Innovate UK

Results of Competition: Smart Round 5 2015-16 - Development of Prototype
Competition Code: 1511_SmartRnd5_DoP

Total available funding for this competition was £7.944M from Innovate UK

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
Indestructible Paint Ltd	SolMag - Development of SolGel formulations for Application to Magnesium in Aerospace	£168,269	£75,721

Project description - provided by applicants

The proposed project is to advance the formulation of a novel SolGel Magnesium (Mg) pretreatment,which has succesfully demonstrated feasibility in a recently concluded TechnologyInspired Innovation between Sheffield Hallam University (SHU) and Indestructible PaintLimited (IPL). With a view to the ultimate exploitation as part of a Chromate (Cr6+) freecoating system for the treatment of Mg alloys for use primarily in the aerospace sector butwith cross-over potential into the automotive and nuclear sectors. This is of significantcommercial importance as a result of the impending implementation of Europeanenvironmental legislation - REACH: which as things stand currently will prohibit the use ofCr6+ from 2017 onwards. Applicant IPL are a leading producer of specialist coatings for theaerospace market and will extensively consult IP holder Dr Heming Wang of SHU to advancethe SolGel formulation, which has demonstrated feasibility on simple shapes and smallvolumes of Mg alloy. Challenges to be overcome are associated with the upscaling ofproduction, exothermic reaction control, formulation stability, consistency of production,formulation efficacy, particle dispersion and ensuring appropriate shelf life.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Molecular Warehouse Ltd	Molecular Warehouse: Mobile-enabled molecular diagnostic for remote monitoring of kidney transplant patients	£585,546	£249,999

Project description - provided by applicants

There are 35,000 kidney transplant patients in UK (and over 500,000 across developedeconomies), who have to take immunosuppressant medication for the rest of their lives, inorder to avoid graft rejection.Modern immunosupressants have increased 10-year overall kidney graft survival to 60%compared with 40% from a decade prior. However, the narrow therapeutic index and interpatientlevel variability of immunosuppressants currently necessitates patient monitoring inthe clinic.Unfortunately, the burden on the time and cost on both patients and the healthcare systemresults in infrequent testing, which combined with lifestyle changes and poor medicationadherence, leads to immunosuppressant levels being poorly controlled, and concomitantly toshorter graft survival.Considering that the cost benefit of kidney transplantation compared to dialysis is £24,100 peryear for each year that the patient has a functioning transplanted kidney, each year ofimproved graft survival for the ~3,000 new kidney transplants per year in UK would save theNHS £72m per year.To solve this problem, Molecular Warehouse is developing a self-testing diagnostic device forthe rapid monitoring of immunosuppressants in kidney transplant patients. The test can beperformed at home on the patient's smartphone, and results immediately sent wirelessly to anonline dashboard for review and confirmation by the prescribing doctor.This test will for the first time enable a patient-centric, precision-medicine approach toimmunosuppression therapy, improving transplant maintenance and patient quality of life, andreducing operational costs and waiting times in the NHS.After having developed a functional proof of concept of the system, this project will developthe pre-production prototype and initial clinical testing, in collaboration with leadingclinicians who have agreed to support this project to make this product available to patientsrapidly.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Asap Water Crafts Ltd	Development and testing of Asap Rescue Hero water craft to pre production level	£93,452	£42,053

Project description - provided by applicants

When a person starts drowning and taking on water, rescuers have around 90 seconds beforebrain damage can begin to set in and the person loses consciousness, therefore speed is of theessence in water rescues. Existing paddleboards rely on the skill and strength of the rescuer.With many charity/ volunteer run lifeguard stations they do not have a large budget fortraining and motorised jet skis ' and to cover the ongoing running costs.The Asap Rescue Hero is a small one-person launch, electric motorised rescue craft. Beingpowered by electric it is cost effective and can be recharged using renewable energy sources.The craft can also be deployed in hard to reach locations such as caves and narrow windingsand can be used in search and rescue.There is international demand for this product from lifeguard organisations and sports andleisure businesses running water based events. The Asap Rescue Hero has an innovativeenclosed propulsion system which prevents injury from blades and makes it safe to use in awide range of environments.This project is to fully develop the propulsion system and make 10 pre production prototypesfor evaluation in different rescue scenarios.The initial business plan is to manufacture the units in the UK and sell up to 1000 units perannum within 5 years with over half being exported to target territories including Australia,South Africa and Europe. The key focus is to save lives, but the unit has a wider downstreamapplication as a leisure craft, which will generate revenues which can be used not only togrow the business, but also to support provision to the rescue sector.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Smart Antenna Technologies Ltd	The development of a multi-port, multi-band pre-production Prototype antenna system Demonstrator ("PD") for the smart phone market	£624,130	£250,000

