# Geo4Sight

Wireless Subsurface Monitoring System


Elexon
MINING

Monitoring Redefined

# Elexon Mining

Elexon Mining is a world leader in wireless in-ground geotechnical monitoring systems for open pit, tailings dam and underground mines providing real-time insight into ground movement, cave monitoring and ore flow.

At Elexon Mining, our success is your success. We are committed to providing tailored solutions and building lasting relationships around high precision movement and positioning activities.

Having access to this information and real-time insights enables operators to anticipate needs, manage their workforce, diminish risks, and prevent disasters.

Elexon Mining's wireless configuration also eliminates the need for manual monitoring and expensive cabling thus contributing to capex and opex savings.

Since forming in 2006, Elexon Mining has worked collaboratively with some of the industry's leading research organisations and mine companies with systems now deployed across the globe including in Australia, Canada, Indonesia, South Africa, Chile, Sweden and the United States.

Our customers choose Elexon Mining because our professional teams have the specialist service expertise to ensure quick project start and maximum uptime. Every challenge is an opportunity to work together to deliver systems that exceed expectations.

Elexon Mining's systems provide invaluable data that empowers mining companies to make well founded decisions to improve safety, efficiency and resource conversion.

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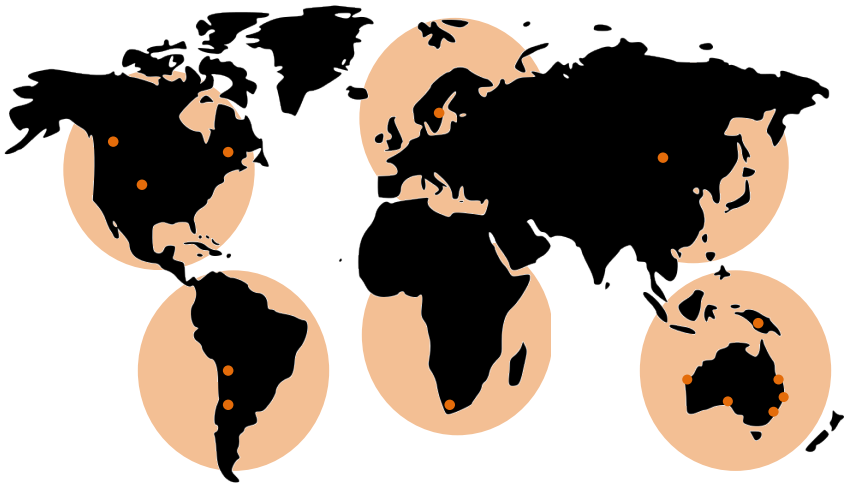


# Geo4Sight

Geo4Sight is an in-ground wireless internet of things (IoT) instrumentation platform capable of measuring angular movement, pore pressure and temperature in subsurface environments, assisting with mine production optimisation, as well as early detection and management of geotechnical risks.

Unlike surface monitoring methods, Elexon Mining's in-ground solution detects key critical changes below the surface where most failures begin, long before surface monitoring methods detect a problem.

The technology, exclusive to Elexon Mining, requires no cables and has the ability to be networked with other Geo4Sight sensors. This allows a larger array of sensors to be deployed as a mesh network in challenging geotechnical environments where the use of cabled monitoring systems is impossible or unreliable due to shearing of cables which are relied upon for power and/or data transmission.

Geo4Sight is highly visible and robust, capable of withstanding nearby blasting and the harshness of cave mining environments.

The sensors/instruments are installed into drill holes at regular intervals to enable wireless data communication along the chain of nodes to the surface where the data can be transmitted via WiFi or mobile network.

This data then flows into Elexon Mining's Hive data storage in which the data is sorted and can be visualized in the Hive, extracted in compatible formats for industry standard visualisation software such as Voxler, Canary, Vulcan and Maptek, or accessed for calibration of numerical models.

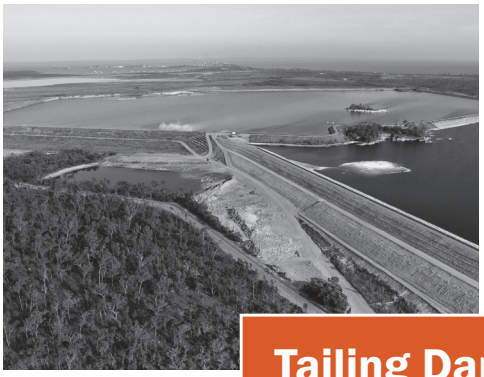
Elexon Mining's technical support team also offers periodic reporting, analysis and interpretation solutions tailored to each site.

