

# Innovate UK

**Results of Competition: Smart Round 2 2015-16 - Development of Prototype**  
**Competition Code: 1505\_SmartRd2\_DOP**

**Total available funding for this competition was £8.144M from Innovate UK**

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
PeerPay Ltd	Peer Pay - a solution to SME cash-flow optimisation	£365,796	£164,608
<b>Project description - provided by applicants</b>			
<p>Research indicates that one of the most pressing challenges for Britain's 5.2m SMEs is cashflow optimisation. Over 70% of SMEs look to their bank when they need finance and despite strong business cases the response is typically 'we just don't have the appetite for this type of business at the moment'. These businesses are exactly the type that need help, because they are on rapid growth curves which stretch their finances to the limit. To quote 'Too often, the liquidators are called in to viable firms due to short-term problems that can be solved. As a result, jobs and livelihoods are lost and the potential that the businesses had to generate is gone.' All banks have had to reserve more capital in line with increased regulatory requirements, and have suffered losses on their capital through bad debts, which limits what they have available to provide to SMEs. To survive and grow, SMEs need greater choices beyond banks standard offerings. The vision is to develop an alternative cash-flow platform, based on a Peer to Peer lending model, to allow companies and individuals to lend to vetted, established SME businesses within the closed and safe environment of the Accountancy practice community. The secure platform's matching algorithm will utilise an Accountancy firm's specialist insight and superior knowledge of its clients businesses to build better-performing, proactive risk profiling of borrowers, whilst lenders are able to choose risk profiles, length of time and amounts that they wish to use to invest in other companies, without becoming a shareholder. The algorithm will manage diversification of the investment to minimise risk for the lender, against invoices that have been validated and are waiting to be paid, to help these SME businesses with cash-flow finance. The service will be managed by Accountancy firms as a value-added service for their own client-base, allowing them to provide professional advice and support to both lenders and borrowers.</p>			

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Inclusive Technology Ltd	Personalised Preferences Profile (3Ps)	£538,361	£242,262
<b>Project description - provided by applicants</b>			
<p>The key aim of the Personalised Preference Profile (3Ps) project is to better detect the interests/preferences of learners with Severe Learning Difficulties (SLD) and Profound and Multiple Learning Disabilities (PMLD) and provide the ability to create personalised content that is automatically and dynamically tailored to them. It can be a hugely complex task to find out what stimulates children with SLD/PMLD. This project uses a novel technical approach to detect the child's interaction with content and couples this with real time &amp; off-line data analytics to tailor the experience to their interests. This provides a unique market opportunity and innovation based upon:</p> <ol style="list-style-type: none"> <li>1) Creating an authoring tool that can be used by teachers to create educational self-tailoring content for learners with PMLD from fixed and authored content. Specific visual and sensory content packs will be created and the tool will be available on any online computer/tablet device.</li> <li>2) Creating an application that presents the content generated and analyses feedback from the individual user's interaction with it (via eye tracking ' a technology already used in ITL's product offering) to detect what is of interest. This will drive the real time content tailoring for individual users and the longer term tailoring in the authoring tool.</li> <li>3) Research into how virtual reality technologies (e.g. headsets, sensory room software) might in the future be able to be integrated with this application and learning process. If the application can be successfully developed then its impact to learners and teachers will be:</li> </ol> <ol style="list-style-type: none"> <li>1) The ability to build up learning interests and preferences/personalised profiles for individual learners and produce student friendly reports that can form the foundation of a communication passport.</li> <li>2) Information that allows teachers, guardians and designers to create focused learning content that provides more engagement resulting in the learning experience being enhanced</li> </ol>			

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IBEX Innovations Ltd	IBEX Virtual Anti-Scatter Grid Detector	£405,657	£182,545
<b>Project description - provided by applicants</b>			
<p>IBEX Innovations (IBEX) has successfully demonstrated, in an InnovateUK PoC project, the potential for its virtual anti-scatter grid (VASG) concept to improve diagnostic quality and significantly reduce patient dose in medical radiological examinations. Physical anti-scatter grids (ASGs) are extensively used in medical X-ray imaging to reduce the levels of unwanted X-ray scatter reaching the detector and are essential to achieve diagnostic quality images, especially on thicker body parts such as the torso, head and breast. However, as well as blocking unwanted scatter, physical ASGs also absorb a significant proportion of useful direct X-rays and result in patient doses being increased by between a factor of 2x and 8x to achieve acceptable images. By contrast, the proposed IBEX Virtual Anti-Scatter Grid (VASG), takes materials data generated by the IBEX Multi Absorption Plate (MAP) and advanced IBEX software algorithms and uses it to deconvolve the scattered X-ray component, utilising the scattered X-ray data to improve image contrast without the need for a physical ASG. By usefully employing more of the available X-ray photons to create an image instead of just blocking unwanted scatter with a physical ASG, the VASG is expected to generate improved contrast at significantly lower patient doses, whilst further improving the sensitivity of the IBEX materials classification, leading to further improvements in the diagnostic value of radiographic examinations. The VASG concept relies fundamentally upon the IBEX materials classification technology successfully developed under a previous InnovateUK DoP project, and has been shown to work in a PoC project which completed in July 2015.</p>			

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<b>Mobile Content Management Solutions Ltd</b>	MCM Solutions (CyberHawk) - a novel solution for the surveillance of Wi-Fi networks and devices that can identify a device (by MAC address) and show its exact location to dramatically reduce Cybercrime	£208,034	£93,615

