Results of Competition: Infrastructure Systems over 12 months or over £100k

(12-24 Months)

Competition Code: 1607\_LO\_Infra\_R1

Total available funding is up to £15m for Infrastructure Systems Round 1.

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
Visual Atoms Ltd	iTravel - A Virtual Journey	£1,140,500	£897,214
iGeolise Ltd	Assistant		
University of Surrey			

#### Project description - provided by applicants

This project will develop iTravel, a smartphone-based interactive travel assistant, or "virtual journey assistant", providing end-to-end routing and proactive contextual information to the traveller, whether they are commuters or tourists. iTravel aims to bridge the gap between textual/map-based navigation and visual navigation/real-time interaction. iTravel will achieve this by combining (i) seamless multimodal routing and real-time traffic updates with (ii) automatically generated visual routes and automatically selected and location-sensitive visual checkpoints displayed on the smartphone's screen and (iii) real-time visual search through the smartphone's camera, allowing users to get a visual fix on their position and see an augmented view of their surroundings on the smartphone's screen, including travel information, directions, local landmark information, and local advertisements and offers. iTravel aims to provide a personalised, intelligent, proactive and interactive journey planning and mobility solution, offering seamless routing across multiple travel modalities to deliver a unique consumer experience.

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

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
RSK Group Plc	Finding Infrastructure with Non-	£533,225	£331,038
University of Birmingham	Destructive Imaging Technologies		
Geomatrix Earth Science Ltd	(FINDIT)		
British Telecommunications PLC			

#### Project description - provided by applicants

Finding Infrastructure with Non-Destructive Imaging Technologies (FINDIT) is a collaborative project between RSK, Geomatrix, BT and the University of Birmingham (UoB) and will develop non-destructive geophysical methods to detect factors critical to the maintenance and development of subsurface infrastructure including telecoms, water and gas supply pipes. These factors include blockages, space limitations in ground congested with multiple services, and damage caused by ground collapse. Currently, geophysical sensors are used to detect the location of buried infrastructure, but no reliable method exists to detect these other critical aspects. FINDIT will address these challenges by using existing technologies in a novel way and developing new data processing approaches. If successful, this will provide the necessary tools to assess the condition of buried pipes and ducts and evaluate the capacity to install new buried infrastructure. This in turn will help maintain our buried assets, utilise any spare capacity and lead to more proactive asset management. Overall, this will reduce unplanned utility streetworks and support more cost effective maintenance, and make the roll-out of new buried infrastructure critical to UK economic growth quicker and cheaper.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Skanska Technology Ltd	VISUALISE -Visualisation of	£1,026,827	£680,521
10D Nopo Eta	integrated infrastructure systems		
CartoConsult Ltd	for efficient management		
UNIT9 Ltd			
Building Research Establishment Ltd			

#### Project description - provided by applicants

VISUALISE will develop a single environment integrated data visualisation and analytics capability to effectively analyse, develop and maintain smart, integrated urban infrastructure over the long term.

Organisations such as Skanska are responsible for building & managing/maintaining multiple infrastructure assets for local authorities, transport infrastructure operators, utilities companies and facilities such as hospitals, schools. These physical assets are often widely geographically distributed and are managed within closed 'systems' based around asset type. Whilst data relating to individual asset types may be available they are not effectively utilised across multiple systems making it impossible to evaluate large scale data patterns. Efficiency improvements that could be achieved by managing multiple assets from a targeted, single maintenance resource capability are therefore not being realised. The VISUALISE solution will address these barriers, enabling data from different sources to be integrated, overlayed, analysed and visually assessed using 3D visualisation and augmented reality techniques. The project use case will be provided by major infrastructure assets in and around Cambridge.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
	Reducing the levelised cost of	£786,507	£603,647
ABB GROUP (Switzerland)	energy in offshore wind through a disruptive silicon carbide converter technology, SiCtronic		
Senvion SE			

#### Project description - provided by applicants

There are substantial global market potentials for offshore wind if the Levelised Cost of Energy (LCOE) could become competitive with alternative low-carbon power generations. The power electronics converter is a major component in offshore turbine drivetrains and power transmission via High Voltage DC (HVDC) networks. The efficiency and economics of market dominating Silicon-based converters have plateaued, but recently introduced compound semiconductors such as Silicon Carbide (SiC) have the potential to deliver radical improvements to performance, reliability and economics of converters.

