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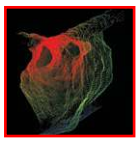
Void Scanner



Reduce project timescales

Accurately map the shape, position and spatial location of underground voids and stopes in real time to support project management.

Enhance productivity

Monitor and control ore loss and dilution by comparing scanned stopes with design data for better site management.

Maximise safety

Flexible deployment options and wireless connectivity enable operators to scan hazardous areas from a position of safety.

The cavity monitoring system of choice for mine operators and civil engineers

Void Scanner is a laser-based cavity monitoring system (CMS) engineered by Renishaw to produce high-quality 3D laser scans of underground voids and stopes where access is limited, dangerous or prohibited. These surveys provide the spatial information that enables mine operators and civil engineers to maximise safety, productivity and profitability at low cost.

A specialist ruggedised instrument, Void Scanner uses time-of-flight laser measurement to map the shape, position and spatial location of cavities quickly so that site managers can plan more profitable projects, improve operational efficiency and, importantly, ensure high standards of safety in potentially hazardous locations.

The key business benefits

Void Scanner comes with all the benefits of more expensive systems, but has been designed for use in extreme environments to work quickly and at a cost-effective price.

Flexible deployment options enable you to reach otherwise inaccessible or hazardous locations safely, so that you can offer more complex project capabilities and stay competitive.

Investing in a Void Scanner enables you to:

- **Enhance safety:** Use Void Scanner's detailed models of underground voids to plan – and ensure the safety and compliance of – current operations and future projects.
- **Increase profitability:** Map the surface features of underground voids to manage dilution and ore loss, in order to maximise extraction, and reduce secondary blasting, wastage and the unnecessary destruction of valuable mineral sites.
- **Transform project efficiency:** Real-time 3D scan data visualisation supports the fast, effective and informed on-site decision making that ensures smooth operation of projects.

Why use a cavity monitoring system?

Using a robust CMS to determine the exact volume and position of air-filled underground spaces is vital to the safety of operations in unpredictable subsurface environments.

The risk of possible failure or collapse poses a serious threat to public and worker safety, as well as the potential destruction of sites and equipment.

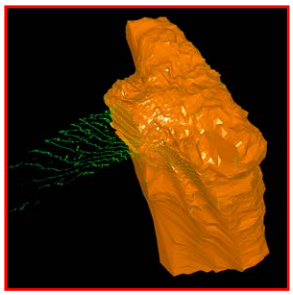
Void Scanner enables project managers to evaluate the stability and capacity of sites accurately so that no unnecessary risks are taken with these resources.

A specialised CMS can also support new project planning by providing a full 3D image of the site for opportunity proposals and evaluation. Data can be exported into CAD packages to plan for new extraction programmes or installations and even to identify new ore bodies.

Void Scanner's fast scan speed, range of flexible deployment methods and low cost make it affordable and versatile.

Use Void Scanner to solve a wide range of underground surveying challenges at low cost

Deployed vertically or horizontally on a boom, Void Scanner can access hard-to-reach cavities.



Point cloud editing and visualisation can be conducted on site to support swift operations.

Applications for mining and civil engineering

Void Scanner is a survey and inspection tool with flexible deployment options, which supports a wide range of surveying applications, including:

- Gallery, void and stope surveying
- Ore pass monitoring
- Mine design management
- Waste and ore stockpile surveying
- End-of-shift extraction volume scanning
- Project profitability / feasibility planning
- Compliance, environmental and safety management
- Underground blast planning
- Drive surveys
- Face modelling
- Pre- and post-excavation mapping
- Storage silo volume measurement

Features that support your operation

- **Ease of use:** Quick setup and simple operation is essential for those who use Void Scanner for daily void volume calculations. Ten minutes is all it takes to unpack the system, connect cables, mount to the boom, and ready the software.
- **Speed of operation:** With a 200 points per second scan rate, a 360˚ horizontal scan and a vertical scan extent of 270˚, you'll complete a full scan in 1˚ increments in under 12 minutes.
- **Flexibility of deployment:** Void Scanner's mounting options include tripod, boom, mast, and crane deployment for unmanned operation where access is limited or dangerous.

Optional wireless connectivity

When operating in potentially dangerous environments, the optional Wi-Fi box accessory can be used to control the Void Scanner wirelessly from a position of safety. The Wi-Fi box includes a rechargeable battery and wireless module.

- Automatic wireless network connection
- No need for a separate battery pack, power cable, PC data cable or interface box
- Two power options: internal battery and/or optional external battery
- No cables are required between the Wi-Fi box and PC
- Ruggedised IP65 Peli™ case enclosure

When using the Wi-Fi box, the scanner is controlled using the **Cavity Profiler – VS** software in the same way as if it were connected with a cable. Scan data can be sent wirelessly over distances up to 50 m to the operator's PC.

During scanning operations, it is possible to 'hot swap' between the internal battery and the optional external battery so that one can be on charge while the other is in use. Alternatively, both power sources can be left powered ON to ensure the maximum scan time is available.

Quicker and simpler software set up and data communication.

Hot swap power sources to eliminate downtime when charging.

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Engineered for use underground with the assurance of manufacturing excellence

How it works

Using high-speed laser scanning to survey voids is quicker, more precise and safer than traditional surveying methods. The Void Scanner laser sends out infrared pulses, which rebound off solid surfaces and are received back into the probe.

Scan information is corrected by internal pitch-and-roll sensors to produce real-time XYZ co-ordinates for each data point.

The data can therefore be accurately geo-referenced in the mine's co-ordinate system and multiple scans can be stitched together. The output data can be plotted against design drawings or as-built data to build a 3D representation of the project site.