### **Project description - provided by applicants**

The UK government, businesses and public lose a total of £27 billion per annum to cybercrime with the largest share of this cost borne by businesses. Most of the attacks on business emanate from inside threats, which have become increasingly difficult to trace or prevent, especially due to the proliferation of 'smart' Wifi enabled devices. To combat this threat, technology has been developed for the surveillance of Wi-Fi enabled devices. However the currently available state-of-the-art is highly limited both in its hardware and software applications. The majority of available devices are for fixed use and cannot be adapted for mobile use, such as would be necessary for tracking. They thus cannot be used in mobile surveillance operations. Furthermore, the derived data is not stored centrally and so cannot be shared and leveraged for ongoing or future analysis. Finally, there are no facilities to identify and track specific devices across locations thereby limiting application in intelligence or law enforcement application. There is thus a ready and growing market in the UK and globally for innovative surveillance and security equipment for use by the defence, law enforcement, civilian and military applications. MCM Solutions is developing an innovative solution for the effective surveillance of Wi-Fi enabled devices that will provide users with the ability to harness software, hardware and data to identify, locate and track Wifi enabled devices. Our solution will for the first time, enable both fixed and mobile surveillance with live data sharing capabilities enabling the identification of a device and geolocation technology to trace a device's movements. The commercialisation of this system will deliver economic and social benefits as it helps to reduce cybercrime and also equips law enforcement agencies with a highly efficient tool to assist in various investigations.

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<b>FitnessGenes Ltd</b>	FitnessGenes: Development of a new tool for provision of personalised health & nutrition advice	£505,372	£227,417
<b>Project description - provided by applicants</b>			
<p>61.9% of the adults in the England are overweight or obese. The health problems associated with being overweight cost the NHS over £5 billion every year. In addition, twice as many deaths may be attributable to lack of physical activity than obesity, with just a modest improvement having significant health benefits for many. It is clear that both diet and exercise will be key to tackling this growing problem. Personalised diets and fitness programs are now seen as the future. By assessing an individual's genetic predispositions in combination with their lifestyle it is possible to make evidence-based recommendations on what types of diet and exercise are likely to be most effective for them. In addition, personalisation based on genetics has been shown to improve compliance with making healthier life choices. With the rise of the genetic testing industry, personal genetic information has become easily accessible. However, there are not reliable mechanisms that will aid the interpretation and dissemination of this data so that it is relevant and empowering to a wider consumer. The FitnessGenes:Tool will create the platform that can use genetic and environmental data to create truly personalised fitness and dietary programs. Using a complex and proprietary algorithm, it will identify the required programs and diet plans, as well as review an individual's progress and compliance. The information presented to customers will be positive, educational and most critically, actionable. Ultimately, the most significant and high impact outcome of this project will be the creation of a novel prototype that evaluates the utility of gene-lifestyle based fitness and dietary advice. This personalised method will not just appeal to the fitness obsessed, but could also contribute to the prevention of obesity and chronic disease, improving compliance with government and scientific advice, thus improving overall public health outcomes.</p>			

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SoundVault Ltd	SoundVault - Music Licensing Platform	£274,388	£123,474
<b>Project description - provided by applicants</b>			
<p>SoundVault is a global online B2B music licensing marketplace which licenses music from composers (music sellers) to media producers (music buyers) around the globe for use in movies, TV, radio, gaming, advertising, IPTV, online and apps. The SMART DP Project will enable SV to prototype 4 unique enhancements: 1 - Licensing Database 2 - B2B2C IPTV licensing solution 3 - Mobile playlist and licensing solution 4 - Search &amp; Discovery. Collectively these enhancements will provide the first complete end-to-end solution for composers and libraries, enhancing British Copyright and creative industries. Project Management: Utilises an Agile Software Development approach enabling us to divide tasks for each milestone into manageable packets, and to view incremental progress of each member in the team. Project Deliverables: There are 4 distinct development phases to the project, with each phase being subdivided into Management, Design, Programming, and Appraisal tasks. Phase Description: Phase 1: Licensing Database. Phase 2: IPTV licensing solution. Phase 3: Mobile playlist &amp; licensing. Phase 4: Search &amp; discovery (Data-mining). R&amp;D: R&amp;D will be carried out by the Management and Technical teams.</p>			

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Peak Analysis and Automation Ltd	PROTEUS & SLAB next generation life science robotics for a better quality of life	£319,711	£143,869
<b>Project description - provided by applicants</b>			
<p>There were 8.2m cancer related deaths globally in 2012(1), rates are increasing &gt;50% by2020(2) &amp; there are ~300K people diagnosed with cancer in the UK PA, the ~3% mortality due to late diagnosis(3) is a major problem, equating to 10K preventable UK deaths/PA(4) Sara Hiom (Cancer Research UK) said: "We know the strain the NHS is already under &amp; the number of people diagnosed with cancer is increasing - further investment is essential". Adding "Research would indicate we do fewer key diagnostic tests (KDT) in this country than comparable countries, but there are a lack of workforce, a lack of kit, to do those tests,...this really does need to be addressed"(7) KDT's also screen for numerous long term conditions (diabetes, depression, dementia, &amp; hyper tension) which 25% (~15m) of the UK suffer from (=50% all GP consults, 70% hospital days) ~800m KDTs/PA = ~300k patient KDTs/day The fundamental issue affecting KDTs in the lab is cost: a small robot costs ~£15K for repetitive un-skilled tasks a further £15K is required for software + systems integration, making the £30K total purchase cost a real issue whilst valuable scientific talent carrying out these tasks is inefficient use of resources. As in any production process, automation offers the ability to increase efficiency, reliability, throughput &amp; quality. Existing systems are typically over-engineered for their function Our focus is creating plug&amp;play (P&amp;P) hardware to automate KDT instruments &amp; equipment &amp; remove costly 'onsite' software &amp; integration Peak analysis &amp; Automation Ltd (PAA) has developed a concept with key innovations for new automation &amp; integration system Our P&amp;P set up is designed specifically to address the issues at &lt;1/3 total cost (£9K) This system will revolutionise diagnostic testing labs in the UK &amp; globally whilst offering the opportunity to increase the quality of (&amp; save) life for up to 10K UK citizens</p>			