This project, which is a collaboration between Camtronics Limited and University of Warwick, aims to prove and demonstrate the benefits and economics of a SiC converter technology through design, build and testing of a 50 kW prototype converter as a building block for large-scale converters for offshore and HVDC applications.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Samad Power Ltd	TwinGen- prototyping of world's	£1,574,209	£1,140,440
Jabii Oilcuit Eta	most compact heat and power		
British Gas Trading Ltd	boiler		
BAXI HEATING UK LIMITED			
Johnson & Starley Ltd			
Cranfield University			
University of Sheffield - AMRC			

#### Project description - provided by applicants

Samad Power Ltd's micro turbine TGB (TurboGreenBoiler)domestic CHP boiler, capable of producing up to 2KW of electricity whilst simultaneously providing hot water and space heating (approximately 12 kW), is currently going through lab testing and preparation for CE certification. The fundamental challenge to high volume deployment of micro CHP units is the cost to the end users but TGB represents a significant cost reduction, with a projected installed price of £3,500. This project is to develop the TwinGen, next generation of TGB which has fast response characteristics similar to "combi" boilers and can be substituted into boiler packages, replacing the fan and burner with a compact axial turbine assembly which slots into conventional units, thus allowing technology licensing into boiler manufacturer standard ranges. This revolutionary configuration represents a breakthrough for reaching the boiler replacement market and in recognition of this potential, the consortium includes two boiler manufacturers, Utility giant BG and also world leading turmanufacturer Jabil, working with Samad to refine the design and produce prototypes.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
London Underground Ltd	ICEIMO: Intermodal Capacity,	£2,160,770	£1,210,511
	Environmental and Intelligent		
Atkins Ltd	Mobility Optimisation.		
Cubic Transportation Systems Ltd			

#### Project description - provided by applicants

The project objective is to develop a commercially viable innovative future transport authority facing integrated toolset called ICEIMO (Intermodal Capacity, Environmental and Intelligent Mobility Optimisation). ICEIMO will create a truly demand-responsive intermodal transport network and demonstrate this concept at a major London transport hub. This will create and utilise innovative transport demand data filling existing data gaps, novel predictive transport demand algorithms, Intelligent Mobility impact toolsets and new field test service to monitor air quality. Transport infrastructure will increase its resilience to population growth through making operational decisions on intermodal capacity to dynamically allocate capacity based on demand and air quality drivers, realise business efficiencies and reduce operating costs (proving viability). The consortium will approach the project by applying specialist skills and knowledge to the project. This improves current state-of-the-art tools because new real-time modelling software/datasets, air quality and Intelligent Mobility impacts will be incorporated into operational tools, refined and validated through industrial research field trials. A substantial impact on the market, partner products and strategies is expected in the next 3-5 years.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
I LIIII CCOII LIU	Smart Grid Enabling compact 12KV SF6 free solid dielectric switchgear solution	£526,952	£368,866

#### Project description - provided by applicants

Electricity grids are becoming increasingly complex & dynamic to meet renewable/distributed energy needs & improve operational efficiencies mitigating costly power outages. Studies show full smart grid potential will require installation of switchgear at every network switching point. Growth of urban populations is leading to increased complexity & current density at key junctions where space is limited & vaults subject to flooding risks. Regulators require more flood tolerant network capability. Sulphur Hexaflouride gas (SF6) is widely used in Gas Insulated Switchgear, but gases vent into the substation or environment, with potentially toxic by-products of SF6 or mineral oil. SF6 is a greenhouse gas with an impact 22,800 times greater than CO2. The project delivers a compact, high performance, flood proof, SF6 free, switchgear solution.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Ford Electronics Ltd	High-Speed backhaul communications infrastructure for connected transport	£224,044	£156,831

#### Project description - provided by applicants

This is an industrial research project to demonstrate to London Underground a novel communications solution that will enable the provision of the fastest wifi service available to any metro system worldwide, without the need for new infrastructure to be installed in the tunnels.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
<u> </u>	REACH: the enabler for long-reach	• •	£1,257,257
Torrica Milgaorii Morric Ericigy Matriority	asset integrity inspection & nuclear decommissioning		

#### Project description - provided by applicants

Throughout the UK and global nuclear markets, there are numerous and substantial long-reach challenges in asset integrity and decommissioning sectors which require new & disruptive technology. REACH is developing an innovative solution for long-reach remote access in Plant Life Extension (PLEX) and nuclear decommissioning markets. PLEX, driven by security of supply, requires remote inspections significantly beyond original plans and at an increasing frequency, with existing technology unable to meet these needs. In the decommissioning industry, many sites contain large spaces that preclude human entry and similarly require remote solutions. With the support of RACE and end-users, with their industry expertise & knowledge, OC Robotics will develop a new long-reach manipulator. The compact, modular system will use lockable links to traverse 10-20m drops; deploying snake-arms at the tip and carrying innovative tools, developed by Viridian Consultants and Createc, for inspection, characterisation & sampling of radioactive environments.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
British Geological Survey (NERC)	Improving the resilience of hard urban systems via improved flood risk modelling	£150,201	£109,637

