

Results of competition:

Seeing more than before - emerging imaging technologies - Feasibility studies

Total available funding for this competition was £1.25m from the Technology Strategy Board.

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Aralia Systems Limited (lead) Centre for Machine Vision	Seeing more – long-range, high-definition, moving 3D imaging in daylight	£149,993	£131,250
Project description - provided by applicants			
<p>This project will enable Aralia Systems to develop 3D imaging technology for moving objects at very long range (100s metres) outside in daylight. This is currently not possible. The team has previously demonstrated how by controlling a network of existing near-IR illuminators and cameras, photometric stereo (PS), a shape from shading technique, can be used to capture high-resolution moving 3D images in an indoor environment.</p> <p>The project is timely as it will explore the feasibility of exploiting an exciting recent development in camera sensor technology, known as black silicon. Black silicon imaging allows the capture of artificially illuminated images in a depressed region of the solar spectrum (at 940nm) by using controlled LEDs and eye-safe lasers. This allows the use of PS to create information rich 3D hotspots that can be placed anywhere within a monitored environment. This development could allow a step change in the use of moving 3D imaging outdoors. This will enable Aralia to develop enhanced visualisation and threat detection software in surveillance applications.</p>			

Results of competition:

Seeing more than before - emerging imaging technologies - Feasibility studies

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Atout Process Limited (lead) University of Bath	High-speed Magnetic Induction Imaging system for Process measurement (Hi-MIIP)	£149,909	£131,159
Project description - provided by applicants			
<p>The Hi-MIIP project researches improved sensor and signal processing components and techniques within an industrial Magnetic Induction Imaging (MII) system. The project will prove whether the MII techniques can be enhanced to reach the speeds and sensitivities required for a commercial product.</p> <p>The development of such a commercial product is outside the scope of this project but this full system demonstrator is a key confidence building step to allow the commercial partner in the project (Atout Process Ltd) to activate a technology transfer and production engineering project from the University of Bath Engineering Tomography Laboratory and out to market.</p>			

Results of competition:

Seeing more than before - emerging imaging technologies - Feasibility studies

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
IS Instruments Limited (lead) University of Leicester	Time resolved Raman spectrometer using Geiger mode detector technology	£139,105	£114,327
Project description - provided by applicants			
<p>Raman spectrometers are a common laser based chemical analysing tool used today across both industry and academia. The aim of this project is to develop a new class of Time resolved Raman spectrometer to remove background fluorescent signals from Raman measurements. Although time resolved measurement is an established method to remove the fluorescent signal current systems are complex and expensive.</p> <p>This novel approach in principle could enable the development of a new hand held instrument for use in the security, pharmaceutical or biological services sector within 5 years. Within this study the team will focus on the production of a proof of concept bench top system that will be tested against both non-fluorescing and fluorescing samples. During the programme potential customer in the security pharmaceutical and biological services sector will be consulted to ensure the development is target at key markets.</p>			

Results of competition:

Seeing more than before - emerging imaging technologies - Feasibility studies

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Kromek Group PLC (lead) King's College London	Improving the accuracy of X-ray absorptiometry imaging measurements of bone mineral density for the diagnosis and treatment of osteoporosis	£149,695	£119,678
Project description - provided by applicants			
<p>Dual-Energy X-ray Absorptiometry (DXA) imaging is currently the gold standard method for the diagnosis and treatment of osteoporosis. However, DXA measurements of bone mineral density (BMD) are affected by significant errors due to the variable lean and fat composition of the soft tissue surrounding bone. These errors lead to the frequent misdiagnosis of osteoporosis and failure to properly target treatments on the patients most in need.</p> <p>Kromek and King's College London intend to develop innovative algorithms to unlock the extra information captured by DEXA's multispectral detectors but currently not utilised by the outdated methods. This will see a step change in the reduction in noise of the BMD measure, making a breakthrough in the diagnosis and treatment of osteoporosis.</p> <p>The project will start by defining the requirements of the imaging system, followed by computer simulations which will develop and test the methods. A simple hardware system will be built to prove the real-life feasibility of the system, verified by a world-leading expert on bone densitometry.</p>			

Results of competition:

