

Innovate UK

Results of Competition: First of a Kind Deployment of Innovation

Competition Code: 1607_SBRI_FOAK

Total available funding for Phase 1 of this competition is up to £1M from Innovate UK plus funding from DECC

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
BMSHome Ltd	Thermionix Energy	£12,744	£12,744

Project description - provided by applicants

Thermionix Energy is an innovative, First Of A Kind, end-to-end Smart Energy solution for electricity users. Energy Saving - Money Saving - Planet Saving. Thermionix Energy provides the complete solution to allow the Consumer to benefit from reduced energy prices by managing peak demand, whilst meeting the Customer need, making Smart Energy a reality. Thermionix Energy's patented, cloud based, intelligent energy management system, uses Internet Of Things (IOT) technology to balance building performance characteristics against user requirements and the weather forecast, to ensure that only the energy actually required is used. Thermionix Energy uses lower cost energy to keep Customers warm and safe. It reduces carbon emissions by cutting waste, and supports energy supply resilience by managing peak demand. Thermionix Energy combines three elements to provide a true Smart Energy Solution:- 1. Thermionix Smart Energy Supply - with its EcoSmart24, EcoSmart10 and EcoSmart7 tariffs, we have tailored our electricity supply offering specifically to meet the needs of peak (EcoSmart24) and off peak consumers (Economy7 and Economy10), whilst providing comfort and savings from improved energy control and lower energy costs. 2. Thermionix Smart DSR - our Demand Side Response technology allows us to actively manage the demand profile, whilst still keeping the customer warm. Our Smart DSR technology allows us to offer EcoSmart10 and EcoSmart7 tariffs to Smart eHeating customers. 3. Thermionix Smart eHeating - our unique smart heating control system has been developed to improve the performance of electric heating, especially electric storage heaters and electric water heating. Using our patented Predictive/Adaptive Energy Consumption Control System (PEACCS), we make the most efficient use of energy in domestic, commercial and industrial settings by predicting energy demand and balancing the timing and amount of energy used to minimise cost. Thermionix Smart eHeating has been designed as a retro-fit technology which can be added to existing buildings; from a single occupancy residential property to multi-occupancy residential buildings, office blocks, commercial properties and residential tower blocks. By combining these three elements into a First Of A Kind product, Thermionix Energy, we provide a Smart Energy solution that reduces cost, improves comfort, and looks after the planet.

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Lynkeos Technology Ltd	Deployment of a Muon Tomography System for Nuclear Waste Characterisation	£49,960	£49,960

Project description - provided by applicants

Muon Tomography is a new technology that is just now making the transition from academic research into commercialisation. Over the past decade, Muon Tomography has been one of the fastest-growing fields in applied particle and nuclear physics research with applications in diverse areas such as national security, volcanology and cultural preservation. This imaging technique uses naturally-occurring background radiation in the form of cosmic-ray muons, particles that are constantly showering the Earth's surface. It builds up a 3D image of shielded and/or large, dense structures that other, more conventional forms of imaging radiation (e.g. X-rays, gamma rays etc.) are not able to penetrate. Researchers at the University of Glasgow and UK National Nuclear Laboratory (NNL) have developed a novel Muon Tomography 3D imaging system to address an important and complex challenge in today's society. The challenge for the UK Nuclear Industry is to process and safely store current as well as legacy nuclear waste, some of which dates back several decades. In particular, the cost and safety of the long term storage of the UK Intermediate Level Waste (ILW) inventory is of crucial importance. One form of ILW are so-called '500 litre' drums that contain cladding material stripped from nuclear fuel rods that are encapsulated within grout-filled steel containers. There are currently more than 30,000 such barrels in long-term storage on the Sellafield site alone. Whether these contain fragments of uranium fuel is a key factor in deciding how these containers are stored. If there is an uncertainty about the content of a legacy container then it must be treated conservatively (i.e. to assume the worst case in terms of possible content). This would require storage space that would incur additional cost of the order of £100M-£200M for the UK Taxpayer in order to build such facilities. The 3D imaging system that has been developed is capable of identifying the presence (or alternatively confirming the absence) of fuel within these containers, thereby allowing the barrels to be more efficiently and cost-effectively stored and processed or by establishing the presence of fuel that can be retrieved and/or repackaged more safely at a much reduced cost. This could not otherwise be done without opening up each container to manually inspect the contents, which would be prohibitively expensive (of the order of £300M). The proposed project will be led by Lynkeos Technology Ltd., a Glasgow-based company founded in August 2016. It has been spun-out by the University of Glasgow after a successful multi-million-pound R&D programme funded by Sellafield Ltd. (on behalf on the Nuclear Decommissioning Authority) and in collaboration with NNL. Innovate UK funding from this competition would enable the first-of-a-kind deployment of this innovative solution within the UK Nuclear Industry. This contract will facilitate the commercialisation of this unique technology and advance the current TRL6 (lab-based demonstrator) system to TRL9 (active deployment) on a nuclear-licensed site in the UK (NNL Preston site). This system will then be ideally placed to characterise the contents of these ILW containers and to help mitigate the risks inherent with the long-term storage of such materials, and in the process will provide a significant saving to the UK Taxpayer.

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Vivacity Labs Ltd	City Wide Smart Transport Sensor System	£49,764	£49,764
Project description - provided by applicants			
Our project will transform Milton Keynes into the world's first fully smart city by gathering and distributing real-time data about the 'busy-ness' of the city, including availability of public transport, roads, cyclist parking, mixed-mode pedestrian and cycling areas, car parking and retail areas, with a particular focus on interchanges. This live data will be shared with citizens & businesses through an intuitive app to enable more effective use of infrastructure - increasing availability without building new capacity. We will build on the work of the MK:Smart project, rolling out networks of sensors prototyped through that project and combining these with the front-end interfaces developed for Milton Keynes. This will deliver the first real-time, city-wide data feed on the end-to-end transport network.			

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Zeetta Networks Ltd	NetOS® : Dynamic & Intelligent Orchestration of Networks	£49,824	£49,824

Project description - provided by applicants

Zeetta Networks offers Open Networking solutions based on a proprietary network operating system, NetOS® that provides a single, converged and secure platform for monitoring, managing and automating the operations of heterogeneous networks. NetOS® uniquely manages simultaneous data flows between different types of connected devices and sub-systems including Wireless, Optical, Ethernet and Internet-of-Things (IoT) devices. This integrated and scalable approach, able to handle from a few kilobits of data per second generated by an Internet-of-Things (IoT) network up to Petabits of data per second managed by an optical switch, significantly increases network performance and efficiency. NetOS® is being developed to tackle city-scale integration of Energy, Transport and Information & Communications Technology (ICT) infrastructure. It uses intelligent software and virtualization to replace expensive hardware networking equipment and human intervention for provisioning and management of network resources, enabling greater efficiency, capacity, security and resilience across the network. Zeetta Networks will deploy NetOS® in a first of a kind deployment at Ashton Gate Stadium in Bristol, to provide a large scale demonstration of the capabilities and commercial potential of the innovative NetOS® technology. Zeetta will develop key network applications running on top of NetOS® which satisfy the expressed needs of the stadium's operations teams, members of the public (visitors and fans) and security and emergency services. These network applications will allow operations staff to monitor and dynamically reconfigure network resources (e.g. bandwidth quotas) across the different network subsystems, in real time, with minimal effort and no service downtime, thereby reducing the cost of operating and maintaining the network of service delivery sub-systems in Ashton Gate stadium. This deployment serves as an example of managing complex civil infrastructure (such as a 30,000 seat stadium) in a dynamic and future-proof way using cutting-edge networking technology to: (i) Optimise network capacity in a safe & secure way, (ii) improve resilience of the infrastructure by intelligent use of network and services, (iii) support the reconfiguration of resources to meet anticipated needs and (iv) adapt to rapidly changing demands in an urban environment.

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Flexisolar Ltd	Large-scale Solar Carports for Integrated Transport & Energy Systems	£50,000	£50,000
Project description - provided by applicants			
The First of a Kind (FOAK) Demonstrator supports large scale deployment of field tested products. The project will demonstrate the use of solar photovoltaic (PV) arrays in combination with electric vehicle charge point to provide low carbon power to charge vehicles. The project will use of novel connection and peer-to-peer trading to allow local businesses to make use of excess generation. In addition a number of products will be integrated into the structures for the first time. An E-bike and E-Bus charging station, intelligent LED powered under canopy lighting, an intelligent parking solutions to monitor the use of EV charge point bays.			

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Cybula Ltd	Event Detection using Pattern Analytics Platform (EDPAP)	£47,052	£47,052

Project description - provided by applicants

At a time when many organisations are monitoring 'things' and as a result collecting large amounts of time-based data, Cybula is using its' considerable skills in developing novel pattern matching methods which can be used to monitor the health of complex assets and systems. The company has developed a set of analytical tools which can be used to answer common questions such as is the asset working normally or has this event been experienced before across the fleet of assets. Multiple models can be set up and validated before routine use on the company's Event Visualisation Platform (EVP), a flexible, scalable data management platform that focuses the user on detected events. With the EVP, Cybula can offer a customised approach to monitoring as it can develop models quickly, customise the EVP according to client requirements and then integrate with other data systems to create the monitoring application. Typically, these event models can be adjusted so they accurately detect the events required unlike many traditional monitoring systems which generate many false alerts. This repeatable business model allows Cybula to assemble different monitoring applications in very productive way making Cybula's solutions affordable to many more organisations who want advanced monitoring systems but cannot justify the price of traditional condition monitoring solutions. There are many applications with Cybula having worked in aerospace (engine monitoring), rail transport (track and vehicle condition), water industry (pipeline leak detection) and medical (critical care monitoring). However, it is the energy industry where Cybula seeks to prove the usefulness of its' technologies using its' prior experience with a range of clients including monitoring on rotating machinery (EDF and SSE), critical steam generation (Doosan), energy balancing (SSE), short-term wind forecasting (SSE), and pipeline leak detection (Sim-Soft/Shell). In this FOAK project, we want to develop an EVP application to monitor a set of Gas Circulators operating at 2 nuclear power stations. Having already proved the value of Cybula's analytics to EDF UK's Rotating Machinery Group, we aim to show how various event models operating on performance data from these assets collected and managed by the EVP can provide a superior, advisory alerting system compared to the current plant installed vibration alarm system. In doing so, Cybula will gain valuable experience in implementing a working application of the EVP for the first time with the potential for wider application in the EDF group, the nuclear industry and the wider energy market.

