

## Results of competition: Smart round 3 - Proof of concept

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
AIDC Global Ltd (lead)	SPOTaFAKE	£176,347	£100,000
<b>Project description (provided by applicants)</b>			
<p>Counterfeiting is estimated to be a 600 billion dollar annual problem. AIDC global has developed a solution that has a potential to transform this problem. It is a natural feature system using smart mobile phone technology, which will enable consumers to authenticate products they buy at purchase. With this solution consumers will be able to check the authenticity of the product using a mobile app installed on their mobiles. It is a revolutionary solution.</p>			

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AMBX UK Limited (lead)	HDMI interception for surround lighting	£94,987	£56,992
<b>Project description (provided by applicants)</b>			
To develop a prototype hardware device that will intercept an HDMI video connection, for example from a game console to a TV, process the image and deliver data to a lighting control system to create a surround lighting effect in the room. The product will work in real time, connecting to wireless LED lighting, and immersing the viewer in the colour and dynamics of the video content			

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Aridhia Informatics (lead)	Innovation in image analytics	£166,489	£99,893
<b>Project description (provided by applicants)</b>			
<p>Medical imaging has evolved over the years and is now used to provide interventional treatments, such as stent insertion for heart attacks and to screen for early onset cancers. Medical imaging can provide information about tissues adjacent to areas of abnormality, helping clinicians decide whether certain treatments are likely to be of benefit or may cause unwanted side effects. As imaging techniques have developed to provide greater detail, the size of the images files has also increased significantly. This has an impact on storage costs and computer performance required to process these images.</p> <p>Automated computer analysis of medical images can highlight abnormal areas but also identify those areas that are likely to be of clinical relevance and need further attention. These techniques have been used to support radiologists' workload and have been shown to improve accuracy of diagnosis. There is a large amount of research being undertaken to determine new ways of analysing images to enable early detection of disease and to develop new biomarkers and drugs that will provide treatments targeted only at areas of abnormality. Achievement of these objectives requires the ability to have a platform to analyse clinical and research images at speed and in detail, without impacting on the performance of the IT infrastructure already in place.</p> <p>Our proof of concept proposal aims to take each image and separate out the descriptive information from the image data so these can be stored separately. Images will be broken up into constituent pixels and distributed on a newer type of computing infrastructure, which can store huge amounts of data. This computing platform will also provide tools to enable researchers to model pixel data so that they perform complex analyses. We feel this platform will provide a novel way of developing new models for analysing image data that can be implemented back into the clinical environment to enhance current diagnostic techniques.</p>			

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AutoTrip Ltd (lead)	AutoTrip (Automated mileage claim system development)	£156,844	£87,500
<b>Project description (provided by applicants)</b>			
<p>Following a successful 'Proof of Market' study undertaken with support from the Technology Strategy Board's Smart Scheme, a new company, AutoTrip Ltd, has been formed to exploit our unique 'cloud-based' business mileage monitoring system. Inefficient management processes, compounded by the increasing cost of equipment, fuel and labour, are impacting on business transport costs. This is creating a compelling economic imperative for improved control, particularly over the 'Grey Fleet' – business mileage undertaken using private vehicles.</p> <p>AutoTrip aims to provide the UK's first integrated cloud-based business mileage tracker and management system. This combines ultra-low cost vehicle telematics with a new software tool to fully automate mileage claims for employees and provide fleet managers with substantially improved control of employee road travel. The AutoTrip solution takes advantage of on-going reductions in telematics and wireless communication costs to efficiently collect data on business mileage undertaken in private vehicles. This data is transmitted to a secure system which automatically generates monthly mileage claims for each individual user. Our background IP, lies in our proprietary onboard telematics device (patent pending) which can disaggregate business and personal mileage; assuring employee privacy for private usage.</p> <p>The primary objective of this Proof of Concept project is to demonstrate the technical performance and economic benefits of the "Alpha" device. The project will iteratively develop and trial the device and monitoring systems in up to 25 vehicles. We will conduct base-lining and usage monitoring to identify economic benefits to the pilot participants. Overall, this Proof of Concept project will provide a showcase for the operation of the AutoTrip technology and help establish a UK-based company which will be well placed to significantly reduce business travel costs within the £3.5 billion pound UK 'Grey Fleet' market</p>			

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Call Aid UK Limited (lead)	1138 pager	£165,082	£99,049
<b>Project description (provided by applicants)</b>			
<p>The vulnerability of staff working in healthcare settings is increasing and the need for a reliable, easy-to-use support system for urgent assistance is seen as a priority by employers. Employers have a duty of care to ensure that their staff are properly supported and protected. Current single function receiver-only pagers are very basic; they are not tailored to the Carer market and are expensive. There is scope to considerably improve the tools available to carers, whilst appreciating that these solutions must be relatively inexpensive so that cost is not a barrier to adoption.</p> <p>Call Aid UK wish to develop the COMBI 1138 pager, which will be the first digital pager combined with a portable panic button for the Care Home and staff protection market. This is a major step forward as it has a number of benefits over the currently available separate pager systems. It reduces the amount of equipment carers, nurses and staff have to carry, which will mean it is more likely to be used by over-burdened staff. Using the licence free 868MHz frequency band, which is in common use for radio nurse call and staff panic alarms systems, means there is no need for operators to install separate expensive radio transmitter and aerial, therefore reducing the cost of adoption.</p> <p>Our COMBI pager system will allow digital information to be sent between the COMBI pagers directly without the need for expensive interface equipment this will provide the wearer with the ability to call back into the system; this has previously not been possible. This product has many applications in lone worker, domestic care, independent living units as well as disabled applications. This product will open up new markets for Call Aid UK and will also increase our export activity, thereby increasing our turnover and headcount significantly.</p>			

