



SEE THE UNSEEN

**QUANTUM SENSING FOR THE
NEXT ERA OF SPATIAL INTELLIGENCE**

// [DELTA-G.CO.UK](https://delta-g.co.uk)

We detect the tiny variations in gravity and reveal structures, patterns and anomalies invisible to traditional sensors.

Society wastes billions every year digging blindly into the subsurface. Existing technologies have their limits, whether they are slow, difficult or disruptive, they aren't providing a full picture of the world around or beneath us. We are changing that by unlocking an entirely new category of spatial intelligence. **Think Google Maps for the subsurface.**

Gravity is universal, inescapable, and impossible to mask. Our sensors treat it as a truth signal. By comparing tiny differences in gravity across space, our sensors uncover what's hidden all without emitting a trace.

That means surveys can be carried out in places where existing tools fail, on roads, railways, ports, and underwater. The result is a leap in both speed and reliability: geologists and engineers get trustworthy data before they dig, and governments gain tools to protect their spatial infrastructure.

At the core is our patented hourglass technology, stacking two atom interferometers vertically. Inside each "bulb" are clouds of cooled rubidium atoms. As the sensor passes over hidden features, each cloud experiences a slightly different pull of gravity. A perfect laser ruler tracks these changes, recording interference patterns that act as gravity's fingerprint.

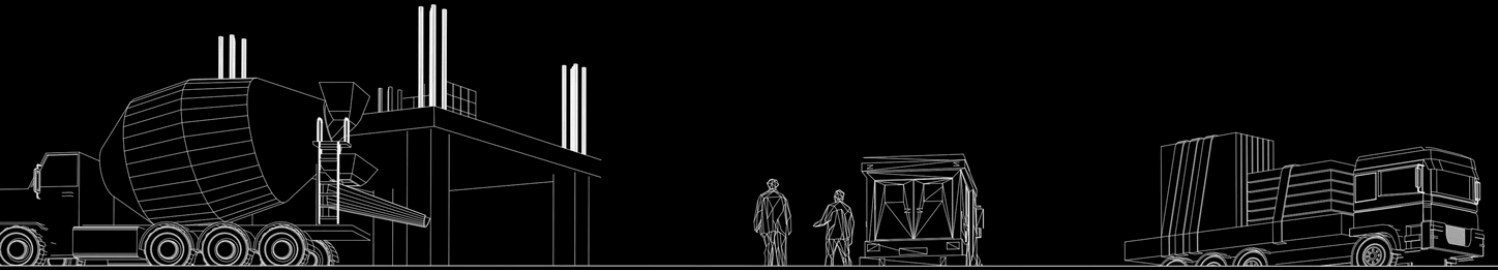
Meet the Rhino. Our Next-Generation Quantum Gravity Gradiometer

In a world first, we deployed our quantum gravity gradiometer in a live infrastructure environment at the National Buried Infrastructure Facility, and it was operated by non-physicists.

Over the course of the deployment, control moved from on-site physicists to remote support to fully handled by the field team. Debugging included.



Gravity becomes business intelligence, powering decisions with unseen insights on **land** ...



With accurate spatial intelligence, you can take action on previously unseen threats before they cause real damage, identifying sinkholes below the surface, mapping abandoned tunnels, or finding new reserves of natural resources.

and **at sea** ...

Navigating with gravity means using the mass distribution of the Earth as a reference map. Underwater mountains, ridges, and changes in geology leave unique gravity signals that can be read even when GPS is unavailable



Applications in Infrastructure, Transport & Asset Management

Bridge Foundation Mapping

Many legacy bridges lack as-built foundation records; intrusive investigations are costly and disruptive. Delta.g will enable non-intrusive detection of foundations and depth via density contrast mapping.

Highway & Rail Safety

Unseen subsurface erosion, washouts, or voids can compromise bridge approaches and carriageways. Real-time gravity mapping identifies at-risk zones to prioritise maintenance, reduce reliance on boreholes and de-risks major projects.



