Innovate UK

Results of Competition: **Robotics & Autonomous Systems Application under £100k and under 12 months**

Competition Code: **1607_MM_RAS_SC**

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
Oxford Lasers Limited	Robotic Autonomous Laser Processing for agile High volume production (RALPH)	£98,776	£69,143
Project description - provided by applicants			
RALPH's objective is to develop an autonomous laser micromachining system with fully auto-mated part handling, but agile and easily reconfigurable, suitable for mass customisation pro-duction of different device formfactors. Despite laser manufacturing being a rapid process (typical laser drill/cut time in sec), long production cycle times of several min/part due to manual part handling, hinder further uptake of advanced photonics-based production technologies in high value microelectronics, powertrain or medical device manufacturing, resulting in uncom-petitively high laser process costs and loss of global market share for the UK. The challenge is to satisfy the stringent part positioning accuracy requirements for laser processing (5 m) using conventional, affordable, but less accurate robotic pick and place technology. We will develop a technical solution integrating the laser, optics, 6-axis robot and machine vision for parts hand-ling of various sample formfactors (wafer, cylinder, disc) based on intelligent part registration and adaptation of laser beam positioning through high precision optical scan axes.			

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Myrtle Software Limited	Efficient Deep Learning Hardware for Robotics and Autonomous Systems	£98,799	£69,159
Project description - provided by applicants			
There is a wide consensus that deep learning algorithms are key to the future of smart autonomous machines and robots. This project aims to automate the production of low power, lightweight hardware implementing these algorithms so that RAS applications become a reality.			

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i3d Robotics Limited	IVIRA- Intelligent VIsion for Robot Awareness using multi-sensor data fusion	£90,481	£63,337
Project description - provided by applicants			
IVIRA will address the needs of RAS by providing further information to high resolution 3D models of scenes and objects. Data fusion and interface will be used to provide perception for the RAS, enabling the system to make informed decisions on the appropriate task to perform as well as responding to unexpected results. This technology will initially be proved through this project for high value agriculture and will be expended to other RAS application areas beyond the project. IVIRA will provide further functionality to the high resolution 3D vision systems produced by i3D robotics to increase our competitiveness in various markets. Achieving our aims will significantly move the RAS technology from automated systems to become autonomous.			

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BECOCO Ltd	BECOCO. Be confident.	£98,003	£68,602
Project description - provided by applicants			
Every woman knows this feeling. When you wear something but don't feel quite right in it. You pull, you tuck, you twitch - nothing seems to help. This feeling of discomfort and haunting self-awareness will stay with you the entirety of the day. It will follow you into meeting rooms, school yards and every public space you go. And it will impede you from doing what you have to do that day. Imagine a service that analyses your individual body shape and personal colour complexion and sifts through millions of items of clothing in seconds, to find the ones that will suit and flatter you best. Not some celebrity. You - just the way you are. BECOCO is a virtual styling platform, which does exactly that. For free or for £49, if you would like your customised styling report with it. In addition to helping consumers becoming more confident, BECOCO is determined to support retailers in reducing their return rates for items ordered and to decrease the impact that the handling of those returns have on the environment.			

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Swarm Systems Ltd Loughborough University	Persistence through Reliable Perching (PEP)	£85,819	£66,073
Project description - provided by applicants			
Swarm Systems is developing a product for the growing market need of Flying Binoculars. Multi-rotor, battery SUAS have endurance of around 20 mins. A common request is for SUAS persistence of hours or more. Customers are specifically asking for a perch and stare capability to achieve persistence. However, perching using existing technology is very hit and miss. This PEP proposal has a goal of achieving greater than 99% reliability in perching on unprepared, outdoor locations in challenging weather conditions and taking off again. The SUAS category is sub-200g. The PEP research approach includes: adding new passive and active sensors, creating soft sensors from combinations of existing sensors, researching a novel automatic abort using 'disturbance from internal model' techniques (Loughborough University) and innovating undercarriage design including multi-surface gripping. PEP project management will be led by an analysis of perching ground types and weather conditions. The final 1/3 of the project will be focused on improving where testing proves that reliability is poor. A commercial goal is to add a key new capability to Swarm Systems product, enabling it to win export orders.			

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Swarm Systems Ltd	Robust and Reduced SWaP Obstacle Sensing	£69,935	£48,955
Project description - provided by applicants			
Small Unmanned Air Systems (SUAS), or "drones", have captured the public imagination. In the military domain SUAS can offer Flying Binoculars™ capability, allowing a user to monitor an area of interest from the air, out of sight and out of danger. In the non-military domain, search & rescue, inspection and remote delivery have all been suggested as the next 'killer' application. To extend the range of SUAS uses, the systems must be capable of operating in the real world without human intervention. The technology required to operate SUAS autonomously in wide open spaces is relatively mature. Operation in complex environments, such as urban, is still challenging. The SUAS has to fly in and around trees, buildings, walls and, in some cases, people. Several critical capabilities are needed to enable this type of operation. Robust sensing of obstacles is one of these. A miniature obstacle avoidance module is proposed incorporating two cameras, a processor and an active rangefinder. The objective is a low cost module capable of sensing obstacle presence and relative position. The module, when incorporated with an SUAS, will enable new applications. It will remove limitations to SUAS use in complex environments and will allow industry growth to proliferate.			