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<b>CNR Services International Limited (lead)</b>	Automated Transmission Laser Alignment System (ATLAS)	£172,479	£100,000
<b>Project description (provided by applicants)</b>			
<p>CNR Services International Ltd delivers leading-edge engineering design services to a wide range of industry sectors. From concept generation, through design and optimisation, to the effective integration into the manufacturing process, CNRs dedicated team of specialist engineers, designers and scientists help customers achieve the results they are looking for. CNR recently successfully completed a Technology Strategy Board-funded Proof of Market project which showed that the Automated Transmission Laser Alignment System (ATLAS) system being proposed in this Proof of Concept project would meet a very large need in today's helicopter market.</p> <p>ATLAS will automate helicopter transmission shaft alignment. Currently this is done using outdated labour intensive manual processes. It is anticipated that ATLAS could be used by a single aircraft technician without the need to remove the helicopter transmission shafts. Therefore, the impact of an ATLAS system in an already large market with accelerating growth is potentially huge with users seeing significant process, operational and financial benefits.</p> <p>With the detailed market and customer intelligence we gained from our Technology Strategy Board-funded Proof of Market project, we estimate the potential sales of our ATLAS system to be approximately £100m even before we consider the huge growth expected in the helicopter market over the next 20 years. We believe that we could establish a sustainable business with annual revenue of approximately £10-15m which offers OE sales, R&amp;D to develop on-going upgrades and performance enhancements, higher margin spares provision and contracted annual re-calibration services. A business of this size would expect to employ about 50 people. ROI for this project will be extremely high (x80). If successful, this project will be the bedrock for a significant growth of the business, doubling in size in each of the first five years from commercial launch. ATLAS is expected to create approximately 50 new jobs for CNR.</p>			

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IF Sensing (lead)	IF Sensing Ltd. Self-monitoring diagnostic device	£443,510	£100,000
<b>Project description (provided by applicants)</b>			
<p>Chronic kidney disease (CKD) has become a global healthcare concern with an estimated cost to the worldwide economies in the past decade of approximately US \$1 Trillion. This is unsustainable. Most of the costs of CKD therapy come late in the patient pathway in providing renal replacement therapy.</p> <p>The idea is to develop a simple, rapid and minimally invasive biosensor device to detect creatinine in interstitial fluid for screening and monitoring of kidney function outside the hospital environment in the home and community setting in both established and undeveloped healthcare systems. This novel approach unlocks a very significant business opportunity by alerting individuals early to the need for clinical intervention thus improving patient outcomes while reducing the costs of disease management.</p>			

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Imorphics Limited (lead)	qRAMRIS	£169,621	£100,000
<b>Project description (provided by applicants)</b>			
<p>Rheumatoid arthritis (RA) is a painful disease of the joints which affects significant numbers of adults. Powerful drugs are available to treat the disease, however these drugs do have limitations; they are typically expensive and require hospital care to administer. Development of new drugs for RA is hampered by the clinical tools available to assess the progress of the disease.</p> <p>Clinical trials are typically conducted using radiographs (X-rays) of the hand, evaluated by experts. Radiographs are excellent at visualising bone damage, but this kind of damage is now uncommon in RA. Magnetic resonance (MR) imaging, which can visualise soft tissues and swelling are becoming common. Typically MR images are also 'read' by experts; this method provides an improvement over the reading of radiographs, but remains unable to discriminate the very small changes which occur within clinical trials. Agreement between experts is poor, due to the difficulty in assessing complex 3D images, and the semi-quantitative methodology is relatively insensitive to change.</p> <p>Imorphics has proved successful at accurately measuring musculoskeletal structures using proprietary 3-dimensional statistical modelling using MR images. Imorphics recently identified that this technology could be applied to the field of RA measurement, using models of the whole of the hand, including bone, ligaments, tendons, cartilage, joint capsule and skin. The POC project objectives are to technically demonstrate that MR images of an RA hand can be consistently and automatically processed to provide accurate quantitative measurements. Removing inconsistencies in clinical assessment will provide increased accuracy in both treatment and clinical trials.</p> <p>Commercially, the effective measurement of small improvements in RA management and treatment could result in quicker drug testing, lower overheads and therefore reduced time to market.</p>			



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James Leckey Design Limited (lead)	An innovative stander for rehabilitation	£155,590	£93,354
<b>Project description (provided by applicants)</b>			
Development of an interactive standing frame for physically disabled adults and children.			

