

Technology Strategy Board

Driving Innovation

Collaboration nation

Technology-inspired feasibility projects



Disclaimer

The entries in this directory were provided by the individual companies. The Technology Strategy Board cannot guarantee the accuracy or completeness of any of the information about the winning projects.

The Technology Strategy Board is a business-led executive non-departmental public body, established by the Government. Its role is to promote and support research into, and development and exploitation of, technology and innovation for the benefit of UK business, in order to increase economic growth and improve quality of life.

Technology Strategy Board

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Introduction

Nearly two-thirds of commercial innovation stems from small companies and they are a vital source of wealth-generating new products.

This directory of feasibility projects we helped to fund provides an overview of the opportunities highly innovative small companies can offer across the UK through their developing technologies. It can also be used to help link those companies to the wider funding community to develop their ideas into new products, processes and services.

Technology-inspired feasibility studies

We funded 69 projects across three areas: low carbon and energy, life sciences, and advanced manufacturing, data and measurement. We invested up to £25k in each project, lasting up to three months.

This directory provides a snapshot of the winning projects and companies so that potential future collaborators, investors and companies interested in open innovation can get to know the companies involved.



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Atlas Genetics

We are a start-up business developing a point of care molecular and immuno diagnostic platform based on a novel electrochemical detection technique.

What is the problem your project is trying to solve?

Addition and stabilisation of reagents in microfluidic devices is a significant challenge in industry. Atlas will develop formulations and optimised drying conditions for enzymes so that they can be economically dried onto cards in a manufacturing process and are compatible with current sealing techniques.

What is the study aiming to achieve?

The project aims to deliver one or more formulations for stabilising the enzymes used in the Atlas genetics assay. The project will also identify dry-down conditions (temperature and humidity) that can be used for all reagents on the system so that a simultaneous dry-down can be achieved.

What are the potential benefits?

The know-how generated will have application in many microfluidic devices. In particular microfluidics are being increasingly utilised in the diagnostic industry, which is worth \$40bn alone. This know-how is one of the critical pieces of the jigsaw that will help UK industry bring new innovative products to this market.

What do you need to do next – to get closer to a marketable product, service or usage?

Atlas will use this know-how immediately in the development of the diagnostic system. The next stage of development required £3.6m to take the product to a prototype ready for clinical testing. It will require a further \$1.5m to bring the product through clinical trials to market.

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BlueAid Ltd

BlueAid is a consultancy company with expertise in mobile and wireless communications. It has moved into consumer-based healthcare over the past two years. Working with lead companies like GSK, Qualcomm, IKEA and many others, BlueAid has understood what needs to be done for consumer electronic healthcare.

What is the problem your project is trying to solve?

Our analysis has shown that transferring biometric data is a concern for people, hence Bluetooth and mobile phone solutions are not taken up. People can feel left out of the collection process and find configuring devices to communication with each a problem. The control that our solution potentially provides will sit comfortably with people.

What is the study aiming to achieve?

The overall solution is multi-fold: secure transfer of biometric data from measuring device to Condwei collecting device; self-powered nature of the Condwei collecting device; simple to use and transferring to PC and server via USB interface. Our aim is to create a simple system that will be self-powered and collect measured data then allow it to be transferred without the user needing to be troubled by complexity. We are trying to achieve close proximity collection that is all powered from a button press.

What are the potential benefits?

Our view is that it will provide a low-cost easy-to-use way to collect biometric data and activity. This monitoring of data can be used for the individual or if shared to monitor mass trends.

What do you need to do next – to get closer to a marketable product, service or usage?

We would be looking for further resources to help produce our system, and are potentially looking for partnerships to work together to provide of enable devices.

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**Bluefrog
Design Ltd**

We are a product design consultancy, designing for clients and also developing IP on our own account. We design water control products for the domestic market, and aim to build a portfolio of products with IP over the next few years. We have five staff, in-house prototyping facilities and a pre-manufacture workshop.

What is the problem your project is trying to solve?

Ceramic cartridges have not had development of their basic design since these largely replaced washers around 20 years ago. The project is looking to overcome drawbacks in the current design by reviewing construction, and including advanced materials plus integrating air entrainment.

The significance of this work will be to reduce manufacturing cost, increase functionality and remove the need to entrain air within the tap/valve by a separate component. Lifetime cost will be reduced and water conservation encouraged through this added-value technology.

What is the study aiming to achieve?

