Innovate UK | Business Connect

UK Quantum Infrastructure

A guide for international visitors looking to understand and engage with UK capabilities



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Introduction

This guide gives an overview of the UK's quantum infrastructure and where international visitors may want to focus their time. It covers the main national organisations and groups the wider ecosystem by area of interest, with an emphasis on the capabilities, facilities and potential routes for engagement. Many of the organisations listed in this guide will have a stand at the showcase. Equally, the organisations may have a presence at the 1-2-1 meeting event.

At a glance

Use this page as a quick reference while visiting the showcase. Start with the area closest to your interests, then use the fuller sections that follow for capabilities, facilities and possible routes for engagement.

Choose the route that best matches your interests		
Interest area	**What the visit could cover**	**Good starting points**
Quantum computing	Hardware, software, applications, benchmarking and skills	NQCC, QCI3 Hub, NPL, Digital Catapult, STFC Hartree Centre, Fraunhofer CAP
Quantum networking	Quantum communications, network testbeds, components and secure communications	Integrated Quantum Networks Hub, NPL, Satellite Applications Catapult, National Dark Fibre Facility, RAL Space, Fraunhofer CAP
Quantum sensing	Sensing, imaging, timing, PNT and biomedical applications	QuSIT, QEPNT, Q-BIOMED, NPL, Fraunhofer CAP
Supply chain and enabling technologies	Photonics, semiconductors, fabrication, cryogenics, packaging, control and manufacture	STFC campuses, open-access foundries, NPL, Compound Semiconductor Applications Catapult, High Value Manufacturing Catapult, Fraunhofer CAP

Typical engagement routes: collaborative research, facility visits, testing, demonstrator projects, investment or commercial partnerships. For the wider ecosystem, use the UK Quantum Landscape Map referenced on page 5.

1. The UK quantum ecosystem

The UK quantum ecosystem brings together government, universities, national laboratories, businesses and investors. The UK National Quantum Technologies Programme supports research, skills, industry engagement and international collaboration. The National Quantum Strategy sets out the UK's longer-term ambition to become a leading quantum-enabled economy.

Capabilities span quantum computing, networking and communications, sensing, imaging, timing, position and navigation, biomedical applications and the enabling supply chain. Depending on the organisation and facility, engagement may include collaborative research, visits, testing, demonstrator projects, investment or commercial partnerships.



Click the image below to be taken to the UK Quantum Landscape Map.

For a more detailed list of UK companies, research groups and quantum infrastructure, email Mathew.jones@iukbc.org.uk to set up a 1-2-1 meeting.



2. Explore the UK by area of interest

The sections below provide a starting point for tailoring a visit. There will be overlap between them, particularly around measurement, components and enabling technologies, but they should help visitors identify the organisations and capabilities most relevant to their interests.

2.1. Quantum computing

For visitors interested in quantum computing, Harwell is likely to be an important starting point. The National Quantum Computing Centre brings together hardware platforms, technical expertise and opportunities to work with researchers, technology developers, businesses and government. A wider visit could also include organisations working on software, applications, benchmarking and adoption.

- **Areas of interest:** hardware platforms, testbeds, software, algorithms, error mitigation, benchmarking and sector applications.
- **Relevant organisations and facilities:**
  - National Quantum Computing Centre — "a national laboratory for quantum computing, aimed at accelerating the development of quantum computing by addressing the challenges of scalability."
  - The Hub for Quantum Computing via Integrated and Interconnected Implementations (QCi3) — "brings together quantum computing experts in academia, industry, and government across the UK to address key challenges and deliver applications across diverse areas of engineering and science."
  - NPL quantum computing — "We contribute to technical evaluation, component characterisation, and the development of documentary standards to define terminology, specifications, and test methods for quantum computers."
  - Digital Catapult — "Unlock real business impact with quantum and enhance quantum readiness in computing, sensing and post quantum cryptography, with real world use cases across industries."