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Larkfleet Limited (lead)	Development of Smart Flood House using Larkfleet Homes StartLink technology	£150,823	£90,494
<b>Project description (provided by applicants)</b>			
<p>The ever increasing likelihood of flood events occurring has helped to create a pinch-point in the supply of adequate new house builds in key infrastructural areas. It is more difficult to use suitable land in flood risk categories because planning authorities are now being advised by the National Planning Policy Framework (NPPF) to “allocate development away from flood risk areas”; no doubt a sensible step without suitable alternatives. However, this has the cause of moving developments into more green-field sites that require significant civil infrastructure investment, while also creating environmental challenges. Furthermore, housing associations are under severe pressure as they seek to provide suitable accommodation in urbanised areas. Building insurance providers are also on the same trajectory and now refuse to take any risks on new properties built on nominally at risk land.</p> <p>The barriers to building traditionally constructed homes in appropriate planning areas continue to mount on the back of increasingly wetter seasons and climate change. In the face of sub-optimal solutions to the problems highlighted, there is an immediate and pressing need to develop a house with flood proof characteristics.</p> <p>This project seeks to take advantage of a novel lightweight house, whose structure is inert and impervious to moisture, in order to develop an economically viable smart flood proof house (SFPH). To deliver this market innovation, the project will develop: specialist active lifting mechanism, structural lifting platform, associated flexible services modules. Realisation of these technical objectives will result in the creation of a SFPH, which will in turn, bring back into play strategic and desirable land, both for private and social building purposes that is currently deemed too risky to build upon. A multitude of social and economic benefits will also follow.</p>			

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LimitState Limited (lead)	Rapid metal cutting simulation software	£165,774	£99,464
<b>Project description (provided by applicants)</b>			
<p>Metal cutting is used in all metal machining processes (e.g. turning, milling and boring) and lies at the heart of the global manufacturing industry. However, modelling the physics of metal cutting reliably and quickly has always been difficult. This means that designing efficient manufacturing processes has remained an inexact science, generally relying on collected experience and/or time consuming and costly trial and error testing. With the metal machining industry estimated to be worth in excess of \$675 billion per annum worldwide, the scope for significant cost savings is clearly huge.</p> <p>The goal of this project is to demonstrate that the recently developed discontinuity layout optimization (DLO) numerical modelling technique can be applied to metal cutting simulation, potentially allowing the process to be modelled far more reliably than using traditional hand analysis methods, and an estimated 1,000x more quickly than using current-generation finite element based techniques. This has the potential to give manufacturing engineers the ability to rapidly determine optimum operating conditions, thereby revolutionising the way in which machining processes are designed</p>			

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LiteCool Limited (lead)	Advanced LED module manufacture, Litecool	£112,552	£67,531
<b>Project description (provided by applicants)</b>			
<p>Litecool was formed in 2012 to develop and patent innovations for Light Emitting Diode (LED) assemblies that offer significant performance benefits to rapidly growing markets. Litecool has developed a unique set of core technologies that enable the packaging of any LED chips to achieve up to 100% improvement in performance over leading products, by enabling heat to more easily escape from the LED allowing it to run cooler, shine brighter, and last longer. Litecool can achieve this and also produce the LED modules at competitive cost compared with market leaders. Furthermore, the core technologies can be embodied into a module which can be designed to fit in standard LED-based lighting systems and reduce the size of heat-sinks or the need for active cooling. In this way lighting manufacturers can simply 'plug-n-play' with no need for design changes, access a broader range of applications, and accelerate the lighting industry's conversion to LEDs.</p> <p>Litecool have completed a proof-of-market project and have identified key application areas where their core technologies will have a significant impact. Litecool have also completed a proof-of-concept project for down-lighting and industrial high-bay applications where they have proven their core concepts which are now being launched as products.</p> <p>While great advances were achieved in light output and energy efficiency, the use of conventional materials and assembly methods used in LED module assembly significantly inhibits further performance gains and cost reduction. This has motivated Litecool to develop progressive concepts in module design and Technology Strategy Board funding is required to develop, combine and refine advanced micro-manufacturing methods to realise the next generation products which are capable of achieving higher levels of performance than previously possible, and enable greater lighting emission, heat dissipation, electrical isolation, and flexibility in design for optical performance at industrial scales of manufacture.</p>			

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Loop Technology Limited (lead)	Composite gripper for double curvature surfaces	£172,038	£100,000
<b>Project description (provided by applicants)</b>			
<p>The adoption of advanced composites structures is spreading across a wide range of industries from aerospace to automotive and wind energy. This is driven by both an organic development model and a regulatory one. The use of carbon fibre reinforced plastic (CFRP) has the potential to massively reduce the weight of structures without compromising performance. Lower weight means lower fuel burn and therefore lower emissions, sometimes with even higher performance than would be achieved had metallic components been utilised. There are many stages involved in the production of a CFRP component. Operations can include cutting of fabric into patterns, layup of material into a mould, inspection, trimming and finishing. All of these can include an element of handling, a job that to a large extent is performed manually.</p> <p>The objective of the project proposed here is to develop a flexible gripper system suitable for use in automated handling operations. The gripper will be modular, scalable and suitable for mounting on a variety of deployment systems be they robotic or gantry based. The system will be infinitely configurable for the material shape and surface profile to the extent it can pick or place onto a surface with curvature in two dimensions.</p> <p>The gripper can be operated in normal or inverted horizontal planes or place onto vertical surfaces as the application demands. This will mean the same gripper concept can be used for a wide range of components ranging from wing skins and engine nacelles in the aerospace world to roof and body panels in the automotive environment. The gripper being configurable allows for numerous sizes and shapes of component to be processed using a single gripper.</p>			

