UK
RI — Innovate UK

COMMERCIALISING QUANTUM TECHNOLOGIES CHALLENGE

The Quantum Technologies Challenge provides funding to commercialise products and technologies based on quantum science. It builds on the UK National Quantum Technologies Programme (NQTP), which supports ideas, innovation and investment in the new global quantum era.

About the challenge

This challenge is investing to advance the commercialisation of new products and technologies based on the latest developments in quantum science.

We work to drive innovation across a range of sectors including:

- 🚗 Automotive
- 🔒 Cybersecurity
- ✈ Defence
- ⚕ Healthcare
- 🚦 Infrastructure
- 📶 Telecommunications

Four key areas of the challenge:

- 💡 Funding for collaborative research and innovative ideas
- ⚗ A programme of industry-led technology, research and development projects
- 🔍 A series of feasibility projects
- 🚀 Running an investment accelerator

SPLICE: SINGLE PHOTON LIDAR IMAGING OF CARBON EMISSIONS

Lead organisation: QLM Technology

Cost: £3.1m

Reducing industrial methane emissions is one of the most immediate ways to combat climate change. However, existing technologies are complex, expensive and require specialist expertise.

SPLICE aims to revolutionise this market with affordable, innovative lidar (light detection and ranging) that utilises quantum technology to autonomously detect and measure greenhouse gas emissions.

Project outcomes:

- Produced multiple methane lidar prototypes and successfully demonstrated their performance in industrial trials in the UK, France and the USA.

- Received £15m in commercial funding.

- Established a strategic partnership with SLB, a leading gas industry provider.

- Set up a UK quantum gas lidar manufacturing facility capable of producing thousands of units.

AIRQKD

Lead: BT

Cost: £6.8m

AirQKD represents the first UK initiative to address metropolitan-scale 'last-mile' quantum secure connectivity, using network-integrated Free-Space Optical (FSO), Quantum Key Distribution (QKD) and 5G wireless links.

The project was designed to support real-life use cases where security and data integrity are vitally important, including roadside-to-vehicle communications.

Project outcomes:

- A fully-functional Single Photon Detector (SPD) module prototype, which has been developed specifically for FSO-QKD systems.

- The development of microcavity technology, which is now being further exploited in related projects.

- Growth in head-count and maturity of industry partners' businesses as a result of AirQKD involvement.

RELIABLE, HIGH THROUGHPUT PRODUCTION AND CHARACTERISATION OF COHERENT SUPERCONDUCTING DEVICES

Lead organisation: Oxford Quantum Circuits
Cost: £3.8m

Semiconductor-based electronics support almost all technologies we use today, from laptops to cutting-edge medical equipment. However, the production of superconducting circuits is a challenge, and primarily confined to laboratory settings.

This project set out to transfer crucial knowledge from academia and translate it into commercially-viable devices, developing robust, reproducible processes for manufacturing high-coherence superconducting while ensuring scalability.

Project outcomes:

- Removed technical barriers in translation of laboratory knowledge, providing seamless access to cutting-edge quantum solutions.

- Strategic partnership and investment in state-of-the-art cryogenic equipment has ensured precise evaluation and quality control.

- Accelerated commercialisation of quantum technologies and bolstered UK product reach.

- Installed world's first Quantum Computer (QC) in a colocation centre.

NISQ.OS

**Lead: Riverlane**
Cost: £6.7m

Operating systems simplify computers so that everyone can use them. While quantum computers are increasingly powerful, it's still difficult for users to interact with them because there's no good operating system. Many have tried to build this but no solutions have worked.

NISQ.OS is an operating system that overcomes this technical challenge. Rather than presenting quantum computers as a "black box", NISQ.OS exposes its different elements, giving users the power to schedule tasks in an optimal way. The project aims to improve the performance of quantum computers by 1,000-fold vs competitors.
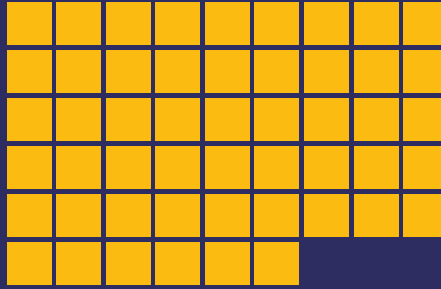
Project outcomes:

- Successful running of experiments on all of the hardware partners' systems.

- Significant progress in hardware partners' quantum computing capabilities.

- Software offering and capabilities of Riverlane's products have also taken large steps forward.

- Strengthened relationships with consortium partners.
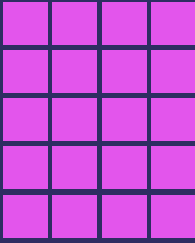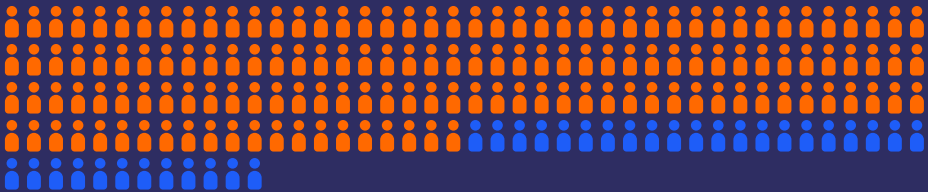
£204M
of allocated
funding so far

£513M
of generated private investment

80 New or improved
products

+9 New or improved
services

+9 New or improved
processes*

More than 1800 jobs generated or supported so far, of which **1470** are high-skilled jobs*

EXPLORE FUNDING OPPORTUNITIES

Search the UK Research and Innovation Challenge Fund to find further quantum technologies funding opportunities:

ukri.org/opportunity

‹ Learn more about all the projects funded by the challenge and the organisations involved