Innovate UK

Results of Competition: Infrastructure Systems Round 3 - 3-12 Months

Competition Code: 1707_INFRA_R3_12M

Total available funding is £5,207,799

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
SMART COMPONENT TECHNOLOGIES LIMITED	Investigating the feasibility of applying smart fastener technology in energy, power generation and process chemical infrastructure	£105,207	£73,645
SEVERN UNIVAL LIMITED		£76,980	£38,490

Project description - provided by applicants
Smart Component Technologies Ltd (SCT) and Severn Unival Ltd (Severn) have identified an opportunity to apply SCT's leading-edge safety critical fastener management technology to flanged assets with potential application across a wide range of industries, in particular energy & power generation and process chemical industries, which Severn operate in, where the correct installation of pipework, pumps, valves, process vessels etc. and the ongoing remote condition monitoring of flanges and critical bolted joints is both performance and safety critical to the asset owners.

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CORTEXICA VISION SYSTEMS LIMITED HAMMERSON PLC	Video action recognition in the urban environment, powered by AI and computer vision analytics	£902,456 £95,061	£631,719 £47,531
Project description - provided by applicants			
New advances in computer vision are offering opportunities for disruptive innovation, which could have widespread benefits across multiple use cases. The 12 month project is a partnership between Cortexica Vision Systems Ltd (artificial intelligence and computer vision experts) and Hammerson plc (owner, manager and developer of shopping centres). Cortexica have already built state of the art single image visual recognition solutions for the retail industry. This new research moves into live analysis of video. This grant application is to develop an automated action recognition system, which uses CCTV to automatically identify actions e.g. recognising a bag/object which has been left; or identify people who slip or fall. Adopting such technology in a proactive urban safety environment, without using biometric data, could create a novel citizen-centred approach to public health and safety.			

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STEAMA COMPANY LIMITED	Connect the unconnected: smart nanogrid management for peer-to-peer energy sharing	£97,870	£68,509

Project description - provided by applicants

620m people lack access the electricity in sub-Saharan Africa. Small solar home systems (SHS) are a sustainable solution to supplying electricity across these developing countries in an affordable manner, increasing energy reliability and replacing the use of harmful fossil fuels. However, the poorest consumers currently pay 9x more for their SHS than those with bigger systems. The costs of producing solar hardware mean this problem is difficult for small standalone systems on their own to overcome, despite increasing competitiveness in the market. Without necessary innovation, millions are at risk of continually being left-behind without access to affordable electricity. A potential solution to this problem is to use solar nanogrids. In these super-small grids, owners of larger systems share their excess capacity to their neighbours in a peer-to-peer network. This would provide cheaper electricity to the lower end users and a saving mechanism for the SHS owner. SHS companies have the SHS kits to provide the energy generation but lack the expertise and technology to manage the networks. We aim to build on our low-cost, resilient smart meter platform to assess the technical and operational feasibility of an advanced automation system for these smart nanogrids. Our proposed system utilises emerging computing and communications technology to reduce the operational cost of supplying electricity. Using advanced data analytics, pay-as-you-go mobile payments, and a suite of tools based on data-driven algorithms and automated decision-making, our cloud software platform will enable the retail of affordable electricity, even in the most challenging, remote locations. This will unlock the widespread roll-out of electricity to rural communities, significantly reducing the economic, health and environmental damage caused by unsustainable energy sources.

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RAB MICROFLUIDICS RESEARCH AND DEVELOPMENT COMPANY LIMITED	Productizing Microfluidic Technology for Real-time Lubricating Oil Analysis on Wind Turbines	£55,854	£39,098
OFFSHORE RENEWABLE ENERGY CATAPULT		£30,359	£30,359
SIEMENS GAMESA RENEWABLE ENERGY LIMITED		£0	£0
WIDEBLUE LIMITED		£84,325	£59,028

