Innovate UK

Results of Competition:	**Robotics & Autonomous Systems Application over £100k and Over 12 months**
Competition Code:	**1607_MM_RAS_LO**

Total available funding is £4m across 2 streams

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
HAL Robotics Ltd Innovative Technology and Science Limited ABB Limited Skanska Technology Ltd	CAMERA: Construction and Manufacturing Enabled by a mobile Robotic Arm	£499,922	£322,716
Project description - provided by applicants			
Construction accounts for 9% of UK GDP, employing 3M people. Whilst the size of the construction industry suggests that there should be many opportunities for the use of robotics, uptake has been slow. Projects are often bespoke, with complex supply chains. Demand also fluctuates, leading to a risk-averse approach to investment. Previous work has shown that individual construction tasks can be efficiently and effectively automated. However, to achieve the overall efficiency improvements needed to justify investment it is essential that robotics and autonomous system (RAS) solutions can move between different activities (either on-site or in a temporary construction component assembly factory) and to be easily reconfigured by non-expert staff. Mobility and positioning is a key component of this but existing mobile solutions are not suitable for use in harsh, dynamic environments that typify construction. The project will therefore build on recent innovation in the development of construction RAS. It will develop, demonstrate and assess a proof of concept version of a robust mobile 'platform' and supporting visioning and positioning capabilities that can support, place and control a robotic arm in a 'flying factory' or small product manufacturing factory.			

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Dogtooth Technologies Limited NIAB Hugh Lowe Farms Limited	VESCA	£467,561	£353,251
Project description - provided by applicants			
Strawberry harvesting is a labour intensive task that depends critically on the availability of a large amount of low-cost labour. Growers are increasingly vulnerable to labour market price fluctuations and burdened by high employment overheads. Building on Dogtooth's proof of concept strawberry picking robot (developed during Innovate UK project Ananassa), project Vesca will deliver commercially viable picking performance using cutting edge machine learning and computer vision techniques to facilitate more efficient localization of target fruit (by more nearly optimal control of robot motion) and more accurate determination of suitability for picking. The project will also provide ancillary benefits such as yield mapping and prediction that are of significant importance to growers.			

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RPPtv Ltd Queen Mary University of London Mixed Immersion Ltd	Autonomous Systems for Sound Integration and GeneratioN (ASSIGN)	£386,823	£305,368
Project description - provided by applicants			
In immersive media and game sound design, the biggest challenge is the effort required to source the sounds and integrate them with the timeline and visual content. We propose an intelligent decision-making system in a system that generates sounds (with their immersive context) from other sensor data. The Autonomous Systems for Sound Integration and GeneratioN (ASSIGN) project exploits innovative vision-based object recognition technologies to control sound synthesis techniques, so that captured video information can drive sound generation, placement and perspective. This parallels visual effects and computer games, where rendering is driven by high level information, e.g., if a man drops a glass, we see it falling in the virtual world of the game, film or augmented reality. The animation is a property of the object, and sound effects should follow this same paradigm. The business potential is compelling, since ASSIGN could revolutionise the sound design process. Outputs will include a prototype for autonomous sound effect generation, with market analysis, business models and road map to launch a commercial service.			

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Computerised Information Technology Ltd Innovative Technology and Science Limited London South Bank University TWI Limited	Robotic Inspection of Mooring Chains in Air and Water (RIMCAW)	£499,312	£394,518
Project description - provided by applicants			
Failure of mooring chains that secure floating structures in off-shore production of oil and gas results in oil leaks due to the rupture of flexible pipes that bring product to the surface. The clean-up costs of environmental pollution run into hundreds of millions of pounds. It is therefore important to inspect the mooring chain links to assess the extent of corrosion, fatigue cracking and developing weld faults before they result in failure of a chain. It is very expensive to remove a chain weighing many tons and bring it to shore to inspect it. Savings can be made by perfoming non-destructive testing (NDT) of a chain in-situ while it is in operation. The heavy chains generate large dynamic forces so that inspection using divers is extremely hazardous. The project aims to develop a small, compact mobile robot that can climb on mooring chains both underwater and in air to scan chain links with advanced ultrasound sensors. The robotic NDT system will provide a tool to assess the condition of mooring chains to enable asset managers to make decisions on repair and remaining lifetime of a chain. It will reduce inspection costs by speeding up coverage of a mooring chain and remove the need for diver inspection which costs £40,000 per floating structure and puts their lives at risk.			

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N.D.T. Consultants Ltd Innovative Technology and Science Limited London South Bank University	Autonomous phased array ultrasound robotic NDT of long weld lines (AWI)	£465,324	£360,621
Project description - provided by applicants			
Failure of ship-hull welds can result in loss of vessels, loss of life and pollution of the environment. This is prevented by inspecting all welds with ultrasound (as required by Classification Society rules) which is labour-intensive, expensive and hazardous to operators. The aim of this project is to develop a new, automated robotic inspection system that will climb ship surfaces, autonomously tracking the weld lines, ultrasonically scanning the weld. AWI will dramatically reduce inspection and maintenance times by 32%, reduce shipbuilding and ship operating costs by 4%, and upskill the UK shipbuilding workforce, bringing a competitive edge to the UK shipbuilding and non-destructive testing / inspection industry. AWI benefits include: fast reproducible and accurate weld testing, reduced labour costs, safer working and lower insurance costs, higher overall equipment effectiveness due to high availability™ (uptime), performance and quality. The project is led by NDT Consultants Ltd., a UK SME inspection services provider who will develop new robotic inspection services for the UK and global shipping industries. The supply-chain consortium also includes InnotecUK Ltd., an SME robotics manufacturer who will commercialise the AWI robot.			