» **STFC Hartree Centre** — "We focus on quantum computing software, exploring cutting-edge quantum computing theory, and investigating the intersection between classical high-performance computing applications and the emerging potential of quantum computing."

» **Fraunhofer Centre for Applied Photonics** — "Fraunhofer CAP is addressing multiple challenges associated with these architectures including at a component level and issues associated with scalability and networking."

- **Likely audience:** hardware and software companies, researchers, investors and organisations exploring potential use cases.
- **Potential engagement:** technical discussions, application development, benchmarking and introductions across the UK computing ecosystem.



2.2. Quantum networking and communications

This area covers both quantum-secure communications and the longer-term development of connected quantum systems. A tailored visit could bring together academic research, network testbeds, telecom operators, component developers, photonics expertise and organisations working on standards and assurance.

- **Areas of interest:** quantum key distribution, quantum memories and repeaters, entanglement distribution, network architectures, satellite and fibre links, security assurance and interoperability.
- **Relevant organisations and facilities:**
  - » Integrated Quantum Networks Hub — "a major UK-wide collaboration to enable secure quantum networking at all distance scales."
  - » National Dark Fibre Facility — "provides a dedicated dark fibre network connecting selected UK universities with research networks in Europe and worldwide via telecommunications facilities in London."
  - » NPL quantum photonics and communications — "We provide SI-traceable measurements" of single-photon sources and detectors, quantum random number generators, quantum key distribution systems and quantum networks.
  - » Satellite Applications Catapult — "Growing the UK economy by supporting our best companies to accelerate the invention and adoption of space data and technology."
  - » RAL Space — "the UK's national space laboratory."
  - » Fraunhofer Centre for Applied Photonics — "Fraunhofer CAP is working with commercial partners to roll QKD out into real-world situations working towards quantum
- **Likely audience:** telecom operators, network equipment providers, cybersecurity organisations, component suppliers, researchers and public bodies responsible for secure infrastructure.
- **Potential engagement:** testbed participation, demonstrations, component evaluation, standards discussions and links to operators or prospective users.



2.3. Quantum sensing, imaging and timing

Sensing is a broad area, so it would make sense to tailor a visit around a particular application or sector. UK capabilities include sensing, imaging, timing, resilient position and navigation, and biomedical sensing, with activity ranging from laboratory research through to demonstrators and field trials.