Distance measurements are accurate to ±5 cm and the encoders measuring the direction of the laser are accurate to 0.2˚.

The Void Scanner is controlled remotely from a PC or handheld device running Renishaw's **Cavity Profiler – VS** software, which plots the data on-screen in real time. **Cavity Profiler – VS** allows the finished scan to be analysed, edited, transformed, combined with other datasets and exported to third-party software.

Renishaw, manufacturing excellence

Leading global engineering technologies company Renishaw has over 30 years' experience in the design and manufacture of laser scanners for measurement and surveying. Following major investment in the new production and servicing facilities at Renishaw's York site in the UK, Void Scanner brings the assurance of world-class manufacturing and production values.

Developed for use underground, Void Scanner has been subjected to Renishaw's rigorous environmental testing practices, which aim to guarantee high-performance operation within specified limits of temperature, pressure, humidity, mechanical stress and other environmental conditions. Testing includes IP65 dust and water protection and performance in extremes of temperature and humidity. Inspections also include:

- Shock testing
- Vibration testing
- Acceleration testing
- Drop testing

The assurance of experience in your industry

For over three decades our laser-scanning devices for the mining and quarrying industries have allowed operators to map and survey dangerous or inaccessible areas in order to reduce project timescales and optimise safety and productivity.

We have worked closely with our clients to understand the applications for which our products are used, and our customers' technical and business requirements. Enhancements to the latest Void Scanner include significant improvements to the internal gearings, which has enhanced pointcloud quality and surfacing, leading to improved data accuracy.

Void Scanner is just one of many laser systems designed by Renishaw. Others, such as the slimline C-ALS® CMS, and the Quarryman® and Boretrak® blast optimisation system, have been proven over many years of demanding use around the world. Like Void Scanner, these products provide measurement solutions within the mining, quarrying and geotechnical industries.

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Now with real-time modelling of 3D void data acquired from multiple locations

Intuitive design guides you through deployment

Void Scanner is controlled using Renishaw's **Cavity Profiler – VS** software package, which runs on a rugged field PC or handheld device. The software's intuitive design and navigation guides you through deployment and processing, making it the ideal software choice for mining and construction projects where time is at a premium, or where operators use many different systems.

Cavity Profiler – VS enables you to visualise scans in real-time as data is collected. In-software post-processing tools enable you to analyse, edit and filter data as required. Data can also be exported in a number of industry-standard formats for easy integration with third-party processing software packages.

Obtain a closed 3D model and volume in one click, within seconds of finishing a scan.

Multi-station project capabilities

Multi-station project capability now enables you to scan from multiple locations and view the resulting 3D data together, in real time, for a complete 3D representation of your project site in minutes.

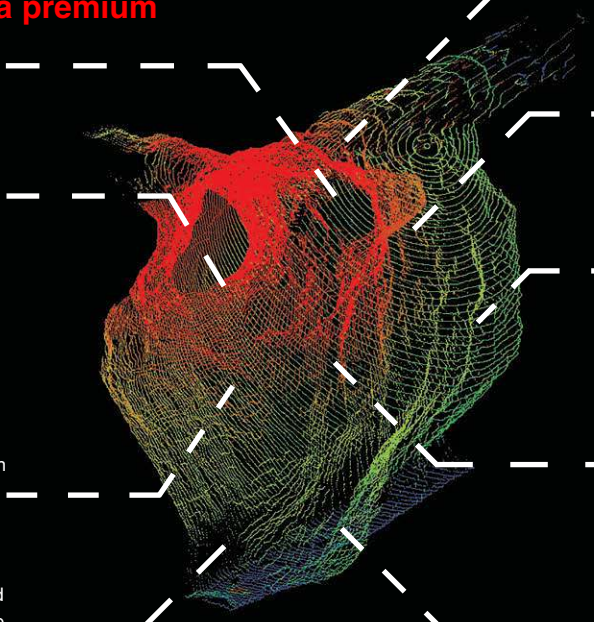
Cavity Profiler – VS is the ideal choice for mining and construction projects where time is at a premium

Reduce setup time with auto-connection to the probe.

Visualise scans in real time as data is collected. Software shows scanner inclination and position at all times.

Obtain a closed 3D model and volume within seconds of finishing a scan with one-click surfacing and volume calculation from raw scan data.

Calculate the width, height, and length of tunnels, as well as the volume, shape, position and spatial location of voids.



Rotate the data if orientation not known prior to scan commencing.

Conduct point cloud editing and visualisation on site to support swift operations.

Shift the dataset if collar co-ordinates not known prior to scan commencing.

Use 3D manipulation tools to visualise data.

Export to industry-standard formats, including LAS and DXF, allows easy integration with third-party processing software.

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About Renishaw

Renishaw is an established world leader in engineering technologies, with a strong history of innovation in product development and manufacturing. Since its formation in 1973, the company has supplied leading-edge products that increase process productivity, improve product quality and deliver cost-effective automation solutions.

A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

Products include:

- Additive manufacturing and vacuum casting technologies for design, prototyping, and production applications
- Dental CAD/CAM scanning systems and supply of dental structures
- Encoder systems for high-accuracy linear, angle and rotary position feedback
- Fixturing for CMMs (co-ordinate measuring machines) and gauging systems
- Gauging systems for comparative measurement of machined parts
- High-speed laser measurement and surveying systems for use in extreme environments
- Laser and ballbar systems for performance measurement and calibration of machines
- Medical devices for neurosurgical applications
- Probe systems and software for job set-up, tool setting and inspection on CNC machine tools
- Raman spectroscopy systems for non-destructive material analysis
- Sensor systems and software for measurement on CMMs
- Styli for CMM and machine tool probe applications

For worldwide contact details, visit www.renishaw.com/contact

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