Project description - provided by applicants
Smart Antenna Technologies ('SAT'), a spin off from University of Birmingham in 2013, isresearching and developing the next generation of smart multiband, multi-functional, multiportcompact configurable antenna systems for laptops, tablets, smart phones, automotiveapplications and other mobile/portable devices. Thus, the aim of this project is to develop abench Prototype Demonstrator ('PD') to meet the current and future demands of the smartphone market. These patented new antenna systems reduce the number of antennas fromseveral (typically seven in a modern smart phone) to just a single miniaturised antennasystem, allowing WiFi, Bluetooth, 4G and GPS to all run concurrently (see appendix A),therefore considerably reducing costs, power usage, and materials, size/space used. Inaddition, it has significantly enhanced performance over existing antennas covering allfrequencies between 400MHz and 6GHz and it also supports the new and emerging 4G LongTerm Evolution (LTE) market increasing the phone life. There is substantial interest in theSAT technology and capabilities from some of the top OEMs in these markets, but while SATis keen to exploit as many of these as it can, it does not have the resources to follow all theseopportunities. SAT has considerable experience in fabrication a PD as it is currently workingwith a global laptop manufacturer and a global chip design/manufacturer developing a laptopantenna systems for them. With additional resources it could also be exploiting theconsiderably larger smart phone market while it has the technological lead over others.If successful, SAT would immediately employ 3 additional engineers, and by 2020 thereshould be at least an additional 20 to 25 new jobs created in SAT. It is anticipated that theproject to make one PD for just one phone will require approximately £624k of funding intotal and will last approximately 21 months from early 2016

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Gainly Ltd (T/A "Wriggle")	Wriggle - SMART Grant	£347,317	£156,292
Project description - provided by applicants			
Wriggle is a startup working in the digital Eat-Out industry. It is developing a prototype for amultichannel, online marketplace on which restaurants, cafÃ©s, and bars can use reactivepricing to responsively fill spare capacity and reduce food wastage. For end-users, Wriggleprovides time-sensitive opportunities to purchase reduced-price products from local businessesthrough data-driven suggestions.Whilst reactive pricing is a common tool to manage capacity across a variety of sectors (suchas flights, trains, taxis and hotels), the same innovation has not been applied to the eat-outsector, even though it is a sector that sees vast discrepancies in demand based on the season ortime of day. Wriggle's prototype will help businesses to tackle last-moment capacity (4 tonnesof food waste per restaurant in 2014 and £$7.2bn of empty tables in high-end restaurants inmajor dining cities) in a reactive manner not currently provided.To-date, Wriggle has obtained strong proof of concept with a simple minimum viable product(MVP), which has been successfully trialled by 450 businesses (in Bristol and East London),who have used it to target last-moment capacity, generating 15,000 transactions, revenues of£120,000, and a NPS of over 83 from 350 pieces of customer feedback.With proof of market, Wriggle is now looking to obtain Innovate UK support to build a fullscalable prototype, integrating Reactive Pricing, a Customer Intelligence Platform (providingcustomers with data-driven suggestions based on preferences and behaviour analysis) and aBusiness Intelligence Platform (a dashboard analysing success of price-reductions based ondifferent criteria to support businesses).			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MPL Systems Ltd	AESOP - Advanced Engineer Scheduling Optimisation & Prediction	£502,432	£226,094

Project description - provided by applicants

Efficient scheduling of field service engineers is very difficult to achieve. Current methods are human-intensive and it is challenging and disruptive to make last minute or real-time changes.This means that providing a responsive service is expensive, requires a substantial number of'on-demand' engineers and can still fail to deliver as required due to the occurrence of unexpected problems.The'Advanced Engineer Scheduling Optimisation & Prediction' (AESOP) project will prototype a unique customer service application to enable real-time responsive scheduling of field service engineers' work programmes. The advanced predictive scheduling will combine:1) the use of real-time data feeds concerning traffic flows, the weather, calendar events, etc.;2) data from deployed machinery and equipment through an Internet of Things (IoT) infrastructure; 3) customer preferences for appointment times, and 4) all correlated with information about engineer workload, availability, location and skill set. The scheduling will include optimised sequencing of the various field service activities and the best routes between them.The benefits of this new approach are:a) Organisations will be able to reduce their overall service maintenance, planning and administration costs by at least 50% and be able save time for every service activity, making a significant annual cost saving across the service workforce;b) The predictive-based preventative maintenance scheduling through the use of information reported by IoT devices will significantly reduce overall maintenance costs, achieved through proactive scheduling thereby requiring fewer unexpected/planned maintenance journeys;c) Customers will receive more accurate information about when their service visits will take place. Customers will also have greater control over when their service visits are scheduled thereby reducing wasted time waiting for an engineer to arrive.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Fidel Ltd	Fidel ltd - Card-Linked Loyalty (CLL)	£557,329	£250,000
Project description - provided by applicants			
Customer loyalty schemes, such as Tesco Club Card, Boots Advantage Card and Nectar, havebeen long-proven to positively impact upon customer retention and sales uplift.These schemes are popular with customers (Nectar has 19m customers). However 80% ofoffline retailers do not have them, and with 280k retailers in the UK generating £300bnrevenues each year, there is significant potential and urgent need for expansion.The value of loyalty schemes to retailers is significant, with customers who have loyalty cardsspending 4x more. However an overwhelming majority of retailers do not know theircustomers are. Whilst 83% of people are members of a loyalty scheme, a woeful 58% do notuse them because current approaches to loyalty schemes are full of friction and inefficiency.Sources: Retail Research, Rosetta, Dailybreak, Colloquy, BBC, TelegraphRetail loyalty schemes have hardly evolved over the last twenty years and the process isanything but streamlined and efficient.There are fundamental problems with existing loyalty programs (whether digital or not):1) Customers are forced to present/swipe/scan a plastic card, key ring, mobile app or paperstamps.2) All systems require added time at point of sale, which slows down operations.This is highly inefficient. We intend to solve this. The industry is in need of disruption!Our goal is to make loyalty and retention marketing simple for both merchants andconsumers, and to enable retailers to increase revenues.Our technology will deliver customer insights, business intelligence & subsequently automateretention marketing via predictive analytics. We are a lean start-up that has raised seedfunding, has a capable management and operational team in place and is already revenuegenerating.We need to develop new ways to integrate volumes of financial transaction data fromdisparate payment platforms, securely in real-time. This project will explore the technicalfeasibility and commercial potential of this.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Digital Assess Ltd	Exam Scoring Assistant (ESA)	£629,106	£250,000
Project description - provided by applicants			
Exam Scoring Assistant (ESA) is a software package which utilises latent semantic analysis &other NLP techniques in combination with Adaptive Comparative Judgement & MachineLearning to provide automated assessments for educational examinations			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Sustainable Marine Energy Ltd	Surface Supplied Installation System (SISS) for Community Scale PLAT-O Arrays	£515,061	£231,777

