Technology Strategy Board
Driving Innovation

Results of competition: Smart – Round 5 – Development of prototype

Total available funding for this competition was £9.4m from the Technology Strategy Board.

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
3D Repo	3D Repo	£120,000	£54,000

Project description - provided by applicants

Business globalisation and the internet are redefining the way we work and communicate. Not surprisingly, the demand for geography-bridging web-based work tools and collaborative services continues to expand. Online information sharing, document editing and project planning can indeed accelerate and improve results, especially where multiple stakeholders are contributing towards a common project from different physical locations.

For many industries including, but not limited to, architecture, design, engineering, gaming and film, 3D content is an essential part of the business model whenever distributed teams require common access to the assets. 3D RepoTM (http://3drepo.org) is an open source version control system that enables coordinated access to large-scale 3D data. It is currently the only cloud-based architecture able to support maintenance and transmission of 3D information as well as rendering on the scale required by the industry. Based on the results of our academic research we propose significant improvements in the Building Information Modelling (BIM) workflow that supports collaborative development not possible otherwise. Instead of designers and stakeholders sharing massive files in a costly and time consuming manner, they would simply point their web browser to a shared 3D repository in order to collaborate over the Internet. With our system, the stakeholders will be able to seamlessly examine all project stages virtually, even on mobile devices.

The objective of this project is to turn these novel concepts into a practical solution that can be applied on a live architectural project as an industrial demonstrator for the technology. Even though the initial development is driven by the built environment, 3D Repo will be applicable to all aspects of Computer Aided Design (CAD) including aerospace, automotive and 3D printing applications. In the long term, we aim to develop the technology into a commercial grade open source solution.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
A.M.P-Rose Limited	A.M.P-Rose: A prototype process for high efficiency, high throughput, secondary packaging of snacks	£649,163	£227,207

Project description - provided by applicants

A.M.P-Rose is one of the world's leading suppliers of processing and packaging machines for the chocolate, confectionery, candy, biscuit and wafer industries. We supply new as well as used and rebuilt confectionery machines of many types. In recent years, we have transferred these skills into manufacturing savoury snack packaging machines to meet the growing opportunity in this area. Snack foods such as crisps are typically sealed into packets straight after manufacture to preserve freshness. Different flavoured crisps will be manufactured and packaged on separate lines. It is then common practice to bring together a collation of packets for secondary packaging in a larger bag.

In a conventional collation packaging line, the packets are delivered from the individual bagging lines, through a number of sorting stages and onto individual belts from where packets are individually selected and suction-lifted into the collation line by robotic devices. Because this selection and lifting operation is slow, a number of robotic devices are needed. These are extremely expensive and require a large amount of floor space. Also on a conventional line, changeover to a new product type or collation can result in significant downtime because the machinery has to be manually adjusted. We have designed a novel collating packaging line, which uses a conveying system and new servo technology to feed individual packets to the wrapper for multi-packing. The benefits include: higher throughput, automatic change-over, bale formatting, increased efficiency and lower capital costs.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Apollo Pass Limited	Apollo Pass	£512,600	£230,670

Project description - provided by applicants

Apollo Pass is a revolutionary primary ticket agency providing a comprehensive service to the live events industry. This includes: ticketing services, access control, cashless payments and real-time onsite analytics. At present, the ticket industry is plagued with many economical and social problems. These include: ticket touting, prolific ticket fraud and counterfeiting, rising administration fees and lack of transparency.

As the current industry leaders are failing to respond, consumers, venues, festivals, promoters, the police and government are calling for regulation or legislation, but a technological solution is preferable and considered to be more sustainable. Apollo Pass is the first ticket agency to address these problems. We are developing a product and system that is tout and counterfeit proof, abolishes admin fees and introduces industry firsts such as refunds and transfers of tickets. It is extremely disruptive, exceeds every demand and is set to reform the industry.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Aragreen (UK) Limited	Novel photobioreactor for sustainable high value chemical production	£259,123	£116,605

Project description - provided by applicants

The project will seek to develop a novel photobioreactor (PBR) for the industrial production of Astaxanthin from the micro-algae Haemotococcus pluvialis. The bioreactor design and technology will be based on a 300l bench scale model developed by Aragreen (UK) Ltd. It will be capable of operating efficiently in the UK's climate, will utilise only a small land footprint and can be operable using treated water from waste water treatment works, as the key feedstock in algae production.

Such a production platform will aim to produce astaxanthin from H. pluvialis algae at a price point comparable with existing synthetic sources, would offer a novel engineering solution to the industrialisation of algae biomass production in the UK; and open the possibility of utilising a hugely valuable but unexploited resource for algal production: nutrients (Phosphates & Nitrates) from the UK's waste water plants. Rising global demand for astaxanthin will provide the foundation for expanding the company's product portfolio into additional high value chemicals derived from algae biomass and its associated derivatives.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Bullingdon Research Limited	Bullingdon Research Ltd - Solvency II: Insurance Capital Adequacy Modelling Software	£613,099	£250,000
Project description - provided by applicants			
Bullingdon Research Ltd will develop stochastic financial forecasting software to enable insurance companies to calculate their capital adequacy, which is a requirement under Pillar 1 of the EU Solvency II framework. This risk-modelling environment will be accessible over the web and via mobile devices, utilising a cloud based mathematics engine designed for high performance and large scale commercial computation. A prototype will be constructed for user testing and rapid iteration, in order to prove fitness-for-purpose of the final production application.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Cadscan Limited	A Low-Cost Dental Impression Scanner	£320,203	£144,091

Project description - provided by applicants

Dental impression scanning is the process of digitising a physical cast of the soft and hard tissues in the mouth precisely. The resultant 3D model can be used for subsequent dental restorations which can be milled from solid materials such as crowns, veneers, inlays, bridges and dental implants. The process is fast and efficient, with the replacement parts typically bonded on the same day, requiring a more conservative preparation of the tooth. In contrast, the conventional method requires the patient to wear temporary prosthesis while a dental laboratory produces the restoration over several weeks.