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Rovco Limited	Real Time 3D Modelling for Subsea Asset Management - Feasibility Study	£76,345	£53,441

Project description - provided by applicants

Rovco are developing a system that will improve the way in which subsea assets are managed through the development of a 3D modelling process which will allow inspection personnel to be based onshore. The aim of the system is to make asset management far more cost efficient, while also improving safety for staff and the environment. The final product will allow chartered offshore vessels on inspection campaigns to be smaller, while reducing costs and the number of personnel required at sea. Using visual 3D models of subsea assets will allow onshore assessment by all interested parties meaning decision making can be referred as needed, and onshore communication between all of the parties will be made more effective. This will allow faults to be spotted more efficiently and repairs to be made to damaged assets well before the point of failure, decreasing the chance of environmental pollution by mitigating the chance of corrosion going undetected. Initially a feasibility study will be conducted to ensure that industry is ready for this solution, and that it is viable. Alongside this an example of the final output will be produced to help recruit collaborators and assist in defining the project direction during market analysis.

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Motion Robotics Limited	Ultra Safe Ambulation Control System of Systems for a Bipedal Host Robot	£67,517	£47,262
Project description - provided by applicants			
SARAH is a bidpedal humanoid silent, agile, robotic, semi-autonomous, host vehicle that can carry a high tech payload. The payload can interface to SARAH and provide further ambulation guidance and environmental context or the payload can just rely totally on SARAH to carry around the payload using remote human guidance or GPS way points. SARAH is semi-autonomous and even though blind and relying only on proprioception and inertial sensors, she can stand and walk safely under a large number of circumstances; zero visibility, unstable ground, pushed, shoved, tripped. The idea is that high tech developers of robotic health care, search and rescue, hazard detection or companionship and domestic services can simply use SARAH as their trusted bipedal locomotion subsystem on sensitive terrain, around children, pets, and frail elderly. SARAH's ultra safe and agile quiet ambulation will be feasibility tested and demonstrated in this project. The control system of systems will make use of state of the art innovations in deep learning, morphed modality pattern generators and these will be integrated with an OPEN API so a developer can quickly interface to SARAH and reach the market sooner and safer. SARAH will be developed and manufactured in the UK for export.			

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Oxford Robotics Ltd Performance Projects Ltd	Autonomous Agricultural Robotics Platform	£98,283	£44,227
Project description - provided by applicants			
The aim of this project is to develop a robot that is suited to 21st century farming. Our Robot will be autonomous, efficient, affordable, flexible and powerful. With a standard three-point-hitch and Agricultural PTO, our robot will be compatible with traditional farming tools as well as 3rd party apps and implements developed by others. Technology is hard to predict, but with a standardised platform we hope our product will be prepared to perform a broad range of future tasks such as crop analysis, picking, weeding and spraying. Our project will involve the design, calibration and testing of the robot ready for commercialization and 3rd party collaborator involvement.			

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FlyLogix Limited	Tern	£97,017	£67,912
Project description - provided by applicants			
FlyLogix is a developer of low cost, innovative RPAS (remotely piloted aircraft systems). FlyLogix is currently working with the CAA (Civil Aviation Authority) to conduct what will be one of the first beyond visual line of sight (BVLoS) flights of an RPAS. This project addresses the limitations of the current technology by developing a low cost control system that will allow the RPAS to be flown over a range of >100 miles. Once FlyLogix has worked with the CAA to build a safety case for this technology this will enable FlyLogix to become the first commercial provider of BVLoS RPAS flights. The first application of this position will be providing inspection for offshore platforms and wind turbines - removing the expense and risk of mobilising people by helicopter. Once proven the technology will have wider applications in the development of RPAS.			

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Muretex Ltd	Enabling Ubiquitous Control of RAS	£97,184	£68,029
Project description - provided by applicants			
Funding from Innovate UK has allowed Muretex to continue developing their prototype system for intuitive control of robotics and autonomous systems (RAS). In the near future RAS will become increasingly necessary to many aspects of human life and work- such as manufacture, construction, healthcare, transport and energy. It is essential therefore that an easy to use and safe "langauge" or method of human/machine interaction (which is applicable to and easily portable across the many different sectors) is developed. The Muretex protoype system consists of a high level RAS, being controlled by the operator using gestures. These form a system of abstracted comands delivered to the the RAS via a data glove. Real-time visual feedback and position information from the RAS is continuously delivered to the operator's smart glasses, allowing the operator to see what, where and how the RAS is performing. This represents a prototype for a genuinely teamed integration of a human and robotic autonomous system.			

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