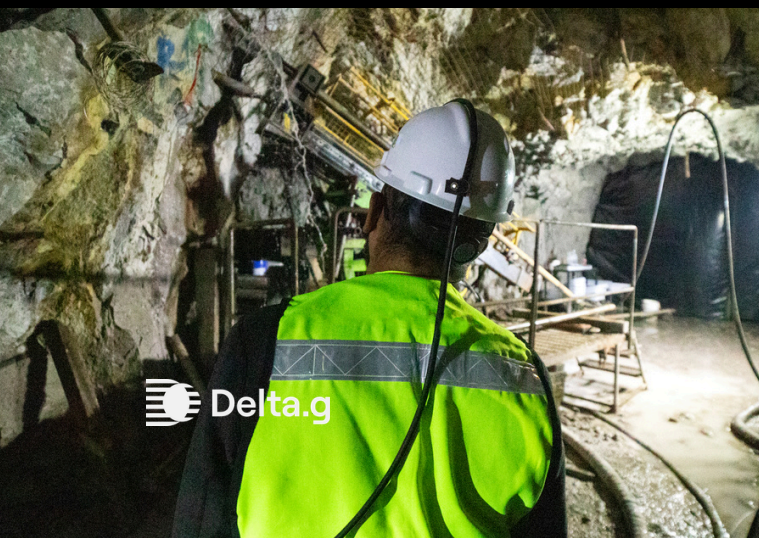
Void and Cavity Detection

Hidden subsurface voids can compromise structures or cause sinkholes. Quantum Sensing enables rapid, real-time gravity surveys to identify anomalies before failure.

Earthworks Risk & Mine-shaft Detection

Old workings or unrecorded features pose collapse risk to roads and railways. We have proven field results showing the ability to detect voids and changes in density.

As the technology matures, these capabilities will extend further integrating with digital twins, smart infrastructure systems, and dynamic transport monitoring networks.



Applications in Energy & Natural Resource Exploration

Optimise The Yield of Drilling Campaigns

High-resolution multi-sensor surveys will be the key to enhanced inversion models, AI-enriched correlations, and improved geological interpretations.

Geological Characterisation

Quantum gravity gradiometers detect minute changes in gravitational fields caused by density variations in the subsurface, helping to locate potential geothermal or hydrothermal reservoirs, with greater accuracy.



Detection of Subsurface Cavities and Underground workings

Quantum gravity gradiometers detect subtle gravitational anomalies caused by voids, collapsed zones, and historic excavations beneath active open pits, enabling miners to identify unmapped underground workings and assess geotechnical risk without drilling or underground access.

Carbon Capture and Storage

Precision Quantum gravity sensors can monitor underground CO2 storage sites, detecting subtle density changes to ensure security, identify leaks, and improve long-term management.



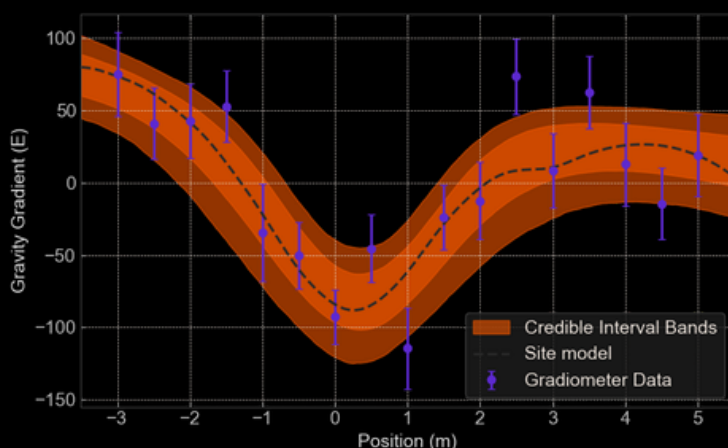
Detecting an Underground Tunnel

A gravity survey was performed above an underground maintenance tunnel to test real-world detection.

Survey Environment & Operational Conditions

- Conducted outdoors above a pre-existing multi-utility maintenance tunnel.
- The tunnel had a 2 m × 2 m internal cross-section with 0.2 m thick reinforced concrete walls.
- It was located under a road surface between two multi-storey buildings, creating a complex gravity environment with background noise from nearby structures and terrain variations.
- The tunnel was air-filled, creating a clear density contrast with the surrounding soil.

Data & Findings



The gradiometer data* (purple) reveals a clear dip in gravity gradient signal as the sensor passes over the tunnel which aligns closely with the predicted site model (dashed line), in the orange band representing the credible interval of expected values.

Results

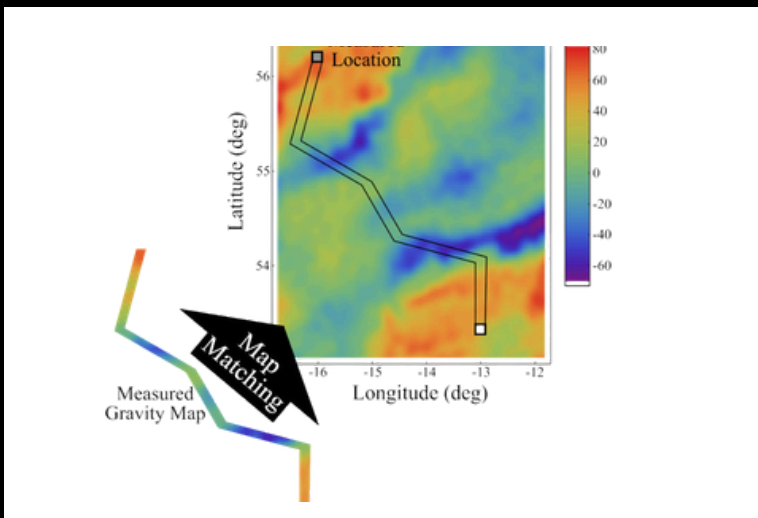
- The sensor operated continuously for several hours in real outdoor conditions, not a controlled lab.
- The results show that the sensor can be used to map the ground safely and non-invasively, helping to find sinkholes, mine shafts, basements, and buried utilities before they become safety or cost risks.