The systems provides invaluable data empowering our customers to make well-founded decisions to improve safety, efficiency and resource conversion.

All Geo4Sight devices are fitted with long-life batteries, enabling monitoring to be carried out for up to 10 years*.

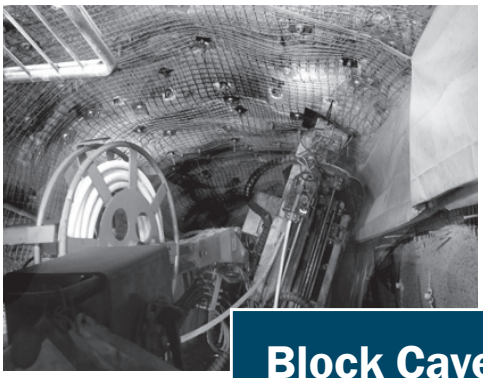
# Geo4Sight Applications

The Geo4Sight system is versatile and is adaptable to various site requirements and monitoring situations. The system is currently being used in:



**Tailing Dams**

**Open Pit**



**Block Caves**

**Waste Piles**

Should the requirement you be wishing to use Geo4Sight for not be listed above please contact us (commercial@elexonmining.com) so we can advise and tailor a solution to meet your specific requirements.

# Geo4Sight Features & Benefits

### World first wireless capability

Elexon Mining's world first patented wireless in-ground monitoring system is unrivalled to anything else on the market today. We look forward to continuing to work with pioneers of the industry to redefine monitoring.

### Monitoring where others can't

Our wireless capability allows flexibility and to be applied in various challenging environments where the use of cabled monitoring is costly or impossible. The Geo4Sight system and its installation methods are far less intrusive and more cost-effective than others.

### Getting the answers

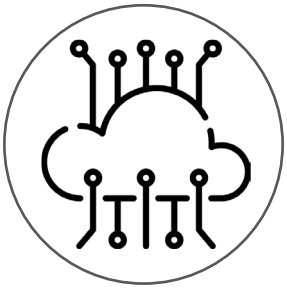
Be confident in the data and understand what it means for your site. Elexon Mining's dedicated team of interpretation experts are on hand to assist and provide updates, giving you the intel update your stakeholders.

### Early detection

Unlike above-ground monitoring, our in-ground Geo4Sight system provides real time data and early detection of change well before its seen at the surface. Being wireless means you'll never loose connection if movement occurs allowing site and geotechnical engineers to monitor and take corrective action. Parameters can also be set to trigger automated communication alerts to assist with the early implementation of the site's Trigger Action Response Plan (TARP).

## Network expansion

The Geo4Sight system allows for any existing network to be extended at any point by adding additional sensors, increasing the network range.



## Real-time data

The Geo4Sight system can be customised to report at any time or pre-set intervals, as required by the client. This data is automatically sent and syncs to Elexon Mining's Hive Software platform for analysis.

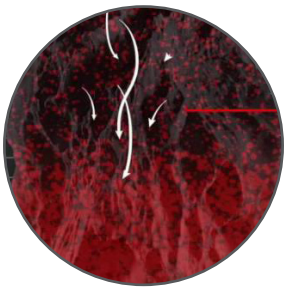
## Reduced implementation costs

Geo4Sight's wireless capability allows installation to be less labour intensive and quicker than traditional cabled instrumentation. The monitoring system can be installed at any point of mine lifecycle, whether it's during detailed design, development or during production. Limited infrastructure outside of Elexon Mining's equipment is required to be installed and can often be done by onsite by existing personnel.

## Improved safety

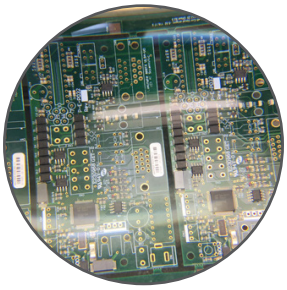
The system's in-built redundancies allow multiple sets of connected data to be more reliably communicated, even if a single sensor is lost. The system will bypass any offline or lost sensors, communicating to the next in sequence, ensuring data is more likely received. In addition, the measurements taken by multiple sensors provides a means of being able to extrapolate missing data when necessary.