This project will develop a prototype digital impression scanner that can match the high accuracy of existing systems but at a fraction of the cost. The system will be developed and tested against a set of requirements developed in collaboration with a number of dental surgeries. According to analysis from Millennium Research Group, the global dental CAD/CAM system market will grow strongly to reach a value of more than $540 million by 2016. This market will see particularly strong growth in its chair-side segment. Furthermore, Japan will see stronger growth overall than Europe or the United States. The chair-side segment, which permits dentists to have CAD/CAM functionality in their offices, will show the most significant growth worldwide. From around 50 percent of this market in 2010, chair-side systems and intraoral scanners will hold nearly 60 percent of a much larger market by 2016. The main results from the project will be a pre-production prototype, a 10 micron scanning module, 3d imaging intellectual property and design tools to improve our scanning design capabilities.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Canning Conveyor Co. Limited	System for Processing of Reclaimed Asphalt Planings (RAP) for High Percentage Incorporation of RAP in new lay road surfaces (Infrarap)	£430,315	£193,641

Project description - provided by applicants

Currently, asphalt removed from a road is stockpiled for later use as aggregate for new hot mix asphalt (HMA) at an asphalt plant. This reclaimed material, commonly known as RAP – recycled or reclaimed asphalt planings, is crushed to a consistent gradation and added to the HMA mixing process. Asphalt consists of 95% aggregate and 5% bitumen, both of which are valuable resources with high embedded energy and CO2 footprint. Several in-situ and ex-situ recycling techniques exist for asphalt recycling the most common of which introduces RAP using a cold feed which bypasses the drying drum. Due to the high moisture content, very low volumes (~20%) are re-used at a significantly high energy cost because the virgin aggregate must be heated to 200-300 deg C. There are also significant issues with the quality of the final product as the aged bitumen binder is damaged by the high temperature needed to dry the virgin aggregate and becomes susceptible to UV degradation and is rendered liable to early stone loss and cracking.

The Infrarap project aims to develop a system for processing RAP so that higher percentages can be incorporated into paving materials and especially into the wearing course layer. The system will comprise adaptable heating, mixing and conveying systems which will feed RAP at an optimum low temperature into elevating skips; or direct to a mixer-feed chute via a conveyor of a static mixing plant; or a mobile mixing plant, using an efficient rejuvenator which will allow high percentages of RAP to be recycled into asphalt mixes at low temperatures. The development follows some preliminary investigations into current methods of incorporating RAP into mixes, including alternative systems. There is a clear market need for an independent method of heating and directly feeding RAP into the pug-mills of mixing plants that bypasses a drying drum and obviates all adverse issues with scorching RAP and blocking filters and screens.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Dexter Intelligence Limited	RISCA : [Realtime Intercept of Social Comment and Audio]	£497,631	£223,933

Project description - provided by applicants

The exponential growth in ‘always on’ and ‘always open’ 24/7 communications through the internet (social media, blogs, news feeds), email and mobile devices (phones and SMS), is producing an overwhelming volume of largely unstructured (text) data. This data contains information important to corporations for monitoring brands and interacting with customers, and is critical to Law Enforcement & Government agencies [LEA] detecting potential threats.

There is an urgent demand for a step change in technology that will process this type of data beyond information and into intelligence, and do this in real-time. To address this pressing need Dexter Intelligence successfully developed a Technology Strategy Board supported proof-of-concept. Trend and Relationship Analysis and Visualisation on Intercept Streams [TRAVIS] software suite demonstrated that it is practical to gather, index, enhance and link intercept data from different sources, providing "real-time” insights allowing intelligence-led and rapid decision making. A new project, RISCA - Real-time Intercept of Social Comment and Audio - will develop this proof-of-concept into a fully functioning prototype. It will focus on the vast quantity of voice and email data produced at modern call centres, combining this with comments and interaction with customers on social media. RISCA will provide organisations with an enhanced understanding of customer interactions, improving the acquisition and retention of customers and increasing revenue per customer. RISCA will deliver a scalable platform that provides real-time analysis on high volume intercepts such as call centre voice content, twitter pipe and LEA facilitated internet traffic. As part of the solution, very efficient voice-to-text conversion is required and auto-text translation is also necessary for selected key markets. Both of these will be third-party components, the technical challenge here will be the efficient embedding of these to maintain performance and scalability.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Dolphin Computer Access Limited	Accessibility Pad (aPad)	£673,633	£235,772

Project description - provided by applicants

The aPad project will undertake development of a prototype device for the provision of accessibility software. This will address vision impaired (VI) access to reading materials available on 'tablet-form' devices as mainstream computer devices are difficult to use by someone who is not technically proficient and who has accessibility needs.