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Powervault Ltd	Second Life Batteries for domestic electricity storage (SLB)	£48,478	£48,478

Project description - provided by applicants

Powervault aims to be the UK's first specialist provider of cost-effective distributed electricity storage, lowering consumers' electricity bills, reducing peak demand and increasing the utilisation of onsite renewable energy. Since 2010 the UK has witnessed a solar revolution, with >820,000 households installing solar photovoltaics. However, due to the supply profile of solar generation (high during the day, low during the evening), and typical household demand (low during the day, high in the evenings), households are generally only able to access ~50% of the clean energy produced on site, and remain reliant on the grid at periods of peak demand (e.g. evenings). Installation of domestic storage typically doubles the amount solar generation used onsite, by charging during the day when solar is plentiful, and discharging during periods of peak demand, reducing customer electricity bills, and pressure on the grid during peak periods. The UK's electricity networks face considerable challenges from decarbonisation - with microgeneration, electric vehicle penetration and renewable heat stressing distribution networks which were not designed to take this load. New technologies such as energy storage and demand side response offer potential solutions through increased load flexibility, and increased system resilience. In 2016 the National Infrastructure Commission predicted these technologies, alongside interconnectors, could help instigate a 'smart power revolution' estimated to worth £8 billion in consumer savings annually by 2030. Domestic storage benefits households and the wider electricity system across all three pillars of the energy trilemma; facilitating greater use of local renewable energy, thereby supporting decarbonisation and security of supply objectives, and providing a cost-effective alternative to unnecessary additional generation and network reinforcements. However, in 2015 only ~1000 systems were installed in the UK, with high upfront cost cited as the main barrier. To address this bottleneck, Powervault has spent 3 years undertaking customer research and technical development devising a solution affordable enough to unlock mass market traction. Having successfully completed an Innovate UK Proof of Concept in April 2016, validating technical feasibility, Powervault believes its supply chain innovation, 'Second Life Batteries' ('SLB') can be a game changer for energy storage economics. To transform this lab-tested alpha device into an optimised and market ready proposition, Powervault now seeks to validate SLB in an end user environment, secure emerging areas of IP and complete technical development. SLB will benefit from the expertise of Powervault's management team and 4 years' market activity. To date, Powervault has received support and recognition from many organisations including: Innovate UK; RBS Innovation Gateway; NESTA; National Physical Laboratory and Climate-KIC. In 2014 Powervault set a cleantech crowdfunding record, securing investment in <8 hours on Crowdcube and in 2015 BusinessGreen awarded Powervault 'Innovator of the Year'.

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PassivSystems Ltd	District Heating Digital Canopy	£49,897	£49,897

Project description - provided by applicants

District Heating provides a critical capability for the UK to increase the capital, operational and carbon efficiency of domestic heating systems, deliver Carbon Budget 5 and export CHP generated electricity to improve security of supply. Optimal energy system efficiency is achieved by using technology that is able to predict and control the heat demand and heat generation factoring in external electricity system requirements. Today's heat networks are sized and operated against assumed models of demand and respond to changes in demand patterns reactively. Passiv previously demonstrated the technology that enables heating networks to proactively control the demand profile in order to improve the operating performance of district heating plant, delivering a 44% reduction in annual opex costs and reducing costs on a (25 yr, 6%) NPV basis by 30% from the counterfactual scenario. This project takes that technology to operational readiness and extends it to allow demand control, generation and storage to be orchestrated to maximise operational and carbon efficiency. The heat network operator will use generation and storage plant to both deliver heat and to optimise energy generation and heat consumption against the opportunities for value creation from the electricity market. Optimising the coordinated control of these cloud-connected assets at the same time as managing the demand profile will reduce operating costs, increase revenue from energy sales and energy services, and reduce the carbon intensity of the energy system. The District Heating Digital Canopy Project will, for the first time, install advanced load control capability into all end points on a district heating network. This will give a comprehensive view of the value of demand optimisation. The project will develop the advanced controls required to coordinate demand, generation and heat storage assets to achieve best value and will demonstrate this in the field. Modelling of the system and the results obtained will assess the potential value of this solution when applied to other district heating schemes. The analysis will then be used to quantify the potential value to the UK economy and to the UK's carbon reduction obligations. Finally, the project will produce a detailed business model explaining the commercialisation approach, including routes to funding for volume deployment. The project is led by PassivSystems, a leading innovator in heating control systems, with support from Buro Happold. PassivSystems is a leading provider of domestic energy services and has invested in excess of £25m in developing a connected home services platform (PassivEnergy) that is providing energy monitoring and control solutions into existing domestic heating and rooftop solar generation markets. The flexible and scalable nature of PassivEnergy makes it ideally suited for the emerging residential demand management markets for which current technology solutions provide limited and siloed capabilities. Buro Happold has a wealth of experience of evaluating and prioritising district energy opportunities for both conventional district energy systems and more innovative approaches such as low temperature heat networks with heat pumps. They have undertaken district heating projects at all stages and have experience of innovation and added value through utilisation of advanced technical software.

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CarTap Ltd	Car as a Delivery Service (CaaS)	£40,345	£40,345
Project description - provided by applicants			
Car as a Delivery Service (CaaS) is a revolutionary technological urban solution to the last mile delivery problem. Building on a secure smartphone based vehicle access technology, the project aims to enable a new asynchronous delivery option to strengthen urban infrastructure. Apart from the cost benefits and emission reduction by eliminating redeliveries, this solution has the potential of offering a complete automated round the clock delivery systems, reduce demand on transport infrastructure during peak times, increased usage of zero emission vans and drastic reductions in the CO2 footprint of logistics delivery.			

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8power Ltd	Autonomous, self-powered sensors for smart infrastructure	£47,880	£47,880

Project description - provided by applicants

A collaborative project between UK industrial sensing startup 8power, Costain, and the Centre for Smart Infrastructure and Construction at the University of Cambridge. Costain will install 8power condition sensors on site to create smart, self-monitoring infrastructure and show a sustainable, scalable business case by addressing maintenance and inspection costs. The benefits that wireless sensors offer in many applications are now understood. Remote monitoring of infrastructure can reduce asset management costs by avoiding frequent visual or manual inspection, enhance safety by limiting the need to access dangerous sites, and by detecting problems, real-time, as they occur. Wireless sensors are often favoured over wired sensors where it is expensive or difficult to install cables. However, smart sensor adoption has been limited by common problems: high cost of the sensors, due to costly components and batteries; limited battery life, due to the energy needs of the sensors and wireless link; and poor radio range, due to use of technologies developed for short-range applications. Sensor installation and maintenance costs have thus been high, limiting the viability of the business case for many scenarios. This project addresses these challenges by introducing two emerging technologies. 8power's breakthrough vibration energy harvesting, using parametric resonance, is able to power sensors in a broader range of applications (such as on rotating machinery and bridges) than is possible with current devices. This is due to its wider bandwidth and ability to harvest up to an order of magnitude more energy than existing technology. A new interoperable long-range wireless low power wide area network (LPWAN) system called LoRaWAN allows sensors to connect with much greater range than has previously been possible, at low power levels available from energy harvesters. In the project these recent inventions will be combined with state-of-the-art technology for monitoring assets, machinery and infrastructure to produce prototypes of easy-to-install self-powered sensor ds. These will be deployed in the field to inform users, designers and stakeholders of the cost of ownership of this low-maintenance lower-cost sensor technology, and the applications benefits it can deliver. This Innovate UK project will speed adoption of this technology by accelerating development, proving the business model, and creating and publicising case studies, which would otherwise be very difficult for this SME. This will create a platform for 8power to rapidly grow headcount, revenue and exports.

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Sharp Laboratories Europe, Ltd.	User Trials of an Adaptively Controlled Renewable Heating System	£40,827	£40,827
Project description - provided by applicants			
Sharp Laboratories of Europe Ltd (SLE) has developed an adaptively controlled hybrid-renewable residential heating and hot water system that can provide 100% of a household's annual space heating and hot water requirements. The system has very low predicted operating cost and carbon intensity and is designed to be suitable for retrofit to a large proportion of UK housing stock. In addition, the system minimises the use of grid energy and the controls shift load to off-peak times. Domestic heat accounts for 15% of the UK's carbon emissions, making the rollout of economic low-carbon home heating essential to meet emissions targets. Market interest in electrification of heat, managing residential PV output, and providing consumers with smart flexible home energy management systems provides the context for developing and trialling this system. This project to field-test the installation and in-use performance of the system in a range of homes is a collaboration between Sharp Laboratories of Europe, Good Energy, Thermal Earth, and renewable installers.			

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Grid Smarter Cities Ltd	Kerb - Intelligent Kerbside Management	£46,405	£46,405

Project description - provided by applicants

KERB Virtual Parking System (VPS) - Is a Real Time Dynamic, Intelligent Kerbside Management Solution for Cities: The solution addresses the First of a Kind Challenge with an innovative, patent protected, ready for market solution with global potential that can deliver, rapidly, at least cost and effort additional capacity adaptability resilience integration of / into other technologies. Grid Smarter Cities Limited (Grid) has developed a novel web-based scalable application which allows commercial vehicle operators to opt to pay and park/load unload on previously unavailable kerb space in high density, urban traffic areas. Operators will use the application to reserve a defined location on restricted kerbspace during an available time slot for a fixed fee. This pre-booked space becomes a 'Virtual Loading Bay' (VLB) or Virtual Parking Bay (VPB) allowing drivers to load and unload in close proximity to their delivery point without causing congestion and without the risk of receiving a Penalty Charge Notice (PCN) and saving time and fuel. Local Authorities (LAs) will determine the fee and the locations to be exempted. This can be time and vehicle specific to give preference to certain vehicles (e.g. zero / low carbon vehicles) and to 'nudge' behaviour into off-peak times. Using Kerb VPS helps councils to address air quality issues in general and also in specific areas by managing kerbspace at a micro level and behavioural change through incentivisation and intelligent kerbside management managing traffic flows. Kerb VPS contributes to macro reductions when applied across the borough area by reducing congestion and driver stress on roads. Kerb VPS will reduce the cost associated with administering PCNs creating cost certainties (for fleet operators and councils alike) as well as well as efficiency savings from optimised deliveries. Other benefits include: efficient planning multiple drop-offs, reducing CO2 emissions. Encourages take-up of electric vehicles (EVs) by the delivery industry, by providing bookable EV bays incentivised by 'at location' rapid chargers. Utilises kerb space on routes that traditionally prohibit loading and unloading - allowing deliveries at previously difficult to reach locations. Saves money by reducing the time and mileage spent searching for available kerb space. Reducing PM, NO and CO2 emissions in keeping with 'Corporate Social Responsibility and international air quality standards. Sending 'real time' updates to Civil Enforcement Officers (CEOs) reducing the issuing of PCNs. There is overwhelming support for such a solution with significant environmental (included in Air Quality Action Plans provided by DEFRA and London Councils) and economic benefits for commercial vehicle operators and LAs in the adoption of the solution in comparison with the existing regime of PCNs for illegal parking which is currently 'stick with no carrot.' It also provides a positive user-led revenue stream for the city, and helps freight and logistics operators avoid PCNs by offering them bookable spaces, where they need to deliver at times that least impact on the road network creating efficiency savings for all parties and a national booking portal for operators and councils. The solution is replicable and repeatable for London boroughs and provincial cities who will be able to opt-in with as many or as few VPBs / VLBs as they wish. Additionally the platform can be used for other vehicle types as well as freight vehicles such as EV's (including taxis), coaches, vehicles for disabled drivers and skips.

