



**SOUTH EAST ASIA/TURKEY**  
Coal & Mineral exploration -  
calibrated quality logging data.

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Getting the job done - highly trained and  
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**ROBERTSON  
GEO**

Unlocking Your GeoData

# GeoUnlocked<sup>©</sup>

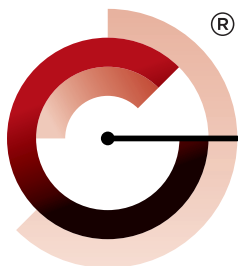
GLOBAL GEODATA NEWS

ISSUE 03 | WINTER 2018

STONEHENGE IS ONE of the wonders of the world and the best-known prehistoric monument in Europe. It dates from 5000 years ago with the unique stone circle being erected in the late Neolithic period about 2500 BC.

Robertson Geo service teams successfully logged investigative boreholes for characterisation of the subsurface for a road tunnel project intending to ease traffic and conserve the area around the iconic site.

# Stonehenge



**ROBERTSON  
GEO**

Unlocking Your GeoData

AS A RELATIVE newcomer to Robertson Geo, I am fascinated by the range of equipment and technical ideas that come out of our Deganwy base in North Wales.

Our tools are deployed across the globe in the most diverse applications imaginable - from aquifers, underground mines, oil and gas prospects, high rise buildings, road infrastructure, rail networks, tunnels, bridges, dams, harbours, power stations, quarries, wind energy projects and even glaciers.

Key to all of Robertson Geo activities are people - from our very skilled staff in Deganwy that design, build and ship our products all over the world, to our agents and their employees who promote our products, and of course our customers, the end users of this equipment. Several of these people have contributed to the articles in this edition, and they reflect the huge range of geographical and cross-sector use of our technology.

A number of exciting products are coming to market during 2019, as we strive to push technical boundaries in slimhole logging tools, which by their nature are challenging due to space limitations.



**Gavin Rowlands**

Global Business Development Manager



## around one of the wonders of the world

**STONEHENGE IS A prehistoric monument. It consists of a ring of standing stones, with each standing stone around 13 feet (4.0 m) high, 7 feet (2.1 m) wide and weighing around 25 tons. The stones are set within earthworks in the middle of the densest complex of Neolithic and Bronze Age monuments in England, including several hundred burial mounds. Archaeologists believe it was constructed from 3000 BC to 2000 BC.**

Stonehenge remains one of the world's most important prehistoric sites and a major tourism site in the UK - attracting many thousands of visitors from across the world to what is a UNESCO site of special importance.

A proposed A303 tunnel would remove the majority (around 3km) of the existing road and its traffic from the site. It would reunite the north and south sides of the ancient landscape and also allow for the reinstatement of the line of the Stonehenge Avenue, an ancient processional route to the stones.

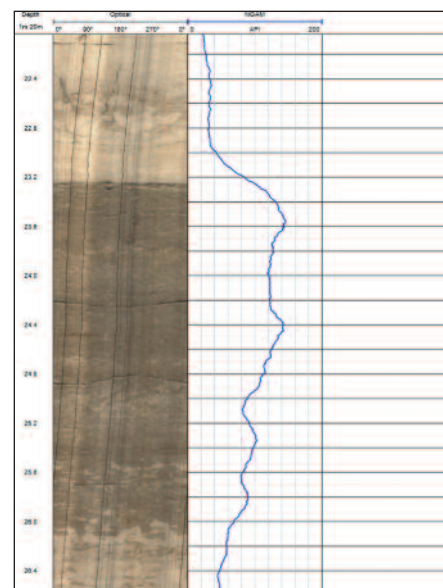
Robertson Geo have been heavily involved in the initial investigation stage for the tunnel proposals with the successful logging of 18 subsurface boreholes ranging from 146mm OD bores up to 355mm OD wells. These boreholes ranged from 35m through to 70m deep.

One of the objectives of investigation was to find the location of sections of phosphoric chalk and this was achieved by using a High Resolution Optical televiewer (HI-OPTV) to identify changes in bed colour, backed by the identification of differing radiation levels (See data example). The Robertson Geo PS Logger was also

utilised during this project to determine the small strain moduli of the chalk which will aid in the design and construction of the tunnel.