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Rare Recruitment Ltd	Potential, Not Polish - Contextual Performance for Graduate Recruitment	£535,381	£240,921
<b>Project description - provided by applicants</b>			
<p>UK businesses are missing out on highly qualified candidates because of hidden bias (SPA,2015). 2/3 of elite jobs are filled by candidates with a private or grammar school education (11pc of UK population). Children born to high professional parents are 20x more likely to get high status jobs(Guardian, 2012). 80pc elite firms recruit graduates from just 19 universities (New Economics Foundation,2014).This bias creates economic inefficiencies by artificially restricting the pool of candidates,leaving vacancies unfilled and preventing diversity and social mobility.Rare Recruitment has identified an opportunity to help companies source young talentidentifying potential rather than polish, drawing on experience from contextualisation systemsused by UK universities since 2004. Rare's Contextual Recruitment System enablescompanies to identify candidates that have outperformed their environment and haveoutstanding potential for growth, widening the pool of talent available to fill positions, andhelp employers understand and address the implicit bias that guides their recruitmentdecisions.We have proven the concept of this technology with a basic prototype that requires manualcandidate selection, and we have secured pilots with Baker&amp;McKenzie and Hogan Lovells.We now seek funding from Innovate UK to automate remaining processes, enabling thetechnology to become fully scalable and widening access for SMEs.Since inception in 2005, Rare has grown to become a multi-award winning diversity firm withcorporate clients including the Civil Service Fast Stream, Goldman Sachs, L'Oreal and 6 ofthe top 7 UK law firms. Successful development and commercialisation of this technologywill help Rare disrupt innovation in the recruitment industry by enabling better recruitmentdecisions, achieving systemic improvement of social mobility, workplace diversity,recruitment efficiency and economic growth.</p>			

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Amity Ltd	Pre-Flushing Unit and Semi - Automated High Level Disinfection Endoscope Re-Processing System	£398,761	£179,442

## Project description - provided by applicants

Flexible Gastrointestinal (GI) endoscopy is a prevalent diagnostic and therapeutic procedure. In the UK and US 1.3M and 26M procedures were performed in 2009 and 2012 respectively. Despite its efficacy the internal channels of the array of endoscopes routinely get contaminated with blood, secretions and microorganisms increasing the risk of exogenous (patient to patient) infection. Decontamination is a two stage process whereby (1) Pre-flushing to remove gross contamination occurs immediately after use at bedside using specialised brushes & syringes; preceded by (2) manual cleaning in a decontamination room with detergents/water/air followed by High Level Disinfect (HLD) by cycles of soaking and syringing with water and orthophthalaldehyde, peracetic acid or more commonly glutaraldehyde. The problem is that these chemicals are irritants and sensitisers and root cause of conjunctivitis, asthma and dermatitis. Staff that continuously work on manual endoscope decontamination processes are prone to toxic chemical exposure and in addition at high risk of acquiring Repetitive Strain Injury (RSI) and Carpal Tunnel Syndrome (CTS). Automated Endoscope Re-processors (AERs) are limiting healthcare worker exposure to toxic chemicals. However, AERs are very expensive and are not affordable by some first, all second and all third world countries. Amity state there is an unmet global business opportunity to develop systems to bridge the gap between high risk manual and expensive automated endoscope re-processing methods. Amity will also reformulate their proprietary biodegradable non-toxic HLD concentrate and render it applicable for the proposed devices. Significant revenues could be realised upon development and exploitation in UK, EU, US and Asia which is seeing increased rates of GI diseases associated with increases in standards of living and rich diets.

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<b>SofMat Ltd</b>	Development of Prototype to respond to industry feedback requesting sequential covert marking techniques & methods of on-site verification and to raise the TRL of the SofMat product for investment & commercialisation	£470,014	£211,506

### **Project description - provided by applicants**

The problem of counterfeit products has been well documented in the press for a number of years. The most recent case of counterfeit cosmetics containing arsenic amongst other contaminants was reported in May 2015. The SofMat product allows for sequential covert marking of products to produce a unique code and the verification of authenticity throughout the supply chain. The product also links in with, and augments, the 'Track and Trace' technology that is currently being implemented by the pharmaceutical industry by adding an extra layer of security to the system. This technology adds an item specific code to each component marked that links with a master database for added security & ease verification by the client. The SofMat product can also be linked with any individual company marking system, again to increase security but also to make the product unique to that company. The use of the SofMat product is not limited to the cosmetic and pharmaceutical sectors although these are the initial target markets. The marking technology has had interest from the high value and medium value watch markets, producers of containers and closures, automotive, aerospace and drinks markets. The time for copying most existing anti-counterfeit technologies is less than 18 months. However the SofMat technology provides a greater degree of security by producing a larger number of variables, for example a 7.5mm and 0.5mm array can be used to mark and uniquely identify above 10 billion parts or components. The marking system is backed up with a bespoke hand held reader that can be tailored to be unique to each end user and allows confirmation of authenticity throughout the supply chain