Therefore a new generation of accessibility capability is required for mobile devices. The innovation activities are to: a) Overcome the identified constraints on the features required of tablet devices so that a generic accessibility software application can provide the required support for vision-impaired users; b) Address the problems of text/audio synchronisation in the delivery of EPUB3 (the international standard for eBooks) based content; c) Address the problems of making a web browsing experience as easy as possible for someone with restricted vision and where the features in web pages do not facilitate accessibility; d) Provide federated search, using the appropriate metadata in EPUB3 as provided for accessibility-enabled content, so that the appropriate books can be obtained.

Successful deployment of VI accessibility software on 'tablet-form' devices will: a) Ensure that VI people can cross the digital divide and have affordable, mobile and user friendly access to the Internet and relevant digital content. This will have significant social benefits in terms of greater mobility, increased integration into society, improved self-esteem and self-sufficiency; b) Enable providers of print-based content delivery devices to include this new accessibility software in their device and so ensure that the devices are accessibility-enabled. This will have economic benefits as well as social benefits through the reduction in CD production and packaging. The key deliverables are the evaluation of the new accessibility enabled applications through Prototype demonstrators using Android-based tablet devices.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Dynamic Boosting Systems Limited	ElectricSupercharger for Automotive Engine Downsizing	£549,203	£247,141

Project description - provided by applicants

This project builds on the success of (BS088J) IDP7 and seeks to bring into production the world's first high-performance; low-cost, electrically-driven supercharger (eSC) specifically designed for the rapidly growing segment of small engine (ca. 1.0L) vehicles. By 2016, it is estimated that 49% of gasoline engines will have a displacement of <1.2L and 50% of diesel engines will have a displacement of <1.3L. This segment growth is supported by increasingly stringent regulatory emissions controls and changing consumer preference for more economic, environmentally conscious transportation.

However, these increasingly discerning consumers also seek these downsizing enhancements without compromise to their overall driver experience – requiring automotive OEMs to deliver larger torque from smaller engines, particularly at low engine speeds. Whilst engine boosting systems have become established ways to deliver an enhanced driving experience, the technology remains problematic in several key areas important to Automotive OEMs, particularly for small engines (e.g. engine response; impact on other car systems). eSC is based on Dynamic Boosting System's patented TurboClaw® technology. It has unique design attributes that mitigate many of these performance issues, whilst also delivering superior engine performance in accordance with downsizing objectives. During IDP7, eSC provided a proof-of-concept, which resulted in a 20% reduction in CO2 emissions and a 31% increase in torque on a 1.0L displacement engine, compared to its single turbocharged counterpart. These characteristics have created significant interest amongst a number of automotive OEMs. Building on this success, this project aims to bring eSC to market in 2018 with conservative estimated sales of 20,000 units, generating over £500K of manufacturing licensing revenues. By 2020, we conservatively estimate annual revenues to be £3.8m with an annualised production of over 1m units.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Eris technology Limited	Development of a Biometric Emotional Analytics Methodology and Technology Platform	£182,072	£81,932

Project description - provided by applicants

Eris Technology Limited is a start-up company, spun out of Staffordshire University in October 2013. We are working within a wide range of industries to define a methodology and technology platform that will provide and enable business to incorporate biometrics enabled emotional response information into product development lifecycles and service delivery.

Building on the research of Dr Clive Chandler into human emotional response and behaviour, our innovation is based on a new methodology, B.E.A.M (Biometric Emotional Analytic Methodology) which combines several biometric software and sensor technologies with intelligent reasoning and provides a more accurate emotional profile of a user, offering both a historic data set and live analysis capability. B.E.A.M. utilises non-intrusive sensor technology to indicate the emotional response of users to any form of media. Our technology is applicable to many industry sectors in both public and private, it is hoped that our innovative approach will lead to providing more appropriate information to parents in their decision process for future game purchases for example the level of fear in any particular game. In addition we intend to develop applications in the future addressing the health sector, criminal justice system and online gambling.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Fabbed Limited	Fabbed.com prototype: designer consumer products made digitally, through distributed manufacturing	£552,507	£248,628

Project description - provided by applicants

Fabbed.com aims to build a global online marketplace for digitally fabricated products, initially focused on furniture and furnishings. We intend to transform the choice available to consumers and provide a viable alternative to mass produced products that dominate the market today. Our vision is to give the consumer access to hundreds of high quality designs by talented designers worldwide for any product category. Moreover, consumers can customise any of these items by choosing materials, finishes and functionality. Fabbed.com leverages a new generation of computer controlled manufacturing technologies, which includes 3D printing and laser cutting. Such new technologies are transforming the economics of manufacturing by reducing labour to a smaller percentage of the cost of manufacture.