Project description - provided by applicants

SME is aiming to reduce the levelised cost of tidal energy (LCOE) by reducing the capex andopex of its tidal energy platform, PLAT-O. A reduced levelised cost of energy will ensure thatSME will be able to deliver profitable projects at a community scale (3MW). SME hasidentified that by removing the pull down system and hydraulics from the platform this can beachieved. The prototype platform, 100kW PLATO #1, has these mounted on the platform butthey can be susceptible to corrosion and marine growth due to the platform being submergedfor long periods of time (up to 11 months in between servicing). The pull down system andhydraulics are only used for the installation and retrieval of PLAT-O so, therefore, they areredundant whilst the platform is operational subsea. In order to reduce the capex and opex, asolution is to remove the parts completely from the platform and deploy them only whennecessary. This can be achieved by SME designing and building a Surface SuppliedInstallation System (SISS) to facilitate the installation/retrieval of SME's commercialdemonstrator platform, 250kW PLAT-O #2. By using a SSIS to install/retrieve PLAT-O theutilisation of the equipment will be increased as it will be used for multiple platforms. TheSISS will not be affected by corrosion or marine growth because it will only be submergedduring marine operations. By doing this, SME will reduce the capital cost per platform andthe operational cost by reducing the maintenance costs which would be incurred servicing thepull down system and hydraulics. The capital cost of each platform will be reduced by£150,000; over a community-scale project (an array of 12 platforms) this equates to areduction of £1.8m out of a total cost of £14.4m.

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RPPtv Ltd	RTSFX	£553,861	£249,237
Project description - provided by applicants			
In the Creative Industries, sound design typically starts by searching sample libraries fordesired sounds. These sounds are rarely ideal, not easily found and must be customized foruse. Alternatively, sample libraries can be replaced by sound synthesis techniques that usesoftware algorithms to generate the desired sounds, enabling high quality sound effects acrossall forms of content creation.Our InnovateUK Feasibility Study demonstrated the need for a synthesised sound effects(SFX) service. The study highlighted two barriers to use; content creators want to use theirown sound archives and metadata but with real time control and manipulation, and need acritical mass of high quality synthesised sounds. These barriers could be overcome bydeploying lightweight sound synthesis models on the cloud. Such models can reverse engineerany sound sample, thus removing the need for large SFX libraries and associated issues withtheir use.The SmartSounds project will deliver and validate a prototype cloud content design andcreation service, for use by anyone wanting to enhance or interact with sounds. It will allowuploading, analysis and synthesis of any sound, with real time control and integration intoexisting workflows, and the business models and road map to launch a commercial service.SmartSounds has the potential to revolutionize the sound design process. It will greatly extendthe limited reservoir of sounds that can be used for content creation, turning any sound into asound effect and synthesizing all the sounds of the world. It democratises the industry, givinganyone the ability to become a sound designer, giving users control, harnessing theircreativity.SmartSounds will gather all technical and business information required in order to launchthis service. The business potential is compelling since the project will demonstrate adisruptive cloud service for a globally used and purchased resource.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MediaGamma Ltd	A Prototype Data Management Platform with Machine Learning-based Automated Turing Test for Prevention of Online Advertising Fraud	£555,152	£249,818

Project description - provided by applicants

Over 29% of internet activity arises from malicious non-human traffic (NHT) andprogrammatic platforms for automated placement of online display advertising via real-timebidding (RTB) are highly vulnerable to Click Fraud. Click Fraud occurs when bots falselygenerate impressions or enhance the click-through rate of displayed ads, generating fraudulentpay-per-click or cost per mille revenues by artificially increasing the bid value/frequency.Advertising fraud is hard to detect and leads directly to >$68bn/yr of lost revenues byadvertisers/media agencies, as well as restricting the £24bn/yr opportunity to leverage valuefrom analytics data for personalised marketing.Existing software to prevent CF uses rules-based filtering, restricted for RTB by limitedcapability to detect the origin of a click/impression (ground truth) for labelling NHT (negativeexamples) only after a visit/bid. Limited platform compatibility and rule generation rates arealso unable to address a rapidly evolving Click Fraud threat.In contrast, MediaGamma Limited (MG) aim to develop a prototype Automated Turing Testas a pre-bid solution to prevent Click Fraud using 1 million binary bid request features, byactively and continuously identifying the characteristics of fraudulent clicks/impressions fromNHT. Using machine learning algorithms integrated through a novel Data ManagementPlatform for RTB ad placement, trained via techniques inspired from biological behaviouraltests, MediaGamma target capability to prevent an agency/advertiser from participating in afalse bidding process in real-time. This 12 month project will cost £555,152 withperformance of the prototype Data Management Platform software module demonstratedthrough A/B testing in commercially relevant situations.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Void Technologies Ltd	Innovative Nano voided polyester fibres creating the next generation of lightweight textiles	£587,176	£250,000

