

# Stimulating application and market opportunities in quantum technologies

**The UK is ideally placed to be a world leader in the new quantum technologies industry. In 2013 the government recognised the transformative potential of new quantum technologies by announcing a £270 million investment to form the UK National Quantum Technologies Programme (UKNQTP).**

The vision is to create a coherent government, industry and academic quantum technology community that gives the UK a world-leading position in the emerging multi-billion-pound new quantum technology markets, and to substantially enhance the value of some of the biggest UK-based industries.

The UK National Quantum Technologies Programme has already leveraged over £50 million from more than 90 collaborators, indicating a high level of commercial and public interest in quantum technologies. This flyer aims to demonstrate examples of progress towards stimulating application and market opportunities.

## A £1 billion future industry for the UK

Exploitation of quantum physics offers the potential for a range of novel technologies from highly secure communications, and gravity sensing devices, to next generation global position systems, and high speed quantum computing. The UKNQTP's investments, notably £120 million to establish four Quantum Technology Hubs, complemented by investments in training, innovation, and infrastructure, has provided focal points for accelerating the transition from the laboratory to applications and devices. These hubs, led by the universities of Birmingham, Glasgow, Oxford and York provide focus points for the UKNQTP, drawing together 17 universities and more than 100 collaborators.

The UK's National Strategy for quantum technologies identifies five areas for action:

- Enabling a strong foundation of capability in the UK.
- Stimulating application and market opportunities.
- Growing a skilled UK workforce in quantum technologies.
- Creating the right social and regulatory context.
- Maximising UK benefit through international engagement.

Read the National Strategy here: [uknqtp.epsrc.ac.uk](http://uknqtp.epsrc.ac.uk)

The programme delivers against the strategy through five pathways:



## Partnership Resource Funding

One way in which industry and academia are brought together is through Partnership Resource Funding. Each Hub has a flexible fund, enabling them to support new academic collaborations with industry that aim to develop and facilitate the translation of new technologies from the lab to the market.

## A Single Pixel Camera

Researchers at the UK Quantum Technology Hub in Quantum Enhanced Imaging (QuantiC) are developing cameras capable of seeing through smoke, visualising gas leaks and high-precision 3D ranging. Rather than using pixelated camera sensors, these QuantiC cameras use low-cost compact mirror arrays, typically found in digital light projectors, to rapidly scan the light in a scene onto a single pixel. Efficient scanning strategies and computer algorithms enable faster image reconstruction than existing scanning cameras in real-time. The advantage of using a single pixel is that it is much cheaper than traditional arrays, giving this camera the potential to provide a low cost alternative to



Prototype Single Pixel Camera (November 2015)



## Gas Sight

The progress achieved with the Single Pixel Camera meant that it was ideally placed to be developed through one of the first partnership resource grants. The project Gas Sight aims to explore and develop the performance capabilities of the prototype Single Pixel Camera, and will investigate combining it with a laser designed by M Squared Lasers to form an active hyper-spectral gas imaging system.

Imaging gas leaks has important applications in sectors including oil and gas, building and construction, food processing, healthcare and water treatment. The global gas sensing market was estimated at USD \$1.78 billion in 2013 and is projected to be worth \$2.32 billion by 2018. This innovative project has the potential to fill a competitive market gap for a lower cost, lower power and highly

portable gas detection system than those currently available. This partnership resource grant builds on an already successful collaboration between Glasgow University and M Squared Lasers who have been closely involved from the outset.

**“QuantiC’s approach to industrial collaboration is focused on supporting companies by adding value to their existing products and services. The input from their researchers has been invaluable and we are excited to be working with them on the new Gas Sight prototype.”**

- Dr Graeme Malcolm,  
CEO and Founder of M Squared Lasers

M Squared Lasers manufactures lasers and photonic instruments for applications in sectors such as defence and academia.



## Exploring the commercial applications of quantum technologies

As part of the innovation pathway, Innovate UK, with co-funding from EPSRC and Dstl, has already run a call to support feasibility studies and collaborative research and development projects to explore the commercial applications of quantum technologies. This initiative has already supported twenty industry-led projects around the UK. Here are some of the companies involved:



For more information, visit [uknqtp.epsrc.ac.uk](http://uknqtp.epsrc.ac.uk) or contact [quantumtechnologies@epsrc.ac.uk](mailto:quantumtechnologies@epsrc.ac.uk)

The UK National Quantum Technologies Programme aims to ensure the successful transition of quantum technologies from laboratory to industry. The programme is delivered by EPSRC, Innovate UK, BIS, NPL, GCHQ, Dstl and KTN.