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Surecore Ltd	State-of-the-Art Low Power Memory for Battery Powered Applications	£591,533	£250,000
<b>Project description - provided by applicants</b>			
<p>The crux of this application is to develop extremely low power, working samples of CMOS memory 'chips' suitable for customer evaluation on the latest 40nm Low Power process (40ULP) available from the leading global silicon foundry, TSMC. SureCore have already proven their power reducing concepts save up to 60% active power compared with 6 rival solutions in an independent test. The new 40ULP process released by TSMC has been specifically developed for portable, mobile, wearable, and energy scavenging products where battery life is key. The objective for SureCore is to become a leading vendor of Static Random Access Memory (SRAM) IP for integration into System on Chip (SoC) devices by semiconductor product suppliers. In order to achieve this, the power saving techniques must be proven on real silicon on the target process. This is the purpose of this application. SRAM memory is a key IP block essential to the development of SoC devices found in the majority of modern electronic products and will occupy up to 70% of SoC silicon area by 2017. This growth is driven by consumer demand for more features integrated into their mobile devices. However battery technology continues to lag consumer expectations; integrating more functionality means more memory which can consume up to 70% of battery power when active. The industry's approach to date has been to reduce battery voltage but this approach has reached the end of the road; a rethink of the memory architecture is required. The secret of SureCore's power saving technology is a re-design of the internal memory architecture without changing the external interfaces and with minimal change in performance. SureCore's low power memory technology has attracted the attention of many global semiconductor companies who have expressed commercial interest if the benefits can be proven on the new 40ULP process. This project would achieve that, moving the company forward towards establishing commercial agreements.</p>			

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Transfiniti Ltd	Development of a new Infinitely Variable Transmission (IVT)	£329,480	£148,266
<b>Project description - provided by applicants</b>			
<p>The Project is to research, develop, manufacture, license and monetise a new and completely original Infinitely Variable Transmission patent for Automotive and Industrial applications. The crucial operating characteristics are as follows: - Infinitely variable speed in both forward and reverse. - Multiple variable speed inputs and outputs are easily achievable, so the System can easily be adapted to act as both, the Vehicle transmission and the rear differential / Transaxle. The major advantages being that each wheel can be electronically speed controlled and positively / negatively driven in all dynamic conditions, it also has the capability to dramatically improve the vehicle handling especially for e.g. during cornering, as the inner wheel can be speed reduced and the outer wheel speed increased to account for the varying distance in the track experienced. In low traction situations such as snow / ice and other hazardous driving conditions both wheels are positively driven improving vehicle traction. Furthermore in certain applications the transmission is easily capable of providing forward motion on one output whilst providing reverse motion on the other, so that a vehicle could turn within its own footprint, as is often advantageous with Track and Military vehicles. - The transmission has a high commonality and a fewer number of components meaning reduced production costs compared with modern Automatic Transmissions - The system naturally adjusts for any wear in the contact elements. - Low revs at cruising speed, leading to optimal engine use, reduced engine wear and at least 20% fuel or electric savings, along with increased vehicle performance. - Controlled braking is possible on each wheel, and can be possibly dispense with the ABS braking system. Furthermore in Electrically driven vehicles regenerative braking can be optimised through the infinite ratio the gearbox can provide. Kinetic energy recovery can also be easily added to the rear transaxle assembly.</p>			

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<b>Power Drive Efficiency Ltd</b>	Preparing an AC electric motor controller for market: An energy saving motor controller requires industrialisation and product range extension prior to market entry.	£248,643	£100,000
<b>Project description - provided by applicants</b>			
Power Drive Efficiency have developed an energy saving drive for three phase AC induction motors. The drive addresses fixed speed variable load motor applications such as conveyors. Such applications are currently limited in energy efficient solutions. PDE's drive in a preliminary concrete mixing application demonstrated an average energy saving of 43%. To conduct a secondary pilot over a longer time frame, the drive requires re-design to meet CE and EU certification. In addition the redesign will consider efficiency of manufacture at large volumes, in preparation for commercial production. The drive currently exists in one size (75kW). For PDE's technological benefits to reach a greater market the redesign will cover an additional 9 drive sizes (11kW - 315 kW). It should be understood the principles of the drive design will be constant across scale however appropriate certification must be acquired for all drive sizes before being viable for commercial pilots.			

