Overview of UK's Quantum Technology Ecosystem

Roger McKinlay and Peter Knight UK National Quantum Technology Programme



10-year UK National Quantum Technologies Programme has resulted in a thriving Quantum sector...with growing ambition for 10 more years



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World leading research and skills: 1st in Europe and 3rd in the world for the quality and impact of quantum research. More than 470 PhDs, 125 MSc candidates, and 85 apprenticeships funded through the NQTP

Thriving business community: UK is second for the number of quantum companies (11% of the world's quantum companies)

High-levels of private investment: UK is second in attracting private equity investment (12% of global private investment)

Broad capabilities: Quantum companies spanning computing, communications, sensing, timing, and imaging

Highly collaborative community: 180 quantum organisations working together through IUK challenges, and 140 Hub industry partners

NPL®







Innovate

UK











By 2035, there will be accessible, **UKbased quantum computers capable** of running 1 trillion operations and supporting applications that provide benefits well in excess of classical supercomputers across key sectors of the economy.



By 2035, the UK will have deployed the **world's most advanced quantum network at scale**, pioneering the future quantum internet.



By 2030, every **NHS Trust will benefit from quantum sensingenabled solutions**, helping those with chronic illness live healthier, longer lives through early diagnosis and treatment.



By 2030, **quantum navigation systems**, including clocks, will be deployed on aircraft, providing next-generation accuracy for resilience that is independent of satellite signals.



By 2030, **mobile, networked quantum sensors will have unlocked new situational awareness** capabilities, exploited across critical infrastructure in the transport, telecoms, energy, and defence sectors.

And 5 new Research hubs aligned with these 5 missions

Page 13 of the Strategy – Immediate actions.

- £70 million missions in quantum computing and PNT \checkmark
- £100 million in research hubs
- £25 million for skills including quantum fellowships and doctoral training
- £15 million Quantum Catalyst to boost government procurement.
- £20 million Quantum Networks Accelerator
- £20 million additional funding the National Quantum Computing Centre
- Increased international collaborations via the new International Science Partnerships Fund



Funnel Vision

Secure

- PNT

Imaging

UK



We Have a Quantum Industry



Commercialising	QT	challenge
metric	cs	

Total number of Projects	207
Number of supported Businesses	157
Number of involved RTOS and Universities	44
Total project cost	£300m
Total allocated funding	£227m
Generated investment	£610m



The Life of Pie – First Ten Years

The UK's National Quantum Technologies Programme is a **£1B 10year** investment in the sector.

- 1. The Science Bit
- 2. The Industry Bit
- 3. Facilities & Infrastructure











We collated data with input from the UK quantum community & desk research. We strive to be accurate, but acknowledge that it is impossible and are correcting data constantly. Sometimes, we adopt our definitions & assumptions, resulting in differences to previous years, for example the exclusion of subsidiary of a US company. We would like to acknowledge the contribution from Ian Reid from Trace from Trace from Trace Flowm Trace from Trace Flowm Trace from Trace Flowm Trace from T

To find out more or contribute, contact Anke Lohmann <u>anke.lohmann@anchoredin.uk</u>. We believe in the UK Quantum community and are happy that this graphic is used subject to **Attribution** to **Anchored In** and that you do not change it. NoDerivatives



Challenges Leading to Missions



- ISCF has given way to other sources of funding.
- The initial collaborative R&D grant funded projects (CR&D) have given way to SBRI contracting.



Take Computing as an Example.



£1Bn investment in research, innovation and commercialisation across QT since 2014

Quantum Computing & Simulation Hub Research V Collaborations V Wh We have by Constraints of the second second

National Quantum Computing Centre



Infrastructure £93M investment in a new national lab opening 2024

Innovation industry-led collaborative R&D £79M on QC projects since **2019**

The UK Quantum Technology Hub in Computing and Simulation brings together academic and industry partners to accelerate progress in quantum computing.

Research technology hubs funded by EPSRC £64M since **2014**

Orca Computing

Photonic quantum computing hardware

In 4 years, ORCA Computing have:

- Gone from 0-40 staff
- Raised ~£17m, more planned
- Sold first UK Quantum Computer
- Now sold 5!
- Company valued at >£70m



2020 first IUK quantum project £ 2019 founded from Oxford & Imperial

2020 first IUK quantum project £0.5M

2021 lead major IUK Quantum Data Centre of the Future consortium £9M

£12M series A and delivers first system to DSTL/MoD

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Universal Quantum

Ion trap quantum computing hardware In 5 years, Universal Quantum have:

- Gone from 0-30 staff
- Awarded major R&D contract from German government – set up office in Hamburg



2018 founded in Sussex

2020 collaborate in first IUK quantum consortium & £3.6M seed

2021

£58M (67M Eur) contract with German leads major govt to build fully IUK quantum scalable QC computing demonstrator consortium £6M





They aren't alone....