To determine possible water ingress or egress within the boreholes a Heat-Pulse Flowmeter probe was used to help identify any potential water-table movement across the site.

Surface logging equipment included a Robertson Geo 500m winch with 3/16" four-core armored cable connected directly to a laptop via the Micrologger2, Robertson Geos' surface interface system for handling logging data acquisition. Winch and surface equipment operated from one of the service team's fleet of purpose modified vehicles, in this case a Land Rover Discovery, allowing access to difficult to reach areas and affording quick and efficient movement between borehole locations.



Stonehenge chalk bed data sample.



# Coal & Mineral exploration

## IN THE PHILIPPINES AND MALAYSIA

**ROBERTSON GEO CLIENT Construction and Drillings Specialists Inc. (CDSI) of Manila is a specialist contractor for exploration drilling and formation testing, providing coal and mineral exploration and geotechnical services throughout the Philippines and South East Asia.**

The use of wireline logging instrumentation offers cost effective data acquisition for the exploration and evaluation of quality and quantity of the economic coal resource and indications of the viability of its extraction. The data provides in-situ results of a high-resolution scale and true vertical depths.

Compliance is the key to success and vital to the confident use of the data. Robertson Geo's tool calibration and ISO 9001 procedures provide absolute reassurance that the data acquired complies with the various mandatory requirements for submission and consideration for Public Reports, including the JORC, CIM, UNFC, CIRSCO, Perc, SAMREC, SME and MRC standards. Unless these criteria are achieved, logging results will simply not meet the necessary compliance standards.

Coal and Mineral exploration is often progressed in the most challenging of locations and environments. Robertson Geo has supplied over 2,000 units to the international market and over 40 years has logged many thousands of investigative boreholes and wells. Versatility and the portable use of its equipment in-situ have, and continue, to be important to the success of its technologies and results.

*Robertson Geo thanks Construction and Drilling Specialists Inc. (CDSI) [www.cdsi.com.ph](http://www.cdsi.com.ph)*



**20 boreholes were logged totalling 5,000m by CDSI for a coal exploration project at South Cotabato, Philippines - commissioned by Mana Resources Development Corp.**

*We enjoy a good relationship with Robertson Geo and know we can rely on the services and equipment to gain and interpret reliable and quality data for geotechnical investigations from drilled boreholes.*

**Cris Leyva,  
CDSI, Manila**



# Coal & Mineral exploration



*ABOVE: By far the most abundant occurrence of coal in Malaysia is found in Sarawak State. Geological surveys have outlined various deposits of economic importance in the Silantek, Mukah-Balingian and Bintulu regions. CDSI carried out a project of coal exploration and evaluation for the Sarawak Energy Board on location at Mukah-Balingian over 293 boreholes logging a total of 38,800m. Data gathered was utilised for the coal reserve evaluation and established the accurate thickness of the coal seams and location. The project fulfilled its objectives in compliance with JORC code standards.*



*ABOVE: At Tarragona, Philippines, CDSI performed coal reserves and seam evaluation for Blackgem Resources and Energy Inc. 9 boreholes were logged totalling 3,250m as part of the project.*



*LEFT: Data was acquired from 214 boreholes, logging a total of 21,600m for the San Miguel Energy Corp by CDSI at Lake Sebu, Philippines.*

## Coal exploration **IN TURKEY**

**ROBERTSON GEO CLIENT Bayer Ltd of Ankara was commissioned by the Turkish Mineral Research Institute to define the subsurface coal levels and extraction potential at a number of sites throughout Turkey.**

After drilled and cased boreholes were completed, the sites were investigated by wireline logging to define the quantity, quality and the difficulty of economically extracting the coal resource.

Geophysical probes and surface equipment supplied by Robertson Geo were used to acquire and interpret the data during the country-wide project at several locations. Bayer Ltd deployed a range of probes for the exploration including Formation Density, Neutron, Fluid Temperature/Conductivity, ELOG and Natural Gamma.





# A pioneering approach



Close up of the GeoKey Micro  
Resistivity Imaging probe

## Robertson Geo (RG),

formally Robertson Geologging, officially came into being in 1979 via the activities of Robertson Research. It was the latter business that utilised its experience in applying geological interpretation technology to the quarrying industry to take its first steps into the world of North Sea oil and gas in the late 1960s, and helped give RG the platform to pioneer the development of slim-hole digital borehole logging systems and techniques.