# Elexon Mining Support



## Real time operations

Elexon Mining provides a full support, data quality control and monitors data distribution to our clients. The secure facility helps maximise productivity of our service through improved operational efficiency and minimises downtime.



## Manufacturing

Our best in class manufacturing division has a focus on continuous improvement. It combines a high performing team with a 1500sqm infrastructure facility that has been designed on the Lean and 5S principles. Elexon Mining has the capacity to deliver high volumes of various products efficiently and our Quality Management Procedures ensure peace of mind for our customers.

## Research and development

A continual focus on research and development keeps Elexon Mining at the forefront of geotechnical in-ground monitoring and the provision of the highest quality data. Our deployment and measurement technologies are constantly being improved to increase value for our clients.

## Project coordination

We see your success as our success. We stand behind all of our products and work with you to ensure you receive a tailored solution for your project site and a seamless transition from feasibility right through to delivery.

## Installation support

Installation is key to ensuring great results. Our focus at Elexon Mining is to make this process as simple and easy as possible. We have an expert team on hand to help explain and where required, can assist with the installation – providing you with confidence and maximising results. All Elexon Mining products can be fitted with existing mine infrastructure.

# Geo4Sight Data

### 3-Axis Dimensional Tilt

Designed to measure and monitor tilt movement in the X, Y & Z Axis.

### Pore Pressure

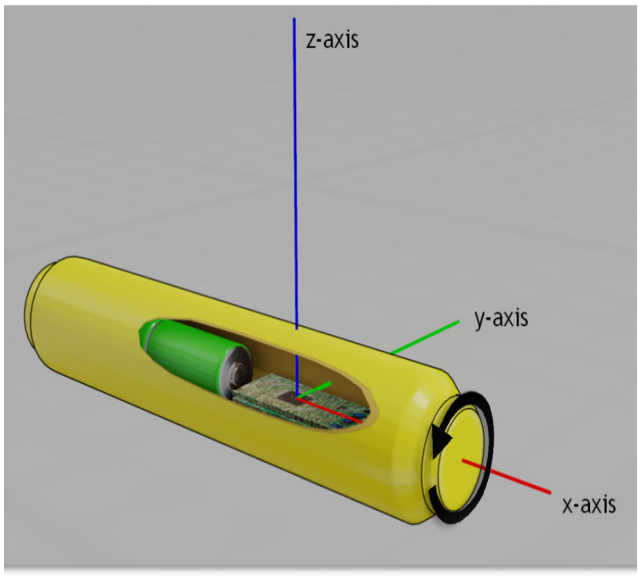
Designed to measure and monitor phreatic surface levels.

### Temperature

Measures and monitors ground temperature enabling the detection of hydrologic flows.

### Relative Distance

The use of in-ground wireless technology allows the estimation of relative distance between markers.

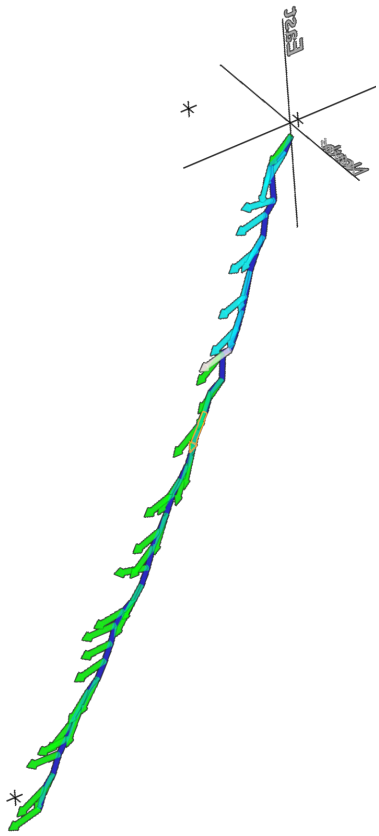



# Geo4Sight Software

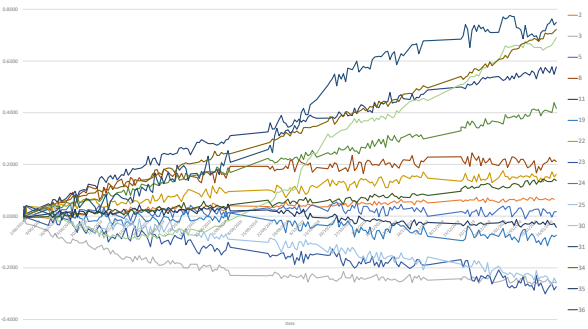
To communicate, extract and crunch the data from the Geo4Sight system, Elexon Mining has its own software package - ***GeoHive***.