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Boldmind Ltd	Flow.City - Novel Digital Signage Big Data Solution for High Street Retail	£557,449	£250,000
<b>Project description - provided by applicants</b>			
<p>The UK high street is decline, 1 in 5 shops could close by 2018 , as retail operating cost is increasing is at a faster rate than consumer spending (increase of 20% since 2006, compared to 12% ) &amp; increasingly customers turn online for shopping. Impact on UK economy: store vacancy rates have doubled since 2008 (from 5% to 10%); closures of high street stores have tripled (from 371 closures in 2013 to 987 in 2014); &amp; 5000 high street jobs lost in 2014. For high street retailers to remain competitive &amp; prevent dominance of online retail (growth of ~650% over the past 10 years, from £7.8bn in 2005 to £52bn in 2015) the gap between operating cost &amp; consumer spending must be closed by improving profit margins. Studies by Experian &amp; McKinsey suggest that exploiting tech innovation is key to securing commercial gains. Existing solutions: 1. Digital signage (Displays2Go, NV3 Tech). Limitations: no remote operation; inflexible - no real-time adjustment of ads; campaigns must be planned ~3 months in advance &amp; thus may be irrelevant/outdated upon release; no hyperlocal marketing; &amp; no dynamic pricing or artificial intelligence (AI) based scheduling of content. 2. Retail analytics (Retail Next, Experian &amp; Nomi). Limitations: no marketing suggestions, no data sharing &amp; focus is on upselling rather than obtaining new custom. Boldmind Ltd seek to address the need for improved digital ad tech via development of Flow.City - novel digital signage with supporting big data platform &amp; AI software. Advantages over existing tech: big data exploitation generates hyperlocal insight; ad content &amp; design can be altered in real-time enabling responsive marketing &amp; dynamic pricing based on big data. The potential impact of Flow.City has been shown in PoC trials which resulted in a 400% increase in table bookings for Club Lounge Restaurant &amp; a revenue increase of 22% for its. This project will advance Flow.City from current unoptimised PoC to beta stage. Market launch is expected Q3 2017.</p>			

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# Innovate UK

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**Competition Code: 1505\_SmartRd2\_DOP**

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
TQC Ltd	Micro Application Leak Tester (MALT)	£133,435	£60,046
<b>Project description - provided by applicants</b>			
<p>Recent times have seen progressive miniaturisation of devices. In some, it is critical that smallparts are leak proof and their production demands quality assurance for leak characteristics.Examples are in small medical devices e.g. small drug dosing pumps, swallowable cameras,diagnostic cartridges, lab on a chip devices, and medical vials. Non-medical applicationsinclude in-tyre pressure sensors, electrical sensors and hermetically sealed parts. Existing solutions are bulky, imprecise, or very expensive.TQC developed a pre-prototype high-precision compact low cost Micro Application LeakTesting module (MALT). The MALT is designed to minimise internal volumes below onetenth of comparable instruments.The MALT module uses differential pressure decay and can detect leaks by an order ofmagnitude more sensitively than other pressure decay leak test instruments. TQC's engineersachieved this at a lower unit cost than existing solutions. Bespoke versions of the prototypeare successfully deployed in two distinct industrial assembly and leak testing applications,validating the proof of concept.The challenge remains to convert the initial prototype into a general purpose microapplications leak test unit, and to enhance its capabilities for a broader range of applications.Further developments are: create pneumatic micro circuitry and control for leak testing hermetically sealed parts build a vacuum micro-leak tester variant integrate a shock filling function for testing semi-flexible parts include functions to automatically calculate the test volume and set the test pressure redesign the electronics to SMT to further reduce the size and production costs enhance the user-interface and communications software so that MALT becomes an Internetof Things device accessible remotely and by Cloud services ensure regulatory compliance for validation to FDA approval standards, IP rating enclosure rating enclosure and ATEX rated for use in hazardous areas</p>			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Aveillant Ltd	Radar Sensor Capable of Detecting Small Low and Slow UAV (Drones)	£555,955	£194,584
<b>Project description - provided by applicants</b>			
<p>UAVs are becoming an increasing feature within our everyday lives. In Year 2014 they werethe second highest selling toy in the USA. Unfortunately bad press also surrounds UAVs withtheir use by terrorist organisations, as a nuisance for airport safety and their ability to intrudeon the private lives of members of the public. Looking to the future certain large corporations,notably Google, are trialling the use of UAVs to provide an efficient air 'borne postal service. Therefore for many reasons it is highly unlikely that the growth in UAV usage will decline inthe foreseeable future. The problem for security organisations and regulators of controlled airspace to date has been the lack of an effective UAV monitoring system which can allow desistaction to be instigated where necessary or alternatively to allow regulation of the operation ofUAVs. Aveillant have identified this problem as a business opportunity and this project willprove that Aveillant can develop a surveillance system using Holographic Radar that willmeet the needs of security and regulation.This project will develop a prototype UAV sensor that is capable of detection and tracking themovement of UAVs using Aveillant's unique Holographic Radar technology. Detection willtake place in a timely enough fashion to enable security organisations to react with whateverdesist action is required before the UAV is able to reach its intended destination. The trackingability of the Holographic Radar UAV sensor means that the regulators will be able to ensurethat the UAVs are flying in pre- agreed flight paths and track any deviations. In instanceswhere the operator of the UAV is acting illegally the sensor will provide the track back to theoperator to aid their detainment while the UAV is still in flight. The business opportunity isworld-wide and Aveillant intend to be first to market with their UAV sensor.</p>			