During the 1980s, RG successfully designed a suite of digital logging tools from the ground up specifically for in-house use. The tools were especially unique in that they became the first to be used outside of the oil and gas market, where analogue equivalents had until then been the norm. However, it was not until 1986, following a crash in oil prices and the rapid decline of the coal industry in the UK, which was a key source of revenue at the time, that a major change occurred within the business with RG being sold off following a management buyout. This was the catalyst for the business to move from being purely a manufacturer and user of its own technology, into one that developed comprehensive sales and service functions and sold its technologies globally.

Fast forward to 2018 and RG, under the majority ownership of the OYO Corporation of Japan, is the largest global

supplier of slim-hole logging equipment, supplying well-logging instrumentation and logging services to over 160 countries and on every continent. Industries served not only include oil and gas and mining, but also nuclear and civil engineering, geotechnical, water-well management and the renewables sector. Headquartered in Deganwy, North Wales, it also has subsidiary companies in Hong Kong supporting the Asia-Pacific region, and the United States that directly supports the North and South American markets, while a network of local agents and representatives provides support elsewhere.

### Business advantages

The global presence of the company not only means that its solutions and services have been put to great use in a number of well publicised domestic projects in the UK, such as the A303 Stonehenge construction, HS2, Crossrail, Lower Thames crossing, Hinkley Point C and all of the major offshore wind farms, but also in a number of far-flung, challenging locations such as Greenland, Antarctica and even on Mount Everest.

“The core business of the company today continues to revolve around our range of geophysical logging technologies,” explains RG’s Managing Director, Simon Garantini. “As well as solidifying our position in a number of different market sectors, we have



In developing a range of digital tools and partnering this with a can-do attitude, it brought about a step-change in its various market segments, and that is something we want to unlock the value of further in the years to come

Below:  
Simon Garantini - MD -  
with a GeoKey oil/gas system







Above:  
Part of the comprehensive  
offering for the Mining  
& Minerals, Oil & Gas,  
Renewable Energy,  
Geotechnical and Water &  
Environmental industries.

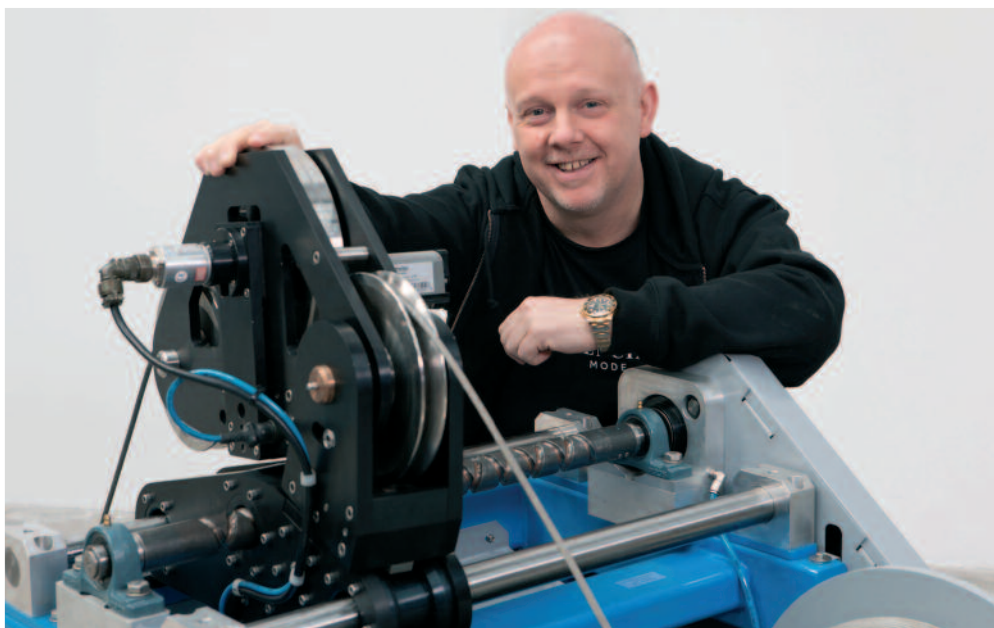
also differentiated ourselves through the efforts of our Services division. Thanks to our breadth of experience and the support of our **manufacturing and development** teams, we are able to offer a range of services at short notice, for projects both onshore and offshore, which is a capability that clients within the offshore industry in particular appreciate.