*[Doi.org/10.1038/s41586-021-04315-3](https://doi.org/10.1038/s41586-021-04315-3)

Quantum Sensing for Assured Positioning

Modern navigation relies on Global Navigation Satellite Systems (GNSS) such as GPS. These are highly effective, but fragile. They can be blocked, jammed, or spoofed, creating vulnerabilities. Inertial Navigation Systems (INS) offer a partial solution but without external correction, errors accumulate rapidly, often resulting in positional drift of hundreds of kilometres over extended periods.

To create resilient navigation a new reference system is needed, one that draws directly from the fundamental properties of the planet itself. Every object on Earth, mountains, voids, tunnels, even ocean trenches, slightly alters the local pull of gravity, forming a gravity fingerprint that's unique to each location. Our sensor is being built to measure those differences, producing an absolute gravity gradient, independent of light, radio, or magnetic fields.



Delta.g and the University of Birmingham successfully conducted the world's first quantum gravity gradiometer trial at sea, marking a milestone in resilient, alternative navigation.

Results

- The sensor remained stable on the deck of a moving ship, demonstrating exceptional robustness and readiness for deployment.
- Continuous measurement of acceleration and gravity gradients at varying vessel speeds
- The world's first quantum gravity gradiometer trial at sea.

2010-2020

Core research at the University of Birmingham (Quantum Technology Hub in Sensors and Timing)

FEBRUARY 2022

The team demonstrated the world's first quantum gravity detection of underground infrastructure (Nature, 2022).

SEPTEMBER 2023

World's first quantum gravity gradiometer successfully trialled at sea, opening up potential for resilient navigation.

NOVEMBER 2024

Delta.g was the only quantum sensing company invited to present at the UK's Global Investment Summit.

MARCH 2025

The world's first industrial quantum gravity gradiometer within a commercial contract with the UK Department for Transport.

MAY 2025

Delta.g was awarded the IOP quantum Business Innovation and Growth (qBIG) Prize.

SEPTEMBER 2025

Delta.g secures £4.6 Million seed round to unlock spatial intelligence.

NOVEMBER 2025

Secured over £2.6M in grants and awards and appointed Ewen Stevenson, Chair of Serendipity Capital and former Group CFO of HSBC Holdings, as Chair of the Board.

Delta.g spun out of the University of Birmingham in 2023, and was founded by an award-winning team at the forefront of quantum sensing.

Our founders led the world's first quantum gravity gradient survey, recognised by the Institute of Physics for taking quantum sensing from theory to field.

We're scientists, engineers, and builders - a group of people who share one goal: transforming gravity into insight for real-world impact today.

Delta.g builds on more than a decade of research. Backed by over £6M in pre-seed and seed investment, and over £5.8m in government grants and contracts, we are delivering world-first quantum sensing capabilities into the hands of government and industry, to provide real time, decision-grade subsurface data.

Supported by:



From UoB's Quantum Sensing Group to 20+ field trials.



Dr Andrew Lamb, Co-founder & CTO

A key inventor of our core IP, leading the development of the first commercial prototypes. Successfully led the delivery of Delta.g's commercial prototype within a £2.6M contract with UK Department for Transport, the first of its kind.



Tony Lowe, CEO

Deep Tech Leader with a proven track record in scaling startups, securing VC funding, and driving advanced technologies to market in the Automotive, Autonomy, and Quantum Computing spaces.



Prof. Michael Holynski, Co-founder & CSO

Principal Investigator at QuSIT hub and Chair of the Quantum Sensing Group at the University of Birmingham. Awarded the 2022 James Joule Medal for pioneering quantum gravity sensing.



Jonathan Winch, Co-founder & Head of Engineering

Experienced quantum researcher, and a key figure in bringing the quantum sensing technology from the lab to field, including in 10+ trials, driving improved ruggedisation and practical usability.

We Are Delta.g

Tony Lowe, CEO
t.lowe@delta-g.co.uk

Birmingham Research Park
Vincent Drive
Birmingham, B15 2SQ
United Kingdom