

TIME Names Q-CTRL's Ironstone Opal One of the Best Inventions of 2025

Quantum-based navigation system ensures planes and ships stay on course during GPS attacks

SYDNEY, AUSTRALIA, October 9, 2025 /EINPresswire.com/ -- Q-CTRL, the global leader in quantum infrastructure software, today announced its software-ruggedized quantum navigation system's selection for TIME Best Inventions of 2025.

TIME
Best Inventions of 2025

Quantum-assured navigation

 Q-CTRL |  Ironstone Opal

[Ironstone Opal](#), which has been [field-validated](#) in air, land, and maritime trials, provides a solution to GPS denial, which has become an increasing danger in conflict zones and recently threatened a plane carrying European Commission president [Ursula von der Leyen](#). The system leverages quantum sensors, stabilized using software, to provide navigation that is immune to the kinds of interference plaguing commercial aviation, shipping, and defense operations.

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Jonathan Green, Chief Technology Officer, Northrop Grumman Mission Systems

In airborne trials, Ironstone Opal enabled GPS-free navigation with an accuracy up to 111 times better than the best conventional GPS alternative, even under highly dynamic maneuvers. It delivered GPS-like positioning accuracy down to just 4m over flights up to 700km long.

Most recently, Ironstone Opal operated continuously for more than 144 hours on an Australian Navy vessel, the MV Sycamore, trialling gravimetric navigation capabilities.

"In today's sophisticated threat environment — marked by jamming, GPS denial, and spoofing — quantum sensing offers a strategic advantage delivering resilient and precise capabilities where traditional systems fall short," said Jonathan Green, Chief Technology Officer, Northrop Grumman Mission Systems. "As a leader in quantum technology, Northrop Grumman supports

innovators like Q-CTRL in advancing the quantum industry to enhance national security through cutting edge innovation.”

TIME recognizes 300 products, software, and services each year that are changing the world, including scientific or technological breakthroughs and innovations that make life easier and more sustainable. Ironstone Opal was identified through research from TIME’s global network of reporters and expert contributors based on key evaluation factors like originality, efficacy, ambition, and impact.

Ironstone Opal’s quantum sensors detect tiny, otherwise imperceptible signals from Earth’s structure that serve as gravimetric or magnetic “landmarks” for navigation, which are then compared with geophysical maps for precise positioning. Q-CTRL’s proprietary software-ruggedization hardens these quantum sensors for operation in the real world, allowing resilient performance in demanding environments.

The system can function as a robust backup for GPS on both crewed and uncrewed defense platforms, as well as in commercial settings. Over 1,000 commercial flights per day are affected by GPS denial, and many key players in the aerospace industry, like Airbus, are looking into quantum-assured navigation technologies as a solution.

“We are thrilled to be recognized by TIME for bringing forth one of the best inventions of 2025,” said Michael Biercuk, CEO and Founder of Q-CTRL. “One of our core values is to Be Revered, and it’s thrilling that an independent and venerable publication like TIME has seen the real world-changing value we’re delivering against one of today’s most pressing strategic challenges.”

TIME’s recognition of Ironstone Opal comes shortly after DARPA awarded Q-CTRL two contracts totalling \$24.4 million USD to develop quantum sensors for navigation on defense platforms, and the Department of Defense’s Innovation Unit (DIU) awarded a contract to Lockheed Martin and Q-CTRL to develop a quantum-enabled inertial navigation system.



If you are interested in learning more about Ironstone Opal, please visit Q-CTRL's website.

About Q-CTRL

Q-CTRL is a global leader in quantum infrastructure software that makes quantum technology useful. Q-CTRL partners with industry pioneers like IBM, Rigetti, and AWS to enhance quantum computer performance through AI-driven control solutions. Its education platform, Black Opal, is trusted by thousands worldwide to build practical quantum skills. In quantum sensing, Q-CTRL delivers field-deployable capabilities for navigation and detection in GPS-denied environments, with partners including Lockheed Martin and Airbus. The company's breakthroughs have been featured in The New York Times and are transforming both commercial and defense operations. Founded in 2017 by Professor Michael J. Biercuk, Q-CTRL operates globally from offices in Sydney, Los Angeles, San Francisco, Berlin, and Oxford.

Taylor White

HKA, Inc. Marketing Communications

+1 714-426-0444

[email us here](#)

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