“We are also the only company of our kind to be ISO certified, which gives us a modern-day advantage as we run all of our processes through an ISO risk management framework that **underpins** our quality management system. Additionally, we are the only company to possess its own test well on site. This means that once our tools are developed, again on site, and tested using the full calibration capabilities that we have in-house, we can put them

to use in our test well to **analyse** their performance against tens of **thousands** of runs of similar products held around the world to ensure that we have the optimum end product in front of us.”

### New technologies

Simon himself was brought into the business by OYO Corporation during 2017 as part of what he calls a ‘reactivation’ of RG, and his first few months in the role allowed him the opportunity to study the main strengths and qualities that have enabled RG to prosper. “Looking back over the history of the business, it is clear that it has always been a pioneer and an innovator in its area of expertise,” he details. “In developing a range of digital tools and partnering this with a can-do attitude, it brought about a step-change in its various



Left:  
Steve Parry - Sales & Marketing  
Director, with a 3000m oil/gas  
wireline winch

market segments, and that is something we want to unlock the value of further in the years to come.”

In April 2018, Simon oversaw the formal rebranding of the business as it moved away from its previous Robertson Geologging moniker, which he admits was somewhat pigeon-holing it, and with this came the start of a concentrated marketing push that he anticipates will run for the next two years before fully established. “What has begun with establishing our new registered trademarks and corporate brand will soon be accompanied by the launch of an innovative marketing and promotional platform; these are exciting times for our company,” he said. “At the same time, we are working to develop a business development plan to energise the sales and marketing sides of the business in anticipation for what 2019 holds.”

What next year is set to bring is the result of a project to completely redesign RG’s core technologies. Dubbed Project Agile, Simon believes it will be key to revolutionising the company and putting it back into a position of technology leadership. “We have taken everything that RG has learnt and perfected over its 40-years of existence and funnelled that into what will be a completely new range of technologies and systems that will provide further proof of RG’s ability to respond to our customers’ needs,” he proclaims. “We are confident that this, coupled with a concentrated marketing push, will bring the business back to where it was historically and that is into a position

of being a technology leader, as well as being the default choice for customers seeking innovative, reliable logging systems that are born from 40 years of experience and know-how.” ◆

## Robertson Geo

[www.robertson-geo.com](http://www.robertson-geo.com)

Products: Slim-hole geophysical logging equipment across five market segments: oil & gas, mining & minerals, renewables, water & environmental and geotechnical, backed by a service division.





# India's railway ACROSS THE HIMALAYAS



## FROM RISHIKESH RAILWAY station to Karnaprayag, Indian Railways' proposed route for the Char Dham Railway.

This 125km route starts at New Rishikesh railway station at 380m AMSL and ends at Karnaprayag 825m AMSL. The 125km project, will reduce the Rishikesh to Karnaprayag travel time from 7 hours to 2 hours. It will have 16 bridges and 105km or 85% of the project inside tunnels. A 15.1km tunnel, reported to be the country's longest, will be built between Devprayag and Lachmoli on the route.

Robertson Geo client Soiltech India Private Limited was involved in the first phase of the project. The geology and locations in the Himalayas made for an exacting borehole drilling and subsurface geotechnical investigation to gain the understanding of rock strength and the presence of fractures. The Robertson Geo High Resolution Acoustic televiwer (HRAT) was extensively used to correctly map out the joints and discontinuities in the borehole. It was also used for carrying out hydro fracture tests after the boreholes had been surveyed. The data was captured on location using the highly portable Micrologger2 acquisition system with a 600m winch.

**THE TAIPEI WATER Department planned to drill a programme of disaster prevention groundwater wells in Taipei and the Zhongxiao Junior High School of North-West Taipei was one of the chosen sites for a well.**

The borehole logging investigation was undertaken by Robertson Geo client Excellent Instrument and Engineering Co Ltd of Tuu Cherng, Taipei Country.

"The geology of the Taipei basin is composed of gravel, sand and mud. The layer constituted by rough sized particles of gravel containing most of the water, with less water content found in the layers constituted by fine sized particles. To locate the aquifers, gravel or coarse sand layers were the target areas for identification. These layers have high resistivity and low natural gamma values".