Project description - provided by applicants

The automation of Operation and Maintenance (O&M) practices in offshore wind sector is central to driving lower costs. The remote location of offshore wind farms means any requirement for physical human intervention pushes O&M costs upwards. This contributes to making the cost of getting offshore wind energy to our homes the second highest in the UK. Until now, it has been difficult to automate lubricating oil analysis processes that provide wind farm project owners and Original Equipment Manufacturer's (OEMs) crucial machine health information on key turbine components such as the gearbox and drivetrain. This resulted in breakdown of about 32,000 gearboxes globally last year alone. Such breakdowns could have been detected early by the right technology. Diagnosing early, potential failure of component parts in a wind turbine is critical to turbine operations. RAB-Microfluidics has developed cutting edge microfluidic lab-on-a-chip technology to deliver real-time continuous testing and analysis of lubricating oil. Our Lab-on-a-Chip technology delivers oil analysis 1000x faster and 10x cheaper than the current send the sample to the Laboratory approach. Analysis of contaminants in engine oil, gearboxes, drivetrains etc. is a well-established method of detecting problems. This procedure is called Oil Condition Monitoring. We deliver this onsite, in real time, saving cost and improving equipment reliability. We combine our hardware technology with data computing by developing machine learning capabilities to utilise the big data generated from our hardware. This offers customers real-time continuous monitoring, early problem diagnosis, rapid decision making, enhanced efficiency and cost savings. To date we have received various levels of funding to demonstrate the technology with laboratory based prototypes. Nonetheless, this project seeks to build on this and develop a field demonstrator to engage project owners and OEMs in field trials and in the reality of the value our technology can provide. This technology will enable us to solve the hard-to-reach and hard-to-sense challenges of the wind sector, using the data we generate intelligently and innovatively to forward model turbine behaviour and immerse businesses in industry 4.0\. We advance evolution of maintenance strategies to secure equipment reliability, increase Overall Equipment Effectiveness (OEE) and by extension reliability of turbines. This can reduce the need for physical intervention on turbines and effectively lower O&M costs. This will potentially reduce electricity costs from offshore wind, making offshore wind more competitive with other sources of electricity and ripple in effect to our electricity bills.

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SENSOR DRIVEN LTD	Zero-power multi-parameter sensing of complex events	£100,000	£70,000

Project description - provided by applicants
Sensor Driven's zero-power technology detects measurement events whilst the sensor electronics is fully powered down. It does this by using negligible amounts of power from the sensor's output signal, radically reducing the size of battery required and extending operating lives to decades and beyond. This project aims to develop and test multi-input sensor systems with zero-power logic processing. The sensor fusion technology enables derived measurements to be made from combining more than one parameter. It can also be used to reduce false alarms for single parameter measurements. This technology represents a step change in situations where complex events require the powering up of the system to make decisions, to bring in other precision sensors, or to avoid false alerts. Companies in the sectors of environmental monitoring, asset management, and industrial monitoring have shown interest in multi-parameter zero-power monitoring and now require proof of concept in order to progress their interest. Extreme weather conditions have a huge impact on the UK's infrastructure. Our advanced monitoring technology could provide the prompt and reliable alerts required to help to mitigate the impact of these conditions on the economy, productivity and safety of citizens. Our multi-parameter technology will disrupt the sensing market, and is applicable to a vast number of situations around the world, where complex events need to be listened for over extended periods of time.

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SOLIDSPARK LIMITED	Smart monitoring of infrastructure to prevent damage caused by insects	£93,110	£65,177

Project description - provided by applicants
SolidSpark is seeking to develop innovative, low cost systems to detect pests and enable early intervention to resolve infestations before they take hold. This has significant advantages for asset owners: * Reduced inspection costs * More reliable identification of a potential infestation * Earlier detection means that intervention is cheaper, quicker to perform and can be scheduled to maximise asset utilisation * Prophylactic intervention is not required, eliminating unnecessary chemical use The project will allow SolidSpark to develop detection algorithms, communications systems and supporting software essential to the development of products that promise to transform the pest-control industry. The project will enable dramatic growth of export income to the UK and create a number of highly technical jobs. It will also have the following broader benefits: * Increased exports for the UK * Reduced infrastructure damage * Reduced use of insecticides

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
INVENIO SYSTEMS LIMITED	StopCheck	£220,261	£154,183
UK WATER INDUSTRY RESEARCH LIMITED		£7,172	£7,172

Project description - provided by applicants

Invenio Systems was founded in April 2015 to provide innovative solutions to the water industry. The company develops sophisticated new sensors, hardware, technology and mechanisms to collect infrastructure data that demonstrate significant reduction in water wastage and leakage, to better support investment decisions and guide routine operations. Stop.Watch is an advanced and innovative system to identify and measure flows through service pipes on water networks without using a meter. Stop.Watch has been acknowledged as innovating in this space and currently provides a newly launched technology (post InnovateUK DoP project) to help companies determine if what they think is background leakage, is actually detectable leakage or consumption, past the customer stop tap. This technology uses non-traditional means to account for, and measure, water flow within district meter areas (DMAs), and individual metered or unmetered properties. Using a device mounted to the stop cock at the property boundary, Stop.Watch can reliably measure both water consumption and pipe leakage, and separate one from the other. This unique proposition allows water providers to gain a greater fidelity of understanding as to where leakage is occurring across water networks, and patterns of consumption by customers, with significant economic & efficiency benefits.Commercial work to date for Stop.Watch has been applied to over 10,000 individual properties in over 40 small Consumption Monitor Areas (CMAs) and DMAs for ten UK Water Companies with remarkable results. Stop.Check is designed to speed up the process and focus on locating unmetered properties with internal plumbing leaks and small underground supply pipe leaks that can't be found with current technologies. An InnovateUK Infrastructure competition industrial research grant will allow Invenio to work with industrial partners, including UKWIR, to scale the system and extend the technology to improve the current SoA combining sophisticated acoustic sensor capability with the existing Invenio sensors. The founding members of Invenio both have 25+ years experience working in water distribution networks and leakage management. As board members of the IWA Water Loss Specialist Group, contributors to the European Union report on water loss, and through research undertaken for UKWIR (who, in recognition of the innovation that this project provides, join as a partner in this project), they have unique insights into the commercial and technical challenges of water loss. The company is therefore well placed to make Stop.Check technology the leading method of leakage detection on supply pipes in UK, Europe and the US.