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Zephir Ltd	WinTIL GO LIVE	£29,713	£29,713

Project description - provided by applicants

Wind Turbine Integrated Lidar - GO LIVE; 'WinTIL - GO LIVE'. With existing funding from Innovate UK under the WinTIL project, Zephir Ltd. has successfully designed a wind turbine hub-mounted wind speed sensor (ZPINNER) based on Continuous Wave (CW) lidar technology that can be used to reduce turbine loading, optimise turbine performance and increase energy generation. By doing so it reduces the cost of wind energy, reduces carbon emissions and increases the security of energy supply hence addressing the energy trilemma (www.worldenergy.org/work-programme/strategic-insight/assessment-of-energy-climate-change-policy/) and satisfies Innovate UK requirements in the Energy Catalyst funding competition. Over the last 10 years, Zephir Ltd. has become a leading global wind lidar innovator and manufacturer, exporting ~80% of all it produces to more than 50 countries worldwide. This step-change innovation, based on ZephIR's unique core CW lidar technology, aims to deploy the First of its Kind in a real-world, user-facing project offering several UK-based SMEs within the supply chain a significant route to market. The specific business opportunity is the mass adoption of the ZPINNER wind sensor on wind turbines. There are ~300,000 turbines operating globally as an existing addressable market for ZPINNER and in addition there are ~15,000-20,000 new turbines installed every year. While WinTIL has taken core research from fundamental scientific principles and produced a proof of concept demonstrator (TRL 7) which has proven the technology, it has not overcome all the barriers to entry to bridge the chasm from early innovators to early adopters and on to the mass majority in the product life cycle (TRL 8 & 9). There are three significant barriers to overcome to drive mass adoption and uptake of the ZPINNER that will be addressed by 'WinTIL - GO LIVE': 1.) First Of A Kind Deployment (FOAK). While ZPINNER has been proven conceptually on an individual turbine, the value proposition is not evidenced to the level required by the market to perceive a low enough risk to adopt across an entire wind farm. The market is waiting for 'others' to adopt the technology before it commits. There is a need to accelerate a First Of A Kind deployment of the technology in a significant enough volume that produces the evidence and demonstrates the value proposition to secure volume sales. Funding this stage of New Product Introduction is currently the most significant barrier to market adoption. 2.) Design for Manufacture. The ZPINNER product design is suitable for small scale manufacture but would benefit from additional improvements to enable it to be manufactured in volume in a cost effective and efficient way to the repeatable high product quality demanded. 3.) UK Supply chain investment. Zephir Ltd. is currently organised to manufacture ~100 lidar units per year. Zephir Ltd. has initiated the build / investment in a larger facility to provide increased production capacity but requires assistance for tooling, calibration and test equipment within the ZPINNER manufacturing line. Investment in UK SME suppliers in our supply chain will give the support required for delivering against the significant opportunity that a FOAK deployment will unlock and the option to onshore currently offshored key ZPINNER components.

Note: you can see all Innovate UK-funded projects here

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Innovate UK

Results of Competition: First of a Kind Deployment of Innovation

Competition Code: 1607_SBRI_FOAK

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Smart Component Technologies Ltd	Creating Smart, Resilient, Affordable & Reliable Infrastructures in Rail	£47,262	£47,262

Project description - provided by applicants

Reliable rail networks are vital for the movement of people and goods across the UK accounting for 71 billion passenger miles and 18bn tonnes of freight. The rail infrastructure uses millions of threaded fasteners. Although a nut and bolt is simple component, it is often safety and performance critical i.e. should it fail, it would lead to catastrophic accidents or significant degradation of the infrastructure. As a consequence, the inspection and maintenance of such safety and performance critical fasteners represents a sizable cost to infrastructure owners as well as reducing capacity whilst maintenance is taking place. Failure can occur through incorrect installation, damage, wear or fatigue. Within the rail network there are around 26,000 switch machines (points) which enables trains to be guided from one track to another such as at a railway junction or a spur. Components of the switch machine include switch rails, stretcher bars & a switch drive motor. When there are two tracks crossing each other, there is a single cast X-shape rail known as the crossing. Collectively abbreviated to S&C's, they are complicated assets subject to extreme loading both vertical and horizontal. Furthermore, they are exposed to a wide range of weather conditions. All of which results in S&C's being the most costly and safety critical asset category in the rail infrastructure. In conjunction with Network Rail and London Underground, Smart Component Technologies (SCT) has developed the "Smart Washer" to measure the clamp force of fasteners during installation & maintenance. This reduces time, cost and error. In addition, the smart washer provides a 24/7 remote monitoring mode with a flexible system of alerts allowing for preventative maintenance and increasing the reliability of the network. The smart washer does a lot more as it also contains other sensors, in particular a 3-axis accelerometer. This allows for the operation and mechanical condition of the entire S&C to be remotely monitored as well as any deterioration of the track bed. SCT completes the end-to-end solution with the provision of wireless comms, data management & analytics, user interfaces and software services. Such a solution is the aim of smart component technology and at the heart of intelligent asset & infrastructure management. Although all this world-leading technology is ready for lift-off, it has not yet been deployed in a real-life environment that proves a compelling value proposition and validates a scalable and repeat business model. The purpose of the project is do exactly that. Working with Network Rail, London Underground and a number of Tier 1 partners, SCT aims to deploy and test every aspect of the smart washer technology over a 12 month period. With the technology validated and a strategic partnership in place, SCT will be able to roll-out, at speed, across the UK and develop the global market for its technology. Smart component technology is a broad platform technology and directly applicable in all major infrastructures, for example energy systems, nuclear, offshore wind. The full range of smart component categories and infrastructure sectors will also be very actively developed over the next 3 years.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
London Underground Ltd	Advanced Motorsports Telemetry to improve Public Transport Networks	£50,000	£50,000

Project description - provided by applicants

McLaren's Applied Technologies motorsport telemetry and data analysis capabilities gives their Formula One racing teams a key competitive advantage during races and post event review whilst OpenCapacity's industry leading transport data processing, aggregation and machine to machine interfaces enables transport operators and the public to exploit the value of data in new ways. Both of these products lead their respective fields in meaningful data collection, analysis and visualisation. The particular demands of Formula One including real time, high data volumes and continually verifying modifications made to vehicles and continually seeking new marginal gain improvements matches well to the problems that public transport authorities faced when viewed in a cities context. Given that cities face increasing societal and environmental pressures, the marginal gains approach of finding, modelling and verifying these improvements in real time with real data to deliver a competitive edge can be applied to the public transport network to better manage these pressures. In the first phase, this project will seek to firstly confirm feasibility and develop a repeatable robust business case for the deployment of this innovation both as a product offering and also the internal business case for the customer as an end user. The second phase will deploy this innovation in London as a real life challenge via Transport for London, supported by OpenCapacity's transport data expertise, handling capabilities and machine learning platforms to demonstrate and quantify real life benefits. The case studies that will be put through the deployed solution will be a mixture of existing pipelined improvements to infrastructure and vehicles to better verify and manage their citywide benefits such as air quality/energy consumption and new opportunities identified by the data visualisation tools supported by McLaren's historical insight.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Innovative Technology and Science Ltd	In-Situ Test of High Temperature Pipes in Nuclear Power Plant (UltraHotTest)	£48,100	£48,100

Project description - provided by applicants

UltraHotTest is a unique new sensor system for assessing the condition of high temperature steam pipes used in nuclear power generation plant. Ageing nuclear plants are an increasing problem globally, with 75% of reactors in the last half of their design life and many plants subject to lifetime extension. A high degree of maintenance is required to keep the pipe-work of ageing plants operating safely. Pipe failures can be catastrophic and expensive (ca. £100M per event). Increasing safety and environmental regulation requires more frequent inspection to mitigate risks of unplanned failure or unsafe conditions. However, current inspection techniques are either inaccurate or only work at room temperature, thus requiring expensive shutdown (energy unavailability worth £1M per day) to perform the inspection. UltraHotTest will use a novel high temperature ultrasonic phased array (PA) probe combined with Time of Flight Diffraction (TOFD) to provide accurate and reliable flaw detection and monitoring up to 580°C, the maximum operating temperature of super-heated steam pipes in UK AGR power plant. This high temperature combined PATOFD system has been developed to an initial prototype stage and laboratory validated at 580°C (TRL6). The objective of this 'First Of A Kind' (FOAK) project is to deploy the technology, for the first time, on super-heated steam pipes (SHSP) in a UK AGR power plant. The project will be conducted in two phases. Phase 1 will develop a detailed business plan for commercial deployment of the UltraHotTest system, demonstrating market viability of the system. Phase 2 will deliver the deployment at a UK AGR plant. This will entail the design and construction of high temperature phased array probes, system integration into a prototype suitable for installation on turbine steam supply pipe-work in operational power plant, and on-site services to conduct the deployment safely and with minimum disruption to plant operation. These FOAK trials will demonstrate customer benefits, paving the way for commercialisation of the technology. UltraHotTest will reduce the cost of nuclear electricity generation and improve its safety. It will improve the profitability of operators by reducing failures and downtime, saving the UK nuclear power industry £56M p.a. It has commercial potential to develop new revenues of £40M with a profit of £25M cumulative within 5 years, creating 75 new jobs for the SME led the consortium and ROI of 20:1.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Viridian Consultants Ltd	ViridiScope®: field-testing an innovative new sampling tool for the nuclear market	£48,927	£48,927

