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Case Study

Quantum Technology University Engagement

QinetiQ's advice and engagement supporting the National Quantum Technologies Programme

Executive summary

Quantum technologies are generating interest around the world; the UK government has invested £270 million in the National Quantum Technologies Programme since 2013, and the Australian government is investing in quantum technology as a priority theme of the A$730 million Next Generation Technologies Fund. The National Quantum Technologies Programme approached us to find out how we could become an early adopter of some of the highly novel quantum technologies currently under development in universities, and to offer industry insight that might direct their research.

The brief

The UK National Quantum Technologies Programme is delivered through four researching 'Quantum Hubs', each a consortium of UK universities and focusing respectively on quantum computing, quantum communications, quantum sensing and metrology, and quantum imaging.

The universities involved in the programme have some very interesting quantum technologies under development. However, they are less aware of the specific requirements of industry, which means that it is difficult for the researchers to know how best to develop their concepts and prototypes into useful components that fulfil a market requirement. Therefore, there was a strong need for early industrial engagement in the research programme, so that industry could advise on system requirements, capability gaps, and 'sweet spots'. QinetiQ is well placed to offer this advice from the viewpoint of defence and security markets, and our advice and engagement was actively sought by the National Quantum Technologies Programme.

> " One of the really valuable things is the network of supply and industry partners that QinetiQ brings. "
>
> Professor Steve Beaumont, Director of QuantIC, the UK Quantum Technology Hub in Quantum Enhanced Imaging

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Our solution

QinetiQ's expertise has been applied to various elements of this research programme. For example, we are working with Sussex University on a technology feasibility study to investigate and qualify potential applications for a novel magnetic sensor under development there. We are also currently working with Imperial College, and Oxford and Glasgow universities, on the potential defence and security applications of some novel gravity sensors, and are actively investigating some joint equipment trials in this topic area with Birmingham University. This work will feed into a business case to establish the feasibility of a potential spin-out company to commercialise at least one of the sensors. Furthermore, we are working with Strathclyde University on applications of some novel quantum magnetic and microwave systems, including investigating the practical feasibility, or otherwise, of quantum radar concepts.

In all of these cases, our expertise in applications and system trials is helping the universities understand the systems aspects of how their devices might be used, so allowing them to focus their development activities. QinetiQ has since used the examples of this work to describe to other graduate students how fundamental science can be translated by collaborating across the Technology Readiness Level (TRL) spectrum.

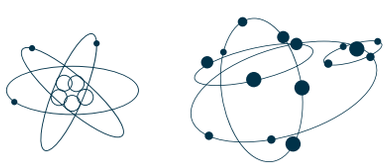
Outcomes and benefits

QinetiQ is ideally positioned to work with universities around the world to mature technology – we have a broad range of capabilities and understanding of the application domain which, combined with a strong history of leading-edge Research & Development, offers our customers great advantage. We are able to collaborate with both the academics and the end-users in the defence and security domain, translating requirements and capabilities from one community to the other. QinetiQ's industry partnerships present unique value to the National Quantum Technologies Programme. We also have access to a very wide range of world-class trials facilities, which can be used to test and validate emerging technology as it matures enough to leave the university laboratories.

We are proud to encourage the next generation of brilliant scientists and engineers. Through our involvement in this programme, postgraduate students gain an understanding of how to apply fundamental science in practical situations, and develop an understanding of the demands of the commercial world.

> "QinetiQ is highly research-focused – they understand how to engage in research. They are a perfect partner, often at the leading edge of everything they touch, and the resulting research is very high quality"

Prof Graham Wren, Chair of Business Engagement, Special Adviser to the Principal and Major Projects Director, Strathclyde University



QinetiQ expertise is aiding Quantum research into areas from novel magnetic and gravity sensors through to magnetic and microwave systems

For more information, contact customercontact@QinetiQ.com

QinetiQ is always on your side, protecting, improving and advancing your vital interests

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