Another disruptive aspect is that the products are manufactured locally (thereby reducing transport cost) to the consumer by a network of SME 'makers' using this new digital fabrication technology. To make Fabbed.com scalable we need to build an innovative technical platform protocol and commercial process that bridges the divide between the software used by designers and the manufacturing equipment/data required by the makers to produce them. The team at Fabbed Limited have extensive prior experience in digital fabrication. They built two websites that have helped to inform and evolve the concept of a global marketplace for digitally fabricated products: Fabhub.io: This directory website helped us to establish the viability of the fabricator network that lies at the heart of the Fabbed marketplace; and OpenDesk.cc: This site is a proof of concept for the Fabbed.com marketplace and proves demand and commercial viability of selling digitally made, designer wooden furniture online and manufacturing them on demand via a distributed maker network. The Fabbed.com marketplace will ultimately address a wide range of product categories made from many different materials.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Foodient Limited (Trading as Whisk.com)	Revolutionising home cooking through smart data	£510,320	£225,320

Project description - provided by applicants

Rising food prices and obesity are key issues around the world. Conservative projections predict that 2.16 billion adults will be overweight and 1.12 billion adults will be obese by 2030. Globally, food prices are near their historic peaks, and food price volatility is widely seen as the new norm. Whisk proposes to create a recommendation engine to give users recipes suggestions to cook with leftover ingredients, suggestions for meals tailored to specific dietary requirements and suggestions for recipes that each specific user will enjoy based on their flavour profile.

The recommendation engine will be able to process any digital recipe in real-time, using state-of-the-art natural language processing on top of a comprehensive food knowledge ontology. Users will have access to important nutritional, flavour and wasted leftover information wherever they find their recipes. This project will provide users with the ability to receive insights and recommendations to improve their quality of life in a life-changing way. Whisk's existing footprint and partnerships will mean that functionality developed in this project will be made available of millions of people upon completion. The service will be free of charge for users and funded through FMCG and supermarket advertising. Whisk is a popular digital shopping list application that allows users to add any recipe they find online to a single shopping list and then, with a few clicks, purchase the ingredients from any online supermarket they like. Since launching in January 2013, Whisk has made a sizable footprint within the world of online recipes and shopping. It has integrated Tesco, Ocado, Waitrose and Asda, is working with the world's largest digital food publishing brands and advertises top global FMCG brands within shopping lists. Since December 2013, over 8 million people see Whisk functionality on over 200,000 publisher partner recipes each month. 2014 will see Whisk expand its reach internationally.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Glassfit Inc Limited	Race Yourself - An Augmented Reality Platform For Smart Eyewear Devices	£514,694	£231,612

Project description - provided by applicants

Getting fit is amongst the most common New Year resolutions following the season of indulgence. However, once the initial momentum has subsided, maintaining motivation and persevering is often difficult. Race Yourself is an innovative augmented reality application for smart eyewear devices, that gamifies exercise allowing you to race against yourself, friends, and even professional athletes, improving upon personal bests whilst burning calories and improving fitness and health overall.

Each accomplishment can unlock a staggering variety of imaginative new game modes. Escaping a zombie horde, avoiding giant boulders and evading a 400 tonne freight train are just a few scenarios available to racers. The objective of the technology is to employ social and addictive reward driven game play to reward racers and incentivise adherence and improvement in an exercise regime. The Race Yourself concept has been extremely well received, netting > 100k views per week of our viral promotional video, and some very enthusiastic press feedback:
“I think it’s going to be a hit… this takes it (exercise) up several notches” – Charles Payne, Journalist, Fox Business News
“Based on the success of the smartphone, we can predict that Google Glass will be the next gold rush… his (Alexander Foster) pitch was like a sci-fi movie, brilliant.” – Venture Beat, Journalist, Mohammed Elalj
“The killer app for Google Glass?” – Steve O’Hear, Journalist, TechCrunch
“Btw, I love the race yourself concept … Awesome” – George Delaportas - Technical Director @ Google
“I have to say that it took me about four seconds to understand what you guys are working and about another two seconds to decide this is the reason why I will buy Google Glass.” – Jens Sorensen, Founder of Experq (web based software company), successful exit.
“Exercise has truly entered the digital age” – Viral viral video
“Race Yourself might just be the app to get the job done” – Neha Prakash, Journalist, Mashable.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Global V-Tech Limited	WindBox – Novel Compact Vertical-Axis Wind Turbine	£250,316	£112,642

Project description - provided by applicants

Renewable Energy (RE) is a sustainable, clean way of energy generation and wind is the most widely used technology. Although the need for wind RE is well known, there is opposition to community installation due to visual aesthetics and noise. This has increased the drive to offshore wind installations, raising issues like higher installation and maintenance costs, greater transmission losses and radar interference. However, there is significant opportunity for micro-wind generation (MWG) within established domestic and commercial infrastructure of urban town and cities.

The annual deployed capacity from MWG systems rose by a record high of 65% (14.23MW) in 2010 (up from the 8.62MW reported in 2009) and brought the UK's total installed MWG capacity to 42.97MW. An installed MWG system capacity of 1.3GW is projected by 2020, generating 1.7TWh of renewable electricity annually and an estimated market size of £5.2 billion. To maximise this opportunity, we have developed a proof of concept (PoC) prototype for a low noise, high efficiency/availability, compact and modular vertical axis wind turbine unit that can be easily integrated within urban structures in a low key, aesthetically pleasing fashion.