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SYNAPTIV LIMITED	Development of a Highly Localised, Real Time Pollution Monitoring Service for Urban and Sub-Urban Environments	£99,424	£69,597

Project description - provided by applicants

Synaptiv AI is a data analytics platform provider, focused on generating value from connected car data. This rich dataset is supplied by the array of sensors embedded within current-generation and next-generation vehicles. Through the application of advanced data science techniques, Synaptiv transforms car data into unique and actionable insights, helping clients reduce costs; develop a better understanding of their customers; and launch entirely new services into the marketplace.   The management and improvement of air quality is of paramount importance to governments across the World. According to the World Health Organisation, air pollution contributes towards up to 3.7 million deaths per annum. Furthermore, there is a growing commercial demand for high quality, real time data linked to pollution levels. Its relevance towards multiple applications including travel, health, wellness and smart infrastructure makes this data extremely valuable. Current pollution monitoring technologies are expensive, requiring significant operation and maintenance costs. Their limited number also means that the data generated is often inaccurate and highly fragmented. This project will assess the technical feasibility of a highly localised, real time pollution monitoring technology for urban and suburban environments. This will be achieved by leveraging the Air Quality Sensor (AQS) embedded within the vehicles that are travelling on the road today. Data will be collected via a telematics dongle, installed within the a vehicle, and streamed over a network to a cloud platform for processing and presentation. The availability of localised, accurate air quality data will deliver a significant impact upon environmental management and planning processes, as well as supporting R&D, policy making and public awareness in the field of air pollution.

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Modal Limited	Customer interchange intelligence	£99,642	£69,749

Project description - provided by applicants

Interchanges can be a major 'pain point' for passenger transport. Transport organisations currently have a limited view of the interchange activities of individual customers, and are therefore unable to improve their interchange experience at a reasonable cost. This project's vision is to improve experiences in rail stations when customers interchange between different modes of transport (e.g. from rail to bus or car, or vice versa). The vision will be realised by Q Shy developing 'customer interchange intelligence' software and models with the support of VTEC and RDG. The software service will provide detailed insight of these interchanges and intelligent, personalised communication with customers before and during their interchange journey (e.g. a real-time mobile 'push notification' for service exceptions and disruptions, or an estimated interchange time). The technological challenge is using real-time customer data and transport data, combined with complex algorithms, including machine learning, to deliver a better experience without investment in physical infrastructure. The nearest state-of-the-art technologies are: * Transit mobile apps that provide real-time disruption updates (e.g. Google Maps, Citymapper) * 'Big data' services that analyse mobile and WiFi network data to understand patterns in people's transport usage (e.g. O2 Smart Steps, TfL WiFi trial) Neither of these technologies specifically address the interchange 'pain point', or support transport organisations with the detailed data needed to alleviate or remove pains. In the case of the 'mobile network big data' services, the location of an individual is imprecise, so the models cannot accurately determine their transport interchange movements. Q Shy's service will allow it to exploit the exploding intelligent mobility market, expected to be worth £900b by 2025\. VTEC, and other transport organisations, will benefit from technology that helps to improve their stations and interchanges, and deliver more intelligent, personalised customer service. This opportunity has been created because there is growing demand on the UK's transport system, however there are limits to the time and money that can be spent on infrastructure projects. It is therefore recognised that a transition to intelligent mobility (IM) is required to make transport systems more efficient, meet higher customer expectations, and reduce environmental impact.

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EV TECHNOLOGY LIMITED	An Innovative demand forecasting platform for connected electric vehicle fleets: Development & Validation	£99,895	£69,927

Project description - provided by applicants
The UK and global Electric Vehicle (EV) market is expected to grow exponentially as countries shift to smart-city models, and race to meet the Paris Climate Change Agreement. There is an urgent need for innovation in both EV 'hardware' and 'software' (apps/intelligent systems/IoT) to enable the expansion of the global intelligent-mobility market. EV Technology Ltd is developing an intelligent platform which addresses major challenges faced by EV drivers: charging, range and infrastructure. We have previously successfully designed a charge management module. In this project, we aim to further optimise EV fleet-management by the development of an additional module for demand-forecasting. This module will allocate resources efficiently, optimising decision-making for the demand-vs-charge-vs-journey selection cycle. Through this project, we will demonstrate the economic viability of using EVs for all on-demand mobility-providers.