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Lumen Research Ltd (lead)	Lumen eye tracking analysis platform	£164,742	£98,845
<b>Project description (provided by applicants)</b>			
<p>William Lever, the 19th century soap entrepreneur famously said “I know half my advertising isn't working, I just don't know which half.” This simple statement (which remains all too true today) continues to have massive implications for the UK economy - advertising spend in the UK was over £17B in 2012, a huge cost for UK brands in food, fashion, financial and all other consumer facing sectors. At the same time, this advertising underpins the UK's commercial performance - each £1 spent on advertising returns at least £6 to GDP through increased consumer confidence and spending, showing advertising's fundamental importance to those companies, brands and the wider UK economy. Given the level of investment in advertising and the economic activity it supports, understanding where and how to most effectively spend this money to get the most impact is critically important.</p> <p>Oddly, in the light of this, very little scientific and quantitative work has been done in evaluating how effective specific adverts are with their target audiences, and what specifically makes an advert engaging to its audience in a way that drives sales activity. Lumen Research aims to address this by prototyping an evidence-based platform on which an audience's reaction to specific adverts can be recorded, analysed and used to create scoring models that will predict the likely effectiveness of an advert. The platform will use the latest generation of eye-tracking technology coupled with facial-coding systems capable of interpreting the unconscious facial movements of a panel of test subjects. Large panels of test subjects will be shown real-world adverts to disentangle the principles behind advert design that most effectively drive audience engagement and buying behaviours. This scoring model will power a highly scalable web-based SAAS platform so that an audience's reactions can be used to score and provide real-time feedback on the relative effectiveness of one advert design against another.</p>			

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<b>Motoring.Co.UK Limited (lead)</b>	PreFIRST [Predictive Fraud Identification and Reduction Statistical Technology]	£199,851	£99,851
<b>Project description (provided by applicants)</b>			
<p>Automotive Fraud is a major source of crime in the UK and opportunities for fraud are increasing rapidly with the growth in e-marketing and online services. Based on National Fraud Authority statistics the estimate for automotive Fraud is £770 million per year. Vehicle fraud is targeted at relieving a consumer of their vehicle for no or very low cash (e.g. cheque fraud, fake buyers, deposit scams) or selling a low value vehicle for a high price (e.g. mileage scams, cloned vehicles, non-existent vehicles). As more transactions move online, it has become easier to produce digital inventory (fake websites that look genuine, fake cars with 'genuine' credentials). Current car checking services rely on historical data (stolen, on finance, accident etc). There is no available service that provides an alert or flag for potential fraud.</p> <p>The objective of this Proof of Concept is to demonstrate a step change from quantifying car data via history checks to accurately predicting attempts to defraud. The Project - "PreFIRST" - Predictive Fraud Identification and Reduction Statistical Technology - focuses on early identification of fraud. The concept is an integrated fraud-management platform encompassing real time data monitoring with sophisticated behaviour detection, including social network signals from Facebook and Twitter and semantics for typical users.</p> <p>An innovative combination of risk monitoring and detection analytics, designed to machine learn and predict fraudulent patterns, traits and behaviours will feed into an intuitive 'risk scoring' tool that will alert stakeholders and provide effective decision support to combat fraud. Access to multiple live data sources will give a wider 'big data' view to increase the accuracy of prediction. Data from these sources is analysed and transformed into a 'standardised' format to allow PreFIRST to utilise data-mining algorithms and knowledge discovery to evaluate and predict the likelihood of a potential fraud event.</p>			

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Nemauro Pharma Limited (lead)	Micro Needle	£177,939	£100,000
<b>Project description (provided by applicants)</b>			
<p>Nemauro Pharma has developed a number of drug delivery systems focusing on delivery of drugs through the skin. We wish to undertake a proof of concept to deliver the Tdap vaccine (Tetanus, Diphtheria and Pertussis) using a solid micro-dose injector. The Tdap booster vaccine must be administered several times over a person's life span, and also to pregnant women during the third trimester. Pertussis alone is a highly contagious bacterial disease caused by Bordetella pertussis and affects 48.5 million people worldwide yearly, resulting in nearly 295,000 deaths.</p> <p>In April and May 2012, pertussis was declared to be at epidemic levels in the US state of Washington. In September 2012, a similar epidemic of pertussis was seen in parts of the United Kingdom, with several babies dying as a result. The Tdap vaccine is currently administered by needle injection to children and adults and requires refrigeration; it is completely ineffective if stored at room temperature for more than 8 hours. The vaccine also causes serious adverse skin reactions in more than 1 in 10 people.</p> <p>Nemauro's device is disposable, designed to deliver a solid dose that can therefore deliver the vaccine at a fraction of the volume required for a liquid injection, thus significantly minimising skin trauma and adverse events, and the solid nature of the dosage form allows enhanced stability at room and elevated temperatures without the need for refrigeration. This method of delivery has also been independently reported to have a dose sparing effect, leading to comparable efficacy at a reduced dose. These factors have the potential to collectively transform the delivery of the Tdap vaccine and numerous other vaccines.</p>			