The study was designed to investigate the feasibility of improving the performance of header cartridges in terms of functionality, reduced cost and complexity, and to integrate an air entraining water reduction feature within the cartridge, including investigating novel materials. Such cartridges are included in the majority of modern taps and shower control valves, and revised design and materials can contribute to manufacturing efficiency, reduced cost and reduced water use.

What are the potential benefits?

This novel product has the potential to be incorporated in original equipment and for retrofit to existing medium to high-volume products. The current market for new taps in the UK is 11.25 million per year, of which about 10 million are CHCs. The price of CHC is about £1.50, making the UK market about £15m per year. The total European market is estimated at £100m per year, and the global market at £0.5bn per year.

We believe the fully developed product will, within three years, hold 10% of the UK market (£1.5m turnover, £0.3m net profit). Retrofit UK sales are estimated at £200k annual turnover (£60k net profit) by this time. Benefits to the environment include reduced energy input in manufacture and reduced domestic water use.

What do you need to do next – to get closer to a marketable product, service or usage?

Work with a tap manufacturer and ceramic cartridge manufacturer to develop the prototype into a manufacturable product, and a funding partner (for example, a Technology Strategy Board collaborative R&D project) to take the prototype from TRL3 to TRL6.

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Calex
Electronics Ltd

Calex provides high-quality, cost-effective temperature measurement and power conversion solutions for industries worldwide. In-house design and manufacturing is focused on infrared temperature sensors and AC/DC power supplies.

What is the problem you project is trying to solve?

Calex wishes to develop a non-contact infrared sensor to monitor the temperature of railway tracks. The three main applications are: detection of frozen points to enable automatic localised heating and prevent points failure; detection of ice on track surfaces to enable automatic localised heating and prevent trains from skidding; detection and warning of high temperatures that could lead to buckling of continuous rails and derailment. Existing systems rely on temperature sensors which are in contact with the rails and are prone to failure due to vibration.

What is the study aiming to achieve?

In order for the sensor to make accurate and reliable measurements it must withstand extreme ambient environmental conditions. Although weatherproofing in itself is not difficult to achieve, the adverse effect it has on the sensitive infrared measurement system is considerable.

Calex has tested a novel idea that appears to address this problem, and wishes to build and test several prototypes before applying for a worldwide patent and committing to further development. The main advantage of the Calex

sensor is that it can be mounted up to several meters from the track, away from any excessive vibration.

What are the potential benefits?

The total number of points to be monitored worldwide is estimated to be 700,000. Calex believes a net sale price of £500 to £1000 per sensor is both achievable and realistic. This suggests a worldwide market valuation of £350m to £700m. If Calex were able to secure a 30% share of this market it could result in sales of £100m to £200m.

What do you need to do next – to get closer to a marketable product, service or usage?

With a further £150k Calex would be able to refine the existing design, pay for compliance testing and resource a beta-test phase of the rail sensor. Calex also needs to build a relationship with a rail systems provider that will collaborate with Calex and provide vital test-bed data to verify that the sensor provides accurate data in a wide range of ambient conditions.

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**Cambridge
InnoVision Ltd**

Cambridge InnoVision Ltd is a technology start-up company specialising in 3D digital imaging from photos of real objects. Founded in 2003, we now have US and European patents granted to protect our method of creating virtual copies of photographed objects. The prototype software is nearing its completion.

What is the problem your project is trying to solve?

There is a general push towards 3D content. Key commercial application areas include: creative industries, computer games, virtual environments, museums, national heritage, property agencies, manufacturing industry, archaeology, and crime scene documentation. Currently used dedicated 3D scanning devices are cumbersome to use and often unaffordable.

Instead, our solution utilises a standard, hand-held digital camera. The input is simply a sequence of images, taken from different vantage points. Our method then automatically discovers the camera positions and reconstructs a virtual copy of the photographed scene (surfaces, texture and colours).

What is the study aiming to achieve?

In this study, we propose to test the feasibility of the method in a relevant application area. We continue work on materialising the patented method in the software prototype. The plan is to confirm in practice that the technology can indeed be applied generically and reliably, without having to move the photographed objects, and without the use of any markers, calibration objects, special set-ups or dedicated hardware.

What are the potential benefits?

Total sales of 3D software tools, hardware and production were estimated at \$74bn in 2007. Our disruptive technology extends the use of existing hardware, making it particularly cost-efficient, sustainable and environmentally friendly. The lower 3D digitisation costs will expand this market area significantly. A conservative estimate of the technology's market opportunity is \$20bn worldwide.