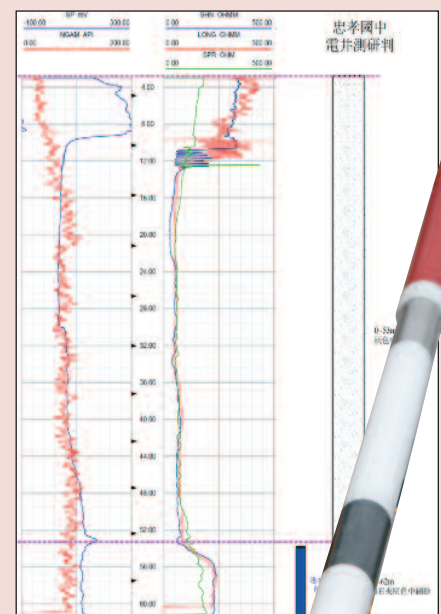
"The Robertson Geo logging system comprised of the Electric Logging Probe, the water well

## DISASTER PREVENTION groundwater wells in Taipei

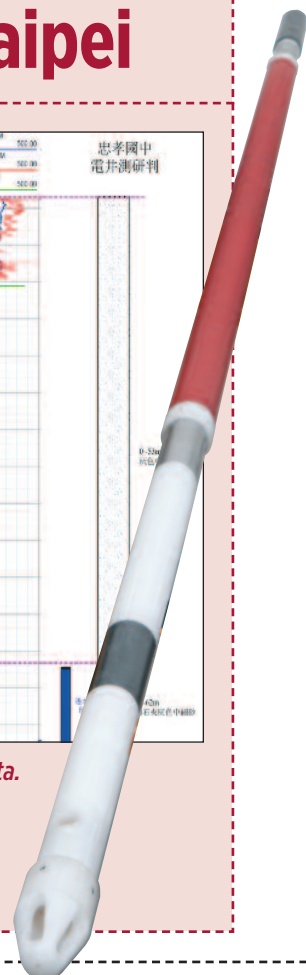
combination probe combining shallow, medium and deep penetrating resistivity measurements with Self Potential. Surface equipment used was the 500m winch and Micrologger2, the interface system for handling data acquisition. This clearly showed up the various deposit sequence and identified which depths we should install the borehole screen. It was very important to construct the well accurately, if the screen was lowered in the wrong deposit layer, it could cause poor flow rates or contamination of the water supply in the well".

"After installation of the casing and cementing, we used the Robertson Geo dual view borehole inspection camera to check the whole well structure and depth of the screen."

Source: Excellent Instrument and Engineering Ltd.



Example of logging data.



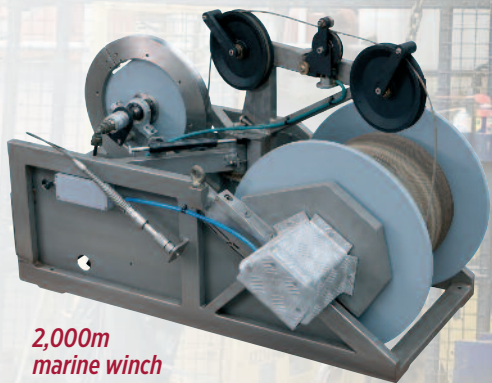


# GETTING THE JOB DONE

**ROBERTSON GEO SERVICE**  
engineers are highly  
trained and fully certified  
for offshore work.

Logging on offshore locations demand versatility of both crews and equipment to get the job done. Here, the 2,000m marine winch has been suspended in the gantry to deploy geophysical probes for offshore subsurface investigation near New Bedford, Massachusetts, USA.

If you look carefully you can just about see the Robertson Geo logging crew behind the marine winch in this image of the set up prior to logging.



**2,000m  
marine winch**

Working experience by Robertson Geo offshore logging crews has led to the introduction of the 2,000m marine winch, designed to resist corrosive and saline conditions. Precision engineered for reliable use in the most challenging offshore applications, the marine winch is fully compatible with the Micrologger2 surface data acquisition system and the full range of probes to depths of 2,000m.