The units can be integrated in applications with guaranteed air flow such as air extraction systems (commercial and domestic buildings) and motorway and rail track side installations; and energy from this air flow that is normally wasted can then be recover. Also, the units have a low start up speed and a high capability factor increasing its usability within urban regions/structures, where minimal and unreliable air flow would prevent the use of conventional turbines. Following on from our PoC, the WindBox project will develop a pre-production prototype to be deployed, trialled and approved for FiT in urban cities. Successful completion of the project will generate a turnover of £34m by 2020 and directly create 200 jobs within our organisation and supply chain.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Graphoidal Developments Limited	Novel Container Glass Coating and Delivery System	£543,672	£190,285

Project description - provided by applicants

Glass containers are moulded at the 'hot' end (1050°C-1200°C) by an Individual Section machine (IS machine). Prior to annealing newly formed glass containers (600 C) are subjected to a Hot End Coating (HEC) of tin oxide using precursors such as MonoButyltin TriChloride (MBTC) or tin tetrachloride. The HEC film preserves the mechanical strength and scratch resistance of the glass, whilst increasing bond strength enabling enhanced adhesion of a Cold End Coating (CEC). After annealing a CEC of polyethylene emulsion (water-based wax) is applied as an atomisation spray. This coating renders the glass slippery, enabling fast scratch and damage-free movement through the inspection and filling conveyor lines. HEC's are well documented for being corrosive, toxic in-life and environmentally damaging; however their usage has remained an industry standard since 1975.

There are 292 glass manufacturing plants globally (excluding India and China) across 27 sizable companies; on average 125,000 containers are formed per minute from 1924 production lines. Graphoidal wishes to conduct a period of R&D to develop a pre-production prototype 'onestep' cold-end coating process, thereby eliminating the hazardous and expensive organotin HEC. The container glass industry is continually searching for solutions to drive down production costs. Substituting the use of organotins for siloxane based polymers will eliminate hot-end coating requirements and allow savings of up to 30% on current prices of organotins. Further, organotins enter the environment by air and have devastating effects on aquatic species. Exposure by inhalation from the air and ingestion from the soil has also been demonstrated to have a toxicological impact on terrestrial animals.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Kudos Innovations Ltd	KUDOS: Development of prototype service to help researchers and their institutions/funders to maximise the impact of published research by explaining and sharing it more effectively	£374,385	£168,473

Project description - provided by applicants

Kudos will help science, technology and engineering researchers and institutions to maximise the application and impact of their published research. For the first time, it will make available a standard set of tools that all researchers and institutions can use, regardless of who has funded or published their work, making it simpler and more efficient for them to share and explain their work. Firstly, the tools will help them summarise their work in non-specialist language, supporting the government's open (public) access policies, and countering criticisms that the general public cannot understand, and therefore does not benefit from access to, research. This simpler language is better suited to translation than the scientific/technical language of formal publications, helping to broaden impact beyond the UK.

The tools will encourage researchers to explain who benefits from the research and how (for example, economic, cultural or health benefits). Secondly, the tools will guide researchers on how to share their work using 'social' media (channels such as Twitter and Facebook, which provide a growing portion of readers of research) and 'traditional' media (particularly, maximising the extent to which research is communicated to and by journalists, with the non-specialist summaries also helping to increase accurate interpretation by the media). Sharing will be guided by innovative activity plans that will be customised to each researcher's situation (subject area, career level, region; target audience; available time). Kudos will provide trackable links for use when sharing work, and will for the first time bring together article-level usage statistics from different publishers so that researchers can see the growth in readership of their research that results from using the tools, helping to incentivise and reward their effort. Finally, Kudos will provide data to institutions and funders to help them track and evaluate the impact of the research they support.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Metafused	BrandFlo - A decision engine for real time data aggregation, analytics and marketing optimisation	£674,889	£250,000

Project description - provided by applicants

BrandFlo is a cloud-based, real-time decision engine, delivering forward-looking alerts and feedback from the continuous aggregation, analytics and optimisation of any data source. Insight is leveraged by the timely transmission of alerts and triggers, enabling businesses to pro-actively improve campaign targeting, find and exploit new revenue opportunities, build knowledge on the effectiveness of actions taken upon audiences to optimise marketing strategy and maximise ROI. BrandFlo is a next generation decision engine that delivers alerts and triggers from any data form including machine, sensor and personal data and turns backward looking historic insights into forward looking intelligence for the benefit of business. BrandFlo builds upon a proven set of algorithms and processes, already employed on behalf of several blue chip customers. This project seeks to further develop and automate key areas of these presently nascent technologies, enabling future integration into a unified, automated and unsupervised platform.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MPL Systems Limited	Multi-Channel Textual Analytics for Customer Service Applications	£524,472	£236,012

Project description - provided by applicants

The key aim of the "Multi-Channel Textual Analytics for Customer Service Applications" project will be to demonstrate the use of intelligent automated response approaches for textbased interactions with call centre-based customer services. Text based messaging e.g. email, Twitter, etc. in customer service interactions is becoming more prevalent, particularly by the younger generation. The introduction of textual analytics is one way to significantly improve customer services. The textual analytics will be realised using Natural Language Processing (NLP) techniques applied to the different text-based communications channels. The corresponding set of interpretations and automated text-driven conversations will be seamlessly integrated with any person-based interaction via the contact centre to provide coherent and seamless communications with customers.