Project description - provided by applicants

ViridiScope® is an innovative sampling tool for characterisation of nuclear contamination. It is designed to permit the safe, clean and fast sampling of surfaces such as concrete, plastic, wood, plaster and brick for a wide range of radionuclides and for elemental characterisation. ViridiScope® is robust and highly portable, and has been designed to be taken into high activity areas. It can be operated manually or deployed on a remotely operated vehicle and can be used in place of conventional drilling to remove material from a surface. Viridian Consultants has been working in partnership with end-user, Sellafield Ltd, which has allowed us to demonstrate ViridiScope® in a non-active area on site. That experience has set us in good stead to access the other end-users more rapidly but confirmed that it does not automatically open doors to other sites. The aim is to overcome resistance to change, a significant barrier that is endemic in the nuclear industry, and thus gain acceptance of this new approach. Field testing will show companies that the tool is fit for purpose and can deliver in real-world, user-facing projects with the performance needed for a wide range of application areas. We plan to do this by providing the SLCs undergoing characterisation activities with the use of a ViridiScope® on-site for a period of deployment with an ROV, commercial in-situ counting equipment, training and support to allow them to fully test and assess the sampling tool in an active operational environment with high levels of radioactivity. It will show that this technology can offer considerable advantage over conventional approaches, delivering characterisation rapidly, at least cost and with least effort. The UK Nuclear Decommissioning Authority is committed to speeding up the decommissioning of the UK's legacy nuclear sites which is forecast to cost £117bn over the next 120 years; Sellafield's Business and Technology Manager Mark Dowson, has suggested that, using ViridiScope®, the savings from separating Low level Waste (LLW) from Intermediate Level Waste (ILW) could ultimately save Sellafield Ltd tens, if not hundreds of £million. Viridian's innovative nuclear characterisation sensors will be deployed in operating and decommissioning nuclear power plants to contribute to the secure, affordable and sustainable delivery of nuclear energy. The vision is for Viridian Consultants to develop disruptive innovation and become the 'Go To' company for nuclear characterisation sensors. The successful commercialisation of ViridiScope® is the key to our ultimate goal of industry acceptance and a route to market.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Route Monkey Ltd	Dynamic and Multi-Modal Passenger Transport Service (DAMPTS)	£47,933	£47,933

Project description - provided by applicants

DAMPTS is an intelligent mobility service for staff and students of Edinburgh University. The project will integrate shared on-demand transport solutions (taxi, shuttle bus etc) with existing public transport solutions (bus, train, tram) to provide a multi modal, low carbon, low cost, timely service between key campus locations. Using algorithms, ticketing and mobile technology the project will optimise travel for students and staff between university campuses in Edinburgh. Students and staff will access this service via a mobile app, connecting them to other user journeys to enable ride share, which will in turn reduce the number of overall vehicle journeys, improve air quality, cut emissions and minimise costs. Demand for transport services around the University is very peaky, and changes each term depending on the current timetable. In a regulated industry, timetabled public transport is not able to meet the fluctuating demand. This project will seek to provide a real time demand based service, that will promote an asset light digital solution. In conjunction with Edinburgh University and the Living Lab, DAMPTS is supported by Route Monkey's optimised multi modal journey planner that will identify the quickest, cheapest, lowest carbon travel options as well as match users for ride sharing. Users will be able to confirm their choice of travel, agree the price and book journeys in real time using ESP's ticketing and booking. The on-demand transport is provided by Capital Taxis, and Urban Foresight will be providing expertise in the development of the business case development and innovative sustainable business models. The truly innovative aspects of this project is that there will be flexible pricing for flexible transport, according to demand. The user enters their requirements and immediately receives a price and timings, along with a comparison to available public transport and/or active travel. Our solution can incorporate new additional modes of transport. For example when the City of Edinburgh launches public electric bicycle hire, it can easily be incorporated into the service. DAMPTS will highlight low carbon journeys and help to alleviate the challenges of urban living. This project will provide a blue print for multi-modal dynamic passenger services using algorithms and mobile technology that can be scaled up globally to provide multi location/campus on-demand mobility solutions.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Citi Logik Ltd	Developing a real-time mobile network data platform for connected transport.	£42,570	£42,570

Project description - provided by applicants

Citi Logik, an SME that analyzes aggregated and anonymised journey paths from the existing mobile phone network, is proposing to develop a repeatable virtual technology platform linked to an advanced telecom 3G/4G/5G sensor network. It will do this with the support of Vodafone Enterprise UK. This platform will be capable of analysing movement by vehicle, on foot or by train in real time and will help us understand peak demand, network capacity and operational efficiency through a detailed analysis of flow and mode, across the UK. The context for this project has recently been reported in the Policy Exchange insight on 'Smart Devolution', which in turn draws learnings from current best practice in New York City. These reports highlight that most cities have vast quantities of data that if accessed and used effectively could help improve public services, optimise transport routes and even prevent cycling accidents. The most significant point is that the mobile phone network is the best public asset, as yet never deployed comprehensively as a system, to analyse traffic movement in real time. The proposed service is a real time extraction of fully anonymised data from the Vodafone Network in compliance with UK Information Commissioner Officer Guidelines and EU Privacy Laws. It creates a structured and secure database environment which is then interrogated to understand actual journey times, road capacity constraints, and journey time reliability. The capability was demonstrated in 2012 for improving network capacity and resilience in a very successful experiment as part of the Transport for London Co-operative Systems trials. As part of this trial Citi Logik demonstrated real time capabilities of data sets to predict journey time reliability. Citi Logik also has an emerging programme of work with UK Local Authorities, UK core cities and UK airports to use the proposed capabilities to replace traditional roadside survey techniques. We have already held discussions with a number of potential customers, including Transport for Greater Manchester and the Welsh Government, regarding the potential deployment of a real time service from April 2017. This proposal is offered by an SME (Citi Logik Ltd), based in Tech City, working in close co-operation with a UK Mobile Operator (Vodafone) for the purposes of creating public good from the mobile network. Significant communication efforts have been completed to share and communicate these ideas with UK Privacy Groups and Vodafone UK Customers.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
E-Car Club Ltd	Virtual Delivery Fleet	£50,000	£50,000
Project description - provided by applicants			
<p>Our proposed solution puts delivery drivers and companies in control of their vehicle needs without the need for holding a large scale fleet. The solution links suppliers such delivery drivers, by intelligently matching work rotas with the most expensive tool for the job, the vehicle. The product will permit approved delivery drivers to access appropriate vehicles on a regular or ad hoc short term basis at the times they need it. This model supports drivers who do not have a car or require a specific vehicle type (i.e. particular van size/delivery bike) at a certain time. It supports peer-to-peer sharing of assets alongside traditional vehicle sharing or hire options to provide the right vehicles at the right time. By providing flexibility of service, the traditional delivery modes can be shifted, allowing greater interaction between transport modes alongside more flexible and sustainable delivery models. E-Car is the UK's first entirely electric pay-per-use car club, developed to provide members of carefully selected communities across the UK with access to full-sized electric cars by the hour. In July 2015, E-Car was acquired by Europcar Group, Europe's largest vehicle rental and mobility solutions firm. It is well placed to commercialise the outcomes of the project.</p>			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Data Performance Consultancy Ltd	Reportable Social Value Smart Procurement Platform	£50,000	£50,000
Project description - provided by applicants			
<p>The Key objective of Phase 1 of this project is to develop, test and prepare to commercialise a 'Reportable Social Value (RSV) Smart Procurement Platform', for the incorporation of social value into procurement decisions. The procurement system, will form part of a wider Smart City Platform known as WASP (Workflow Analysis Social Procurement) and offers a transparent and cost-effective alternative to current methods of procurement. There are currently no procurement systems that can incorporate social value frameworks and perform as a centralised 'one-stop' platform. Development of a cost-effective system for social value incorporation is unique and essential to enable full transparency, fairness and efficiency in public and private sector procurement. There is scope for this platform to be utilised locally, nationally and internationally following the feasibility of the proposed concept. In Phase 1, we intend to confirm the feasibility of the system to accurately report social value using real data. This will complement the business plan in place, covering all aspects of the commercial opportunity, pricing, market size, competition and route to market. The results of the feasibility study will give confidence that an application for Phase 2 can be made to build a more robust demonstrator, changing the way procurement is valued, to deliver a rapid, cost effective infrastructure solution for informing procurement decisions. The delivery of Phase 1 will also provide a collaborative framework across 15 Local Authorities who have agreed to work with the company on its structure. Ultimately, this procurement system will allow digital enhancement of all procurement systems by utilising smart use of data, a key pillar in the 4th Industrial Revolution (Industry 4.0), placing a value on the procurement process and verifying the efficiency.</p>			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
KAM Futures Ltd	SimplifAI	£34,872	£34,872
Project description - provided by applicants			
SIMPLIFAI - (pronounced simplify) - The project aims to address the challenges surrounding the complex interaction between environmental, social and economic aspects of urban transport movements. It will do this using advanced computing techniques to simplify the interaction between transport managers and users of transport networks. The project will build on state of the art transportation management systems and cutting edge research to produce a new form of transportation management to meet the urban transport challenges of the mid 21st Century. The project is led by KAM Futures and supported by industrial partners partners BT, Infohub and KAM Futures, with technical / academic expertise from The University of Huddersfield. The end customer is Transport for Greater Manchester. The project aims to build on the Innovate UK funded innovation voucher between KAM Futures and University of Huddersfield and the technical feasibility study undertaken in the Innovate UK funded project SimplifAI. The technical innovation is a new form of AI planner that can be deployed in a hyper cat enabled internet of things environment. The project combines environmental data sets with the data collected by the local authority to increase the resilience, quality of life and economic performance of the urban area using new ways of reasoning with and combining data			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
TravelAi Ltd	FLOW bringing Mobility-as-a-Service to the UK for the first time	£39,960	£39,960