What do you need to do next – to get closer to a marketable product, service or usage?

With further funding of 125k we could mature the prototype and make it sufficiently robust for a variety of applications. We intend to perform project work for multiple organisations that have contacted us. Cambridge InnoVision is then expected to be investment ready and use venture capital investment to expand its operations.

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CuteCircuit Ltd

CuteCircuit is a fashion company that designs wearable technology. Our products are intelligent clothing that integrate new functionalities into fashion through the use of smart textiles and micro electronics. CuteCircuit is the first company to merge wearable and telecommunication technology to create products for fashion, sport and communication industries.

What is the problem your project is trying to solve?

The manufacturing and development of electronically enhanced garments is currently too expensive and logistically complicated – this causes the impossibility of introducing new products to the market in a timely and competitive manner. To solve this problem CuteCircuit has researched an innovative patent pending manufacturing and prototyping process.

What is the study aiming to achieve?

The aim of the feasibility study is to develop and validate production technology and processes for a high-value manufacturing facility able to assemble prototypes and subsequently manufacture intelligent textiles and micro electronics into clothing.

What are the potential benefits?

The UK is the leader in wearable technology – however, the market growth is restricted due to the difficulties detailed above. The CuteCircuit manufacturing method allows for the reduction of development costs and times by as much as 95%. This would allow to rapidly increase the market size of wearable applications.

What do you need to do next – to get closer to a marketable product, service or usage?

The products developed using the method have been tested and brought to a market-ready stage, and will be available at the Collaboration Nation event for demonstration. To proceed further we would require funding of £100k to manufacture and certify the products, and an electronics manufacturing partner.

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Diamond Hard Surfaces Ltd

Diamond Hard Surfaces Ltd is a technology company and solution provider to high-endurance applications of a unique amorphous diamond material, AdamantT, which gives extended life in high-temperature, chemically aggressive and abrasive environments.

What is the problem your project is trying to solve?

The marine transportation and energy production and exploration sectors currently experience significant downtime and associated cost caused by the effects of components being in contact with salt water and abrasive media.

A solution which offers a hard-wearing, durable and corrosion-resistant surface to pipes and tubes could significantly reduce the costs associated with preventative maintenance and premature failure, helping to improve the efficiency of the supply infrastructure.

What is the study aiming to achieve?

The project will evaluate the feasibility of applying a unique, low environmental impact, novel new coating technology to the exterior and interior of long sections of tube/pipe, and evaluate the design and cost effectiveness of the equipment necessary to achieve this.

What are the potential benefits?

We estimate that there is a £30m-50m total potential market opportunity for a solution which significantly improves corrosion resistance and abrasion resistance of pipes and tubes.

What do you need to do next – to get closer to a marketable product, service or usage?

We estimate that with a further £250k of funding we could build a full-sized prototype to evaluate the principal of scaling up the process to enable it to coat the size of parts which the industry is seeking to coat. We are also looking for potential customers who would be willing to collaborate with us to develop and test the solution.

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Eco Tread Ltd

Lead partner: Eco Tread Ltd – Kevin Walters is a consultant architect.
Partner: Canard Design Ltd – an innovative engineering and product design consultancy set up in 1995.

What is the problem your project is trying to solve?

The objective is to prove the feasibility of manufacturing a door closer that generates power in order to trickle charge a battery using a miniature generator. This is significant because it allows the harvesting of energy that would otherwise be wasted. By applying the technology to the appropriate application, we expect the device to be able to power associated product in a simple way.

What is the study aiming to achieve?

The feasibility study includes the generation of concepts, identification of a valid concept for development, and the production of working rigs and a 'laboratory' prototype to demonstrate that the technology is feasible to develop further.

What are the potential benefits?

The benefits of developing the device are that the power will be harvested from a source which would otherwise be wasted. A door closer is a legal requirement in many public buildings, and therefore the potential to harvest this energy is vast and the reduction in running costs of buildings that this device can be used in are very attractive.

What do you need to do next – to get closer to a marketable product, service or usage?

With a further £50k of funding the Eco Tread Ltd team would develop the laboratory prototype produced during the feasibility stage. We would seek manufacturing partners and, if necessary, external investors in order to take it to Technology Readiness Level 6.