The innovation of this project is through the development of the: a) Automated Interaction Engine that hosts the NLP algorithms to realise the automated text based interactions with the user. This will include mixed channel communication and will ensure that the interaction appears to be 'human-to-human' b) Content Analysis Engine used to analyse the text-based content to obtain the relevant sentiment and trend analytics. Sentiment analysis will be used to provide market acceptance analytics and to enable real-time market response.

The benefits that will accrue to the users of new system are: a) Service agents will be able to handle a significantly greater number of customers without increasing the number of staff and while providing a better quality of service b) Customers will encounter a more responsive and interactive customer service through the provision of more accurate and up-to-date information on the handling of their issues c) New business models will be possible based on the extent of automation, the range of market sectors being supported and the richness of the automated interactions supplied.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MWR Info Security Limited	Countercept- a Blended ETDR Tool	£716,133	£250,000

Project description - provided by applicants

Cybersecurity is a growing threat to large and small organisations in the UK, costing the UK economy ~£27bn per year. Cyber-attacks cause major data loss, disrupt business operations and cause the release of intellectual property affecting businesses, governments and public bodies. The scale and nature of cyber-attacks is well documented and the increased penetration of ICT and data into daily life has driven the UK Government to raise cyber-attacks to a tier one threat.

Cybersecurity has evolved alongside ICT technology to protect data and in 2013 the market was worth $188.9bn globally and £2.8bn in the UK. Typical solutions consist of firewalls, antivirus tools and intrusion detection systems. Security Information and Event Management (SIEM) tools have also been developed as a tool for organisations to monitor event and information activity across a network. SIEM tools are used to carry out investigations into cyber security breaches. To increase SIEM tools effectiveness, Endpoint Threat Detect & Response (ETDR) solutions have emerged as the next generation technology to detect malicious attacks or activity where they occur- the endpoint or host. MWR have found that the current ETDR solutions fall short in their ability to detect and respond to network infiltrations.

Current ETDR tools tend to use either event history without real time data or event history with real time data and no ETDR tool or solution can currently combine the features of both into one effective tool. MWR, an established supplier of cyber security , intend to improve this through providing Countercept, a blended agent and agentless ETDR tool. Countercept will reduce the time and cost of an investigation and improve data quality for current ETDR tools. Countercept will be a valuable tool to both large and small organisations and will be a product that would sit alongside an SIEM tool to improve the SIEM performance and reduce the costly and time-consuming burden of investigations. It is anticipated that the project will be completed by September 2015 and market entry will be by early 2016.

Results of competition: Smart – Round 5 – Development of prototype

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
Precision Varionic International Ltd	Precise - printed electronics for automotive analogue sensors	£445,740	£200,583

Project description - provided by applicants

The Automotive sector has experienced a substantial increase in the integration of electronic control systems. Electronic sensor systems are now routinely employed to monitor linear or angular motion to control accelerating, braking and fuel sensor levels. Precision Varionic International and our competitors currently manufacture integrated electronic systems using traditional masking and etching processes that are expensive, wasteful and energy intensive. As a result, much of this manufacture is now undertaken in the Far East. The application of high-tech printed electronics manufacturing techniques for the production of electronic sensors has the potential to significantly reduce the environmental impact, lower materials and energy usage and reduce costs.

This project is built on a highly successful proof of concept project entitled 'HICAST' (funded under the technology Strategy Board's Smart proof of concept scheme) that investigated the use of innovative nano-copper pastes to print potentiometer tracks. This work has shown that it is feasible to manufacture our potentiometer sensors in the UK using printed electronics to achieve a sales price 20-25% lower than is currently achievable using sub-contractors in the Far East. However, this can only be achieved commercially if the printed potentiometer sensors are able to meet the demanding automotive reliability standards; and be easily integrated into the vehicle wiring harness during mass manufacture.

This project will further develop the nano-metal pastes, printing and laser curing technologies to achieve a pre-production manufacturing route and prototypes samples of a standard potentiometer sensor. If these prototype potentiometer sensors are able to achieve the cost and technical performance we predict, then our customers have indicated that they would be prepared to purchase our UK manufactured potentiometer sensors in high volumes potentially enabling us to achieve cumulative sales of 40,000,000 units and £11.32m in cumulative sales revenue by 2020.

Results of competition: Smart – Round 5 – Development of prototype

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
Reduse Ltd	Unprinter	£497,100	£223,695

Project description - provided by applicants

Reduse Ltd has invented and demonstrated the technical feasibility of a technology to remove toner-print from paper, using laser ablation. This technology, which we call “unprinting”, allows office paper to be reused instead of being recycled. Unlike alternative methods, unprinting can work on all regular office paper and is not dependent on the use of any special toner. By applying unprinting in the office environment, cost savings of at least 40% could be achieved compared to buying recycled paper, while simultaneously reducing the associated carbon emissions with up to 80%.

Having researched the concept of unprinting in basic form, we now need to develop a prototype unprinter aimed at our target market of large, paper-intensive companies. We have the first companies signed up to help us to evaluate this development and assist with the running of pilot tests. Our ability to achieve the desired performance characteristics of the unprinter is largely unproven and we are an early stage company without revenues and so form a high-risk, high return opportunity. The support of the Technology Strategy Board in financing the development of a prototype is important for us to keep the momentum on this project, attract investors and prevent (foreign) competition from overtaking us.