Project description - provided by applicants

Global demand for technical textiles has been increasing rapidly since the 1980s & willcontinue to grow at a CAGR of 18.20% from 2014-2019. Growth will be greatest in productsshowing superior performance, likely to be delivered by producers' ability to tailor chemical& functional characteristics to specific applications (transport, healthcare, sport, packaging).One of the biggest opportunities for further advancements in technical textiles lies within theability to deliver greater lightweighting in multifunctional textiles whilst maintaining strength,durability & comfort. Few textiles are able to achieve this due to a trade-off betweenfunctionalities - as weight decreases, strength is normally sacrificed. The primary method toachieve lightweight polyester (the most widely used synthetic polymer in textiles) is currentlyhollow fibre production (HFP), which leads to a reduction in cross-sectional area => reducingtensile strength, bursting strength & abrasion resistance.To address this major business opportunity (Global Technical Textiles market £134bn in2012), Void Technologies Limited (VOID) are seeking to further develop their novel,multiple-patented Engineered, Nano-Cellular, Composite (ENC) which engineers nanocellularstructures (voids) into polymers to tailor & enhance product performance:- Reduction in weight of the fibre by 30% compared to standard polyester fibre- Increased strength of the fibre by 10% compared to polyester- Multifunctional performance incl. enhanced thermal insulation, breathability & comfort- Reduced amount of polyester per fibre by ~30% compared to standard polyesterDuring the project the ENC will be demonstrated on polyester as this is the principle materialused for textiles within the sports/outdoor apparel (market size $19.4bn) &aerospace/automotive (market size $29.5bn) sectors; chosen as initial targets due to sizeablebusiness opp & VOID's established route to market, Market entry expected in Q3 2017.

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Cresset Biomolecular Discovery Ltd	A prototype of a new type of software application that uses cutting edge IT & science to enable the rational structure-based design of new compounds for pharmaceutical R&D	£302,441	£136,098

Project description - provided by applicants
The availability of crystallographic information for protein targets of pharmaceutical interesthas dramatically increased in the recent years, even for those targets, such as trans-membranereceptors and ion channels, which until recently were considered extremely hard to crystallise.The availability and cost per calculation of high-performing computing through cloud-basedinfrastructure has also dramatically improved in the recent years. This has made theapplication of complex drug design methods and algorithms to the study of target-ligandinteractions accessible to many more pharmaceutical researchers.Cresset have an existing set of products aimed at helping both computational and medicinalchemists with the design of molecules, calculating the 3D properties of molecules and theirinteractions with target proteins. There is a constant desire for new tools and scientificmethods to facilitate the design process. As new methods are often highly compute intensive,these are ideally presented to researchers through cloud computing.We have carried out market research in this area and have received very positive feedback onour concept for a new software application that integrates cloud resources with a traditionalinteractive GUI for structure-based design. The market feedback also indicates that a cloudbasedplatform will become increasingly valuable over the next few years as a means ofproviding rapid access to novel science.Our research indicates that an application that combines this novel architecture with cuttingedge science will provide a paradigm shift in the speed of new molecule design and in theexploitation of available crystallographic information on protein targets of pharmaceuticalinterest.

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Synergy Logistics Ltd	Choreo - A new paradigm in warehouse management systems for ecommerce fulfilment	£530,302	£238,636

Project description - provided by applicants

Demanding e-Commerce fulfilment requires increasingly intelligent Warehouse ManagementSystems (WMS). Some vendors have introduced highly automated'goods-to-man' stockmovement solutions but these are capital intensive and capacity-constrained. Other vendors,including Synergy, offer more flexible'man-to-goods' (MTG) methods with intelligentpicking trolleys that are pushed to the stock locations. Although relatively inexpensivecompared with automation, MTG solutions are demanding for pickers and staffing costs canrise dramatically at peak periods. A new approach to this problem is to retain high flexibilitybut minimise human effort without requiring expensive automated plant and equipment, thekey being to coordinate movement of people and unpicked stock within the warehouse.A real time location system is proposed that will update precise 3D locations of the peopleand stock. New real-time routing and scheduling algorithms will identify the optimum routesfor stock and people movement around the warehouse and schedule change along thoseroutes, in real-time, to compensate for planned and unplanned events, e.g. delays within theWarehouse; new stock arrivals; new stock collection requests; predicted changes in stockcollection patterns in response to expected changes in received stock requests. A key elementof the proposed new system is dynamic relocation of unpicked stock within the warehouse tominimise the distance travelled for picking.This innovative WMS approach will:a) Significantly reduce the time taken to pick stock, enabling processing of more orders perday whilst optimising labour utilisation;b) Allow installation in any warehouse using any standard order/stock picking trollies andtotes;c) Provide robotic levels of efficiency at a much reduced cost level.This 18-month project will deliver detailed evaluations of the functionality and performancecapabilities based around three increasingly complete prototype demonstrators.