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Industrial Tomography Systems plc

Formed in 1997, ITS has commercialised electrical process tomography – the industrial equivalent of CAT scanning. We provide sensors, instrumentation, software and technical support to visualise mixing, flow, separation and reactive processes in real time.

What is the problem your project is trying to solve?

Many types of nuclear waste are stored as slurries. The characterisation of these slurries in tanks and movement of them through hydraulic conveying requires improved understanding and process characterisation that can be provided through process tomography.

What is the study aiming to achieve?

Our aim is to provide a prototype instrument with sensors fabricated from radiation-resistant materials, able to operate over long cables and delivering improved tomography data.

What are the potential benefits?

The benefits are improved management of nuclear waste, reducing processing costs and cycle times. The scale of the challenge is illustrated in the US where on one site there are over 170 tanks each containing approx 50 million gallons of waste.

What do you need to do next – to get closer to a marketable product, service or usage?

Whilst ITS has good connections with UK and US waste management groups, additional resources would enable us to identify key users, demonstrate the technology robustly, and present the process data in a format that is easily accessible to site operatives.

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Laser Cladding Technology Ltd

We are a small company specialising in the application of special protective surfacing materials to customer components that encounter severe abrasive wear and/or corrosive environments. Coatings are applied by the laser cladding process or hand weld applied depending on requirements.

What is the problem your project is trying to solve?

The proprietary hard-wearing materials used cannot be machined, drilled or ground with conventional tooling. This could potentially be used to advantage in the development of enhanced anti-drill or anti-saw security devices. There is currently no available data which measures the improvement in anti-drill and anti-saw resistance which these materials offer.

What is the study aiming to achieve?

This feasibility study is intended to establish some basic testing procedures to gather data demonstrating the potential of the materials for anti-drill and anti-saw applications which can then be used in approaching manufacturers of security devices.

What are the potential benefits?

It is anticipated that enhanced security devices will be able to be designed and manufactured as a result.

What do you need to do next – to get closer to a marketable product, service or usage?

The results will be incorporated into a brochure which will be used in a marketing campaign targeting security device manufacturers in the UK.

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Lateral Logic Ltd

We are a small company specialising in developing and implementing new technology.

What is the problem your project is trying to solve?

A new manufacturing method for producing complex shapes in materials that are difficult to work and machine.

What is the study aiming to achieve?

The study aims to produce prototype components using the developed technology.

What are the potential benefits?

Lower cost and better dimensional control.

What do you need to do next – to get closer to a marketable product, service or usage?

Work with potential customers for the technology.

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**M Squared
Lasers Ltd**

M Squared Lasers designs and manufactures high-end optical parametric oscillators, laser products and advanced internet-based control instruments. We aim to deliver value-added products that provide our customers with significant benefits and new capabilities. Our philosophy is to evolve product families from modular, interchangeable, thoroughly tested building blocks.

What is the problem your project is trying to solve?

Optical parametric oscillators (OPOs) are all broadly tunable nonlinear laser sources currently operating in the 3-4.6 μm range. This broad tunability makes them an exciting source in many applications such as gas sensing, drug development/production and homeland security. Intra-cavity pumping of OPOs has created devices that are compact, highly efficient and can span large optical frequency ranges.

Solid-state OPOs are the system of choice because they are compact, robust and simple to use. However, due to the nonlinear nature of OPOs most systems are pulsed sources which are not ideal for a significant number of applications that require a narrow linewidth CW source; this is primarily due to the long upper state lifetime of typical gain crystals used, therefore alternative materials must be evaluated.

What is the study aiming to achieve?

The primary aim of the study is to evaluate the feasibility of using a semiconductor disk laser (SDL) as the pump source for an intra-cavity all solid-state widely tunable CW OPO. This would provide a low noise device with a compact form factor and a narrow linewidth. Due to their unique material properties, which includes a

short upper-state lifetime, a SDL pump source should significantly improve the performance characteristics over existing Nd:YAG based CW systems.

What are the potential benefits?

The total worldwide gas and chemical sensing market was approximately £5bn in 2008, and has around 8.5% growth per year. The market for gas sensor systems is currently £1.5bn-2bn, with the sales of components approximately £250m per year. Gas sensors for fixed laboratory-style instruments generally account for about 30% of market revenues. It is expected that after completion of a further development programme this project will result in significant direct sales by 2012.

What do you need to do next – to get closer to a marketable product, service or usage?