Results of competition: Smart – Round 5 – Development of prototype

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
Synergy Logistics Ltd	Snapcontrol	£521,609	£234,724

Project description - provided by applicants

The Snapcontrol System project will demonstrate a new form of Warehouse Control System (WCS) designed to significantly improve the efficiency of stock/order picking within a warehouse. Stock/order picking from many product lines of varying physical size and weight is notoriously expensive and difficult to fully automate. Snapcontrol provides a first to market solution ideally suited to supporting ecommerce-based stock/order picking where any mistake in the completion of the picking can have significant adverse business consequences. The commercial aim is for a Snapcontrol solution to cost only 10% of that for a traditional WCS.

The Snapcontrol solution uses standard off-the-shelf components to create a new flexible putto- light trolley and control system that enables warehouse staff to quickly and reliably identify, pick, confirm and complete multiple orders. The innovation activities are the new: a) Snapcontrol Tablet – to extend the capabilities of the WCS and the various types of stock machinery that can be deployed around a warehouse (using standard Android-tablets with Wifi/3G/4G networking) b) Trolley Routing Engine – to host the new routing algorithms within the Snapcontrol server that identify the optimised stock picking routes for multiple trollies, holding multiple totes (plastic bins), within a set of warehouses.

Successful deployment of the Snapcontrol System will: a) Significantly reduce the time to pick stock and improve the accuracy of the picking. This will enable both the picking of more orders per day and reduce the number of staff required to pick the stock. The system can be installed in any warehouse and use any of the standard order/stock picking trollies and totes b) Enable a new range of warehouse support opportunities for companies who could not afford the capital investment traditionally associated with such a system. The ROI is based on costs of only a few tens of thousands of pounds as opposed to the more common few millions.

Results of competition: Smart – Round 5 – Development of prototype

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
Torotrak (Development) Limited	Torotrak V-Charge - Development of a Variable Drive Supercharger for OEM Application	£584,964	£204,737

Project description - provided by applicants

The global automotive industry is under pressure to reduce C02 emissions, both from legislation and consumer pressure. This is driving OEM's to make vehicles more fuel efficient with a variety of approaches such as reducing weight, improving aerodynamics and adopting electric hybrid technologies. Despite significant industry investment and incentives, hybrid electric vehicles are expected to take a small percentage of total vehicles sales for the foreseeable future. Internal combustion engine downsizing and down-speeding are expected to be the dominant ways of reducing CO2 output, where a smaller engine with fewer cylinders running at lower speeds, results in lower pumping and frictional losses which reduces fuel consumption.

Customers however are reluctant to trade bigger, more powerful engines for better fuel economy. To regain lost performance, car makers are pressure charging these smaller engines by a process of squeezing more air and fuel into the engine to increase its performance when required. The incumbent way of achieving this is by turbocharging which regains peak performance, but on a downsized engine results in reduced driveability, and a phenomena referred to as "turbo lag" may be experienced. This is when there is a delay between a driver pressing the accelerator pedal and the vehicle accelerating, caused by the time it takes for the turbo to generate boost. The V-Charge variable drive mechanical supercharger remedies this situation by providing the requested level of boost at any engine speed almost instantly, providing a driving experience similar to a larger capacity naturally aspirated engine. The key aims of the project are to assess the performance, fuel economy and emissions of a VCharge equipped vehicle in a specific OEM application. Firstly in a modelling environment, to produce a system specification to realise the full potential of the technology, and then in preproduction prototype hardware on engine test bench and ultimately in vehicle.

Results of competition: Smart – Round 5 – Development of prototype

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
Viridis UK Limited	A Novel & High Efficiency GRP Double Glazing System	£555,958	£250,000

Project description - provided by applicants

With 26% of building heat lost through windows and 45% of the total UK energy consumed for heating purposes, efficient windows have the potential to significantly reduce energy consumption and in turn greenhouse gas (ghg) emissions, thus supporting EU and national targets to reduce ghg emissions by 80% by 2050. Energy efficiency of windows is measured by U-value, lower U-values equal higher thermal resistance and improved efficiency. The rising price of fuel and government regulations/initiatives, is driving consumer demand for windows with lower U-values.

Double glazing is the most commonly used system, installed in 42% of EU buildings. Aluminium and uPVC double glazing is preferred for commercial projects due to competitive price but: 1. Does not achieve U-values that equal 1.4 W/m2.K required by forthcoming 2014 building regulations; 2. No single system meets the criteria demanded by UK architects and specifies crucial for mass penetration of commercial market. Current best in class systems meet energy requirements and aesthetics but are high in price (triple glazing and pultruded glass reinforced plastic (GRP), so limiting penetration of commercial glazing market and restricting use to high specification projects.

Viridis aim to address this market opportunity through the development of an innovative double glazed window which combines GRP and renewable sourced softwood, to develop a highly efficient system with: low U-value; Passivhaus standard and Code for Sustainable Homes Level 6; low price; slim profile with high glazed area; low maintenance; extensive lifespan of 60+ years; and internally beaded. Virdis will develop three glazing system prototypes, with the aim of creating a window that has the same U-value as triple glazing but can be sold competitively at double glazing prices. The benefits are considerable given that replacing existing BRFC A rated windows with the Viridis system would achieve an annual energy saving of 0.4 MtCO2e/household, widespread uptake of this solution would save an estimated 8,700,000 MtCO2e/year.

