformation is shown for all points across every scan. It's how we detect movement early, and ascertain trends in advance.



SSR-Viewer Compatibility

PRODUCT NEWS

The GMS is fully integrated with SSR-Viewer, our patented, market-leading analysis software. It offers the rapid, precise analysis of data to detect trends, and the ability to send alerts for immediate action.

Its powerful data visualisation, charting and analysis tools take the GMS well beyond the capabilities of typical robotic total stations.

Existing technologies output data in a list format, which needs a surveyor to understand its location.

In our software, high-definition images are co-registered with the data generated by the GMS.

The data is visualised as a deformation heatmap and draped directly over the image, providing spatially co-located information of every point. By clicking on any part of the image, movement can be reviewed and assessed live.

It also offers world-class alarming capabilities. Alarms can be set on a range of parameters including deformation, velocity, inverse velocity and our patented velocity ratio.

No longer leaving the user to find an alarming pixel in a list, they are displayed on the image, so can be easily found. All types of alarms trigger on any device, anywhere in the world, in real-time.

Remote Visual Inspections and Dual Camera Imaging

PRODUCT NEWS

The GMS is set-and-forget, requiring no hardware interaction after deployment and minimal maintenance over time.

It allows its operator to safety and remotely conduct visual inspections, previously not possible with existing products.

Users can control the unit from the software to carry out a visual inspection in real time.

The GMS laser uses a high power telescope that we reuse for camera imaging, with an extreme level of zoom not found in traditional cameras. This allows customers to remotely inspect areas from their desk, at a level often not possible in a standard pit inspection.

The GMS is also equipped with dual cameras offering three levels of zoom.

The wide-angle camera captures broader scope images of the points while monitoring occurs.

SSR-Viewer then automatically aligns all photographs into one panoramic scene to produce a vivid, high definition image.

With the second camera attached to the telescope, users can not only precisely see and control the location of their points, but also capture its details.

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Features and Benefits of the GMS

PRODUCT NEWS

ACCURATE POINT MEASUREMENTS

The GMS measures and displays deformation for all types of points with high accuracy. Multiple streams of deformation data are collected, with different atmospheric timeframe processing.

All measurements are processed and ready for analysis at the end of each scan, enabling the early detection of movement.

For additional accuracy, the vector movement in 3D is also measured for prisms, empowering users to better understand ground conditions and get the benefits of both readings. Users can analyse individual points, or average groups of points in any configuration.

FLEXIBLE POINT SELECTION AND INTERLACING

Providing ultimate flexibility, wall folders can be created using any types of points in any combination, as chosen by the user. Prism, Pixel and Precision Points can be selected and interlaced in a single scan to suit the required accuracy and scan time. Existing prism locations can be imported, or points can be selected using the on-board cameras.

AUTOMATIC GRID SCAN

For immediate analysis, the GMS can be rapidly deployed using the automatic grid scan feature. Once the scan area is specified, the software automates a grid of Pixel Points, allowing users to begin scanning straight away. Using up to 1000 Pixel Points with dense pixel spacing, it ensures that no point of interest is overlooked.

AUTOMATIC PRISM COLLIMATION

The GMS automatically tracks and locates its Prism Points with every scan, known as collimation. There are two lasers on board; one for measuring deformation, and one solely dedicated to prism collimation.

Even if a prism is moving, this functionality ensures that its location is never lost, without ever relying on historical data for coordinate information. The GMS hunts for, finds and locks Prism Points into their exact position with each and every scan.

LONG-RANGE MONITORING CAPACITY

The GMS is capable of monitoring at long ranges, allowing it to be deployed in varying locations around a site, dependent on the needs of each mine or application.

Prism Points can be monitored from the ultra-long range of 5000 metres. Pixel and Precision Points can reach 2000 metres on a white surface, making for reliable monitoring at ~1000m for a typical rock face.

MULTI-SENSOR MONITORING

All data collected by the GMS can be directly imported into GeoExplorer, allowing data from a range of monitoring sensors to be viewed and analysed on the one dashboard.

By incorporating its data alongside data from radars, InSAR, piezometers, extensometers and more, a holistic view of the pit can be realised.

MONITORING NEVER STOPS

With a built-in failsafe for increased robustness, the GMS will never miss a scan, much unlike other systems on the market. Through its on-unit processing and our software's trusted datasync feature, the GMS will continue to collect data, even if the Wi-Fi is lost or the Primary Monitoring Point is shut down.

LARGE SCANNING CAPABILITIES FOR LARGE AREAS

An ideal broad-area monitoring tool, the GMS can capture the entire width of a pit with its 360° scanning capabilities. With its ability to look up 45° and down 55° in elevation, the GMS can be easily and rapidly deployed to monitor any part of a pit, tailings dams or dump.

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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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