The two main issues are: find suitable partners – ideally application developers to help guide the development of targeted SDL-based OEM solutions, and to help with sales channels, application development knowledge and final product integration; and develop the bench top feasibility device into a fully packaged prototype.

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What is the problem your project is trying to solve?

Current methods for localised detection of small quantities of specific chemicals are slow, time-consuming and not useful for 'real-time' detection. There are opportunities in defence, petrochemical and environmental monitoring for devices which enable a user to visualise the presence and dynamics of a wide range of chemicals in real time.

There are very few hyperspectral systems currently available, and those are based on passive detection, capturing the low level IR signals from the target relative to the background radiation level. The sensitivity to background level and the low recovered signal levels impose limits on the sensitivity of such passive systems.

What is the study aiming to achieve?

This project will determine the capability of an IR hyperspectral imager using active target laser illumination to interrogate the absorption characteristics of a target at the laser wavelength through measuring the back scattered IR signal.

A broadly and rapidly tunable laser would enable the hyperspectral data to be gathered, with much less dependence on the background radiation. The project would examine the feasibility and capabilities of integrating

wavelength agile lasers, high-resolution detectors, and advanced image processing hardware and software to create useful devices and systems to enable the visualisation of trace quantities of relevant chemicals.

What are the potential benefits?

We believe that the products enabled by this work will allow us to enter a market segment which is sparsely occupied. Applications include: chemical weapon and explosives detection, narcotic detection, petrochemical exploration, oil and gas refinery leak detection. Within these high-value markets we would target a significant increase in turnover by 2012, which we would expect to grow considerably as we gained expertise and market penetration.

What do you need to do next – to get closer to a marketable product, service or usage?

The main kind of partners useful to take the project forward after the study are, specifically the end users of the complete system. These partners are would help to guide the final development of hyperspectral systems to address known issues and opportunities within their market sector, they should also ideally be the early adopters for the imaging systems.

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**M Wright
& Sons Ltd**

We are a technical textile company that specialises in manufacturing high-performance woven narrow fabrics. We use specialist fibres, including carbon, aramid and glass as well as polyamide and polyester. Product areas include health and safety, medical, aerospace, military and industrial. We are developing advanced technologies to produce carbon pre-forms for composite reinforcements.

What is the problem your project is trying to solve?

There is a requirement to improve the performance of fall arrest equipment. The equipment needs to be more comfortable and easier to use. Also there is an opportunity to improve the speed and quality of manufacture by reducing the number of individual components in the product by developing a manufacturing technology that can integrate product features together at point of manufacture, rather than by subsequent assembly processes.

What is the study aiming to achieve?

The project aims to demonstrate the concept of integrated product design, giving a number of benefits in use. The product will be faster and easier to incorporate into a fall arrest system. It will be lighter and simpler in design. Also the performance of the product will be engineered to provide enhanced protection to the user in an accident, because the dynamic shock loads to the body will be reduced, so minimising injury and trauma.

What are the potential benefits?

The concept will provide the platform for a new technology within the company and also with our launch customers. The product will be designed and manufactured in our existing facilities, thus preserving our expertise and skill base within the UK economy. The concept will also provide enhanced comfort and safety to the user, thus contributing to a better workplace environment.

What do you need to do next – to get closer to a marketable product, service or usage?

With a further £58k (grant funding £29k), the project will advance from a prototype to a field tested product with an established manufacturing route. We will complete the performance testing and validation, develop the marketing strategy, build up the manufacturing capability, and work with the launch customer to optimise the concept.

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Metalysis

Metalysis® is an intellectual property exploitation company that is commercialising the novel electrochemical reduction technology, known as the FFC Process. The process removes the oxygen from metal oxides at a lower capital and operational cost than conventional technologies and with a much smaller environmental footprint.

What is the problem your project is trying to solve?

FFC titanium requires post-processing before introduction to certain markets. Metalysis post-processing methodology is at an early stage but is still expected to give significant cost and environmental benefits over Kroll sponge-ingot metallurgy-mill product route.

The main focus of the feasibility study was to identify a viable, cost-effective route for the formation of titanium spherical powders for the medical and aerospace sectors. Metalysis' approach is to supply titanium powder suitable for new technologies such as metal injection molding and additive manufacturing. These methods reduce waste in comparison to conventional machining from current, typical buy to fly ratios of 10:1 to 2:1.

What is the study aiming to achieve?