Results of competition: Smart – Round 5 – Development of prototype

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
Webster Technologies Limited	Development of a novel hydraulic breaker for attachment on excavation equipment	£249,355	£112,210

Project description - provided by applicants

Hydraulic breaker attachments for excavators have been used throughout the world in the construction, demolition and quarrying industries for over 40 years. Their development has seen only incremental improvements during this time. Major advancements in performance are unlikely based on the mechanism utilised. The market however continues to demand superior performance-to-weight ratio with lower cost of ownership. Customers want to reduce the resources required to operate their machines, increase the efficiency of breakers and fuel consumption, while high noise levels remain a debilitating by-product of the technology.

Webster Technologies (WT) has a long history of developing pioneering “heavy” equipment since 1965. More recently, WT has been successful in developing a “gearbox-less” rock cutter attachment for excavators, which is now sold globally. Following extensive research into alternative methods for generating higher impact forces, WT has developed a new type of breaker concept unique to the market. The technology has the potential to address many of the customer issues just outlined and make a step-change in breaker performance.

The revolutionary solution is based on a novel catapult piston mechanism, which has been successful up to proof of concept (PoC) stage. During trials, the PoC system has demonstrated 4500 joules of impact energy at a lower engine revs. Like for like, our system delivers 3 to 4 times more impact energy than the best breaker currently available on the market, using approximately 20% less fuel. The lower frequency of blows and lower excavator engine revs results in a much lower perceived noise level by humans and confirmed by operator feedback during PoC trials. However, in order to deliver this product to market we must first undertake research and development to address key challenges which arose during the experimental trials. By overcoming these challenges we will deliver a fully tested and validated pre-production prototype.

Results of competition: Smart – Round 5 – Development of prototype

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
WITT Limited	Developing a WITT prototype which will harvest wave energy from all six degrees of motion for deployment and testing in marine buoy and small vessel applications	£438,276	£197,224

Project description - provided by applicants

Sea waves are a renewable resource comprising 70% of the planet. But converting sea wave motion into electrical energy is challenging, in part due to the relatively low speeds and irregular movements of ocean waves. WITT Ltd (WL) has devised a technological innovation in energy generation called the WITT that has the capability to harness wave energy. The innovation concerns a patented transmission system that converts mechanical motion in the full six degrees, up and down, back and forth, side to side, into a single unidirectional rotation used to drive an efficient generator for the production of electricity.

No other transmission is capable of collecting all of this chaotic motion and turning it into useable power. WITTs can be scaled to any size and fitted within different enclosures dependent on the application. Sealed unit operation is potentially maintenance free and suitable for marine environments. It can also be built from tried and tested industry components. For this reason the WITT provides a far more compelling marine energy harvesting device than is currently available. This project will create a prototype unit capable of delivering 15 watts for use both in marine buoys and small boats where naturally occurring motional energy can be converted into usable power. Many marine buoys require electrical power for instrumentation and lighting devices. Solar photo voltaic (PV) is often used but has daylight use limitations and requires extensive battery support. Small marine vessels, yachts, motor-boats, etc also can use of solar PV with the same limitations. Small wind turbines are also used but are noisy and only work in windy conditions. Otherwise electricity is sourced from diesel power. This project will demonstrate WITTs in marine buoy and small vessel use to show its compelling energy harvesting capability and will demonstrate the cost and environmental savings than can be achieved by generating electricity from a WITT compared to diesel for all small vessels.

Results of competition: Smart – Round 5 – Development of prototype

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
Xstrahl Limited	The Compact Gamma Camera (CGC) – An advancement in imaging for cancer diagnosis	£746,829	£250,000

Project description - provided by applicants

Sentinel Lymph Node Biopsy (SLNB) is a minimally invasive surgical technique which determines the likelihood of cancer spreading from a primary tumour and becoming metastatic throughout the lymphatic system. It is the most common procedure for evaluating and diagnosing breast cancer and melanoma which have both experienced a significant rise in incidence globally. The most common method of SLNB (~99% of all SLNB procedures) uses pre-operative gamma scintgraphy, injection of blue dye/radioactive substance (typically Tech 99) and detection of the SLN using a gamma probe.

Despite its widespread use, there are a number of recognised limitations: Cost and inflexibility of gamma scintgraphy - Probe signal masked by injection site activity - Probes inaccurate when detecting lesions in deep seated nodes - Blue dye dissipates quickly causing issues with tracking nodes. These limitations result in the SLN being located in just 92% of procedures; and a high procedural false negative rate of up to 15%. False negatives lead to under-staging and under treatment of individuals with node positive breast cancer, subsequently leading to higher rates of recurrence. Xstrahl's market investigation has indicated that a significant need exists for an advanced gamma camera for use in SLNB with a particular emphasis on more accurate imaging techniques and miniaturisation of components. Xstrahl aim to address this need through the development of a high spatial resolution multi-modal imaging Compact Gamma camera (CGC), which will deliver the following benefits over current technologies: Combined optical and gamma imaging to provide a 3D image - Improved resolution (<1mm) - A low cost design (sale price~£50,000). With considerable increases in cancer incidence projected as a result of an ageing demographic and with the global cancer/tumour profiling market already a $13.30 bn industry, the development of the CGC represents a significant business opportunity, with market entry expected in Q3 2015.