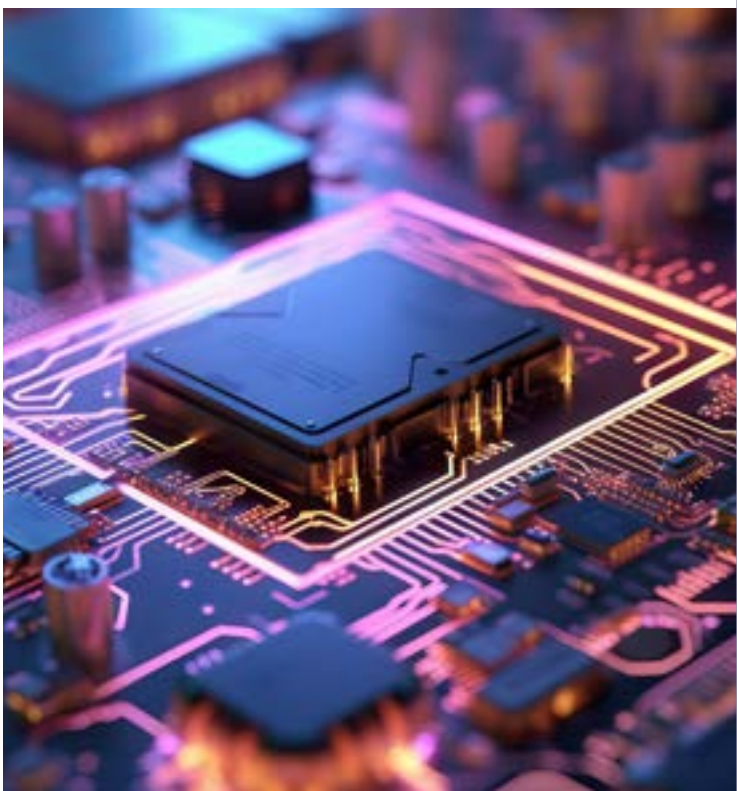
- **Areas of interest:** gravity and magnetic sensing, atomic clocks, inertial navigation, single-photon imaging, environmental monitoring, infrastructure inspection and biomedical sensing.
- **Relevant organisations and facilities:**
  - » **QuSIT UK Quantum Technology Research Hub in Sensing, Imaging and Timing** — "aims to develop quantum sensing tech for the real world, helping to facilitate a safer & more sustainable society"
  - » **QEPNT UK Hub for Quantum Enabled Position, Navigation & Timing** — "We bring together industry, academia and government to create quantum technologies which will be key for national security, critical national infrastructure and sectors such as aerospace, transport, energy, finance, communications and agriculture."
  - » **Q-BIOMED UK Quantum Biomedical Sensing Research Hub** — "aims to deliver a step change in earlier disease diagnosis and treatment for diseases including cancer and Alzheimer's disease."
  - » **NPL Advanced Quantum Metrology Laboratory** — "the state of the art NPL facility for test and evaluation of clocks, clock sub-components and solid-state quantum technologies."
  - » **Fraunhofer Centre for Applied Photonics** — "We develop novel quantum clock, inertial sensors and gravity sensing systems."
- **Likely audience:** organisations in healthcare, defence, aerospace, transport, utilities, construction, environmental monitoring, telecoms, finance and critical infrastructure.
- **Potential engagement:** use-case development, demonstrators, field trials, measurement support and introductions to technology developers and end users.



2.4. Supply chain and enabling technologies

This section cuts across computing, networking and sensing. It is aimed at visitors interested in the components, facilities and engineering needed to turn quantum research into reliable products and systems, and to manufacture them at greater scale.

- **Areas of interest:** photonics, lasers, single-photon sources and detectors, semiconductor devices, fabrication, cryogenics, vacuum engineering, packaging, electronics, control systems, materials and specialist manufacturing.
- **Relevant organisations and facilities:**
  - » Compound Semiconductor Applications Catapult — "We provide access to state-of-the-art equipment and world-leading know-how to help start-ups, SMEs, large organisations and academia advance their compound semiconductor technologies."
  - » High Value Manufacturing Catapult — "We are a strategic research and innovation hub for industry, commercialising the UK's most advanced manufacturing ideas."
  - » CORNERSTONE — "an open source, licence free silicon photonics rapid prototyping foundry."
  - » NPL quantum materials — "We work with manufacturers of quantum devices to ensure reproducible and standardised processes, and provide test and evaluation to accelerate and increase confidence in quantum products."
  - » Fraunhofer Centre for Applied Photonics — "develops lasers and optical systems for applications including energy, security, environment, sensing, space, life sciences and quantum technologies."
- **Likely audience:** component manufacturers, engineering businesses, overseas companies looking for UK partners, investors, scale-up specialists and quantum system developers.
- **Potential engagement:** prototyping, design for manufacture, component sourcing, testing, reliability work and supplier partnerships.



2.5. Investors

The showcase attracts interest from investors around the world. Innovate UK has resources supporting investors and companies seeking investors:

- **Investor partnership scheme:**
  Innovate UK's Investor Partnerships exists to fix a fundamental problem for highly-innovative high-potential micro, small, and medium-sized enterprises (SMEs) in the UK – access to funding to de-risk the development of emerging technology and access to capital to accelerate the business operations towards company growth and scale at the same time.

- **Directory of Investor Partners:**
  The Investor Partner directory is a pool of carefully selected investors with an appetite to invest in innovation and who represent a wide variety of focus, be that sector focus, founding team, business stage and location. Providing the financing needed to grow and scale.