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HANGER19 LTD	BAMBI: Bluetooth Access Module with Broad Integration	£72,471	£50,730
E-CAR CLUB LTD		£24,696	£12,348
Project description - provided by applicants			
The Bluetooth Access Module with Broad Integration (BAMBI) project explores the real world challenges experienced over the last 5 years of EV market growth and creates an alternative technology strategy to the predominate state of the art for chargepoint controllers to manage user access and integration with chargepoint management systems. By leveraging development in IOT communication techniques, the technical capabilities/facilities of smartphones and our knowledge of the EV taxi and car club markets this project shall create a new control system design for a chargepoint that enable it to better operate in car club service provision, provide a method for users to access and pay for the use of chargepoint without any prior registration and increase the options for networking chargepoints so that they can be remotely monitored through an IOT solution rather than traditional GSM. This project shall deliver a cost effective product that reduces the overall cost of chargepoints, reduces the ongoing operational cost compared to GSM networking and offers operators of EV related business new alternative to intregrate EV charging solutions in their operations.			

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EMISSION SOLUTIONS LIMITED	Freight Operators Transport Pollution Compliance Platform	£96,387	£67,471
Project description - provided by applicants			
EMSOL will be creating an IOT based emissions as a service as a centralised Freight Operators complaince reporting platform that will enable Operators to meet the new FORS (V4.1) standards that will take Air Quality and Emissions data to create a client led capability to drive interventions to reduce/cut transport emissions (See our story on You Tube: [https://youtu.be/tK_O1K5xLPs][0]). [0]: https://youtu.be/tK_O1K5xLPs			

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DYNAMON LTD	Using Analytics to Automatically generate Fleet Efficiency Recommendations from Telematics Data	£98,568	£68,998

Project description - provided by applicants

In 2016 the UK road freight industry spent £5.4 billion on fuel and released around 18.7 million tonnes carbon dioxide into the atmosphere. By improving vehicle efficiency there is significant scope to reduce emissions whilst simultaneously saving fleets money. Unfortunately, optimising a fleet is a complex challenge and most commercial transport companies struggle to achieve this. Unlike consumer cars, commercial vehicles can be optimised for their exact use-cases. Each efficiency solution behaves differently on different vehicles and in different operations. Consequently no one-size-fits-all approach to optimisation is possible and this extreme complexity has resulted in inefficient commercial vehicles on UK roads. To solve this problem Dynamon is developing a big data analytics service to identify optimum areas of efficiency improvement for transport companies. Dynamon presents this information on a simple and accessible webpage which demonstrates how much money these improvements can potentially save transport companies. Based on Dynamon's current analysis of 56 million km of vehicle data, the largest opportunities for improved efficiency, in commercial vehicles, come from improved aerodynamics, weight reduction and improved tyre performance. This is applicable for both fossil fuelled and electric vehicles. Dynamon is currently supported by an Innovate UK OLEV project to provide efficiency recommendations to fleets for improved aerodynamics. The first objective of this project is to expand Dynamon's functionality to recommend efficiencies from improved tyre performance and reduced vehicle weight. The second objective of this project is to develop a benchmarking service enabling fleets to compare their performance within their industry sector to incentivise improved efficiency. Initial trials of Dynamon's current capability by leading UK transport companies has identified significant fuel cost and emissions savings - which they are now pursuing. There is currently no service that incentivises fleets to improve efficiency from benchmarking and then demonstrates to them how to achieve it. This project will accelerate the development of this service.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
PV3 TECHNOLOGIES LTD	Development of a Demonstration Scale Electrochemical Hydrogen Compressor to Test for Future Grid Balancing	£98,949	£69,264