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<b>Participant organisation names</b>	<b>Project title</b>	<b>Proposed project costs</b>	<b>Proposed project grant</b>
<b>Advanced Blast &amp; Ballistic Systems Ltd</b>	VAFS Vehicle Active Floor and Seat System	£667,247	£250,000
<b>Project description - provided by applicants</b>			
<p>Whilst there is currently no effective response to landmines encountered by civilian vehicles operated by NGO's engaged in mine clearance work, mine protected military vehicles are now heavily 'up armoured' with 'V' shaped hulls to divert the blast from the vehicle belly. Unfortunately up armouring presents logistical problems particularly for military vehicles such as the inability to cross weak or light bridges, exceeding helicopter lift capacities, excessive fuel consumption, and reduction in speed and manoeuvrability and alternative active mine protection solutions with a low weight penalty particularly for reconnaissance and special forces vehicles are now being sought. ABBS has patented an active system based on a fast reaction ballistic motor to stabilise the floor during the first phase of the mine blast and novel Linear Rocket Motor (LRM) to counteract Vertical Global Acceleration (VGA) of the vehicle in the second high impulse phase of the blast. We propose to develop and demonstrate the Vehicle Active Floor and Seat (VAFS) system together with lightweight composite wound LRM's to counter VGA to provide a light totally active mine protection system for agile armoured vehicles and SUV's for civilian use in mine clearance.</p>			

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Fantoo Ltd	Artificial Intelligence for email Messaging (AIM)	£555,016	£249,757
<b>Project description - provided by applicants</b>			
<p>UK work output is 25% below G7 average, and work-related stress is key, with 34% of UK employees suffering from workplace stress and subsequent poor productivity (Forbes, 2014). Days off due to stress related conditions have risen over the past 3 years, now costing UK business £70 billion each year (Huffington Post, 2014). Professor Gloria Mark (University of California) contends email overload is a top ten stressor. Over 113 billion business emails are sent globally every day, and workers struggle with the demand. Annual global losses incurred by businesses due to lack of productivity and inefficiencies associated with email cost the global economy £1.2 tn (Radicati, 2014). In the UK, office workers receive on average of 121 emails daily and spend 28% of their time with email. 40% of UK office workers feel under constant pressure to check email (up to 36 times/hr) and 45% feel pressured to respond immediately, resulting in stress and frustration. As Professor Cary Cooper clearly states, email is damaging UK productivity and reducing quality of life. Industry accepts email as a problem (Gartner, 2015), as seen in Atos' award-winning 'Zero email' campaign in which the company banned internal emails, thereby reducing the load by 60%. According to Forbes magazine, this measure increased operating margins by 15% (Forbes, 2015). Funded by an Innovate UK Smart Proof of Concept project, Fantoo worked with globally recognised thought leaders in the B2B email sector to prove the concept of its innovative solution using Machine Learning (ML) and Natural Language Processing (NLP) to resolve email overload. Fantoo will now develop a prototype to quantify productivity increase.</p>			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Medstrom Ltd	AeroPlus Pressure Ulcer Care Recliner device for Plus sized users	£249,121	£87,192
<b>Project description - provided by applicants</b>			
<p>Pressure ulcers (PUs) develop when pressure, shear, friction, or excess moisture and heat is applied to skin, disrupting blood flow and breaking down the skin &amp; underlying tissue. In the UK &gt;700,000 people per year are affected by PUs costing the NHS £2.8Bn pa. (1) Many people at risk of developing PUs, specifically elderly or 'plus sized' people (also defined as obese, morbidly obese or bariatric) with reduced mobility, increased metabolic needs and different adipose tissue composition. The impact of excessive moisture and heat at the skin is of particular concern for plus sized people (2,5). Plus size people often use a recliner as their main domestic furniture for rest &amp; sleep, as lying flat may compromise their resting breathing (Muir and Rush, 19). Currently, there are no commercially available pressure redistributing devices (PRDs) for use on Recliners that have intrinsic microclimate control properties. In this 18 month, £249k Development of Prototype project, Medstrom will learn from the TSB AeroSpacer overlay project (ML720552) to develop a prototype that deals with the very different needs of plus size people, providing pressure reduction and maintaining optimal skin condition. The AeroSpacer mattress provides microclimate control due to its pressure-relieving core being manufactured from an innovative, 3D-knit spacer fabric, this enables transfer of air via patient movement or when air is driven through it. The core is covered with a moisture vapour permeable fabric that enables moisture to move away from the skin. The entire unit benefits from being fully washable. These features are unique in this type of device. Conservative sales projections indicate that 9% of all Bariatric Recliners could be fitted with an AeroSpacer Plus (AS+) within 5 years of project close; if the AS+ prevented PU formation in 10% of the plus sized population (PSP) then a cost saving of £5.2M per year would be derived for the UK (1)</p>			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Bull Products Ltd	Advanced low power wireless fire detection system	£584,255	£250,000
<b>Project description - provided by applicants</b>			
<p>Fire safety is a top priority for all business/property owners as part of stringent H&amp;S regulations &amp; legislation. Following the 2005 Fire Safety Regulatory Reform &amp; Construction Product Regulations 2011, demand for advanced fire protection systems (FPS) that comply with EN54 standards has risen, resulting in a global FPS market projected to reach \$79.18bn by 2020. The majority of fire alarm systems for large buildings are wired, requiring extensive cabling between the control panel &amp; fire detection devices. Installation is complex &amp; expensive &amp; systems are inflexible. Due to tech advancements, innovations within the communications industry &amp; the gov. drive towards smart buildings; wireless fire alarm systems are beginning to compete; however major tech limitations are preventing widespread adoption &amp; consumer confidence e.g. systems are energy intensive with high power consumption thus they use power boosters in order to meet required standards, resulting in inflexible 'hybrid' solutions. They are restricted in connection range creating transmission issues between detection devices &amp; Control Panel &amp; have lack of remote monitoring capability meaning frequent checks &amp; maintenance. As an existing manufacturer &amp; supplier of fire safety equipment to the construction sector &amp; in response to demand from existing customers, Bull Products Ltd (BPL) seek to develop a validated 'works-like'/'looks-like' prototype (to meet EN54) of a truly wireless, ultra-low power fire alarm system, with additional security capability, that overcomes the major limitations of existing systems. Innovative communications tech will allow significantly improved range, reliability, flexibility &amp; overcome power restrictions (no need for boosters) &amp; will include a novel &amp; patented intruder alarm to provide a security aspect. BPL will initially target large buildings within construction, housing associations &amp; retail through a strong existing customer base. Market entry expected mid-2017.</p>			