Project description - provided by applicants

The FLOW project brings together a vertical stack of transport actors each of which is helping to move the industry into the digital age and enable Mobility-as-a-Service (MaaS) to be commercially launched to the public in 2017. The FLOW project will achieve the UK's first fully functional and integrated implementation of MaaS to impact intermodal transport options, network capacity and operational cost savings. MaaS is the provision of public and private transportations across several modes of travel through a single payment platform that delivers and tracks usage using business and service models comparable to those used in the telecoms (from Pay-as-you-go (PAYG) to bundles of calls, SMS and data). Where a transport package could include bus and train measured in trips or distance with bike hire and on-demand taxi in a single bundle and paid as one transaction. MaaS is therefore both a business model and technical platform. It draws its profitability and utility from the reduction of privately owned cars, whilst integrating public transport and emerging car-sharing/pooling offerings into a single technical integration to simplify the purchase of multiple legs and modes into a single transaction. Its flexibility allows for different business models to be tested and resolved in the field. MaaS Global Ltd are the thought leaders and visionaries who have built a MaaS solution including a consumer app called Whim that is already integrating disparate transport service providers into one place in Nordic markets. Transport for West Midlands (TfWM) are driving transformation in the heart of the UK with a coordinated vertical of transport services. And TravelAi have launched the first software only solution for gathering transport customer data using smartphones and will add analytical and modelling tools to regional and urban transport stakeholders too. Together these actors are driven by a common purpose to serve the travelling public by providing increased service options, ease of use and increased value propositions through personalisation. The opportunity for these partners to come together to identify, test and refine business models to support a commercial and technically ready service offering in 2017 is a tremendously exciting prospect enabled by this InnovateUK First-of-a-Kind call to support innovative SMEs to engage and secure commercial clients. FLOW accelerates the commercialisation of a highly scalable solution to address InnovateUK priority areas of Connected Transport and Smart Resilient Sustainable Infrastructure. Additionally, working with both UK and international end clients opens up immediate export opportunities for TravelAi's transport solutions.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Secure Sensor Innovative Design Ltd	SAFEHOUSE - LoRa IOT deployment at scale	£46,320	£46,320

Project description - provided by applicants

Secure Sensor Innovative Design (SSID) was set up as a company to address affordable retrofit of Internet Of Things (IOT) at scale using the Low Power Radio (LoRA) free spectrum to gather 'Big Data' at the most granular level in the community and supply this to complementary companies to analyse and use to benefit the citizen by giving them a better and healthier quality of life and allowing smart options based on the advice of many organisations such as energy, healthcare and local government services. SSID has teamed up with Liverpool City Council, Building Research Establishment (BRE), Stream Technologies (LoRA network provider) and Grove Group (Analysers of large data) to address the problem of harvesting IOT granular data, in a cost effective (typically 2% of equivalent GSM network costs) and trusted manner using a Low Power Radio (LoRA) network. To enable IOT application at scale you need to have a cheap secure LoRA endpoint that can be customised for the end user's requirements with the ability to alter / add to its functionality remotely by registering new sensors on the network, and have a reliable, low cost, monthly fee. SSID has developed such data aggregator called SAFEHOUSE, which is a patent pending product that has been designed as the backbone of deployment of the IOT. SAFEHOUSE is a secure network data concentrator, that connects to the LoRa network. It represents a 'unit' in the IOT, giving a shop / apartment / house / room an identity on the SAFEHOUSE network, registering a geographic position (in 3 dimensions) and from the base unit gathering temperature / humidity / electricity status / Carbon Dioxide and is alerted when smoke / carbon monoxide alarms are tested or set off. Multiple other sensors can be connected and the SAFEHOUSE unit allows a whole range of applications to be made using the granular data collected and maintained by the SAFEHOUSE cloud data repository. The major issue with IOT services is that no one company can deliver the complete IOT solution, so partnerships have to be formed of organisations to deliver this type of service at scale and affordability to Local Authorities and private companies. This project will look at how a city, such as Liverpool, would utilise a LoRA IOT network to deliver better and new services to users cost effectively and the business cases for the commercial partners.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Costain Ltd	Advanced Condition-based	£47,230	£47,230
Project description - provided by applicants			
Advanced Condition-based Monitoring Systems for Improved Asset Maintenance: The aim of the proposal is to test, compare and validate in the field the performance of a number of state of the art condition-based monitoring systems and to develop an intelligent data visualisation tool to improve structural asset maintenance, demonstrate a new business case for smart infrastructure and address environmental and societal pressure on infrastructure. These systems improve the resilience and longevity of infrastructure by providing asset condition data to inform maintenance decision-makers. This results in lower whole life costs, fewer disruptions to the public and freight transport networks and a significantly lower risk of catastrophic failure of infrastructure assets. The systems to be investigated will include ambient noise monitoring, ultrasonic monitoring, wireless displacement/vibration sensing, acoustic damage detection and LIDAR. A decision-making dashboard tool will be developed to take the gathered data and present this back to asset maintainers in a useful and visual manner providing information when asset maintenance interventions should be made. This will provide an intelligent link between the collected data and the asset maintenance process. The system will be evaluated based on the requirements of an asset owner advisory panel, with the aim of significantly improving the maintenance of future infrastructure assets.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Ove Arup & Partners International Limited	Commercialising the OneTRANSPORT Data Broker Service	£49,983	£49,983

Project description - provided by applicants

oneTRANSPORT is an innovative Smart City initiative which utilises an infrastructure system and service delivery platform to enable Local Authorities to collaborate with private businesses and non-commercial organisations in tackling modern urban challenges such as the support of ageing populations, increasing urban densities, changes in the ways we live and work, rising service expectations and climate change. oneTRANSPORT is believed to be the world's first data marketplace for live, multi-modal and multi-system transport data, built around the 'oneM2M' international standard for internet-of-things systems. Through compliance with this standard, the system adopts open interfaces and a modular architecture that can scale to support large national and international deployments whilst preventing vendor-lock-in. Originally conceived in 2013, the oneTRANSPORT initiative has been collaboratively developed from concept to pre-commercial trials by a consortium of 11 organisations : InterDigital Europe (technology platform provider), Arup (transport experts), Buckinghamshire County Council, Hertfordshire County Council, Oxfordshire County Council, Northamptonshire county council and Highways England (Local Authorities and use-case owners), Clearview Intelligence and World Sensing (sensor providers), Traak and Imperial College London (data analytics) and with strong support and sponsorship from innovateUK. This FOAK project will commercialise the innovations developed by the oneTRANSPORT initiative, enabling Local Authorities to open & trade their data assets with private industry, academia and other public bodies across the UK. Initially focused on multi-modal transport opportunities, this national infrastructure will enable start-ups, new entrants, SMEs and existing big players to bring a new wave of innovative integrated transport services and applications that address Local Authority priorities and drive end-user behavioral change. Creating this new transport data marketplace with innovative business models will generate new UK jobs and UK economic growth, especially amongst SMEs who have the skills and agility to build innovative new data-centric services and applications to address urban challenges.

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Innovate UK

Results of Competition: First of a Kind Deployment of Innovation

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Air Black Box Company Ltd	OPTTIMAL:OpenPlatform TravelTechnology Integrating Multimodal Available Links	£41,197	£41,197

Project description - provided by applicants

The past two decades have seen seismic change in how people plan and books travel. The three drivers of this are; 1. Internet information - access ease and information 2. Low Cost Travel Airlines - 3. Government focus on integrated public transport, coupled with improved service and growth in use of trains trams and buses. The net results are that people can plan travel by transport type and in some instances get details of multimodal options e.g. walk, bus train, bus walk. However the market failing is the absence of joined up travel planning and the ability to book and communicate regarding an entire multi point and multi modal journey. Other failings are; 1. Limitation of search methods that do not produce full options, 2. Travellers who are poorly informed of alternative options as they work on preconceived ideas of what their journey should look like, and 3. Search methods that respond to traveller enquiries with no thought to options of peak and non-peak time, that do not see full end to end timing implications e.g. travel by train to a London Airport may cost more than the flight. Therefore there is an urgent demand for a step change in technology that will allow passenger to construct and maintain reasonably complex itineraries, avoiding the pitfalls of connecting disparate bookings (let alone the shifting circumstances issues that are encountered once the journey begins) This Project - "OPTTIMAL" - 'Open Platform Travel Technology Integrating Multimodal Available Links' will in Phase 1 produce a complete and very comprehensive Business and Technical Project Plan. This will lead to Phase 2 comprising the development and implementation of an open platform which allows vendors to coexist equally and travellers to construct and maintain itineraries across complex (but common) itineraries. This will include the use of a vast quantity of travel related data produced from multiple sources (both open and commercial). The end platform - OPTTIMAL - will scale to provide real-time data in a helpful and insightful manner. The technical challenge will be the efficient embedding of third party (vendor) connections with sufficient performance and exposed functionality to give customers confidence to book, and then to provide the vendors with an enhanced understanding of customer interactions, leading to improvements in the acquisition/retention of customers and increased revenue per customer. Air Black Box Company Limited have a history of developing and deploying advances in travel software and systems and, critically, reaching and influencing players in the key channels who can integrate and adopt. OPTTIMAL offers a global business opportunity and has a clear fit with the requirements of UK internal and outbound travel, as well as for inbound tourism.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Cyber Efficiency Solutions Ltd	ACES - Airport Cyber Efficiency Solution	£45,696	£45,696
Project description - provided by applicants			
<p>The Airport Cyber Efficiency Solutions (ACES) project takes proven fast, big data and near real time analysis capability from the realms of military and cybersecurity applications and, through extension and integration with extant and auxiliary data sources, employs it to provide better intelligence, improved resilience, and increased efficiency for airport operators. ACES understands the business processes in effect and, moreover, the cyber-physical dependencies of those processes. Through integration with existing systems, augmented as required, ACES is able to quickly determine the impact of events and, using intuitive web-based applications, to provide insight to Airport Control Centres and operators alike. The ACES team includes a fast growing regional airport operator in the role of end-user and, with this First of a Kind deployment, will deliver a smart, resilient, and sustainable integrated infrastructure in support of airport operations. This is expected to improve turnaround efficiency, maximise asset use, and minimise passenger impact. The ACES deployment will also look beyond the immediate airport context in order to understand the connected transportation aspects of the airport as it relates to road and rail services - for both people and goods. In addition, ACES will look to the 'citizen experience' of those who transit and interact with the airport as a system. While the initial ACES deployment is focused on an airport environment, presenting a self-contained complex socio-technical infrastructure system, the challenges that ACES will meet translate to similar challenges in urban living, smart cities, and other commercial domains; such as logistics and insurance. In this First of a Kind deployment, we consider the airport to be a small city-scale environment: an environment full of complexity, interdependency, and - therefore - opportunity.</p>			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Happy City CIC	Measuring and Valuing City Wellbeing	£43,749	£43,749