#### Project description - provided by applicants

A consortium of flood risk modelling company Ambiental and the geoscience research organisation British Geological Survey are embarking on a project that seeks to prove a new computer modelling technique which better represents the role of groundwater (water flowing underground) during flood events. Flooding can occur when the groundwater table exceeds the ground surface, but a high water table can also exacerbate flooding from heavy rainfall. Flooding can also occur in urban areas behind flood defences where groundwater is forced through the rock by high river levels. Successful completion of this project will pave the way to a new flood modelling framework which will allow us to clarify the level of risk properties are facing from this phenomena (which occurred throughout much of the south-west and Thames valley flooding of winter 2013-14). There are a multitude of benefits, including new insight when planning flood defences, better preparedness when preparing for impending floods and improved knowledge about the actual level of risk in 'high-susceptibility' areas.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
OptaSense Ltd	Marine Infrastructure Distributed	£1,100,351	£665,506
The European Marine Energy Centre Ltd	Acoustic Sensing		
University of Edinburgh			
DONG Energy Wind Power A/S			

#### Project description - provided by applicants

The UK is the world leader in offshore energy generation with 5GW of installed capacity and ~15GW consented or in construction. As farms grow and move into remote, deeper waters subsea cable resilience has a critical impact on security of supply and cost of electricity. Electricity is delivered via redundant buried power cables, however this infrastructure is expensive to fix and experiences the worst hazards of subsea life such as anchor drag and seabed movement. This leads to exposed or free spanning sections which can result in failure and a complicated repair - with the worst case being windfarms sitting idle unable to export their electricity. The situation is exacerbated by current technology being unable to adequately locate faults. The MIDAS project brings the known advantages of fibre optic sensing to subsea cabling, developing a product and service which will reduce failure occurences and in the worst case scenarios will immediately identify and locate an issue (a significant improvement on current technology). MIDAS, integrated in a system-wide Operations & Maintenance strategy, will also provide operators with always-online site-wide ocean wave conditions which will improve safety and lower the cost of energy through more efficient marine vessel planning.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Cisco International Ltd	City Mobility Services for	£1,560,492	£983,961
II dibic vvii i Lid	Passengers through Innovative		
IProvama Solutions Limited	Real-time Demand Aggregation (CitySPIRE)		
Transport for Greater Manchester	(Onyot Inte)		
Sustanable Environment Ltd			
Movement Strategies Ltd			

#### Project description - provided by applicants

The peak and trough mobility demand profiles remain a critical challenge for city transport, and lead to negative consequences for welfare, productivity, energy use, and environment. This results from the largely fixed transport infrastructure with finite capacity that cannot respond dynamically to demand variations. Previous attempts to influence demand by altering travel behaviours through top-down policies failed to achieve meaningful improvements. CitySPIRE will address this challenge by creating a demand aggregation service presenting groups of passengers to transport operators. This will be achieved by combining location-based data from two communications (Bluetooth Low Energy and Wi-Fi) network operators. These data will create context-aware knowledge enabling demand-responsive transport services. The project output will be a new demand-responsive transport service curated by Simply Connect, enabled by a networked approach to demand aggregation and end user engagement. Underpinning this, a new commercial model for private data exchange and analytics will be tested. The consortium expects tools and insights from the project to increase the value of the existing Proxama, Purple, Cisco, and Movement Strategies propositions.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Telespazio VEGA UK Ltd	Development of a Satellite-	£311,571	£210,811
TWI Ltd	Structural Health Monitoring		
STL Tech Ltd	System Product and Service		
University of Salford			
London Underground Ltd			

Funders Panel Date: 15 November 2016

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#### Project description - provided by applicants

Asset owners require reliable & long-term monitoring and assessment of their asset performance and condition so that they can schedule maintenance and ensure the maximum utilisation and life of their assets. Key to this is the application of structural health monitoring (SHM) techniques providing increased accuracy over existing survey methods. A variety of in-situ sensing techniques are used to assess the health, such as accelerometers, strain gauges and displacement sensors. This project intends to develop the tools necessary to allow a satellite-SHM product and service to be offered. Using satellite remote sensing (principally InSAR measurements of displacement) to inform structural health will allow such assessments to be made for a multitude of assets since satellites can image many thousands of km2 in one pass, contributing to a lower cost per asset and application to assets otherwise not frequently assessed. TVUK will act as satellite data provider and lead, TWI as expert in SHM provision, ThinkLab as expert in asset 3D modelling and BIM and STLTech as SHM data provider. A new product utilising InSAR data with structural health modelling and 3D visualisation will be produced, with proof of concepts with Transport for London (also a partner) and EDF.