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Oxitec Limited (lead)	Novel tools for genetic control of pest insects; Oxitec Ltd	£184,699	£100,000
<b>Project description (provided by applicants)</b>			
<p>The aim of this project is to demonstrate a novel application of Oxitec's genetic technology, called RIDL®, against the diamondback moth, <i>Plutella xylostella</i>. Diamondback moth is the world's major pest of brassica crops, with annual control costs and losses amounting to US\$4-5 billion. This moth is difficult to control, largely due to its ability to rapidly develop resistance to insecticides; therefore new control tools are urgently required.</p> <p>Genetic technology has enabled the development of an alternative control method, called RIDL, for this pest. fsRIDL insects live as normal with a dietary antidote, but large numbers of single-sex (male) moths can be efficiently produced without it. For control of wild diamondback moth, RIDL males are released over the crop: after mating with wild females all female progeny die, reducing the reproductive capacity of the pest population. RIDL is species-specific in action, and therefore environmentally benign, and also self-limiting in the field and complementary to other control options. RIDL is therefore highly amenable to integration into sustainable integrated pest management strategies.</p> <p>This project will investigate novel genetic methods of inducing female-specific lethality to generate improved RIDL strains, going well beyond the present state of the art for insect synthetic biology. Male selection at as early a life stage as possible will provide considerable savings in insect production, resulting in increased economic feasibility to a broader range of growers, and greater acceptance from growers. Developing a potentially valuable control tool in this major pest would also provide proof-of-principle for a novel means of applying this environmentally sustainable pest control approach to the diamondback moth and other important pest species.</p>			

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Ozone Industries Limited (lead)	UV LED disinfection	£166,269	£99,761
<b>Project description (provided by applicants)</b>			
<p>Ozone Industries Ltd is Europe's largest producer of small ozone generators used in the hygiene market. Having recently achieved the TUV mark for its top selling odour treatment unit, the company intends to maintain its market lead with the development of ultraviolet LED disinfection products fit for the 21st century.</p> <p>The battle against existing and emerging infections continues to be a major area of concern, particularly in healthcare and the food sector. Recent legislation has severely restricted the development of disinfectants, squeezing small companies out of the market completely due to the high cost of new product authorisation. Ultraviolet light (UV), at specific wavelengths, is a highly effective biocide and is not covered by the recently introduced legislation. However, UV is currently generated using fragile mercury filled bulbs. This has restricted their use and specialist disposal is required at the end of their life.</p> <p>LED technology has exploded onto the lighting market in recent years and has gained a significant market share in little more than 5 years. This is due to LEDs inherent advantages of efficiency, non-toxicity and configurability. Recently, LEDs capable of producing biocidal wavelengths of UV have been developed. Although at this stage still a high cost product, the UV LED market is likely to follow a similar trend to the pattern seen in lighting LEDs. Ozone Industries will be the first company in Europe to develop UV LED prototypes. These developments will be suitable for our existing customer base in hygiene in addition to opening up new market opportunities.</p> <p>The project will focus on obtaining solid scientific data on microbial disinfection at different UV LED wavelengths on both surfaces and in the air. The data will be used to aid the integration of UV LEDs into our existing ozone deodorising units to produce a unique disinfection/odour treatment product and to produce prototype surface disinfection units for niche markets.</p>			

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Ozone Purification Limited (lead)	MagiWater handheld spray system	£157,286	£94,371
<b>Project description (provided by applicants)</b>			
<p>Chemical cleaners such as bleaches, detergents, sanitisers and other bactericidal chlorine-based products are expensive, toxic to both humans and the aquatic environment and have a significant carbon footprint associated with their production and transport. It has been known for some time that water and common salt can be turned into a broad spectrum anti-microbial solution through a simple process of electrolysis. This electrolysed water effectively kills all microorganisms - viruses, fungi, bacteria, moulds, yeasts, spores, algae, biofilms and protozoa with as little as 3 seconds' exposure time. Because of its mechanisms of action (oxidation, disruption of the cell membrane and degradation of peptide bonds), a very broad range of micro-organisms are completely destroyed and no resistance can be developed.</p> <p>In spite of its potential, the use of electrolysed water is not widespread. In the past it has been limited by several technology issues. Traditional electrolysis cells require a semi-permeable membrane separating the electrodes. This has several drawbacks – the electrodes have to be cleaned regularly (every 6-8 hours), the membrane has to be changed on a weekly basis and the electrolysed water produced is either strongly acidic or alkaline and needs to be neutralised before it can be used.</p> <p>OzoPure has developed applications of a new electrolysis technology that can create stable, pH neutral, non-toxic, non-irritating, electrolysed water with a high concentration of hypochlorous acid in a single flow cell which requires no electrode cleaning or membrane. This makes its production cheap, simple and continuous. Once applied, MagiWater turns into simple water and a tiny bit of salt with no other residue.</p> <p>The MagiWater project will test the proof of concept electrolysed water production and a hand-held delivery system that can be used in a range of applications, including food production, vets, hospitals and processing facilities and even in a household environment</p>			