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All Street Research Limited University of Cambridge	Virtual Investment Reseacher	£411,073	£312,954
Project description - provided by applicants			
All Street is recognised by the UK Cabinet Office as a market maker in alternative finance. The company provides investment research on SMEs. Both individual and institutional investors are demanding more investment research on SMEs, but the level of coverage is actually falling. There are over 5 million SMEs in the UK with an estimated funding gap of £30bn and only a technology solution can scale investment research coverage to a meaningful level. In partnership with the University of Cambridge, All Street has developed the specification for a virtual investment research system using machine learning and artificial intelligence. This technology will enable All Street to significantly expand its SME research coverage, providing investors with the information they need to invest in this key economic segment. The project has significant economic and social impact, in helping to bridge the SME funding gap and enhancing financial literacy.			

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Olympus Automation Ltd University of Lincoln	Automated Robotic Food Manufacturing System	£488,580	£348,523
Project description - provided by applicants			

Traditional soup, sauces and other liquid based product manufacturing utilises large fixed cooking kettles (500 to 3000Kg) requiring pumped and manual handling transfer systems for moving ingredients and finished product from process to process. Consequently, this leads to prolonged manufacturing times, variable product quality, considerable waste and high energy usage. Olympus Automation Ltd (OAL) intends to address these issues through developing a fully integrated automated robotic food manufacturing system. With the help of an Innovate UK grant, OAL and the University of Lincoln (UoL) will design and develop the technically difficult and innovative robotics control and materials handling systems. It will incorporate the development of a semi-automonous system that combines state of the art cooking and materials handling technologies with automated robotic ingredient loading, utilising vessels up to 1000Kgs. The integrated system will produce higher quality food with unprecedented flexibility, more consistently and faster with greatly reduced ingredient wastage and energy costs, whilst taking up to 50% less factory space. The system will be located and tested in a dedicated food processing hall at UoL's National Centre for Food Manufacturing at Holbeach.

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Shadow Robot Company Limited Cambrian Intelligence Ltd Oliver Crispin Robotics Ltd University College London	SAT - Semi Autonomous Teleoperation	£506,224	£399,225

Project description - provided by applicants
We aim to create a novel semi-autonomous teleoperation experience using modern virtual reality tools. We will build on Shadow Robot's autonomous dexterous grasping capabilities, Cambrian's teleoperation control platform and OC Robotics flexible snake arm robots, to take advantage of significant RAS, teleoperation research and equipment at UCL to build a new capability. Our model of teleoperation control will use augmented reality and gesture recognition to drive robots, with autonomous grasping technologies used to hold objects and automatic path planning to manage motion in complex workspaces.

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Pabugi Limited Cranfield University Adroit Economics Ltd	Pothole Identification and Management Autonomous System	£499,584	£394,358
Project description - provided by applicants			
The Pothole Identification and Management Autonomous System project is a feasibility study into systems for improving the way local authorities identify and manage potholes. Its aim is to improve the current system using autonomous systems and artificial intelligence and enable local authority highways departments to improve the quality of roads and reduce costs.			

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BeTomorrow UK Limited Foster + Partners Ltd	Simultaneous Localisation and Aerial Mapping in the Built Environment (SLAMBE)	£458,876	£292,684
Project description - provided by applicants			
Defects in construction work cost billions globally and >£9bn / year in Great Britain alone. Spotting defects quickly and reliably is key to avoiding or reducing these costs. Current surveying/monitoring techniques are labour-intensive, slow and prone to repeating errors. No solution currently exists to autonomously survey the inside of a construction project, where most problems are hidden (even if drones can do so externally). In this project we propose developing an autonomous drone-based solution that can quickly, cost-effectively and reliably verify accuracy of a recently built internal environment with respect to its proposed design, in order to identify construction defects. Such a service will offer big benefits to the construction industry and building contractors in particular, because, for a relatively small investment, it will help lower overall project costs and risk, while also helping increase quality, client confidence and ultimately sales.			

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Oliver Crispin Robotics Ltd Airbus Defence and Space Limited	ASRND: Autonomous Scout Rover for Nuclear Decommissioning	£312,013	£195,978

Project description - provided by applicants
This project will develop an autonomous scout rover system, for scanning and mapping of a nuclear environment as a part of decommissioning effort. The scout rover is an intelligent autonomous machine capable of conducting operations without human interaction, with the long term goal of making decommissioning of nuclear sites safer and quicker. The innovative robotic system will map otherwise inaccessible, cluttered nuclear environments providing vital information for subsequent safety-critical operations. It's autonomy will allow it to perform frequent, repeat inspections of a hazardous environment inaccessible to a human operator allowing hazardous areas to be routinely monitored - reducing the risk caused by nuclear plants awaiting decommissioning. This project combines OC Robotics' demonstrated experience in accessing and operating in confined and hazardous environments with Airbus Defence and Space's cutting-edge expertise in autonomous navigation, originally developed for the European Space Agency's ExoMars 2020 Rover Mission.

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Shadow Robot Company Limited University of Glasgow	iSee - Intelligent Vision for Grasping	£505,025	£397,923
Project description - provided by applicants			
Smart vision for grasping robots (like the Shadow Smart Grasping System) will unlock significant new markets in research and industry. The iSee project is a feasibility investigation to find out if linking state of the art robotics hardware with cutting-edge research in vision and modern deep learning'•methods can transform the way robots can see - and therefore interact with - the world.			