Get in touch

For more information on investment, visit the UKRI stand or contact:
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iuk-business-connect.org.uk

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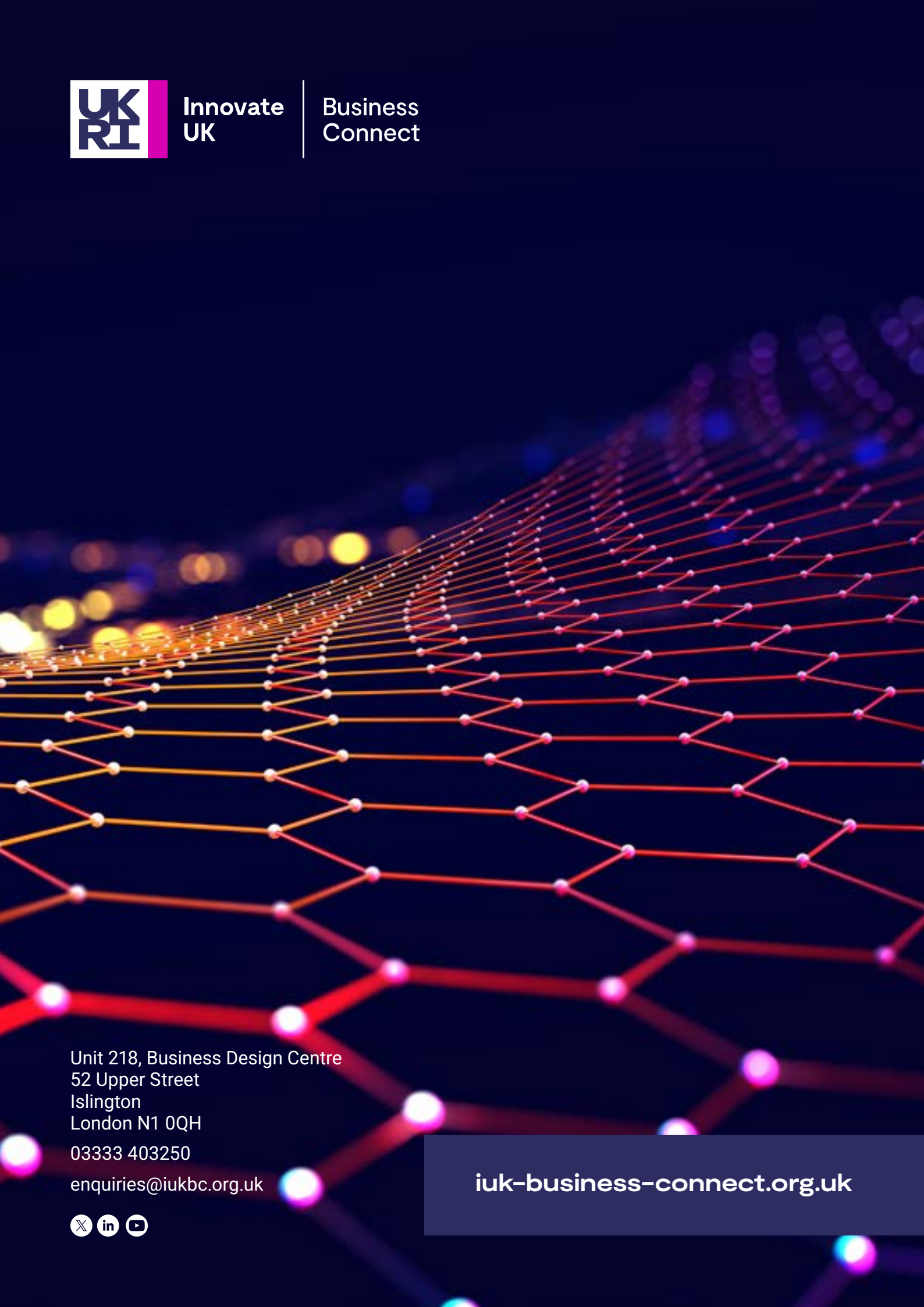

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