



QUANTUM  
COMMUNICATIONS  
HUB

# EPSRC Quantum Communications Hub

The EPSRC Quantum Communications Hub, funded through the UK National Quantum Technologies Programme, is a major collaboration of university and industrial partners brought together to accelerate development and commercialisation of quantum secure communications technologies at all distance scales. This Hub's focus is primarily on technology applications reliant on Quantum Key Distribution or QKD - a mature quantum technology which distributes cryptographic keys to enable ultra-secure encryption of information.

Major Hub achievements over the original phase of the work (2014-2019) include:

- Building and launching the UK's first Quantum Network, demonstrating that quantum secure communications can operate in the real world, alongside conventional high-speed optical communications, using standard installed commercial grade optical fibre;
- Advancing miniaturised QKD technologies, and demonstrating the world's first chip-to-chip QKD encrypted transmission;
- Demonstrating free space QKD between a handheld device and a wall mounted terminal, paving the way towards secure QKD technology for the consumer market.

Significant progress was also made towards real-world realisation of new approaches beyond QKD, such as: taking quantum digital signatures from laboratory demonstrations over a few metres of optical fibre to 100 km distances in metropolitan networks; developing the assurance of Quantum Random Number Generators.

The Hub vision for its second operational phase (2019 - 2024) is to deliver quantum secure communications at all distance scales, through the development of a range of applications and services with the potential for integration with existing infrastructure.

Specifically, the Hub is aiming to:

- Extend and evolve the UK Quantum Network – exploring new networking approaches; developing novel architectures for the integration of classical and quantum communications; operating technology trials and demonstrations over our networks, and using these as testbeds to engage users.
- Advance miniaturisation of QKD technologies onto chips – enabling integration of low-cost, reliable and handheld quantum technologies with current consumer devices and service operations.
- Overcome the current distance limitations of terrestrial fibre-based QKD – developing and trialling satellite quantum communications technologies for the secure transfer of information worldwide.
- Develop new quantum sources, detectors and protocols beyond QKD.

Underpinning all Hub technologies is security – of devices, systems and end-to-end. This cross-cutting theme embraces work on metrology, calibration and worldwide certification of standards for industry (particularly through partnership with the National Physical Laboratory and ETSI); integration of quantum and post-quantum technologies; undertaking cryptographic and security analysis, vulnerability analysis and testing, combined with the development of countermeasures – all from the perspective of providing practical and secure applications and services at all distance scales.



If you are interested in finding out more about the work of the Quantum Communications Hub, please contact us via [enquiries@quantumcommshub.net](mailto:enquiries@quantumcommshub.net)



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