Project description - provided by applicants

Measuring and Valuing City Wellbeing' project will further develop and trial at scale Happy City's suite of pioneering and innovative online digital tools aimed at transforming how we approach urban living. This unique set of wellbeing measurement and policy tools work together to support decision makers at every level of urban life, to better measure, understand and improve the wellbeing of people and place, providing integrated solutions to systemic challenges in urban areas. The digital toolkit comprises: Happy City Index - a powerful progress report on the conditions for wellbeing at a city level, which establishes the foundation from which to improve city wellbeing; Happiness Pulse - a world leading interactive survey getting to the heart of how people feel and function in their lives, work and communities; WellWorth Policy Toolkit - converting wellbeing data into social & economic policy outcomes and demonstrating long-term worth of wellbeing improvements on the wider city system. Together these measurement tools enable and support systemic change. Enabling policy makers to make sense of complex relationships between local conditions and policy and help to future-proof cities for resilient urban living. Our work challenges organisations to think and act differently about running cities, and forces them to be more adaptable in their outlook, priorities and processes. Cities know they need to start investing in wellbeing - to ensure future resilience and sustainability - but find it challenging to fit it into their current structures and processes. It represents a huge step forward for local authorities, national charities and other policy makers and service providers. Working with academic partners and an exceptional range of global experts, all three tools have been through a rigorous design, development, consultation and initial feasibility stage. Even at this early stage, they have generated global interest (including being invited to submit them for the annual Guangzhou International Award for Urban Innovation), and are now ready for in-depth and at-scale piloting, research and development prior to a national and international launch. The quality of our initial feasibility and development work (part funded by Innovate UK Urban Living support) has generated significant interest from potential urban users - with offers to host these much needed larger scale pilots. We believe this demonstrates that they form a viable commercial proposition, subject to rigorous testing in relevant real-world city environments.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Delta Motorsport Ltd	The Deployment of an Intelligent Vehicle Optimisation Kit (IVOK)	£48,800	£48,800
Project description - provided by applicants			
<p>The connected car segment of the car manufacturing industry is growing at a rate 10x the industry average. Connected car functions typically include music/audio playing, smartphone apps, navigation, roadside assistance, voice commands, contextual help/offers, parking apps, engine controls and car diagnosis. The sector is project to grow and investment is growing. However, with increased uptake of connected cars (45% AGR), there is also an increased demand for safety (90% of road accidents is caused by human error) and greater efficiency. With an increasing number of fatalities and accidents resulting from poor driver utilisation of optimised vehicles, the demand for driver assisted optimisation is at its highest level. While connected cars have marked a significant improvement in automotive innovation (10x faster than industry average), there is still a significant gap and this revolves around driver reaction. This project seeks to deploy IVOK (a completely novel intelligent cloud based vehicle optimisation kit for use as a highly efficient, innovative and safe connected transport element). Our technology utilises vehicle connectivity and cloud based artificial intelligence to deliver improved efficiency, safety and customer experience through interaction between the on-vehicle systems, the cloud and the driver community. This innovative project will be based on V2X communications, using data acquisition and cloud-based analysis. The successful exploitation of the technology will result in cumulative revenue of £260m after 6 years in the market.</p>			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Unit 9 Ltd	Metrocare: Strategic decision-making for integrated urban infrastructure	£49,987	£49,987

Project description - provided by applicants

Cities throughout the world face long term strategic challenges in delivering large scale physical infrastructure development whilst addressing social and economic changes and challenges. In delivering such major programmes efficiently and effectively it is essential that investment decisions are thoroughly assessed and their impacts properly understood. These decisions need to be taken not only in the context of the specific development area but also that of the wider city, and over the long term. Decision makers need to take account of high-level factors such as changing demographics, political, economic and sustainability drivers, advances in technology etc. They need to understand and react to impacts on existing infrastructure and services, the environment and economy as well as social impacts such as health and wellbeing of residents, workers and visitors. Currently these 'city systems' are often siloed and, as a consequence, investment decisions can fail to recognise that the city is more than the sum of its parts, potentially leading to errors in infrastructure development that can take decades to correct. The Metrocare solution addresses these challenges. It comprises of an ICT-based, interactive urban development scenario creation and visualisation capability which interoperates with leading urban system models and supporting datasets that are specific to the location and context of the deployment. Metrocare will enable city decision makers and stakeholders to define and assess optional investment scenarios as part of the planning/approvals process for infrastructure development projects. Initial scenarios can be created, providing input parameters and output requirements for interoperating models that, in turn, create richer scenarios allowing decision makers to better understand the impact of strategic planning decisions on the overall 'performance' of city districts in the long term. Metrocare is ready to deploy as part of an iterative infrastructure investment scenario creation and assessment process. Work carried out to date indicates that there is a global demand for such a solution; it is widely applicable to all cities and regions as they adapt to the emerging needs of the economy, the environment and changes in society. However, work is needed to develop business models (cost, market growth, alignment with city systems and data, codification, skills/training etc) for the development of a commercial version that can readily be adapted and deployed widely in many urban environments and by organisations in different parts of the value chain. The project will be led by UK SME Unit9 who will provide the interactive scenario creation capability (building on the Innovate UK-funded 'BIMCity' project). Cambridge University, Skanska and BRE will provide city system models (e.g. land use, transport, energy, building stock, water, environment and economy as well as health, education, crime and community wellbeing). Use cases will be provided by city stakeholders (e.g. Haringey Council, the GLA and Cambridge County Council, providing a strong contextual focus based around planned developments). Other stakeholders, such as infrastructure/utilities owners and managers, may be invited to participate if the application for funding is successful.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
ManagePlaces Ltd	Commuter Guardian	£38,642	£38,642
Project description - provided by applicants			
<p>Commuter Guardian will enable enhanced features for transport focused apps with the potential to improve the commuter journey experience from planning to completion. Commuter Guardian presents optimal multi modal information for A - B journeys, considering the user's personal travel preferences. Using this information Commuter Guardian may then provide personalised incentives to encourage users to change their travel habits and reduce the load on already congested routes. In addition to this, Travel Guardian features will directly generate valuable context-rich, real time crowding and qualitative data which will be available through an API. This project addresses Phase 1 of the competition brief in delivering a study that will evaluate the business case of Commuter Guardian technology in a real-world scenario. The solution has been created through the incorporation of existing technologies: Travel Guardian and Commuterhive. We seek to implement Commuter Guardian in an environment as a first-of-a-kind deployment that mainly addresses the connected transport and urban living themes.</p>			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Nottingham City Homes Ltd	SOUL - Sustainable Optimised Urban Living	£49,985	£49,985

Project description - provided by applicants

SOUL: Sustainable Optimised Urban Living Urbanisation, climate change and demographical and psychographic changes have created enormous pressures on our complex and interdependent social, economic and technical urban infrastructure systems. The UK social housing sector is undergoing significant changes due to these and other issues such as housing shortage, changes to regulatory and welfare frameworks, the unreachability of affordable land, more demanding costumers, the difficulties with providing lifetime performance and financial pressures. SOUL (Sustainable Optimised Urban Living) takes a transformational approach to designing and delivering sustainable urban social housing by holistically integrating environmental, societal and economic solutions in a unique replicable development that is not only cost and carbon neutral but also citizen centric. Cost neutral means whole life cost, including the value of natural capital (health & wellbeing etc). Various attempts to address each of these challenges have been explored in other sustainable housing projects by consortia partners and others. One example is the Nottingham HOUSE (Home with Optimised Use of Solar Energy) an exemplar sustainable dwelling developed by the University of Nottingham (UoN) and Saint Gobain (SG). However, no existing solution could address all challenges together in a cost neutral manner. Consequently, SOUL's purpose is the development of an innovative business model that enables the provision of integrated systems approach to urban living. The project builds on a strong partnership of academia and UK based companies with international reputations. It takes the learnings of the successful Nottingham HOUSE and replicates this at scale on a difficult site, adhering to the cost and design requirements of social housing providers Nottingham City Homes (NCH) to deliver a one of a kind low carbon homes development in one of the most disadvantaged communities in Nottingham. SOUL further integrates social and environmental systems through the provision of allotments and community food growing /sales models that enable residents to grow produce at low cost whilst encouraging healthy eating and lifestyle change. Throughout the build, there is commitment to train local residents in the offsite construction techniques that will be used to build the homes and in crop growth in order to upskill the local area. NCH has considerable expertise in resident involvement; however this project goes beyond the day-to-day, and this is where additional experience is required in order to realise success. In the short term, SOUL enables end customer NCH to develop a difficult urban site in a way that is beneficial to residents and flexible to evolving urban pressures. In the long term this will lead to the development of an at scale business model for housing developers, SMEs and social enterprises to work with social housing providers across different authorities and geographies to deliver integrated solutions in a commercially attractive manner.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
iGeolise Ltd	iRoute: routing by public transport for commercial organisations	£46,248	£46,248

Project description - provided by applicants

The market for fleet management software is worth about \$8bn a year (source: Berg Insight 2013); Vehicle Routing and Scheduling is an inherent part of such software, but is just for routing vehicles - it is for road use only. There is no equivalent multi-modal routing software for commercial use. We propose to develop a fully multi-modal routing software for commercial use by extending the feature set within our existing TravelTime routing platform. The opportunity is significant. There were 310 billion road miles travelled in GB in 2014 (Source: Dept. for Transport) and 80 billion of these miles (25%) were for commercial purposes - HGVs, vans and cars being used for business. iGeolise believe that c.5% of the total road miles could be switched to public transport (around 16 billion road miles). Clearly 'switchable miles' are not HGV miles, nor vans delivering or picking up goods or carrying heavy / bulky equipment - but it could be vans currently just carrying people to jobs, and cars conveying people to meetings where they need little more than a laptop. For this to happen there are 3 pre-requisites; 1) Adequate public transport alternatives for the required commercial journey (which is why our estimates above are only for urban areas, where good public transport is generally available); 2) Continued development and imaginative deployment of the Internet of Things, and ICT (such as tablets and augmented reality to demonstrate products) so reducing the need to transport carrying bulky / heavy items; 3) And commercial routing software that is truly multi-modal and real-time. iRoute can be that software. iGeolise have already built the TravelTime platform that makes maps and data searchable by traveltime. It includes all transport modes (road, buses, trains, walking, cycling, ferries, trams). The platform does 3 things. A) It can determine a travel time area from an origin (the area that can be reached within a given time using a given transport mode or modes. B) it ranks & sorts thousands of destinations by their travel time from an origin. C) it calculates the turn by turn, door to door route to each location, using all travel modes and returns the time, the true distance, and the travel cost to each. These 3 features are used by Zoopla, Countrywide and Foxtons (search for properties by their travel time from the office), and Jobsite (search for jobs within a commuting time), amongst many other clients. We propose developing iRoute by using our existing routing capability and adding the additional features required for commercial routing and scheduling. iRoute will be the equivalent of the best Vehicle Routing software but will include ALL transport modes. This will mean commercial organisations can route and schedule their staff using all transport modes and gain efficiencies by switching some of their road miles to public transport. In context HGVs drive nearly 16 billion miles a year - virtually the same as the van and car miles that could potentially be switched.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Levstone Ltd	Support Ageing Population - to live as independently as possible	£50,000	£50,000