Metalysis' overall goal was to define an end process step, in line with the next generation of semi-continuous cells due to come online in the third quarter of 2010. These cells will operate at a scale that will be commercially competitive, allowing Metalysis to fast track its product to market. Metalysis is the leader of several new competing technologies for the production of titanium powders to dramatically shorten the

supply chain and reduce the environmental impact. Whilst strong, scalable technology is vital, the first process to market in substantial volumes will have a significant competitive advantage.

What are the potential benefits?

The powder titanium process route has the potential to fundamentally change dynamics and demand across the titanium industry and expand the titanium powder market. Having a stable and sustainable high-quality titanium powder supply chain will allow metal injection molded parts to be used in the health care sector, to name but one, on a mass scale.

What do you need to do next – to get closer to a marketable product, service or usage?

The outcome of the study has shown that further investment of £250k would be required for the purchase and commissioning of a hydride dehydride furnace, as well as a partner with hydride dehydride experience in the UK. In addition, partners would be required throughout the titanium medical market.

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**Microsharp
Corporation Ltd**

We are a private UK company with expertise in the design and manufacture of thin film optics.

What is the problem your project is trying to solve?

We are developing a manufacturing process of large-area Fresnel lens parquets.

What is the study aiming to achieve?

To prove a manufacturing process for large-area Fresnel lens parquets using a roll-to-roll UV casting process.

What are the potential benefits?

Concentrated solar power has the potential to be the main supplier of the world's renewable energy needs. By producing lower cost, higher efficiency optics we will contribute to the drive towards grid parity cost and therefore economic viability for this technology. We will generate export revenue and high-quality jobs in the UK.

What do you need to do next – to get closer to a marketable product, service or usage?

In 2010 we will undertake field trials in conjunction with our lead customers and transition to commercial production. This will require capital investment in the region of £2m and the formation of strategic alliances with suppliers and customers.

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Moog Insensys

Moog Insensys is a world leader in optical fibre sensing technology deployment in both the wind energy and aerospace markets. Our focus has been on identifying opportunities where the fibre optic technology delivers substantial technical and commercial benefits over conventional technologies.

What is the problem your project is trying to solve?

Over recent years Insensys has succeeded in commercialising optical fibre strain sensing technology for structural health monitoring in wind turbine and aircraft applications. Customers in both industries have requested a complementary sensing system to detect cracks at vulnerable locations in structures. Some research has been conducted into crack detection using optical fibres, but no commercial products exist. The aim of this project is to demonstrate the feasibility of a commercial product for crack detection using optical fibre sensors.

What is the study aiming to achieve?

Insensys is developing a crack detection system that will detect the severance of an optical fibre due to a surface crack in a composite or metallic structure. The study aims to find a suitable method of deploying the optical fibre at vulnerable crack sites, and to develop an optoelectronics solution that can be integrated into the existing strain monitoring system. The system will be designed to suit specific applications in the aerospace and wind energy markets.

What are the potential benefits?

Crack detection is an enhancement to the strain monitoring capability used to provide active control of wind turbine blades and in aerospace for the calculation of load/time history to estimate fatigue damage. The ability to detect cracks will increase the systems cost effectiveness and its marketability.

What do you need to do next – to get closer to a marketable product, service or usage?

The next technical steps are development of a deployment method for large-scale testing, and software development to integrate crack detection and strain measurement capabilities. Funding (£65k) and aerospace/wind energy partners are required to conduct larger-scale tests in a representative environment to advance the technology to TRL5.

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Openia

Openia is a web and internet development company with expertise in open source technologies. Specifically, Openia has specialised in content management systems and bespoke installations that connect to legacy data-driven systems.

What is the problem your project is trying to solve?

Aside from confidential data, some public data are available online, most are not, and are usually presented in a variety of formats without any semantic information or ontological basis. Converting existing data to linked data suitable for the semantic web would significantly enhance the value of the data for all stakeholders.

This process would then have a considerable impact on utilisation of these data by allowing cross-referencing in consistent and 'meaningful' ways, across thousands of data silos. This would therefore increase the operating efficiency of the economy as a whole, as well as provide the private sector with tangible strategic and commercial advantages.

What is the study aiming to achieve?

The study aims to find out the feasibility of fast tracking the migration of isolated data that resides with government agencies towards linked data. The migration is not intended to affect the data in its current state, but provide a new layer of linked data that leaves the old data intact. There are two challenges: technical and socio-political. The second challenge is seen as one that needs to overcome natural and invisible

boundaries of data access within organisations. The feasibility study also aims to identify ways of making this migration possible by articulating a business model that pays for the efforts to overcome the above challenges.