Seeing more than before - emerging imaging technologies - Feasibility studies

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
M Squared Lasers Limited (lead) Art Access and Research Limited Fraunhofer UK Research Limited University of Strathclyde	INHERIt: INtelligent HypERspectral Imaging	£149,998	£131,246
Project description - provided by applicants			
<p>Imaging of artwork is an important aspect of art conservation, technical art history, and art authentication. Many forms of near-infrared (NIR) imaging are currently used by conservators, archaeologists, forensic scientists and technical art historians to examine the under-drawings of paintings, to detect damage and restorations, to enhance faded or over-painted inscriptions, to study artists' techniques, to examine questioned documents, and as a non-destructive analytical tool for identifying certain pigments.</p> <p>We propose using an infrared optical parametric oscillator (a very broadly tuneable source of mid-infrared light with exceptional spectral purity) to explore oil, acrylic and water colour paintings, specifically to realise an automated system than can scan in an artwork and determine its authenticity. Once proven in this challenging application, the technology we will develop will find utility in a range of diverse, impactful and timely end-use applications in the wider fields of imaging for security, chemical sensing and environmental monitoring.</p>			

Results of competition:

Seeing more than before - emerging imaging technologies - Feasibility studies

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Medical Wireless Sensing Limited (lead) Kings College London	Resolution-Enhanced Microwave Imaging Devices for medical imaging and cancer detection (REMID)	£148,687	£129,012
Project description - provided by applicants			
<p>The aim of this joint Technology Strategy Board project is to develop a new medical imaging prototype based on microwave imaging (MWI).</p> <p>MWI uses low-power, non-ionizing radio frequency microwaves to obtain clinically meaningful images in a way that addresses the patient's needs for speed, safety and comfort. While there is considerable progress in medical MWI systems under development by various research groups worldwide, there is no commercial MWI system available today.</p> <p>The proposed prototype will be designed around the patient experience to deliver a pain-free, safe and accurate system. The novel clinical prototype targeted by this project will be applied first to breast cancer screening. It will allow younger patients (aged 20 and over) to be screened as often as they wish and to be monitored for a longer period of time, thus maximizing the success rate for the early screening of cancer. This is an important benefit that is currently not available in a cost-effective and sustainable manner using today's technology.</p>			

Results of competition:

Seeing more than before - emerging imaging technologies - Feasibility studies

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Optimec Limited (lead) Aston University Visioncare Research Limited	Integrated geometric and optical imaging to allow real-time ophthalmic medical device validation and clinical assessment	£149,999	£131,041
Project description - provided by applicants			
<p>Ophthalmic medical devices, such as contact lenses and lens implanted inside eyes during cataract surgery, need to be biocompatible with the eye and to have the optical profile necessary to interact with the other optical components of the eye (such as the cornea and crystalline lens), to focus light to give good vision.</p> <p>Current instruments cannot deliver this range of information and most verification that a product meets its design parameters is performed manually, increasing costs and the potential for error. Using our innovative miniature aberrometry technology this project will develop a prototype instrument to validate such medical devices during the production process (dimensions and optical quality) and to ensure safe and optimal surgical implantation or placement on the ocular surface.</p>			

Results of competition:

Seeing more than before - emerging imaging technologies - Feasibility studies

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Simpact Engineering Limited (lead) University of Warwick	Pre-strain Analysis of Composites using Emerging Technologies (PACET)	£113,410	£99,016
Project description - provided by applicants			
<p>This project investigates the extension of using digital volume correlation (DVC) in combination with images obtained by micro x-ray computed tomography (µXCT) to examine (a) manufacturing strains within composite materials and (b) strains within composites under loading.</p> <p>Implementation of DVC with µXCT data is reaching maturity, whilst its application and validation has been largely restricted to compression of a trabecular bone. Little research has applied this emerging methodology to engineering materials, such as composites. Safety-critical composite components are frequently over-engineered with large safety factors as the pre-strain during manufacture is unknown and little is understood of the response under loading.</p> <p>New and valuable information can be obtained from DVC analysis of high-resolution volumetric data from µXCT, whilst a number of challenges remain. This includes the sequential scanning of samples at stages during their manufacture, where care is required to obtain reasonable geometric variations that can be detected by the DVC. Proving the viability of the technique to materials testing will be of significant benefit to the larger engineering community.</p>			

Results of competition:

Seeing more than before - emerging imaging technologies - Feasibility studies

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Teraview Limited (lead) University Of Durham	Sensor Array for Terahertz Imaging in Non-destructive test (SATIN)	£142,751	£113,958
Project description - provided by applicants			
<p>The proposed project seeks to demonstrate the feasibility of manufacturing pulsed emitter/detector arrays for true broadband 3D terahertz imaging. Typically, current pulsed terahertz systems create images by raster-scanning a point source. Whilst this is acceptable to establish the potential of terahertz in providing the necessary materials characterisation, current throughput falls short of requirements for industrial quality assurance and process monitoring. Pulsed terahertz arrays are therefore seen as an enabling technology for this lucrative, high volume markets.</p>			