Project description - provided by applicants

In a world in which fossil fuel energy is becoming ever more scarce and expensive and countries are struggling to meet their carbon reduction obligations, the expansion of renewable power generation is at the top of government energy agendas. However, the intermittency of renewable power generation necessitates the development and use of energy storage methodologies. Electrochemical methodologies are proving to be one of the best and most robust methods to store and transport energy as it is both scalable and independent of region. One of the key energy storage materials that is becoming increasingly important worldwide is electrochemical (green) hydrogen. Green hydrogen has a number of societal benefits, from facilitating emission free transport, to grid electrical management whilst ensuring future security of supply. To make this a reality, the technology must be commercially viable, and novel business models applied. Building on the PV3 Technologies expertise in manufacturing world-class coatings and catalysts for electrochemical hydrogen generation, this project will design, build and test a proof-of-principle electrochemical compressor (at a scale that can facilitate customer engagement) that can produce and compress hydrogen to 200 bar (sufficient to fill bottles for distribution) and build the business case for selling renewable energy as hydrogen. The technology developed in this project will dramatically lower the cost of green hydrogen generation and compression using a device with no moving parts able to be powered directly or indirectly from renewable (intermittent) sources helping to facilitate a greater increase of renewables. Alternatively, by connecting to the grid, the technology (at scale) can help with fast frequency demand side management of the electrical grid. This project will develop the proof-of-principle demonstrator, test its durability and allow PV3 to develop a robust business case for commercially viable green hydrogen.

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RFC POWER LIMITED H2GO POWER LTD Imperial College London	HYAPEREST- HYdrogen Ambient Pressure Electrochemical Reversible Energy STorage	£99,600 £99,974 £79,828	£69,720 £69,982 £79,828
Project description - provided by applicants			
Ever increasing energy demands and decarbonisation efforts require substantial incorporation of renewable energy sources such as solar and wind. Their intermittency necessitates addition of significant capacity of energy storage capabilities for proper and uninterrupted grid operation that will result in saving of more than hundred billions dollars to the global world economy. Having extremely long cycle life and being completely site-independent, redox flow batteries and especially commercialised all-vanadium systems are excellent candidates to address energy. Nonetheless, uncertainty in cost of vanadium compounds of the electrolyte are hampering widespread development of all-vanadium redox flow systems. The new technology, developed at Imperial College and on route to commercialisation by RFC Power, has completely replaced the vanadium electrolyte while retaining all the advantages of flow batteries. The technology is based on hydrogen and very abundant and cheap manganese making it 70% cheaper than existing all-vanadium flow systems. This hybrid Manganese Hydrogen Flow Battery (MHFB) has demonstrated exceptional performance running for more than two hundred cycles with 76% roundtrip efficiency and capable of delivering more than 0.8 W/cm2 peak power. The HYAPEREST project will focus on integrating of this MHFB system with patent-pending solid-state hydrogen storage developed by H2GO Power.			

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QBOTS TECHNOLOGIES LTD The University of Manchester	Q-PLUS Intelligent Building energy management system utilising energy storage	£260,922 £110,405	£182,645 £110,405

Project description - provided by applicants

The adoption of renewable energy systems in commercial properties has been low in comparison to the residential market in the UK, due to reductions in subsidies and feed-in-tariffs which make investing in the technology financially unattractive to building owners. There is however a need for this situation to change as renewable generation sources are anticipated to play a significant role in enabling the UK to meet the ambitious emission reduction target of at least 80% of the 1990 level. Other technologies proposed to help lower emissions are electric vehicles and heat pumps, though both of these will further increase the load on the power system. There is an urgent need for innovative solutions to utilise existing assets while integrating energy storage asset in the power system to ensure security of supply while providing the owners of these assets with long-term savings and new revenue streams. This project, a collaboration between QBOTS Technology Ltd and The University of Manchester (UoM), will design and validate a decision-support energy management framework for commercial buildings that will optimise multiple performance criteria, including self-consumption from local renewable generation sources, usage of energy storage systems, provision of grid support services, load shaping, economic costs and comfort, together with the standard objectives of controlling the indoor air quality and thermal environment. The decision-support framework will be validated using existing assets available at The University of Manchester to form a test platform (a blend of real-time simulation modelling using a high-fidelity Real Time Digital Simulator (RTDS) system to emulate appropriate fidelity renewable system models and the building power architecture, together with hardware-in-the-loop by interfacing a commercial 240 kW 180 kWh Siemens SieStorage battery energy storage system to the RTDS to enable the decision-support framework to be evaluated over a diverse range of commercial building operating schedules.

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YELLOW LINE PARKING LTD	The Parking Platform	£989,422	£692,595
Cambridgeshire County Council		£48,414	£48,414
Coventry City Council		£48,414	£48,414
Westminster City Council		£48,414	£48,414

Project description - provided by applicants
AppyParking is creating the next generation Parking Platform(tm) that bridges the gap between big data, high definition mapping, Internet of Things and payments. Firstly, we use laser based LIDAR sensors to collect the Traffic Management Order data that defines the parking estate in a town or city directly from the road. Our platform solution offers local authorities and car park operators a Platform as a Service (PaaS) to manage their on and off-street parking and traffic management assets. including collecting roadside data on yellow lines, bays and signs using LIDAR surveys. Standardised parking data is then licensed to vehicle makers, mapping/navigation companies, connected car manufacturers and hence to drivers and other consumers . This holistic approach offers a complete and scaleable Smart City solution. In the short term AppyParking can dramatically save cites from congestion and pollution and save drivers time and money. Additionally, The Parking Platform can save UK tax payers hundreds of millions of pounds and dramatically increase productivity whilst preparing the UK's cities for the autonomous and mobility revolution.

