Developments in electro-optical (EO) and infrared (IR) systems are key to providing the enhanced capability needed by military forces to meet the current and emerging challenges created through an increasingly difficult and complex range of operational conditions. Such enhanced operational capability must often be delivered against commercial demands for lower costs and reduced timescales together with operational requirements for size, weight, and power (SWaP) reductions. This conference will address current and emergent sensor technology and system developments which will deliver the required future capability of EO/IR systems. It will consider a wide-range of applications across the maritime, land, and air domains together with a diverse range of platforms such as dismounted soldier sensors, UAVs and drones, robotic platforms, and multi-sensor systems. The performance challenges faced by future military systems will continue to evolve and grow. To address these challenges, EO/IR system designers will need to draw upon the ongoing developments in underpinning technologies such as new materials, focal plane arrays, image processing, data fusion, and emergent sensor concepts such as spectral processing, computational imaging, and polarimetry. Modelling and simulation is increasingly becoming an enabler for maximizing performance and optimizing operational adaptability and its interaction with trials and validation is a subject of topical concern.

EO and IR systems are likely to benefit from recent advances in material research, for example new carbon-based materials (including graphene), nano-materials and metamaterials. These new materials promise new EO properties that could significantly change the way EO and IR systems are designed and built, e.g. new detector systems with enhanced properties or negative refractive index materials which could radically change the way optics are designed.

Computational Imaging, e.g. Pupil Plane Encoding, Coded Aperture Imaging, Compressive Imaging, etc, is another family of emerging technologies that will radically alter the way sensor systems are designed. These techniques combine optics and processing to provide a useable output from the sensor and can provide functionality not possible or practical with conventional system designs. Computational Imaging will require developments in specialist sub-components, non-standard optics design and algorithm development to reconstruct the image.

Quantum techniques are also being investigated to assess their potential for sensing systems. Quantum Imaging and Ghost Imaging are examples of quantum techniques being investigated by different teams. Any Quantum system will require specialist components e.g. sources, optics, detectors, electronics and processing as well as providing scope for unconventional system design. Processing of sensor information has become a vital component of EO/IR sensor systems for display-driven, semi-autonomous, and autonomous applications. The timely extraction and presentation of pertinent information in a usable format is the ultimate goal in most developments, although the design flexibility to support hardware upgrades and meet emergent operational needs must be considered. Dual and multi-sensor system designs provide additional information and offer increased performance under a wider variety of conditions. The combination of such sensor information to provide both increased performance and robustness continues to present many design challenges despite the ongoing research into data fusion technology.

Advanced technology by itself is not sufficient to give new and/or advanced capabilities. Systems have to be designed and developed in a way that will enable their reliable and cost-effective manufacture. This will involve adopting rigorous development and system engineering techniques. These are as crucial for the successful exploitation of sensor technology as the detector, optics and electronics. The performance and required characteristics of sensor systems are critically dependent on the platform and the application. Many sensor payloads are now being fitted to autonomous vehicles and drones which present new challenges in design and integration. Applications areas that are currently receiving interest include target detection and tracking, area monitoring, mine and IED detection, environmental monitoring, and border security. There is also growing interest in wearable imaging devices which have their own unique challenges at the sensor design level, the exploitation of the sensor data, and the interconnection of multiple sensors.

The innovation required to meet these future challenges will be drawn from a broad spectrum of organisations ranging from government laboratories, through international companies to SMEs and research centres. This conference will provide a technology and applications forum for EO/IR research and development teams, academia, and business and government stakeholders. Contributions from a diverse range of disciplines covering areas using as sensor components and supporting technology, EO/IR systems engineering, optical materials and design, sensor manufacture and test, materials science, image processing algorithms design and associated software methodologies, and modelling and simulation are also sought. Presentations are encouraged on dual-use applications, and for active and passive technologies systems covering the wavebands from UV to LWIR.
Papers are solicited in the following specific areas:

- advanced materials for EO/IR, e.g. metamaterials, nanomaterials, carbon based materials and their application
- focal plane array detector technologies, covering wavebands UV to LWIR including multi-band FPAs
- detector packaging, temperature stabilization and integration technologies
- passive imaging: technology, modelling, system design and hardware
- active imaging: technology, modelling, system design and hardware
- novel sensor technologies and their applications
- integrated and miniaturized sensors - reduced SWaP+C for applications such as robotic and remote control vehicles and the dismounted soldier
- computational imaging: techniques, components, designs and algorithms
- optical domain processing methods
- broadband, multiband and hyperspectral sensors
- polarisation sensitive sensors
- imaging through the atmosphere
- signal and image processing
- autonomous processing including detection, tracking and classification
- data fusion technology including image fusion and sensor fusion concepts
- modelling and analysis of EO/IR systems and sub-systems
- test, verification, and validation techniques
- compressive sensing in imaging systems
- quantum sensing components and system designs: theory and implementation
- defence and security applications of EO and IR sensor technology
- sensor payloads for autonomous vehicles and drones
- design and applications of wearable sensor systems
- dual-use of military EO/IR sensor technology for environmental imaging and analysis (including ocean monitor)
- border and area security including air to ground detection and tracking for applications such as drug trafficking
- system integration design and development issues
- sensor demonstrators and prototypes
- sensor trials and performance evaluation
- system engineering approaches.
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<td>Author notified and program posts online</td>
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<td>Registration opens</td>
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<td>Submission system opens for manuscripts and poster videos/PDFs*</td>
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Submission agreement

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- Attend the meeting
- Present at the scheduled time

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