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Dyteqta Ltd	SonarTeq - Dyteqta Limited	£532,302	£239,535
<b>Project description - provided by applicants</b>			
<p>The NHS creates 34.4m cubic metres of sewage annually. As part of sustainability obligations, NHS hospitals are committed to reducing water use by 2.5% per employee each year till 2016 (Dept of Health, 2014). To meet these obligations, hospitals are installing ultralow-flush (ULF) toilets. However, these new systems are insufficient to draw waste away from the buildings through existing drainlines whose size, length, and slope were designed for greater flow rates, leading to clogging or plugging of the drainlines and expensive clean-out costs (Veritec, 2005). 85% of UK hospitals now use paper bedpan macerators which use 90% less energy per cycle than washing systems (Haigh Medical, 2015). However, bedpan macerators place an extra burden on ageing wastewater systems, increasing the risk of pipe blockages. Water UK has recommended banning their use (Water UK, 2014). Failed drainage causes overflow, backups, bacterial growth and dangerous risks of infection and there is a correlation between poor drainage and number of superbug infections. Infections acquired in hospitals kill 6.5K in the UK annually, and the NHS pays out over £10m/yr in compensation to people who contract superbug infections in hospitals (Telegraph, 2012). Dyteqta has proven the concept of Sonar-Teq, which detects failed trap seals and blockages in wastewater pipes by sending a sonar wave down the drainage system. Once a blockage is detected, the system sends multiple, powerful waves of water dosed with additives (enzymes, foams, ionised water, degreasers) through the pipes to clear the blockages. Dyteqta has developed a lab prototype of Sonar-Teq, which is currently too large, expensive and complex to install commercially. Dyteqta must make a more compact system that is simpler, more affordable and less complex to install. Dyteqta also needs to prove to the NHS that Sonar-Teq will prevent blockages, thereby reducing direct costs from cleaning and cases of superbugs.</p>			

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Unison Ltd	Unison Integrated Fibre Laser and PKM Machine	£600,032	£250,000
<b>Project description - provided by applicants</b>			
<p>Established in 1973, Unison Limited has built a successful business in the tube machine industry. Unison's expertise is targeted at the high quality end of the tube market where significant savings can be made when using exotic materials as used in the Aerospace, Marine, Oil &amp; Gas and Automotive Industries. Due to the ongoing need for all component manufacturers to reduce and if possible, eliminate costs, aiming for lean manufacturing, it is essential for machine suppliers to constantly update and develop their products to meet the market needs. Unison aim to develop a new machining process for the handling, fibre laser cutting, machining and processing of large diameter tubes. The project intention is to integrate new and known technologies to develop a single machine with multipurpose functionality avoiding unnecessary handling and improving accuracy. The project intends to utilise the new generation of 5 axis Parallel Kinematic Machining (PKM) machines that have the flexibility of a robot with the accuracy and rigidity of a CNC gantry machine in combination with an advanced development of Unison's tube bending machine technology. This will negate the need for costly rotating and advancing chuck units and increase accuracy as there will be no need to integrate and synchronise two separate axis systems. Also, the PKM machine has the capability to be able to use interchangeable end effectors allowing it to perform many different operations in the same work station without the need to move or reposition the work piece, providing additional options. The development of such a machine should enable Unison's customers to achieve a reduction in costs per operation whilst increasing the functionality of the machine will reduce the number of stations required to achieve numerous operations. This in turn will reduce power consumption, the floor space footprint and number of operators required to control the processes, ensuring increased productivity.</p>			

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Navtech Radar Ltd	Low-cost multipurpose radar sensor for Industrial Automation market	£150,578	£67,760
<b>Project description - provided by applicants</b>			
Navtech Radar is a world-leading innovator and multi-award winning designer and manufacturer of commercially deployed radar detection solutions. Their ground-breaking technology is utilised by clients across many industry sectors, from Security Surveillance and Industrial Automation to Traffic Incident Detection. Navtech has harnessed the power of the latest technology for commercial applications at a fraction of the cost, and to the most exacting quality and standards. Renowned for investing heavily in innovation and R&D, Navtech Radar has earned an unrivalled reputation for products that are high performance and extremely reliable. The systems are often used in mission-critical applications where safety and security are vital. This project aims to develop yet another innovative solution to increase safety and efficiency in industrial automation, focussing specifically on the mining industry.			

