

Spotlight on the Hub's Industry Collaborations: the case of BT

The company

BT Group is one of the world's leading telecommunications and network services providers. They provide global communications services and solutions, serving customers in 180 countries. The company is investing heavily each year in security research and development of technologies, with the aim of future proofing national communications infrastructure in a quantum-enabled world.



The partnership with the Hub

BT's association with the Hub dates back to the first phase of the UK National Quantum Technologies Programme, when the company came on board with a strong interest in the Hub's work in quantum networking. This relationship was firmly established in 2015 when a consortium of Hub, BT and Toshiba Research Europe Ltd (TREL – now Toshiba Europe Ltd) investigators secured additional EPSRC funding to extend the Hub's UK Quantum Network (UKQN) from Cambridge Science Park to the ICT tech cluster in and around Adastral Park, BT's Research & Innovation Labs campus, and Innovation Martlesham (a concentration of over 100 tech companies).

Their work with the Hub on UKQN_{tel}, the 125km-long UKQN extension to the telecommunications sector, demonstrated the successful integration of emerging, high-performing quantum communications technology over standard commercial grade optical fibre which comfortably accommodates quantum and non-quantum data traffic. The deployed QKD technology shares data encryption keys via an ultra-secure quantum channel over the same fibre that carries the encrypted data itself. UKQN_{tel} has been established as a test-bed for device and system trials, proof of principle experiments, integration of quantum and conventional communications, and quantum application and service demonstrations for stakeholders, customers and the wider public.



“We couldn't have been even close to the position we are in today on quantum without the close interaction with the Quantum Communications Hub and the associated support from Innovate UK. The access to world-class research has unlocked the power of quantum for us and I am excited to see how we now start to commercialise it.”

Andrew Lord, BT's Head of Optical Networks Research

Looking ahead

Since the establishment of the UKQNTe/testbed, BT has cemented its status as a major stakeholder in the research and development of quantum communications products and services through their ongoing partnership with the Hub coupled with their involvement in a number of high-profile ISCF and EU funded projects including:

- [AQaSec](#), which aims to develop new quantum-resistant algorithms.
- [AIRQKD](#), which aims to trial quantum secured communication over free space.
- [3QN](#), which is focused on developing free-space quantum communications at extra-terrestrial scales using satellites.
- [OpenQKD](#), which aims to create and test a prototype pan-European quantum network infrastructure.
- The [QKDSat consortium](#), which seeks to demonstrate how quantum communications technologies infrastructure at long-distance scales.

BT's future ambitions around quantum communications will seek to commercialise the technology. Current steps include the building of business cases together with ongoing technology assessment as well as overall system security design. A recent contract was signed with ArQit for the provision of satellite QKD in the UK, and BT is continuing to explore the potential for building a terrestrial QKD network. In the longer term, BT is committed to ongoing quantum research, with the ultimate goal of a full quantum internet.



“Demonstrations of both networked quantum communications, and applications that leverage these, have been an essential part of the Hub’s portfolio since we started. Collaboration with BT has been crucial to our establishment and operation of the UK Quantum Network, and we very much look forward to continuing collaboration as the network expands and new applications emerge.”

Professor Tim Spiller, Director of the Quantum Communications Hub

To view the full text of this case study please visit: quantumcommshub.net