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<b>Powervault Ltd (lead)</b>	PowerVault (domestic energy storage - technical demonstration project)	£140,681	£84,409
<b>Project description (provided by applicants)</b>			
<p>Following a successful 'Proof of Market' study undertaken with support from the Technology Strategy Board's SMART Scheme, a limited company, PowerVault Ltd, has been formed to commercially exploit the novel energy storage technology. Powervault aims to be the UK's first specialist provider of cost-effective distributed energy storage solutions to domestic homes and SMEs, lowering consumers' electricity bills whilst reducing peak grid electricity demand.</p> <p>The Powervault device is designed to work with most battery storage technologies. Our background IP, for which we have patent applications in process, lies in the control and integration elements of the storage device and in its interface with the existing household electrical system. The device allows consumers to benefit from low demand/marginal prices thereby delivering lower average tariffs to the individual household. The device is capable of remote dispatch via existing household Wi-Fi links; ultimately allowing additional benefits to be derived from grid services.</p> <p>The primary objective of the Proof of Concept project is to demonstrate the technical performance and economic benefits of the "Alpha" device. This will address a number of questions raised during the 'Proof of Market' study on actual performance in the domestic environment. These include the perceived technical and commercial limitations of small scale storage devices, consumer acceptance of a novel technology, and the applicability across a range of household demand profiles. Up to 20 of the devices will be deployed, primarily within properties with solar PV installed. We will conduct base-lining, usage monitoring and behavioural analysis to identify direct benefits to the householder. Overall, this Proof of Concept project will provide a showcase for the operation of distributed energy storage and help establish a UK-based company which will facilitate the electricity grid to absorb greater quantities of intermittent renewable energy.</p>			

## Results of competition: Smart round 3 - Proof of concept

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
<b>Pulmorphix Limited (lead)</b>	The development of the world's first lung biosimulator device to investigate orally inhaled products (OIPs) under deep lung conditions – A proof of concept project.	£144,854	£86,912
<b>Project description (provided by applicants)</b>			
<p>The lungs are an excellent way of delivering pharmaceutical drugs into the body to treat various diseases. This is because they have a large surface area, are moist and have a good blood supply. Unlike tablet medicines, which are often slowly absorbed in the gut and then processed by the liver before they can have their effect, inhaled drugs are absorbed more rapidly and exert their effects quicker. Consequently, inhaled drugs are often in smaller doses than oral forms, give fewer side-effects and are likely to have a quicker onset of action, which can lead to better control of disease symptoms and improved patient outcomes.</p> <p>When pharmaceutical companies are developing inhaled drugs, for example for asthma, they are mainly concerned with getting small-sized drug particles to reach the deepest parts of the lung where it is assumed that the particles are absorbed into the body. However, little is known about the way the drug interacts with the lung fluids. This is important to know as the lung fluids are the initial point of contact for the drugs delivered by the inhaled route and the media in which the drug dissolves/is released. Clearly, it is crucial to understand the interaction between pharmaceutical drugs and the lung fluids so that drug release mechanisms can be understood. There is currently no technology available to simulate the environment of the deep lung so that these types of interactions can be researched.</p> <p>Pulmorphix is in the process of developing an innovative technology which replicates lung conditions. The objective of this research is to set up ways in which we can investigate how inhaled drugs interact with lung fluids in an environment which closely resembles that of the deep lung. This information is of value to scientists designing inhaled drugs as the information generated by this technology will help them develop improved drug formulations - which will ultimately improve patient quality of life (e.g. for individuals with asthma or diabetes).</p>			

## Results of competition: Smart round 3 - Proof of concept

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Radix-2 Design Ltd (lead)	Radix-2 Design Ltd – Development of “enhanced pipeline inspection system”	£180,272	£100,000
<b>Project description (provided by applicants)</b>			
<p>In the offshore oil and gas production industry, there are many situations whereby a pipeline becomes blocked and production is halted. The use of pipe rig inspection equipment invites further use of recovery instrumentation. The company has previously developed a Hybrid Optical/Acoustic Imaging Device with the support of the NWDA, which led an inspection system for pipelines, which consisted of an HD camera and high resolution sonars.</p> <p>Demand from the O&amp;G industry for the pipeline inspection is growing as many of the pipelines are getting quite old. There is an environmental and industry requirement to service these pipelines on a regular basis because if the pipeline integrity is breached at any point it can result in a spill or other contamination within the pipeline which can lead to contamination and other environmental damage.</p> <p>The use of existing equipment with video and sonar pipe inspection functions is useful but limited and there is a demand to develop additional functions to the sensor package to make it more useful and provide more information on its location.</p> <p>The first priority is to incorporate an odometer for measuring the distance that the crawler has travelled down the pipe. It is proposed to develop a device that can be pointed at the pipe wall and can pick up movement information, possibly similar to a computer mouse, which knows where it is by taking rapid snapshots of the surface it is moving on.</p> <p>The second function is the need of operator to be aware of the system’s orientation of the sensor through the development of a complete inertial navigation system, with ability to monitor the shape of the pipe and provide an exact location of its position. The system will also highlight any unsupported sections of pipeline, which need to be remedied.</p>			

## Results of competition: Smart round 3 - Proof of concept

**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
RedBite Solutions Ltd (lead)	Bridging smart Auto-ID devices to cloud	£159,081	£95,448
<b>Project description (provided by applicants)</b>			
This proposal is for a proof of concept development of a cloud-based system to manage smart Auto-ID devices			