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Aston-Corp Vision Ltd	CreditVista: the corporate credit data platform	£549,401	£247,230
<b>Project description - provided by applicants</b>			
<p>Business lenders ' both institutional and peer to peer ones ' tend to lend on the basis of a verylimited and rigid set of key financial indicators that have largely proven inadequate forassessing corporate credit risk. Because critical financial data are overlooked, businesslending is not efficiently allocated and as a result certain corporates are not able to accessfunding despite being potentially solid borrowers while other companies are grantedundeserved, excessive credit. Even more importantly, following the initial credit sanctioningand provision of funding, lenders' existing credit monitoring systems and practices havefailed to accurately monitor counterparties' credit risk.This project is about the development of a novel prototype platform as a service that captures,structures and contextualizes decision-critical information and data leveraging newtechnologies and credit analysis expertise with the aim to materially improve the quality of theinformation lender rely upon when assessing corporate credit risk and therefore optimize theprovision of corporate credit.</p>			

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The SpineCorporation Ltd	TechnoSpine Adult Scoliosis Bracing Technology	£379,362	£170,711
<b>Project description - provided by applicants</b>			
<p>There are two main types of adult scoliosis. The first is primary degenerative scoliosis, also called de novo scoliosis, most commonly located in the lumbar &amp; thoracolumbar spine. De novo scoliosis occurs due to asymmetrical degeneration of the intervertebral discs &amp;/or zygapophyseal joints, causing predominantly back pain symptoms, often accompanied by signs of central or lateral spinal stenosis. The second type of scoliosis is from childhood idiopathic scoliosis that continues into adult life becoming problematic as it progresses through degeneration or long standing spinal imbalance &amp; postural collapse. Adult scoliosis may also occur due to trauma (obtained through either a high impact event or through osteoporosis) surgery called iatrogenic scoliosis or adult acquired neuromuscular conditions such as Parkinsons Disease &amp; Multiple Sclerosis. Current art in treating Adult Scoliosis has changed little over the yrs &amp; has generally focused on rigid bracing technology or semi rigid systems that provide support but also cause loss of movement or immobilisation which overtime causes de-conditioning &amp; atrophy of the spinal muscles. The concept under development by SPINECOR is a system that counteracts the asymmetrical forces bearing downwards onto the mal-aligned vertebrae, intervertebral discs, ligaments &amp; muscles in order to prevent further damage &amp; to reduce pain whilst allowing dynamic movement of the body enabling the patient to carry out a normal active lifestyle.</p>			

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Eco-i Ltd	ECO-I LTD – DOP (Development of Prototype) of a Universal embedded intelligent BMS Controller on a Single PCB	£540,303	£243,136

### **Project description - provided by applicants**

A BMS (Building Management System) plays an important safety function, controlling, monitoring, optimising, and reporting on facilities (ventilation, lighting, power, fire, security), as well as giving owners ability to optimise comfort/efficiency. Systems linked to BMS represent on average 55% of a building's energy usage. BMS comprises software+ hardware; leading to global opportunities for products and services. This \$30bn industry employs over 0.5m staff and serves 150 countries. Over 10000 UK companies operate in this market. Almost every industrial and domestic building has at least one BMS Controller - a purpose-built unit that manages data (temperature, humidity, pressure, current, etc) which it uses to communicate instructions to BMS devices. Products that reduce energy and carbon emissions in buildings will be in increasing demand. Europe's Energy 2020 document and Lisbon Treaty states 'Energy efficiency is a key priority' and 'the price of failure is too high'. Europe's Energy Performance of Buildings Directive (EPBD) targets enhancement opportunities at building controllers. Further, the Display Energy Certificates (DEC), Carbon Reduction Credits (CRC), BREEAM and ISO16001, all require the use of a BMS ' supporting estimates that the UK Energy market will reach £200bn by 2020 from £43bn now. BSEN 15232 was created to measure impact of intelligent building controls on energy in buildings - expected mandatory in future. This project addresses these problems. Following two successfully funded TSB grants (POM and POC - File Refs 700289 and 710518 respectively), we address the problems by developing a DOP Stage 'Universal Controller that maximises interchangeability amongst BMS equipment, requires no wiring, no dedicated 'expert', uses common software, and maximises interoperability via the cloud. A low-cost 'Plug and Play' approach has been identified, based on SmartPhone tech that could satisfy current /future needs, and open significant \$bn markets.

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Massive Analytic Ltd	Video Precognition	£369,744	£166,384
<b>Project description - provided by applicants</b>			
<p>Founded in 2010, Massive Analytic is a London-based data science company, developing innovative technologies related to artificial intelligence, big data and predictive analytics. Holding core patents for artificial precognition, MA seek to disrupt the way we interact with data, realised through the novel software platform Oscar AP. This project aims to transform video analytics by making it possible to predict likely event outcomes. Surveillance videos can be monitored automatically in real time, triggering alerts to be sent to response teams such as emergency services as required. This allows crowd managers and emergency services to target resources effectively. Current video analytic solutions are limited by their capability to capture relevant information from video streams in real time, given the increasing size of data streams. Human operators can only monitor a limited number of screens and their reliability decreases dramatically after 20 minutes continuous monitoring. The performance of automatic video analytic solutions is also limited, with high rates of false alarms and missed events. Massive Analytic have applied the latest techniques in data science and, by approaching video analytics in an entirely new way, have succeeded in demonstrating the concept of video precognition. This demonstration system is able to predict when a fight is about to break out in a crowd, or identify a car driving amongst the people. To develop the system to a prototype that can be used to engage with clients, the system will need to be scaled to be able to process thousands of hours of videos and trained to recognise a large array of different behaviours. Massive Analytic will use their expertise in big data solutions to deliver an innovative, robust and computationally efficient video precognition system that can interface easily with third-party systems.</p>			

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