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Anti Counterfeiting Technology Company Ltd	RealTag Development of Prototype	£503,125	£226,222

Project description - provided by applicants

Identity in the real world and online is increasingly blurred. Add to this there is an evergrowing trend for individuals to further access services online. In interacting with productsand services there is typically a need for a means for identity to be verified, but there is a lackof a standard means of obtaining this authentication. Certainly there are products that addressthe storage of online identity e.g. individuals can use password managers, but these stillinvolve launching an app and performing authentication and do not address the wider issuesof identity and its concomitant aspects such as authenticity and provenance.RealTag's solution is an innovative optical based tag producing a unique randomised codewith billions of permutations that is applied to products and securely verified by purchasersusing the camera of a smart device connected to a secure database that confirms to the enduser whether a product is genuine thereby protecting them from fraud and potentially fromharm.

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Clifson Ltd	ABC (Advanced Breast milk Collection)	£299,468	£134,760

Project description - provided by applicants

The World Health Organisation (WHO) states babies should exclusively drink breast milk forfirst 6 months and into toddlerhood for best immunological protection. However, while 81%of UK mothers initiate breastfeeding, over 30% experience challenges in early stages, and lessthan 25% exclusively breastfeed after 6 weeks.Breastfeeding is challenging for working mothers, and low-income women are the least likelyto breastfeed. 21% of mothers buy breast pumps, but pump use can be difficult to sustain andless than 1% of mothers exclusively breastfeed at 6 months. This makes the UK one of thelowest breastfeeding nations.NHS hospitals seek to support breastfeeding, as increased breastfeeding could save the NHS£40m per year from reduced breast cancer and baby illnesses, including 73% decrease ofsudden infant death syndrome.Current breast milk pumps, however, have many drawbacks. Manual pumps are quiet butslow and exhausting, as mothers may need to pump for 30 minutes, up to 12 times per day.Both hands are recommend, so it is hard to pump both breasts simultaneously.Electric pumps (56% of market), require mains or batteries, are poorly portable, noisy andoften require an uncomfortable forward-leaning position, leaving some mothers feeling 'like acow being milked.'The detriments of insufficient breastfeeding, for mothers, babies and the NHS, areconsiderable (BMJ, 2015).Clifson has proven the concept of an innovative, portable, non-electric, quiet dual breastpump, called 'ABC' (Advanced Breastmilk Collection). ABC uses sophisticated pumpingmechanisms and valve technology to replicate a baby's natural feeding pattern, allowingmothers to easily and comfortably express milk in any location (work, on the go, etc) througha simple rocking motion.Feedback from initial trials of ABC, with mothers over a 6 month period, reports 63% wouldcontinue breastfeeding with ABC, as the rocking motion soothes the baby and pumping iseasy, comfortable and effective

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Innovate UK

Results of Competition: Smart Round 5 2015-16 - Development of Prototype
Competition Code: 1511_SmartRnd5_DoP

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Certain Indexes Ltd (T/A Campden Instrument	Certain Indexes:- Project ADSOR	£166,583	£74,962

Project description - provided by applicants

This project proposes a novel research apparatus, where none currently exists, to bring bothautomation and multiple arenas to a novel methodology for Spontaneous Object Recognition(SOR) by collaboration between a UK university and UK scientific instruments company. Theapparatus will significantly reduce both the time required and the number of subjects andcosts. Results will be scored automatically, removing subjective judgement and facilitatingcomputer-based analysis.Neurological ailments have grown in prevalence, with aging populations inherentlysusceptible. Development of new therapies requires more efficient, lower cost methodologies,brought to clinical use in shorter times and with greater economy of research funds.Alzheimer's Disease (AzD) is increasingly prevalent in an aging population, particularlyafflicting women. Anxiety disorders (AD) include post-traumatic stress disorder (PTSD) andobsessive'compulsive disorder (OCD).Research of episodic memory (EM) has an emerging role in AzD and AD using SOR forinvestigation of brain function and Phase 0 pre-clinical studies for medicines.Scientific experimentation needs to be robust and reproducible, however pharmaceuticalcompanies (Pharma) have reduced investment in research for neurological therapies dueproblems of irreproducibility of data in problematic methodologies, impairing the drugdiscovery process.SOR has been extensively published in academic research, however the prevailing currentmethodology has several disadvantages:-The procedure is slow, manual in operation with one procedure per day, is time consumingand costly, with no standardisation of apparatus or procedure, results is also problematic andcan typically show significant variance, often to the extent of a lack of repeatability.The prevailing methodology prevents investigation of some potentially useful novelcompounds due to their short time of stability.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Bauman Lyons Architects Ltd	Bauman Lyons: A real world demonstrator of MassBespoke™, an integrated parametric design & construction solution	£177,178	£79,730