## Results of competition: Smart round 3 - Proof of concept

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Roli Ltd (lead)	BluePOC - Blue SEA Sensor Proof of Concept	£160,000	£96,000
<b>Project description (provided by applicants)</b>			
<p>BluePOC is aimed at proving the concept and technical feasibility of ROLI's new "Wing" sensor technology, a core component of our manufacturing process that is integral to the scaling of our operations and a key optimisation of our costs. ROLI has successfully demonstrated an innovative touch interaction paradigm with its flagship product, the Seaboard, which has generated global demand from high profile musicians and unsolicited requests from blue chip companies to understand the underlying technology.</p> <p>The research and development for the Seaboard has led to the filing of two patents and the building of a team of 30 in London, across two sites. The underlying SEA Interface technology, however, relies partly on purchasing off-the-shelf sensors, which drive the material costs of the product up and require intensive labour to assemble. We have recently developed a way to replace these sensors and are seeking funding to prove the concept and its feasibility, in order to reduce our costs, speed up the assembly process, and support more efficiently our product roadmap and route to market.</p> <p>Innovations such as touch screens and motion capture have created opportunities in a range of industries, from mobile phones to automotive. They address the fundamental need to communicate more intuitively with machines, to empower the user more while reducing the complexity of interaction.</p> <p>Our vision is to humanise technology and build upon these existing innovations, to provide technology that is tailored to the highly perceptive capabilities of human expressions. While this is a fundamental problem of interaction with long term applications and use cases, it also doubles as an untapped area in the current economy</p>			



## Results of competition: Smart round 3 - Proof of concept

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Rook Services Limited (lead)	Cable extraction	£162,846	£97,706
<b>Project description (provided by applicants)</b>			
<p>The Environment Agency is very concerned when high voltage electricity suppliers leave oil filled redundant cables in the ground. This leaves potential for the oil to leak into the ground and have an impact on water courses, flora and fauna and even the local community. Our innovative idea is to extract the copper core and oil impregnated papers of the high voltage cable left in ground. This eliminates any potential oil leaks. The extracted copper can be recycled and reused for future cable manufacturing and the procedure also leaves a duct in the ground which could help provide a new fibre optic link to the community.</p> <p>Currently HV cable is removed using open trenches for the full length of the cable which is highly costly and disruptive. Our approach involves digging small pits at intervals along the cable, and using our prototype hydraulic test rig to wind out the cable in lengths, extracting the oil, paper and copper as part of the process. Rook wish to carry out a proof of concept project to establish whether the cable can in fact be cleanly extracted using our prototype hydraulic rig, safely, effectively and without any papers left in the pipe.</p>			

## Results of competition: Smart round 3 - Proof of concept

**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
Scottoiler Limited (lead)	Cycleoiler - bicycle chain lube delivery system	£260,083	£100,000
<b>Project description (provided by applicants)</b>			
<p>Scottoiler has been designing and manufacturing award winning chain lubrication systems for motorcycles since 1986. The oiler system works by delivering lubrication to a motorcycle chain as it is driven. Scottoiler has developed an international reputation and brand with a multi channel market strategy with OEM, wholesaler, dealer and end user outlets.</p> <p>Ten years ago the company looked at developing a product similar in nature to the motor cycle chain oiler for the bicycle. Some ad-hoc activity took place culminating in the development of an initial prototype in 2002. However initial testing failed to deliver meaningful results and the project was halted.</p> <p>Initially the project was regarded as a development of the existing motor cycle oiler. It turned out to be a requirement to design a completely new system for the cycling community. The impression remained that there was a large market opportunity for an oiler for bicycles. Following on from a very successful Proof Of Market exercise supported by the Technology Strategy Board, it was established that there was a significant and tangible market opportunity of £150M for a targeted market sector of the cycling community. In addition the user product requirements were also established with potential price points for market entry.</p> <p>The purpose of this Proof of Concept exercise is to test the technical feasibility of the user requirements. If the user concepts can be proven to be technically feasible a product would be highly desirable to the targeted market and hence the decision to make final the investment to develop the sellable product can be made from a position of knowledge and understanding.</p>			

## Results of competition: Smart round 3 - Proof of concept

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Simitive Limited (lead)	Simitive - iKnowShare - proof of concept	£166,766	£100,000
<b>Project description (provided by applicants)</b>			
<p>Simitive Limited specialises in providing performance management systems and performance consultancy to the university, education, public and private sectors. The company is the leading provider of performance management systems to the UK university sector, working with over 40 UK and international universities, and is the technology provider for the International University Performance Initiative “Performance for All” (PFA).</p> <p>Simitive plan to perform R&amp;D to investigate ways in which a self-learning intelligence model could be used to “understand”, “anticipate” and “identify” users knowledge requirements and how this could be used as a basis of an intelligent knowledge sharing system. The system would automatically capture relevant data from staff, undergraduates, post graduates, distance learners, faculties and institutions to establish key patterns of knowledge and use the measured outcomes from these patterns to improve its own intelligence and performance.</p> <p>The ability for an automated intelligence to identify its own context, identify what knowledge/data is valuable, proactively highlight knowledge in real-time and from that learn how to improve its own intelligence, would radically change the way users access data and knowledge, and represents a huge advance in technology that would have large industry-wide commercial appeal. The economic benefits of effective knowledge sharing are vast and will only increase as the UK moves towards a knowledge economy and value added industries. For example, in 2011/12 the UK HE sector employed over 180,000 academic staff, working at a cost of £14Bn. Research in this sector shows there are a significant need for systematic ways to improve knowledge sharing and the cost saving and increase in effectiveness from this would be significant.</p>			