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

https://www.gov.uk/government/publications/innovate-uk-funded-projects Use the Competition Code given above to search for this competition's results

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
NVP Energy UK Ltd	Low temperature Anaerobic	£1,384,218	£401,870
J K Fabrications Ltd United Utilities Water Ltd	Digestion wastewater treatment pilot for Municipal WW Industry		

#### Project description - provided by applicants

NVPE will deploy a 12m by 4.0m pilot reactor treating 500m3/day of WW with a chosen Municipal WW customer in the UK (United Utilities or Severn Trent). NVPE have identified this market as the largest most suitable market due to its low strength WW characteristics in terms of chemical oxygen demand (COD) and total suspended solids (TSS). This pilot will allow NVPE to validate the Lt-AD technology specifically in the municipal WW market, gaining access to this large market, grow as a company in the UK & then expand into additional International markets. As a first to market technology, accessing this market will substantially contribute to revenue generation and job creation. NVPE's innovative Lt-AD solution removes WW pollutants at low temperatures and generates biogas that has a methane content >80% (exceptional for an AD Technology), allowing municipal WW customers to significantly reduce their current operational and energy costs. This biogas, a by-product of the process, generates more energy than is required to operate the system, making it a carbon neutral & energy positive solution. The biogas can be 100% utilised for heat & electricity production on site. This is very attractive to WW Utilities who are the highest energy users in their respective countries.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Lateral Logic Ltd	SensCrete - Condition Monitoring	£270,609	£189,426
Fibre Technology Ltd	System in Concrete		
Technical Software Consultants Ltd			

#### Project description - provided by applicants

Load bearing capacity and condition monitoring in large or critical concrete structures is increasingly desirable in Building Information Management Systems (BIMS) to facilitate real-time building condition monitoring and assessment and to allow competitive advantage through reduced construction cost, reduced cost of building ownership and asset life extension. This project develops a system for the non-destructive evaluation of concrete condition in steel fibre reinforced concretes which are already a significant and growing class of performance concretes used in current and planned major civil engineering projects. A key advantage of this approach is that removes the need and cost of embedded sensors which are used in alternative monitoring systems.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Greenspur Renewables Ltd	A Low Cost Ferrite Based Direct	£1,593,956	£1,259,058
TOTISTICIE INCITEWADIC ETICITY CATABULT	Drive Permanent Magnet Generator for Wind Turbines		

#### Project description - provided by applicants

Greenspur Renewables has developed a new, low-cost, ferrite-based direct drive (DD) permanent magnet generator (PMG) aimed at the offshore wind energy market.

DD PMGs are becoming increasingly important for large-scale wind turbines as they remove the need for a gearbox and the high maintenance costs associated with using them. Today, however, all existing large-scale DD PMGs use scarce and expensive rare earth magnets that are sourced almost exclusively from China. The Greenspur DD PMG uses ordinary ferrite magnets which, although less powerful, are 1/30th of the cost by mass of rare earth magnets and can deliver substantial cost savings.

Following smaller-scale trials, patent filings and positive feedback from industry, this project will enable Greenspur to specify, build and test a 250kW generator in collaborative R&D partnerships with the Offshore Renewable Energy Catapult (OREC) and with Warwick Manufacturing Group (part of Warwick University). The company's ultimate objective is to licence its technology for the manufacture of multi MW units for use in the rapidly expanding global offshore wind market.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
NquiringMinds Ltd	ESDP- Elderly Support Digital	£1,469,798	£1,160,786
University of Southampton	Platform		
Southampton City Council			

#### Project description - provided by applicants

ESDP addresses one of the biggest systemic urban challenges faced by the modern world: catering to the needs of an ageing population. In the context of the demographic time bomb of an ageing population and global austerity measures being implemented at central and local government levels, this is an essential objective that needs to be addressed by society as a whole. Domiciliary care, reduces pressure on residential care (approx. 28k per person per year). To date the lions share 3.83 of 4.62bn 82% is funded by state. And according to UKHCA figures 2.3 billion of this is administration costs (49%). With the recent 40% drop in local authority budget, this is unsustainable. ESDP address this problem by providing dynamic, shared-economy (uber-like) market place for Domiciliary Care services. This platform mobilses the social support infrastrcture more efficiently to address needs. The objectives are a) provide care services more efficiently, with less administration cost, and b) platforms that can effectively employ third sector, community services and social capital and c) platforms that encourage transition from state supported to community supported care.

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