This hosting interface manages the data packets, correlates, stores and forwards. Allowing many visulation options.

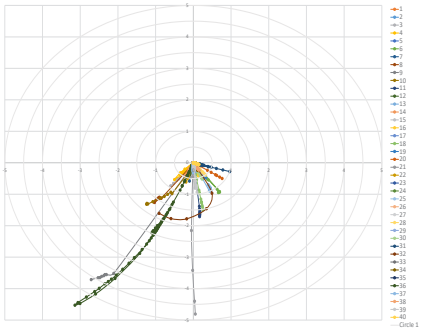
The GeoHive software allows the data, once processed, to be exported using a CSV format, enabling operators to import the data into their own preffered visualisation and monitoring software such as Voxler, Canary, Maptek and Vulcan.



***Change of Tilt (°)***



***Dip & Dip Direction (°)***



# Geo4Sight Specifications

### Geo4Sight - Tilt & Pore Pressure Marker

| Specifications | |
|---|---|
| Length | 325mm |
| Diameter | 65mm |
| Weight | 1.3 kg |
| Power | Internal |
| Communication | RF 13.56MHz |
| **Operating Limits** | |
| Operating Temperature Range | 0°C to +70°C |
| Maximum Sensor Distance | 2 metres |

### Geo4Sight - Tilt Marker

| Specifications | |
|---|---|
| Length | 325mm |
| Diameter | 65mm |
| Weight | 1.26 kg |
| Power | Internal |
| Communication | RF 13.56MHz |
| **Operating Limits** | |
| Operating Temperature Range | 0°C to +70°C |
| Maximum Sensor Distance | 2 metres |

**Geo4Sight Activator**

| Specifications | |
|---|---|
| Length | 130mm |
| Width | 130mm |
| Height | 77mm |
| Diameter | |
| Weight | 0.67kg |
| Power | 18VDC |
| Communication | Bluetooth, RF 13.56MHz |
| **Operating Limits** | |
| Operating Temperature Range | -30°C to +70°C |
| Maximum Sensor Distance | 100mm |

**Geo4Sight Mini Reader**

| Specifications | |
|---|---|
| Length | 285mm |
| Width | 220mm |
| Height | 140mm |
| Weight | 1.73kg |
| Power | 12 to 15 VDC |
| Communication | Ethernet, WIFI, Bluetooth, RS232, RF 13.56MHz |
| **Operating Limits** | |
| Operating Temperature Range | -30°C to +70°C |
| Maximum Sensor Distance | |

**Multiplexers**

| Specifications | |
|---|---|
| Length | 200mm |
| Width | 120mm |
| Height | 120mm |
| Weight | 1.58kg |
| Power | From Mini Reader |
| Communication | RS232, RF 13.56MHz |
| Communication | Bluetooth, RF 13.56MHz |
| **Operating Limits** | |
| Operating Temperature Range | -30°C to +70°C |
| Maximum Sensor Distance | |

**Antennas** 

| Specifications | |
|---|---|
| Length | 340mm |
| Diameter | 55mm |
| Weight | 0.5kg |
| Communication | RF 13.56MHz |
| **Operating Limits** | |
| Operating Temperature Range | -30°C to +70°C |
| Maximum Sensor Distance | 2m |

**Cabinets**

| Specifications | |
|---|---|
| Length | 600mm |
| Width | 600mm |
| Height | 300mm |
| Weight | 31kg |
| Power | Solar, AC Mains |
| Communication | Ethernet, WIFI, Cellular, RF 13.56MHz |
| **Operating Limits** | |
| Operating Temperature Range | -30°C to +70°C |
| Maximum Sensor Distance | 2m |

**Power Option - Solar Panel**

| Specifications | |
|---|---|
| Length | 1475mm |
| Width | 670mm |
| Height | 35mm |
| Weight | 9.8kg |
| Power | 12V 190W |
| Cell Type | Monocrystalline |
| **Operating Limits** | |
| Operating Temperature Range | -40°C to +85°C |

Elexon MINING

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