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HIGHVIEW ENTERPRISES LIMITED University of Brighton	Development of High Grade Heat Storage for integration with Liquid Air Energy Storage	£210,799 £58,170	£147,559 £58,170

Project description - provided by applicants

Energy storage is a vital aspect of electricity supply, balancing variation in energy demand and energy generation. A novel approach to energy storage uses refrigerated air to store energy until it is needed. Liquid Air Energy Storage (LAES) uses electricity to cool air to -196degC, the temperature at which it liquefies. The liquid is then stored in an insulated tank until there is a demand for the stored energy. Exposure to ambient air or waste heat from an industrial process causes rapid re-gasification of the refrigerated air and a 700-fold expansion in volume; this expansion is used to drive a turbine and generate electricity. LAES brings considerable benefits to the grid in terms of security of supply. Its large scale, long duration storage capability helps balance the grid against variation in generation and demand, with intermittency linked to the increasing contribution of renewable energy, such as wind power, in the energy generation mix. A major advantage over conventional energy storage options is that LAES systems can be placed within industrial estates or next to existing power generators in order to capture waste heat which can be used to create the gas; thus increasing the efficiency of the system. UK SME Highview Power Storage are world leaders in large scale, long duration LAES energy storage. Highview's LAES system, currently being commissioned in a demonstration plant in Pilsworth, Greater Manchester, has been designed to use off the shelf components, proven in other applications and with long lifespans (30 years), minimising technology risk. It also uses widely available and environmentally benign materials, such as gravel in the cold store. The demonstration plant uses a water based heat store; whilst this represents the current state-of-the-art, water has significant limitations and Highview, in partnership with the University of Brighton, are seeking Innovate UK support to develop an alternative, innovative HGHS that makes a significant contribution to LAES process efficiency. This project will optimise LAES technology and accelerate commercialisation. Specifically, the project will develop a High Grade Heat Store Solution (HGHS) that allows Highview's LAES system to recover higher temperature waste heat from the process itself or from contributory sources that are co-located. An innovative approach is proposed, entailing the development of an alternative heat transfer fluid (HTF) that correlates with the pressure, heat transfer, viscosity, flammability and toxicity parameters of LAES, and operates at temperatures that deliver optimized RTE within a practical, cost-effective HGHS solution.

Innovate UK

Results of Competition: Infrastructure Systems Round 3 - 3-12 Months

Competition Code: 1707_INFRA_R3_12M

Total available funding is £5,207,799

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
GRID SMARTER CITIES LTD	ADAPT - Assistance for Disabled Air Passenger Travel	£217,096	£151,967
LIVING MAP LIMITED		£107,500	£75,250

Project description - provided by applicants

Disabled people experience barriers to air travel including poor information on accessibility and services, having to book assistance 48 hours in advance, gaps in assistance services and help connecting with onward journeys by plane, train, coach or taxi. 1 in 5 report difficulties in accessing transportation ([ONS, 2011][0]) and make 62% of trips compared to those without ([NTS2015][1]). The [CAA2016/17][2] shows for the top 30 UK airports, the PSAN access and service 'very good' category numbers dropping from 10 to 6 and the poor' category rising from 1 to 4 whilst PSAN numbers are growing twice as fast as others with an 11% or 300,000 PSAN increase last year. There is increasing legislative pressure to improve accessibility and enable spontaneous air travel ([DfT2017][3]). Using Heathrow Airport, Terminal 3, passenger journeys, this Feasibility Study looks at the potential, strengths and weakness of a developing integrated mobile phone app that can: * Let PSANs specify their needs prior to travel * Exchange real-time messages with airport service providers * Alert staff to when and where a PSAN arrives on site; * Pin-point the location of the passenger in the airport to staff * Enable independent passenger wayfinding around the airport before boarding or connecting with onward journey. * Access contextually relevant information such as location data * Enable service providers to integrate the information into their resource planning and management to enable efficient and pro-active support service delivery App user-testing by passengers and service providers will look at the user- journey from transport mode arrival point (e.g. Heathrow Express), through terminal (landside and airside) to the point of departure at the gate (flight transfers and inbound journeys are also covered). This will identify technical and passenger service improvements for final app build along with opportunities and threats to its exploitation and success. Improve service consistency and quality for PSANs (whether mobility/dexterity impairments, sensory impairments (vision or hearing), or aspects of neurodiversity including (but not limited to) dyslexia, dyspraxia, diverse approaches to learning, autism and mental health. For PSAN, such a product will increase traveller confidence in, flexibility and overall experience of travel through airports giving help throughout the journey, with just some elements of the journey) or only if requested. Also; greater efficiency and service flexibility to a fast growing passenger base, better matching individuals' needs with services provided by airport management and contractors such as airlines, security and retailers. [0]: https://www.ons.gov.uk/census/2011census [1]: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/551437/national-travel-survey-2015.pdf [2]: http://publicapps.caa.co.uk/docs/33/CAP1577_Airport_Accessibility_Report_FINAL.pdf [3]: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/638404/accessibility-action-plan-consultation.pdf