What are the potential benefits?

Our project shows sustainable ways to give positive public benefit by enhancing publicly owned data, as well as providing economic stimulus to the private sector by promoting strategic advantages. An additional benefit is also one that improves operating efficiency of local government by significantly enhancing their access to their own data.

What do you need to do next – to get closer to a marketable product, service or usage?

In order to resource this project towards a beta-test phase, we need £70k towards further technical development. We also need help in building further relationships with public sector organisations which hold data, as well as connecting with the private sector, which can realise the value of the enhanced data and innovative interface.

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Fiber Ltd**

We manufacture tools for cleaving optical fibre. We are one of three manufacturers worldwide of angled fibre cleavers, which will be a large niche required to install optical fibres in FTTx. We have patented products and innovative design and partner with manufacturing organisations to produce world-leading products.

What is the problem your project is trying to solve?

The cost of cleaving tools is dominated by the cost of the sharp blade used to scratch the fibre. As the cost falls, the demand for the product rises. In this project we show a new technique for producing sharp blades of great length at a cost of about 10% of the current technology. This has the potential to revolutionise the supply of fibre cleavers and so drive the installation of high-speed internet connections.

What is the study aiming to achieve?

The study will demonstrate the production of a long sharp blade. This blade will be incorporated into a modified cleaving device and its performance will be assessed.

What are the potential benefits?

The long blade has the potential to replace 10,000 cutting blades used in the industry at a value of £1m. The long sharp blade has potential for use in various cutting applications, including surgery.

What do you need to do next – to get closer to a marketable product, service or usage?

With further funding of around £100k we would aim to industrialise the production of these long blades and become a supplier of these blades on an OEM basis. In this phase we would both develop the manufacturing technology and work with partners to identify profitable routes to market.

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**Oxford
Lasers Ltd**

Oxford Lasers manufactures laser-based imaging and micromachining systems, and supplies sub-contract services for both areas. Laser micromachining systems and services are mainly used for micro-drilling and micro-cutting in materials up to 3 mm thick with an accuracy of about 1 micron. Imaging systems are widely used for spray analysis.

What is the problem your project is trying to solve?

Laser micro-drilling and micro-cutting is currently used in materials up to 1 mm thick using currently available pulsed nanosecond lasers. Above this thickness the process speed becomes prohibitively slow and rarely economically attractive. As a result, despite the accuracy and simplicity of laser micromachining it cannot be used to drill or cut depths over 1mm. In addition, thermally sensitive materials cannot be machined at high speeds due to the high average power that must be used.

What is the study aiming to achieve?

The project aims to demonstrate that novel ideas can be applied to overcome the depth barrier. We aim to increase the economically viable depth to over 3 mm. We also aim to reduce the amount of power that must be used while increasing the process speed in material up to 1 mm thick.

What are the potential benefits?

The potential benefits to the UK arise from the increased sales – both within the UK and for export – that are likely if Oxford Lasers can achieve the technical targets set.

What do you need to do next – to get closer to a marketable product, service or usage?

As a result of the project, Oxford Lasers already has two US contracts for experimental micro-drilling with a value of over \$50k, one for production of biomedical components and the other for aerospace. The next steps will be to file patents on the process and then begin marketing in earnest.

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Oxitec Ltd

Oxitec is a pioneer in controlling insects that spread disease and damage crops. We have 28 staff, and many collaborations around the world with academic and governmental institutes. We have developed products to tackle several major diseases (including dengue, yellow fever and chikungunya) and crop pests (including medfly, olive fly and silkworm).

What is the problem your project is trying to solve?

The project: development of a novel mosquito separation process for commercial manufacturing and global product support. Oxitec has developed a sustainable, environmentally friendly and cost-effective method of insect control. Oxitec uses modern biotechnology to develop insect strains that are sterile and that can be used to control pests of both public health and agriculture. Our suite of genetic technologies known as RIDL® includes methods for sterilising insects, separating sexes and marking for effective monitoring. The approach is an enhancement of the well established 'sterile insect technique', which has been successfully used to control insects for the past 60 years.

What is the study aiming to achieve?

The sterile insect technique requires large numbers (millions) of high-quality insects to be released. The mass rearing of mosquitoes on this scale has not been attempted before and it is our aim to do this. We have been optimising many areas of mosquito rearing, and this study aimed to develop equipment and techniques for the large-scale sorting of mosquitoes and to evaluate any effects of sorting on their quality.