Project description - provided by applicants
This project demonstrates a system,'MassBespoke' (MB) that joins parametric design &pre-fabrication to assist self/custom home builders. MB enables speed of construction &allows distributed fabrication, so those with limited experience can build to a high quality,meeting Passivhaus standards where desired, at a lower cost than traditional building methods.Design for Homes' David Birkbeck said:'Prefab works well if you have extensive repetition.But we don't do repetition in the UK because of oddly shaped pieces of land requiringsensitive responses we have yet to see a successful example that has broken out from theniche.' MB addresses this issue by incorporating parametrics into a system that outputsbespoke, modular, prefabricated houses, the issue of varying land shape & form is amelioratedby overcoming the previous constraints of repetition. MB brings increased level of cost/buildcertainty to early design stages, making building easier to engage with.Bauman Lyons (BL) propose a £177,178 DoP project to demonstrate MB to construct a 3-storey dwelling demonstrator. MB uses parametric design to enable users to explore variousdesign iterations rapidly & easily, but with enhanced functionality over that already availableby: 1) providing performance, cost & quantity information up-front 2) outputting files readyfor the BIM environment; 3) outputting files ready for 3rd party software conversion into gcode,to enable pre-fabrication of construction components; 4) integration of engineering intoMB, allowing structural requirements to adapt automatically with changes to geometries &components. MB seeks to automate the output requirements for building regulation approvals.MB satisfies two Government drivers: 1) a need for increased self-build; 2) a need for smartconstruction/digital design by 2025. MB will expedite builds, as other systems (e.g. NVHR)& components (such as windows) can be ordered at the same as the MB construction system.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Automata Technologies Ltd	Eva – Development of the first low cost, light weight, plug and play tabletop robotic arm	£534,228	£240,402

Project description - provided by applicants

It has been four decades since industrial robots first began to transform assembly lines inEurope, Japan, and the U.S. Yet despite the advent of automation and advances in robotic,90% of all manufacturing task that could be automated are still done manually (BCG; 2015 -The Robotics Revolution)The reasons for this are simple: economics and capabilities. Even today it is still lessexpensive to use manual labour than it is to own, operate, and maintain a robotics system,given the tasks that robots can perform. This leads to lower productivity, lower efficiency andlower wages.We will address this with the development of Eva - a lightweight, low cost, collaborativerobotic arm and innovative'teach-by-example' programming software. Made of high- strengthplastic and controlled by an easy to use app, Eva will be 400% lighter (3.5kg) than other smallrobotic arms and 500% cheaper, making is possible to automate lower value manufacturingand lab tasks not currently possible. Our'teach by example' software will make tasking,training and redeployment, simple and done in under 3 hours with no training required.We have proved the concept in the lab with a 3D printed arm however significant design anddevelopment work is required to create a pre-production prototype capable of prolongedindustrial use. This includes improving the robustness of the polymer skeleton and mechanics,designing a new onboard electronics control system, improving the software, developing newarm attachments and extensive technical validation of the prototype made through soft-toolingprior to mass-production.All current robotic arm solution are metallic, expensive, and heavy and designed for precisionindustrial use not required for several tasks. As a light weight, low cost solution, Eva has thepotential to revolutionise the robotics industry - enabling the automation of menial, labourintensive, low costs tasks ' potentially saving £16,653pa in human labour costs perinstallation.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Pure Hold Ltd	Self Cleaning Door Handle Cover - Development of Prototype	£42,420	£19,089
Project description - provided by applicants			
The problem of dirty door handles spreading infections from one user to another is widelyknown and publicised. This is why the NHS and Food Standards Agency specify that doorhandles must be cleaned routinely as part of the cleaning protocol. Despite these guidelines, itis widely acknowledged by professions in the industry that this cleaning rarely happens.The project aim is to develop a simple, consumable plastic handle that "snaps" onto anexisting pull handle to act as a cover. This 'snap-on' handle will be coated in a speciallyselected, antibacterial coating which acts as a self-cleaning surface to kill bacteria & virusesand prevent cross-contamination from one user to another. The aim is for the product to have ashelf life of 6 to 9 months before it needs to be replaced, thus making it a consumable product.It will contain a visual indicator to make clear to end users when it needs to be replaced (i.e.because the antibacterial coating has 'worn' and become ineffective).Once the prototype has been developed, the project aims to prove that there is significantproduct demand across a number of industries, specifically food processing, healthcare,schools & hotels. Pure Hold Ltd currently sells its Pure Hold Hygiene Handle (a geldispensing door handle) into these markets and early discussions with customers on theproduct concept indicate that they are interested in deploying it, hence why they have beenselected for prototype field trials as part of the project.This project is technically innovative as it brings together state-of-the-art, antibacterial coatingtechnology with cutting edge product design to make a product that customers can easily use,understand and benefit from. It is also commercially innovative because Pure Hold Ltd willutilise its existing infrastructure, customer contacts & experience to launch this 'snap-on'product in the UK and Internationally, therefore significantly de-risking the project.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Invenio Systems Ltd	StopWatch Prototype Development & Trial	£479,729	£215,878

Project description - provided by applicants

Invenio Systems was founded in April 15 to provide innovative solutions to the water industryand its customers. The company was established to draw on founder expertise, to develop aninnovative'Stop.Watch' system, a disruptive technology that allows a step change inidentification of the leakage-consumption boundary, finding previously undetectable leaks. Itwill both displace existing technology and open a currently unserved market.This technology uses non-traditional means to measure water flow within individualunmetered properties. Using a device mounted to the stop cock at the property boundary,Stop.Watch can accurately measure both water consumption and pipe leakage, and separateone from the other. This unique capability allows water providers to gain greaterunderstanding of where leakage is occurring across water networks and patterns ofconsumption by customers, with significant economic & efficiency benefits.Invenio have developed a proof of concept for Stop.Watch trialling this on individualproperties and small Consumption Monitor Areas (CMAs) of two UK water companies withremarkable results. A development of prototype grant will allow Invenio to scale to a fullprototype system and trial the technology on larger areas of a water network featuring close to1000 unmetered properties. Further R&D investment also allows Invenio to develop the dataanalytics coding that underpins the technology using real world data, validating it as apractical operational tool and evidencing commercial value.Invenio founders both have over 25 yrs experience working in water distribution networksand leakage management. As board members of the IWA Water Loss Specialist Group,contributors to the European Union report on water loss, and through research undertaken forUKWIR, they have unique insights into the commercial and technical challenges of waterloss. The company is well placed to develop Stop.Watch technology.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Divido Financial Services Ltd	CreditMatch: Innovative Market Place for Point of Sale Finance - Driving Competition in Retail Banking	£480,916	£216,412