Project description - provided by applicants

The innovation promotes independence of an ageing population, by supporting people to lead active lives, and to help protect people by early identification of wellbeing concerns. It's people centric; it connects an elderly person with their family, friends, and carers in a secure, private group (termed 'trusted people') that has no public invites. It encourages people to share and care for other people. It's a new mobile app for elderly people that runs on their phones and tablets and features built-in wellbeing sensors. It runs 24/7 in the background even when devices are asleep. It lets an elderly person's 'trusted people' see if they feel lonely or unhappy, and if they are up and about and moving inside their home. 'Trusted people' can receive alerts for wellbeing concerns, such as if an elderly person doesn't get up in the morning at their regular time, or they move unexpectedly in the middle of the night, or they press a SOS button. The app sensors when an elderly person leaves their home. 'Trusted people' can see how long a person has stayed at home (it could be many days), how frequently they go out, the places they go to, and how long it takes them to travel to these places. Knowing how active a person is allows their 'trusted people' to encourage greater activity (which maintains health and reduces the risk of chronic illness). There are alerts for wellbeing concerns, such as if a person doesn't return home by a certain time. The app has screens designed for ageing people to promote social interaction and a healthy active lifestyle, such as: [PEOPLE]: large text/pictures to list a person's family, friends and carers. One click to make a phone call. The list of people can be created and maintained remotely by (say) a son or daughter. [INFORMATION]: large text/pictures to list charities, neighbourhood community groups and advocacy organisations. One press to make a phone call or open a website to get access to valuable resources. The content can be maintained remotely by other people. For example, a health carer can add a picture and web link that explains to an elderly client, and their family, information about their medication and care plan. It's great for securely sharing. [ROUTINE]: used by an elderly person to click to show they have (say) taken their medication in the morning. It means their 'trusted people' can see that a person is remembering to keep to their routine. [FEELINGS]: large text/icons for an elderly person to click to share their emotion. [ALERTS]; real-time alerts to 'trusted people', e.g. if an elderly person is not feeling well, if they missed a routine, if they are not home by a certain time, appointment reminders, [CALENDAR]: lets 'trusted people' share key dates, such as hospital appointments and anniversaries, etc. [GO OUT]: if a person clicks to say where they are going it lets other people receive alerts, such as not arrived. For family, friends and carers a [WELLBEING] screen puts all this wellbeing and sensory information together.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Highview Enterprises Ltd (T/A Highview Power Storage)	Enhanced Frequency Response from a Liquid Air Energy Storage (LAES) plant	£50,000	£50,000

Project description - provided by applicants

Highview Power Storage is a UK based developer of energy storage systems which use liquid air as the energy storage medium. Liquid Air Energy Storage (LAES) systems, demonstrated for many years at pilot scale, will offer a bulk energy storage option that will add resilience and flexibility to the power network of the UK and to export markets around the world. LAES plants are built using established technology, sourced from a global mature supply chain, commonly found in the industrial gas and LNG sectors. A Pre Commercial Partial Demonstrator has been built at Pilsworth in Greater Manchester and is currently being commissioned. This system has received £8m in funding from DECC and the funds sought from Innovate UK for this proposed project will have additionality by converting the partial demonstrator into the world's first ever commercial scale full LAES system with rapid response capability. LAES systems function by using an electrically driven compressor based refrigeration system to condense air into a cryogenic fluid. The liquid air (LAIR) is stored in low pressure tanks until the system is required to discharge, at which point ambient (or waste) heat is applied and work is captured from the expanding gas in an expansion turbo generator (note that the generator is typically synchronous and as a result, naturally provides inertia to the system). Highview have developed a way to enhance the design of LAES systems in order to provide rapid enhanced frequency response services with future LAES plants. This project will explore a first of a kind deployment of their newly patented system innovations and ascertain the commercial benefit of entering future National Grid Enhanced Frequency Response tenders, in addition to the demand for similar services and faster response times in general around the world.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Dearman Engine Company Ltd	Integrated Clean Cold Chain (IC3)	£47,487	£47,487

Project description - provided by applicants

As a recent University of Birmingham Policy Commission, 'Doing Cold Smarter', acknowledged, cold chain infrastructure is vital to modern society. It has a critical role to play in the efficacy of fundamental products and services including vaccines and perishable foods. These services will experience unprecedented pressure as populations grow, become richer, their lifestyles change and the effects of climate change take hold. Meanwhile, conventional cooling technologies, are often inefficient, energy intensive and polluting. Therefore, if we are to meet growing demand for goods and services without creating negative environmental consequences, it is critical that cold chains operate in the most efficient and sustainable way possible. This project will deliver an 'Innovative Integrated Clean Cold Chain' (IC3) for the global cold chain industry. The market for temperature controlled logistics is worth around £23bn per year. However, this sizeable economic contribution comes at a cost as the vast majority of this sector is powered by polluting diesel engines or high-carbon peak electricity. In the UK, demand for cooling consumes 20% of total electricity and the cold chain is responsible for 2.4% of total GHG emissions. Globally, this demand is projected to increase substantially over the coming decades. IC3 will implement an innovative solution across the entire cold chain - food processing, logistics, cold storage, retail and last-mile delivery - leveraging clean technologies and modelling to optimise the system, lowering both costs and emissions. The project could deliver CO2 savings of up to 31%, reductions in operational expenditure of 12% and reductions in emissions of NOx and PM by 1,300T and 146T per year. Economic benefits are widespread; costs for operators could be reduced, valuable cryogenic and industrial gas expertise will be retained and the project offers a gateway to the rapidly growing energy storage demand response market. There are three innovation strands to IC3: 1) the deployment of innovative clean technologies, 2) integration of these technologies in a first of a kind deployment, 3) analysis and development of a 'Cold-as-a-Service' financing model. The technologies to be implemented are: a cryogenic freezer for food processing, a high efficiency liquid nitrogen (LiN) expander delivering clean cold and power in refrigerated transport, a thermal energy storage system for refrigeration demands in retail and cold storage, and a eutectic cooling system for last-mile transport. They have all demonstrated commercial viability independently but at present there is limited market penetration. A first of a kind deployment of the technologies as an integrated solution will leverage synergies and deliver system optimisation across the cold chain. Modelling will enable whole system solutions for technology choice and operating regime. An innovative financing model could remove barriers to uptake, accelerating routes to market and enabling large-scale adoption. The project offers several infrastructure benefits. Technologies within IC3 make use of cheaper, lower-carbon off-peak electricity which has significant benefits including greater integration of 'wrong-time' renewables to help match electricity supply and demand, an increase in UK energy security, and further integration of energy and transport systems. This project has the potential to create a significant UK advantage in a global cold chain market worth over USD\$234bn by 2020.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Swanbarton Ltd	UPStart	£28,257	£28,257
Project description - provided by applicants			
<p>UPS (Uninterruptable Power Supply) battery systems are deployed in commercial buildings and infrastructure sites throughout the UK to provide energy security in the event of a power supply outage. The UK electricity transmission network, operated by National Grid Ltd, needs more balancing capacity. With the addition of a suitable control device, a UPS system can provide network balancing services while providing the UPS owner with a new revenue stream. Swanbarton Ltd is looking for support to make a first commercial deployment of the MSM control device, that enables UPS systems to provide for balancing services. This will be the first deployment of such a control device for a UPS system. Swanbarton has developed MSM (Micro Storage Manager), a control device which has already been demonstrated in a trial with a UPS system. Demand Response Aggregators provide National Grid with balancing services today, but using equipment other than UPS battery systems. Upside Energy Ltd has expressed interest in purchasing some MSM devices from Swanbarton in order to control UPS systems to deliver network balancing services. Swanbarton wants to act as a supplier to Upside Energy, and other Demand Response Aggregators, but needs to: - Develop a Business Plan for the supply of MSM devices for UPS control. This will include planning how MSM devices can be produced in volume at commercially viable prices. - Make First Commercial Deployments with Upside Energy (at a small number of sites) to prove that MSM delivers value in a commercial environment. UPStart is a small project that could make a big difference. The award of this contract to Swanbarton Ltd will support UK R&D and the exploitation of UK owned intellectual property, with minimal spending on the procurement of capital equipment.</p>			

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Innovate UK

Results of Competition: First of a Kind Deployment of Innovation

Competition Code: 1607_SBRI_FOAK

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
ITM Power (Trading) Ltd	MEGASTACK – creating affordable transport fuel from renewable electricity	£44,200	£44,200

Project description - provided by applicants

This project involves the first customer facing implementation of a large 3MW water electrolyser with the potential to convert electricity to hydrogen at a price which is affordable for its use in the transport sector. This is a breakthrough compared to previous electrolyser projects in which the effective cost of hydrogen has been two to three times the equivalent price of petrol or diesel transportation. This breakthrough will enable the beginning of sales of the inter-connecting systems which will be deployed here on a commercial basis to markets for hydrogen transport which are emerging in the UK, Europe and worldwide. This has been achieved thanks to two UK-specific innovations which will be tested in this project: 1. Novel technology which has been developed by ITM Power specifically for highly responsive Megawatt scale electrolysers. These systems will bring the capital and maintenance costs of electrolysis down to the point where they contribute a manageable fraction of the cost of hydrogen production for transport applications, without compromising the system efficiency. The systems have been validated at a proof of concept scale, but this will be the first time that this technology has been deployed in a customer facing application. 2. The system will be deployed at a scale (3MW) which allows interaction with National Grid's electricity balancing markets. The electrolyser is highly responsive (sub-second) and hence can participate in all of National Grid's balancing markets. This project will test the participation of an electrolyser in these markets for the first time in the UK. This will prove that the electrolyser can provide valuable services to help manage a grid which must absorb large quantities of intermittent renewables. Providing these services secures a revenue stream for the plant operator which helps make the price of hydrogen production affordable for transport markets. In this way the project will demonstrate the interlinking of the electricity generation/distribution sectors with the energy demands of the transport sector in an economically and practically feasible fashion. In so doing, the project will demonstrate a key component of the inter-linked energy system of the future (namely the generation of hydrogen from electricity as a tool to balance grids which have a surplus of renewable electricity). The opportunity for this first of a kind installation arises because hydrogen fuelled vehicles are becoming increasingly commercially competitive. The hydrogen produced in this project will be compressed, stored and then used to fuel a fleet of at least 20 hydrogen buses. The buses will be procured as part of a major European hydrogen bus deployment project, which is supported by project partners Birmingham City Council and National Express. This guarantees a customer for the hydrogen produced and leads to a demand which is of a sufficient scale to justify the installation.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Zapinamo Ltd	CHANGING THE WAY WE CHARGE ELECTRIC VEHICLES	£48,410	£48,410