CGU China



ADIPEC 2018, Abu Dhabi

“2018 has certainly been a busy year on the Geotechnical exhibition circuit. We’ve been seen at shows and conferences across the world from China and Asia, Australia, USA and Canada, East Asia and at the recent ADIPEC 2018 in Abu Dhabi and of course around Europe and here in the UK.”

Check out our new Website



Our new website provides a clear message of who we are, what we stand for and where our value lies when developing, delivering and maintaining market leading geophysical logging solutions. It has a clean design with an intuitive and consistent site-wide navigation system with improved menu functionality that directs you to the information most relevant to you.

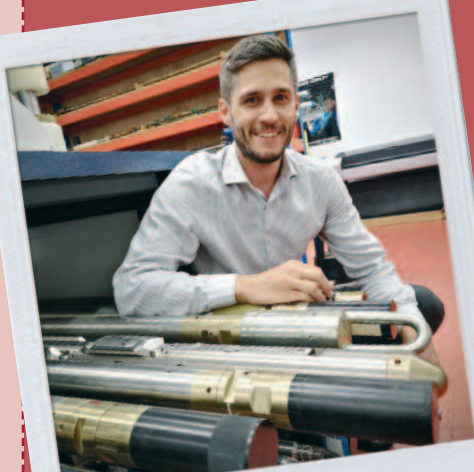
It is also fully responsive with mobile devices, making it easy to navigate on a wide range of web browsers and portable devices.

We’ve introduced a range of new content to our site, including a Download Centre that features customer access to our library of User Manuals and Software, Technical specification and data sheets for the comprehensive range of Probes and Surface Equipment and of course downloads of our market sector literature and GeoUnlocked® magazine.

My name is David Bullock, I grew up around Altrincham (South Manchester) and now live in Northwich.

I come from a Geology background with a BSc from Keele University, which led me on to a career in the Oilfield. Before the oil price crash I was a Unit Manager for a Mud Logging company and worked in many locations worldwide. After finishing in the oilfield I fell into recruitment, it wasn’t quite the right environment for me and so I started to look for something a little closer to my background and interests.

That is when I became part of Robertson Geo. I have been here around four months now and love it, it’s an exciting time of development for the Company and I am enjoying being part of it. My position is Sales Manager for Europe and Africa - it is an interesting and challenging role and I get to use my knowledge and experience to work on an international basis again. [dbullock@robertson-geo.com](mailto:dbullock@robertson-geo.com)



David Bullock, Welcome to Robertson Geo

Available now  
make sure you see a copy

Our new suite of market sector literature, with up to 24 pages of slimhole logging instrumentation background, specifications and data examples.

You can download from our new site on [www.robertson-geo.com](http://www.robertson-geo.com) or request a hard copy from [growlands@robertson-geo.com](mailto:growlands@robertson-geo.com)





# SUBSURFACE INVESTIGATION

## along the proposed route of the HS2 railway project

HIGH SPEED 2 (HS2) is one of the largest infrastructure projects currently underway in the UK. It is a high-speed railway, scheduled to open in phases between 2026 and 2033 with high-speed trains travelling up to 400 km/h (250 mph) on 330 miles (530 km) of track.

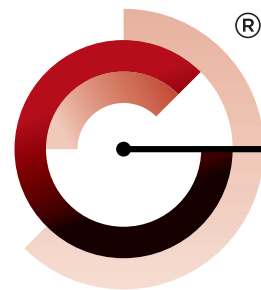
Robertson Geo have been involved with HS2 since August 2016 making this one of the longest running projects for Service Logging to date with data acquired from over 70 boreholes in varying locations along the proposed route.

Characterising the subsurface properties for formation, rock strength and the presence of fractures and faults, the investigation has interpreted the data acquired from a comprehensive suite of geotechnical probes including the Full-Waveform Sonic, PS Logger, Formation Density and the High Resolution Acoustic televiewer (HRAT) and High Resolution Optical televiewer (HI-OPTV).

Due to environmental reasons the occasional visit to rural Aylesbury became a challenging location for portable logging operation, it has tested the versatility of both Robertson Geo service engineers and field equipment.



*Micrologger2 is the surface interface system for handling logging data acquisition. Compact and lightweight Micrologger2 is probably the most powerful portable logging system around. Together with Winlogger the MS Windows based operating system it provides versatile and mobile field acquisition capability.*



**ROBERTSON  
GEO**

Unlocking Your GeoData



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