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
COCONTROL LTD	CoControl's Connected Homes Platform - Bridging the landlord-tenant divide for the Social Housing Sector	£97,886	£68,520

Project description - provided by applicants

CoControl's Connected Homes Platform has a completely different approach to where the key value add is focussed when smart thermostats are installed in the social housing sector. Rather than the focus being purely the collection of energy savings achieved by individual tenants where the smart thermostats are installed, the real value add is to bridge the landlord-tenant divide so that the incentives for efficient use of heat energy and long-term maintenance of the housing asset are aligned. The real-time internal temperature, energy use, and humidity data needed to optimise the tenant's heating control are the cornerstone of what the social landlord needs to monitor the condition of their housing assets, and to plan both their short-term maintenance schedules and their long-term strategic asset management budgets. Until now this data has not been available and landlords have had to rely on poor and outdated proxies for the data such as Energy Performance Certificated. This project will demonstrate how CoControl cannot only provide the benefits to the tenants seen in products such as Nest and Hive, but crucially for this sector where there has been no penetration for installs, how the Landlord can realise the benefits from smart thermostats and hence bridge the landlord-tenant divide that currently is preventing installs taking place. CoControl has worked with 7 social landlords to tailor our product line to the social housing space, with live trials already having demonstrated demand and technical viability. The financial burden on the UK's 8.79m social housing tenants has recently increased due to benefit cuts and reduced rent protection schemes. 43% live in poverty and struggle to balance food and rent with increasingly expensive gas and electricity (JRF, Guardian, DBEIS). Further, social landlords face new 'duty of care' legislation, increasing well-being standards -- in spite of severely decreasing funding: we are 2yrs into a 5yr cycle which has the effect of cutting Social Landlord rent income 12% net of previous forecasts (2015 Summer Budget). In response, CoControl has developed its Connected Homes Platform an open architecture intelligent, cloud based heating controls, built to minimise tenant energy usage and cost, and empower landlords -- our customers -- to invest their £7.1bn annual maintenance expenditure most effectively. This grant provides a critical proof of the benefits that both the Landlord and the tenant can derive from CoControl's energy system product which will take the software as a service product to commercial readiness.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
BRYDEN WOOD TECHNOLOGY LIMITED	SeISmic – Standardisation of School Components	£403,373	£242,024
BLACC LTD		£126,469	£88,528
ELLIOTT GROUP LIMITED		£116,002	£58,001
Manufacturing Technology Centre		£224,051	£224,051
MCAVOY GROUP LIMITED - THE		£116,004	£58,002
PORTAKABIN LIMITED		£116,370	£58,185
Project description - provided by applicants			

SEISMIC (Standardisation of School Components) is an ambitious project to use digital technology and a highly skilled team to productionise the delivery of school construction in the UK. A successful project will deliver ongoing savings to the UK taxpayer and act as a trailblazer to showcase the benefits of modular building across the construction sector. SEISMIC is a collaboration of 3 leading modular construction delivery partners (Portakabin, McAvoy Group and Elliot Group) together with leading consultants and designers (Blacc Ltd, BrydenWood) and the Manufacturing Technology Centre. In just 12 months, SEISMIC will create a harmonised digital modular build design library which can be used used to configure any new school. Thiw will bring a level of certainty to the school community, the supply base and the UK taxpayer which has never been realised before.

Note: you can see all Innovate UK-funded projects here
https://www.gov.uk/government/publications/innovate-uk-funded-projects Use the Competition Code given above to search for this competition's results

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
CORPORATE RISK ASSOCIATES LIMITED	Quantification of Human Errors in Cyber Security in the Nuclear Sector	£99,797	£69,858