Project description - provided by applicants

PROBLEM: A customer walks down the average high street and sees that most largetraditional retailers will offer some type of instalment finance as a payment option. That samecustomer is later that day browsing online stores and struggles to find a single retailer that isoffering the flexibility to pay in instalments.One high street example is DFS which works with one finance provider called HitachiCapital. A customer that want finance has to fill in a finance application form that is sent offto Hitachi Capital. If Hitachi Capital declines the customer's request for finance, the customerwon't be able to buy the sofa on finance. This means the customer is unhappy because theydidn't get their sofa, DFS is unhappy because they didn't make a sale and Hitachi Capital isunhappy because they couldn't arrange finance. This a loose-loose-loose scenario which isplayed out hundreds of times a day, every day, in retail stores across the country.SOLUTION: Divido Financial Services Limited is seeking to develop CreditMatch, an onlineB2B market place for retailers who wish to offer customers simple & quick to use POSfinance (pay by instalments over 6-60 months with 0% interest). Advantages:- INNOVATIVE REAL TIME BIDDING MARKETPLACE: publishes lenders rates online(like on MoneySupermarket/ CompareTheMarket) thus increasing transparency &competition and ultimately drive down the cost of finance.- NOVEL CREDIT MATCHING ALGORITHM: enables customers to complete oneapplication for multiple lenders. Current PoC version of CreditMatch is manual & comparesrates of 2 lenders in ~5mins, this project will enable automatic comparison of customer dataagainst ALL lenders requirements in the market place (~ 75 by 2021) in seconds.- LOW COST, SCALABLE, CLOUD BASED PLATFORM: can be used by orgs of anysize/sector/location & is 30% cheaper for retailers than competitors (Pay4Later) who chargeset-up/maintenance fees

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Theragnostics Ltd	GalliProst - A PET diagnostic for the stratification of prostate cancer patients	£626,828	£250,000
Project description - provided by applicants			
Prostate cancer (PCa) is the most common cancer in men in the UK, accounting for 25% of allnew cancer cases, with around 110 men diagnosed with PCa every day in the UK in 2011(approximately 40k/year), and is the second most common cause of cancer related deaths.Currently, no commercial technology exists for the molecular imaging of PCa, however, thereare several agents currently under development. These agents require expensive equipmentwhich needs to be operated by a specialist, limiting their utility in healthcare institutions.Theragnostics seek to develop -'GalliProst' - an in vivo Positron Emission Tomography(PET) diagnostic for the stratification of PCa patients. GalliProst is a whole body imagingdiagnostic which offers a more accurate diagnosis of PCa without the complex & costlyattributes associated with current methods, which will widen the access to PCa imaging inhospitals. The initial target market for GalliProst is the EU & North American markets.Market entry is expected 2018.		

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Grow Software Ltd	.STLX – A secure system to transmit confidential Additive Manufacturing design and production data in an encrypted manner, directly to Additive Manufacturing machines - enabling full remote control over the distributed manufacturing process.	£314,715	£141,621

Project description - provided by applicants
The market for automotive and aviation spare parts is collectively worth 787bn USD pa,making it one of the largest industries in the world. Traditionally, these parts aremanufactured subtractively, in very high volumes at a single location before being stored andthen shipped globally when required. The economies of scale have always outweighed thelogistic and inventory costs associated with this model. However, the advent of AdditiveManufacturing (AM) technology, it will soon be both technically and commercially feasibleto manufacture physical products closer to the point and time of demand using a network ofdistributed manufacturers ' significantly reducing downtime, logistic costs and inventorysizes.So far the adoption of distributed AM by industry has been hampered by a number ofconcerns regarding the transmission and sharing of valuable AM designs and data:- loss of control over confidentiality;- loss of control over manufacturing process and therefore product integrity; and- lack of secure and reliable audit mechanisms.- legal protection is costly, ineffective & easy to circumvent.As a result only 1% of all parts are manufactured using distributed AM, despite its growingadvantages and reduced cost.To address this, with the support of the three largest AM machine manufacturers, we willdevelop the first system to transmit confidential AM designs and manufacturing instructionsDIRECTLY to AM machines in a secure, encrypted manner, enabling full remote control overthe distributed AM process.The project is the result of innovative, patented POC work we have completed on theencryption of STL files and the communication of manufacturing process metadata direct toAM machines. By removing the confidentiality, integrity and audit concerns regardingdistributed manufacturing, we hope to remove the barriers to it's, and AM's, adoption withclear cost, efficiency and environmental benefits.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Gowerlabs Ltd	The Gowerlabs Open Mind Project: A wearable functional brain imaging system	£432,502	£194,624

