

Eye on the sky transforms detection with quantum radar

Radar equipment is being installed at the University of Birmingham as part of a demonstration intended to test and prove the precision of quantum-enabled radar detection capabilities.

A key part of keeping everyday life secure is being able to detect dangerous or unsafe situations before they occur. Quantum enabled radar technology research, undertaken by academics at the UK Quantum Technology Hub Sensors and Timing, aims to do precisely this.

The Quantum Technology Hub is led by the University of Birmingham and partnered with the Universities of Glasgow, Strathclyde, Sussex, Imperial, Nottingham, Southampton as well as the National Physics Laboratory and the British Geological Survey. It has a close focus on industrial collaboration and partnership and, in line with this, the radars are being developed and installed by Aveillant, a radar technology company whose mission is to move radar technology into the information age by powering a full digital picture of the sky.

The radar technology is being installed at the top of an engineering building on campus and is dependent on the Hub's compact atomic clock oscillators. These oscillators provide the high precision and low signal noise required for the radar to detect small, slow moving objects, such as drones, at longer distances, and even in cluttered environments.

Radar detection is a deceptively complex necessity in the modern world: it is required for a surprisingly wide range of sectors. For example, high precision radar will ensure autonomous vehicles can detect hazards well ahead of time. Hub academics are also developing next generation distributed radar systems, which will transform surveillance by providing much greater coverage and maintaining real-time situational awareness in highly congested and cluttered environments.

The EPSRC*-funded project Mapping and Enabling Future Airspace (MEFA), based at the University of Birmingham, will also benefit hugely from the radar installation. MEFA is a three-year interdisciplinary project bringing together radar experts from across the University to study the use of urban airspace. The project will investigate how radar can be used to study the effects of urban developments on migrating birds, and also to differentiate between flying birds and small drones. Data collected during the radar installation will be incredibly beneficial for the MEFA project.

Professor Chris Baker, Chair in Intelligent Sensor Systems at the University of Birmingham, commented: *'By putting in place this highly sophisticated world-*

leading technology, we and our partners can explore a wide range of advance, novel networked radar surveillance concepts.’

Dr Dominic Walker, Chief Executive Officer of Aveillant, added: ‘*We are delighted that our Holographic Radars are being used in this programme. At Aveillant we are always looking to push the boundaries of our technology, and working with some of the UK’s leading academic institutions such as the University of Birmingham, is allowing us to do just that.’*

About Birmingham University

The University of Birmingham is ranked amongst the world’s top 100 institutions. Its work brings people from across the world to Birmingham, including researchers, teachers and more than 6,500 international students from over 150 countries.

About the UK Quantum Technology Hub Sensors and Timing

The UK Quantum Technology Hub Sensors and Timing (led by the University of Birmingham) brings together experts from Physics and Engineering from the Universities of Birmingham, Glasgow, Imperial, Nottingham, Southampton, Strathclyde and Sussex, NPL, the British Geological Survey and over 70 industry partners. The Hub has over 100 projects, valued at approximately £100 million, and has 17 patent applications.

The UK Quantum Technology Hub Sensors and Timing is part of the National Quantum Technologies Programme (NQTP), which was established in 2014 and has a range of partners including EPSRC, Ministry of Defence, National Physical Laboratory and GCHQ.

Four Quantum Technology Hubs were set up at the outset, each focussing on specific application areas with anticipated societal and economic impact. The Commercialising Quantum Technologies Challenge (funded by the Industrial Strategy Challenge Fund) is part of the NQTP and was launched to accelerate the development of quantum enabled products and services, removing barriers to productivity and competitiveness. The NQTP is set to invest £1B of public and private sector funds over its ten-year lifetime.

* Engineering and Physical Sciences Research Council.

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