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Emerging Imaging and Sensing Technologies for Security and Defence II

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Introduction

Interest in emerging imaging and sensing technologies has been of fundamental importance to the security and defence community for many years, where it has informed the process of horizon scanning for both government and industry. Indeed in the USA, the Defence Advanced Research Projects Agency (DARPA) recognised its role at the outset as an enabler for the development of disruptive solutions for providing enhanced capability in military operations. Challenges posed when sensing under the difficult conditions encountered in military environments lie at the heart of many applications of photonics. Evolving threats have necessitated the need for innovation in the way that reliable solutions are brought to bear when armed forces are deployed. The Emerging Imaging and Sensing Technologies conference brought together emerging activities in sensor and optical technologies and explored their application for those areas of application that are of current interest. This year the conference was organised around the following six topical areas with the last two organised as joint sessions with the conference on Quantum Technologies and Quantum Information Science:

- Optical devices and techniques
- Computational and hyperspectral imaging
- Optical and image processing
- Applications
- Quantum metrology, sensing and imaging
- Components and technologies for quantum devices.

Interest in photon-counting sensing technologies continues, building on advances highlighted in previous conferences. At the device level, contributions covered a diverse range of topics ranging from the development of dual-mode non-linear fibers for supercontinuum generation to the assessment of tunnelling magnetoresistors for magnetic imaging tomography. The benefits of multi-aperture imaging were also explored in relation to the thermal infrared, whilst another paper addressed image enhancement techniques for low-resolution imagery in the visible and LWIR regimes. Challenges for the future of imaging were addressed in a keynote paper, drawing on information generated in research activity supported by DARPA. In the quantum arena, research on active atomic clocks was explored in relation to the detection of gravitational anomalies, whilst another paper addressed the feasibility of single particle imaging for biosensor applications.

The conference drew on contributions from a number of different nations, including China, Cyprus, Czech Republic, India, Iran, Japan, Poland, Russian Federation, Ukraine, UK, and USA.

Keith L. Lewis