Project description - provided by applicants

CHANGING THE WAY WE CHARGE ELECTRIC VEHICLES [EVs], ZAPINAMO is a first of a kind deployable, rapid EV charging system delivering power boosted stored energy. Harvesting from various sources, including renewables and off-grid supplies, it utilises highly sophisticated, but proven, extremely reliable battery technology together with ZAPINAMO power electronics, to provide energy at a point where and when the EV user wants it, even totally off-grid, and at the fastest rate / highest power the EV can take. ZAPINAMO is Power Boosting its way to future proofing EV Charging in an increasingly demanding world with frail Grid infrastructure. WHY DO WE NEED EVs? Electric vehicles are highly beneficial to city air quality. In 2015 over 9,500 premature deaths were attributed to air pollution in London alone costing health services over £3.7bn, with an estimated 40,000 across the UK. Emissions from petrol and diesel vehicles (esp. 'PM2.5') are a major contributor to this public health emergency. EVs have had, up until now, a limited impact due mostly to ineffective slow charging infrastructure making longer journeys uncertain causing 'range anxiety'; ZAPINAMO can help overcome this fear and create confidence in EV use. Slow chargers take many hours to charge a car; that's unpopular with users, businesses and local authorities who are asked to host the chargers, taking up valuable parking spaces. Upgrading slow chargers to rapid charging posts is impractical and costly for local authorities involving sub-station upgrades and associated disruption over a long period of time. Through this FoAK deployment, ZAPINAMO can road-test its revolutionary movable EV charging system with customers, allowing the fastest rapid charge (minutes, not hours) to be available where and when it's needed. Installation advantages such as same-day deployment and operational cost benefits versus conventional direct from the grid infrastructure will be assessed. Operationally, stored energy allows harvesting during low tariff and clean energy generation periods. If a ZAPINAMO charger appears under-utilised or in the wrong place it can be easily relocated, avoiding costly, disruptive and wasteful network upgrades. If over subscribed, the number of charging outlets and energy storage level can be increased quickly, economically and in small increments (unlike substation upgrades). That's a transformational innovation, allowing more EVs into the most polluted areas where they can make greatest impact on public health.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
NVP Energy UK Ltd	Low temperature Anaerobic Digestion - Brewery/Malting Industry	£48,662	£48,662

Project description - provided by applicants

NVP Energy (NVPE) has developed a unique technology that cleans wastewater (WW) to a very high standard whilst recovering valuable high quality biogas that is 100percent available for reuse. NVPE's solution has global reach, where their innovative energy positive 'Low temperature Anaerobic Digestion (Lt AD) technology' works at temperatures less than 20C (unique for Anaerobic Digestion). NVPE's solution turns wastewater treatment (WWT) from being an operational cost into a new revenue stream for prospective customers in Food and Drink Industries (brewing, malting, distilling, bottling, dairy, meat processing,) offering average paybacks of 3 years. Lt AD offers a triple effect of substantially reducing trade effluent charges by more than 60percent, removing sludge and creating biogas that is 100percent available for reuse to generate heat and or electricity on site. WWT occurs at ambient temperatures, so uniquely no heat input is required for the microbes to work effectively. The low treatment temperatures do not affect the efficiency of the technology, allowing the Lt AD to work at Hydraulic retention times below 12 hours. NVPE's innovation enables customers to treat their the large volumes of low strength WW on site, the technology removes chemical oxygen demand (COD) & total suspended solids (TSS) concentrations in their WW, allowing customers to significantly reduce their current trade effluent charges. Unlike other WWT technologies, negligible sludge is produced, so sludge treatment and disposal costs are minimal. A byproduct of the Lt AD process is biogas and as the energy generated from the biogas is greater than the energy required to operate the system, it is carbon neutral and energy positive. Biogas generated (more than 80percent CH₄ content with very low H₂S content, which is exceptional for AD) can be 100percent utilised on site for heat and/or electricity production through Boiler or CHP systems, which will become an ongoing revenue stream for customers. NVPE will develop a strong business case for the use of Lt AD in a brewing malting application, a key target market due to the low strength WW characteristics and large volumes of WW generated on site. For this business case NVPE will choose the most suitable end user to deploy a full scale demonstrator on one of their 'live' operational sites. NVPE has engaged with prospective customers and feedback has been that a consistently operating reference site in their industry is the next step before they would consider proceeding with a full scale commercial deployment. During Phase 1 NVPE will select a final first adopter customer and chosen site based on a number of criteria. Phase 2 NVPE will design, install, commission, operate a full scale demonstrator system, treating 500m³ per day, on a brewing malting site to fully validate the technology in this target market at full scale. The ultimate outcome will substantiate NVPE's short payback & value proposition calculations already achieved at lab and pilot scale by demonstrating consistent operational data for WW pollutant removal & biogas quality volumes at scale. This flagship reference site will allow prospective customers to see first hand the technology treating their specific WW stream providing a platform for NVPE to generate real jobs, revenue & growth. There are more than 106 UK plants where our technology is applicable with the average sized plant requiring 4 x NVPE modules minimum. The payback is 2.5 years with RHI and without RHI the payback is less than 3.2 years, offering a compelling proposition for this target market.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
42 Technology Ltd	TripleOhm: Distribution substation monitoring	£49,634	£49,634
Project description - provided by applicants			
<p>The UK's low voltage 'distribution' network is owned and operated by a small number of companies called Distribution Network Operators (DNOs). These companies need to maintain very significant infrastructure that is required to ensure that electricity supply is continuously and perfectly matched to energy demand. Emerging social trends such as the widespread deployment of small scale solar installations, the adoption of electric vehicles and changing patterns of power generation is putting pressure on the existing infrastructure. In order to invest efficiently and hence minimise consumer bills, DNOs strive to upgrade, maintain and replace infrastructure only where required, seeking to make judgements about how close substations are to capacity limits. This project aims to develop and field test a secondary substation condition monitoring system that will enable DNOs to remotely monitor the performance, status and condition of their assets. The system will be based on a novel 3 phase metering technology that has previously been prototyped and patent protected by 42 Technology Ltd (42T), a product and innovation Services Company based near Cambridge and tested at the Power Networks Demonstration Centre near Glasgow and in the field. The system aims to improve on existing technologies by being significantly lower cost as well as offering high frequency analysis which enables analysis of harmonics, detection of incipient failure and potentially data disaggregation.</p>			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Upside Energy Ltd	GBDESC: Grid Balancing via the Domestic Energy Supply Chain	£43,184	£43,184

Project description - provided by applicants

The 12 month First Of A Kind "GBDESC: Grid Balancing via the Domestic Energy Supply Chain" project is focused on installing Home Energy Storage Systems (HESS; including Batteries, Inverters, Meters, and Control Systems) into 400 homes with PV systems, and then in using these systems to provide balancing services to the grid. In doing so the project will firmly establish the technical, regulatory and financial benefits of mass deployment of low carbon energy storage systems, and their aggregated integration into National Grid's balancing services. The eight partners in the project are Upside Energy, Sharp Labs Europe, Sharp Electronics, Southend-on-sea Borough Council, Sustainable Homes, Stoneford Associates, Imperial College and National Grid. Trends such as growth of renewable generation, plus electrification of heating and transport, are creating dramatic changes on the grid. This creates an £8bn p.a. UK opportunity for storage and Demand Side Response (DSR). The GBDESC project will create the first demonstrator of dynamic balancing of energy supply & demand via the domestic & community energy supply chain at commercial scale. The project will develop a repeatable model to deploy home energy storage systems & use them to provide balancing services to the grid. This opens up a route to deploy tens of GWh of energy storage into domestic properties, thus providing substantial flexibility and hence value to the grid. The GBDESC project will deploy an integrated solution that creates value across the supply chain, thus enabling deployment at scale. It is based on two technology innovations: Upside Energy's highly scalable & flexible cloud platform for managing energy storage on large numbers of domestic sites & hence aggregating it into a coherent Virtual Energy Store (VES); and Sharp's Home Energy Management System (HEMS), which manages power flows within a house and makes energy within the HESS available to the VES. The project builds a sustainable supply chain around these two innovations by creating value for HESS manufacturers, installers, landlords, tenants, homeowners and the grid. It also addresses two key supporting factors: financing packages to support repeatable deployment at scale, and policy recommendations to support this deployment.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Clean Energy Prospector Ltd	Kings Worthy community solar microgrid with storage	£45,321	£45,321
Project description - provided by applicants			
<p>There are already more than 30,000 'embedded' electricity networks in the UK owned and operated by eight independent DNOs (IDNOs) serving more than 1 million homes. This project is developing a repeatable business model that supports housebuilders to take a novel additional step and construct future 'embedded' networks as practical community 'microgrids' with smart solar and storage. We use the term 'microgrid' to refer to 'license exempt' private wire networks with a single large metered connection to the public grid and customers who are privately metered and billed/credited for consumption/generation. Solar microgrids aggregate domestic generators, loads and storage improving the ability to balance supply and demand. The physical infrastructure comprises standard DNO/IDNO cabling, one or several microgrid distribution panels per site and community owned solar PV, electric heat pumps and battery storage. The key technology being demonstrated is an ICT platform that standardises the process of setting up, operating and billing/settlement within these networks. The secondary technologies are demand response and battery storage systems that improve the economics and carbon impact of energy supply in these microgrids. The project is led by CEPRO, an energy services provider, and is partnering with a housebuilder, a virtual power plant provider and a licensed Independent DNO to address key microgrid commercial/technical/regulatory issues and deploy a commercial scale system at a 50 home new-build development in Hampshire.</p>			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
TESCA Consultancy (Part of Advanced Witness Systems Ltd)	Innovative radioactive liquid waste treatment	£45,810	£45,810
Project description - provided by applicants			
The purpose of this project is to prove that a highly innovative water purification process, called the WOW Process, which has proven successful in initial feasibility testing and small scale applications, can decontaminate nuclear elements found in water from active nuclear generating plant, in decommissioning sites, and other similar applications. An industrial size plant will be manufactured and installed at a working nuclear facility in the UK in order to demonstrate both the efficacy and scalability of the process. There is recorded industry demand for this process in both static and portable formats. The project will also prove the commercial feasibility, funding mechanisms and most appropriate business model for units which can be dispatched to locations across the UK (and globally) to decontaminate liquids using a method which is far more cost effective than that which currently exists in the market.			

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