Project description - provided by applicants

The objective of this project is to accelerate the commercial development of the world's firstwearable brain imaging system. The ability to image human brain activity has become criticalto neuroscience research and clinical practice, yet existing technologies (including functionalMRIand PET) are large, expensive, and require dedicated hospital or research facilities,which severely restricts their use.The Gowerlabs Open Mind Project will develop a wearable brain imaging device that useslow levels of red and near-infrared light to map human brain function. The system's noveldesign will enable high-quality images of the brain to be obtained in almost any environment.Wearable technology is already beginning to play a major role in healthcare, and a wearablebrain imaging system has a vast range of potential applications both within and beyondmedicine. Our technology will open up a multitude of new areas of research and will alsomeet a very significant clinical demand for monitoring brain-injured patients at the hospitalbedside or in the home. Gowerlabs is a new company that was established by engineers andscientists who are world-leaders in their field, and we are ideally placed to become the marketleader in wearable brain imaging technology.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Wirewax Ltd	WIREWAX - IntelliTag	£555,560	£250,000
Project description - provided by applicants			
Global IP video traffic will account for 79% of all consumer Internet traffic by 2018. Withvideo content increasingly consumed online instead of via broadcast TV, ad spends aremigrating to the web. However, web video is still a passive medium which does not fullyexploit all the potentials of digital web technologies. Interactive video aims at filling this gapby creating engaging user experiences such as clickable or shoppable videos or immersivestorytelling. Interactive videos are typically produced as single, very customised projects bycreative designers and software developers for a specific video identified by the client. Thisprocedure is limiting the exploitation of interactive videos into the current online videomarket where thousands of videos are released every day both for advertisement or contentbroadcasting. With IntelliTag, users will be able to efficiently, automatically or semiautomatically,create a large number of interactive videos just by specifying a set of metadatawithout the need of any specific technical knowledge. Tags or 'hotspots' in the form ofgraphical calls-to-action will be linked to the specific elements appearing in the video andtheir motion will be tracked to allow the viewer to interact with the actual moving element.The system will be provided with an intuitive Graphical User Interface (GUI) which willallow the user to specify the elements of the videos that need to be made interactive. The userwill be able to create overlays to be associated to a specific metadata in order to displayproduct information, behind the scenes videos, competitions and any other external content tobe linked to the video. Through this process the video will be made 'intelligent' andconnected to the web around. The system will make use of the most advanced ComputerVision and Machine Learning algorithms to extract semantic information from visual andaudio data and associate them with interactive content to be displayed in the video.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Bulroc (UK) Ltd	Multi Functional Large Diameter Drilling System	£657,678	£230,187
Project description - provided by applicants			
Large diameter (LD) drilling either vertical piling or horizontal directional drilling is used inconstruction, utilities, telecoms & underground services. Historically LD vertical drillingsystems have utilised pneumatic hammers up to 24' diameter & solid steel drilling bits whichhave advanced more recently to concentric drill bits, mechanical expansion segmental bits &overburden drilling systems used for hole expansion used for cased holes in constructionpiling. With ever increasing sizes of construction being undertaken from high rise buildings inHong Kong, bridges & ports in Malaysia to wind turbines both onshore & offshore, the use ofLD piling up to 1400mm & beyond is becoming more commonplace. LD canister drills orcluster hammers have been developed over the last decade in an attempt to improve thepenetration rates when cutting LD piles through medium to hard rock formations. The conceptof cluster drilling or canister drilling involves between four & nine smaller individualpneumatic hammers that are held together on a bolster or canister to provide the combinedforce both impact & rotational action to cut through varying rock (medium density formationssuch as gravel, clay & boulders & hard rock) formations. These systems have been found tobe unreliable due to imbalance & stresses causing catastrophic failure & breakdown ofindividual hammers which are frequently experienced down the hole. Bulroc have 40 yearsexperience in novel pneumatic hammer & drill bit design in both horizontal & verticalapplications. The proposed LD hammer 33' & LD drill bit technology aims to be able tooperate in both vertical & horizontal environments producing holes from 1250mm to 1400mmdiameter from a single system in both medium & hard rock formations. Global pilingequipment machines market was valued at US$4.31B in 2014 expanding to US$6.94B by2022. (Grand View Research 2014 ' Piling Machine Market Analysis).			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Base Materials Ltd	TORCH	£541,103	£189,386
Project description - provided by applicants			
Base Materials Ltd (BML) is primarily a manufacturer of model, pattern and tooling materialsand these manufactured products aligned with a range of distributed ancillary products servemultiple manufacturing sectors, including aerospace, automotive, motor-sport, marine,foundry and other industrial sectors. Tooling board has two key disadvantages, poor thermalconductivity (leading to extended oven cycle times) and a high Coefficient of ThermalExpansion (CTE) compared to resin pre-preg requiring long thermal cycles for curing and atwo-step tool making process that incurs cost and time. It is our proposal to incorporateselected fillers into tooling board in order to improve both its mechanical and physicalproperties (particularly thermal conductivity and CTE) and make available a novel toolingboard to the market with superior properties.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Nu Nano Ltd	Massively Parallel Assembly - A low cost, high throughput manufacturing process for MEMS.	£481,103	£216,496
Project description - provided by applicants			
Awaiting Public Project Summary			

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