## Results of competition: Smart round 3 - Proof of concept

**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
Symetrica Security Limited (lead)	A high resolution gamma camera for earlier tumour detection	£174,571	£100,000
<b>Project description (provided by applicants)</b>			
<p>This Proof of Concept study relates to developments that Symetrica could make towards improving the performance of gamma-cameras that are currently used in many hospitals worldwide. These cameras provide vitally important diagnostic information to clinicians in many branches of medicine, especially cardiology, oncology and neurology.</p> <p>We believe that the combination of our unique spectrum-processing technology with the proposed new gamma camera technology will provide images that have improved contrast, greater sensitivity and create the possibility of generating simultaneous, 'multi-colour' gamma-ray images of a patient. The results will be used to demonstrate to clinicians and potential partners a significantly improved tool for the diagnosis. This will include delivery of enhanced resolution that enables earlier detection of small tumours, improved quantitative information for radio-immuno-therapy, the opportunity to implement new diagnostic techniques and therapies using dual isotopes. This could remove the need for patients to undergo repeated measurements several hours apart in order to collect the same information.</p>			

## Results of competition: Smart round 3 - Proof of concept

**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
<b>The Technology Research Centre Ltd (lead)</b>	A new concept for ultrasonic flow enhancement in injection moulding, to eliminate polymer leakage problems	£173,183	£100,000
<b>Project description (provided by applicants)</b>			
<p>The EU polymer processing industry continues to contract, with companies struggling to remain competitive. Whilst energy cost reductions would be welcomed, cycle time and component thickness are key drivers of financial performance, with parts costed as a function of cycle time and machine hourly rate. Our idea is to apply ultrasonic energy into the molten polymer just before it enters the cavity. This can yield as much as a 60% reduction in melt viscosity, enabling a significant reduction in equivalent melt temperature, thus saving both heating and cooling energy.</p> <p>Our goal is to establish a clear 'proof of concept' for a novel transducer/sonotrode/melt chamber design that eliminates the need for sealing, and thus eliminates the problems of molten polymer leakage and injection pressure drop. The benefits of this are numerous. Melt temperatures could be maintained and the lower viscosity used to enable easier filling of existing parts or design of thinner-walled parts with corresponding reductions in cooling times. Alternatively, the melt temperature could be reduced significantly, while still being able to fill the same mould (due to the reduced viscosity) but with significantly lower embodied heat the cooling time can be reduced substantially. This technology could enable UK moulders to increase productivity and competitiveness, regain market share and capitalise on new business opportunities. Existing parts can be cooled much quicker; have improved mechanical properties, and potentially lower internal stress and reduce tendency to warp. New design capability for thinner, higher aspect ratio parts would also be possible.</p>			

## Results of competition: Smart round 3 - Proof of concept

**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
<b>Virtus Projects Ltd (lead)</b>	Creating low-cost, interlocking, relocatable barrier blocks, from 100% recycled materials, using novel geopolymer from recycled CRT glass	£130,587	£78,352
<b>Project description (provided by applicants)</b>			
<p>Although cement is a strong construction material, its manufacture produces the same weight of CO2 as it does cement (this was 5 billion tonnes last year). An alternative eco-friendly setting agent can be produced from sodium and aluminium silicates that combine to form a geopolymer – a glassy rock-like material that can be made harder and more durable than concrete.</p> <p>We have identified an opportunity to produce geopolymer material in an exceptionally eco-friendly way by utilising waste streams from another recycling process – one developed by our sister company to remove toxic lead from CRT glass screens. Once the lead is removed and prepared for sale, they have a clean output stream of mixed silicates. Our project is to develop the method to prepare this silicate material into the form that it can be used to form a geopolymer. This geopolymer is intended to be stronger, denser, more resistant to chemical attack and more waterproof than concrete.</p> <p>We plan to develop the geopolymer for use in our 1-tonne 'Lego' style interlocking blocks. These blocks provide an easy to install, flexible and re-usable construction system with unparalleled protection from impact, blast and water. It is suitable for temporary, emergency or permanent construction. It is a flexible and low cost construction system that is easy to use, quick and simple to build, dismantle and re-locate. Due to its unique interlocking design it can be dry laid, or it can be laid with mortar for a permanent solution. No maintenance is required. Two men can dry lay a 50-metre long 1.2m high wall in just 1 hour. It can be used for a wide variety of applications such as;</p> <ul style="list-style-type: none"> <li>• Flood Defence - permanent or mobile as part of Environment Agency's strategy</li> <li>• Land Defence - landslide protection and erosion control (permanent or mobile)</li> </ul>			

# Technology Strategy Board

Driving Innovation

- Security and Construction - walls, compounds, barriers
- Transport - road and culvert repairs, railway embankments, barriers
- Bulk Storage and Segregation – construction; agriculture; recycling