Project description - provided by applicants

The UK's Civil Nuclear Security Strategy (Feb 2017) identifies CS and blended attacks as being a major concern and proposes that organisations in the UK Nuclear Sector and the associated supply chain should increase their understanding of CS risks and mitigate security vulnerabilities. At CyberUK 2017, the NCSC People-Centred Security Lead presented a keynote speech linked to the UK national strategy and the focus on the essential roles that personnel take in preventing these attacks. Human tasks include identifying and responding to attacks, maintaining defensive barriers, monitoring personnel, decision-making and situation awareness and avoiding inadvertently weakening these defences. Human errors, including both unintentional errors and violations, which are conscious acts that do not conform to the prescribed methods or organisational policies that are undertaken for non-malicious reasons (e.g. because a person does not consider them to be necessary). Both of these have been implicated in many CSBs and so, understanding the underlying human factors issues will enable assessors to identify the task features that will increase the risk of human errors. This project will develop a structured approach underpinned by research into human capabilities in terms of cognitive strengths, limitations and performance shaping factors. The tool that will be developed will enable nuclear installations to quantify the risks for CSB prevention tasks, so that any weaknesses can be identified and the risk of human errors that compromise CS can be reduced. The tool that is developed will cover tasks to prevent hardware or software for a CS or blended attack from entering a nuclear site physically or via the internet; access control tasks; monitoring internet traffic and if necessary, undertaking effective preventive actions in the event of an attack. The project will be undertaken by CRA who are renowned experts in the field of risk management, human factors and human reliability analysis, especially in the nuclear arena. Advanced CS expertise comes from the University of Kent which is part of the Academic Centres of Excellence in Cyber Security Research (ACE CSR) institution.

Innovate UK

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MENISCUS SYSTEMS LTD.	Predicting cloud cover and solar intensity at PV sites to improve performance of the Low Voltage distribution network	£103,747	£72,623
BUILDING RESEARCH ESTABLISHMENT LIMITED		£4,721	£0
Cornwall Council		£2,936	£2,936
OPEN ENERGI LIMITED		£44,789	£31,352

Project description - provided by applicants

The rapid rise in the installation of photovoltaic power generation (PV) is leading to operational problems for the Distribution Network Operators (DNOs) and impacting the electricity demand profile. These issues restrict installation of additional PV capacity, increase operating costs for the DNO's, complicate forecasting and balancing of the electricity network and impact margins of the PV operators. This project tests the feasibility of developing a smart system to create short term (up to 1 hour ahead at 5 to 15 minute intervals) predictions of cloud cover and solar intensity at specific locations. These predictions will update every 15 minutes as new satellite imagery becomes available Using these predictions, the project will: 1. Predict site power output for PV sites. 2. Model the integration of these predictions into the Demand Side Response (DSR) market to predict short term electricity output from PV farms and properties, with and without on-site battery storage. 3. Review how these predictions can optimise on-site generation and demand, and enable the creation of a micro grid to optimise local electricity demand. The project is geographically focused on the South West but the system will be suitable for any location in the UK. The benefits of the project being: 1. To help balance local power fluctuations in the local distribution network 2. To help solar farms that have fixed output contracts identify shortfalls and have some opportunity to manage this shortfall 3. To help solar farms that have (or are considering) battery storage to improve the revenue (or business case) of such an asset by better managing the combination of storage and solar output, for example generating additional revenue by participating in DSR markets. The innovation in the project lies primarily in the integration of the short term cloud cover/PV output predictions with DSR capability to deliver a system/service that can be exploited by the commercial PV community. The project team comprises; Cornwall Council, a PV farm owner who is impacted significantly by grid imbalances; BRE -- National Solar Centre, a leading consultant in PV installation and monitoring providing solar advice and expertise; Open Energi, a leading specialist in the DSR market with existing expertise in the PV sector; Meniscus, a real time Big Data analytics specialist who is the project lead. The project calls on specific expertise from two sub-contractors; Pixalytics Ltd a satellite acquisition specialist providing processed imagery; Bath University with expertise in cloud prediction algorithms.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
GRAVITRICITY LIMITED DAVYMARKHAM LIMITED	GRAVITRICITY energy storage: Subsystem Testing and Detailed Design for cost reduction	£840,676 £84,756	£588,473 £50,854
Project description - provided by applicants			
Gravitricty Ltd is developing a mechanical technology using gravitational potential for grid-connected electrical energy storage. The scale is currently around 1MW with potential for up to 20MW peak power, and energy storage from 250kWh to 10MWh per cycle. Combination with CAES, using the same vertical shaft as a pressure vessel, could increase the energy stored threefold. The technology has major advantages including rapid response (<1s to full power), high energy efficiency (75-85% round-trip efficiency), very long lifetime (50 Yrs+ for major components) with no cyclic degradation, and locational flexibility. During this 12 month project Gravitricity will work with heavy-lift experts Davy Markham and Deeptek to: A) develop detailed designs for cost reduction in future commercial projects (both in existing mineshafts and in purpose sunk shafts); B) test modular components of the Gravitricity system under gravity and under mock-grid conditions at the Power Networks Demonstration Centre; and C) identify sites and begin environmental and geophysical assessment of sites for our full-scale prototype project, which will be built in 2019 or 2020\.			