What are the potential benefits?

Dengue fever is the fastest growing mosquito-borne disease, affecting over 50 million people with around 25,000 fatalities each year across the world. Dengue is an extremely expensive disease, estimated to cost the global economy over \$5bn each year. Oxitec has developed a sustainable, environmentally friendly and cost-effective method of controlling mosquitoes and preventing dengue.

What do you need to do next – to get closer to a marketable product, service or usage?

With a further £40-60k we would develop rearing techniques and equipment to produce enough insects for control programmes around the world over the next 2-3 years. Consultation with manufacturing experts and building on current relationships with local manufacturing companies will help increase production efficiency and make it more cost effective.

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Oxsensis

We are an SME specialising in the development of optical sensors for harsh environments. Target applications include gas turbine combustion monitoring, avionics and automotive engine sensors.

What is the problem your project is trying to solve?

There is a strong drive to reduce the weight of aero engine ancillaries such as electrical generators. Instrumentation enabling condition monitoring of key components such as shaft bearings would enable weight reduction without compromising safety or component life. The problem addressed by SOATS (Simultaneous Optical Acceleration and Temperature Sensor) is how to maximise the benefit from sensors with minimum additional weight by considering multi-function sensors capable of measuring multiple parameters. The key issues affecting bearing life are vibration and temperature, and SOATS is considering both parameters. The problem extends into other aircraft subsystems with generators selected as a representative case.

What is the study aiming to achieve?

SOATS is aiming to identify a sensor concept capable of measuring the two key parameters affecting bearing life. The project considers the simulation of the sensor response using optical and mechanical modelling leading to a suitable design for a concept demonstrator. SOATS relies on a well understood optical measurement technique but is innovative in the way the technique is implemented to enable the

two parameters to be measured from a single sensing element (as opposed to being a co-packaging of two separate sensors).

What are the potential benefits?

If the demonstrator produced in SOATS is taken forward through to product it would offer benefits in terms of component lifetime and/or enabling reduced engineering margins in aircraft systems. The eventual benefit is felt in terms of reduced weight and therefore fuel saving and CO₂ reductions for air travel.

What do you need to do next – to get closer to a marketable product, service or usage?

Oxsensis is actively looking for partnership opportunities with tier 1 supplier of aero generators and power units. The next step is to establish a development project to take the proof-of-concept demonstrator of SOATS and develop it into a prototype suitable for testing in realistic environments.

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What is the problem your project is trying to solve?

Maintaining alignment of critical optical components in harsh environments is a significant problem for the adoption of fibre optic sensors. Established methods from the optical telecoms industry are generally applicable only at low to moderate temperatures.

What is the study aiming to achieve?

The study is seeking to develop a high-integrity process for active alignment of precision optical components at high temperatures.

What are the potential benefits?

The benefits are that if successful HEFOAP (Harsh Environment Fibre Optic Alignment Process) will enable Oxsensis to address a larger proportion of the estimated £300m market for optical sensing in harsh aerospace applications in addition to further opportunities in industrial applications.

What do you need to do next – to get closer to a marketable product, service or usage?

Oxsensis needs engagement with partners who have appropriate test facilities to enable early testing of new products under development.

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Oxsensis

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What is the problem your project is trying to solve?

High-temperature materials are generally non-reactive and this makes them hard to bond reliably. BOSDIM (Bonding Optical Sapphire to Dissimilar Materials) is seeking to identify novel ways to join optical ceramics to other materials including other ceramics and metals.

What is the study aiming to achieve?

The study is aimed at identifying means of producing reliable joints between dissimilar materials capable of withstanding high temperatures.

What are the potential benefits?

The assembly methods currently used to assemble optical sensors are expensive and so reduce the application space. BOSDIM is aimed at finding low-cost assembly methods, enabling more of the estimated £200m market for optical sensors in aerospace to be targeted.

What do you need to do next – to get closer to a marketable product, service or usage?

Oxsensis needs partners with appropriate test facilities to enable R&D testing of potential new or improved sensor products.

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Panorama Synergy (Europe) Ltd

We are a small innovation company with an Australian parent company – total six staff. We are developing new digital projection ‘light engines’ with promising advantages over LCD and DLP. We contract to universities and businesses to further develop our technology.

What is the problem your project is trying to solve?

Current projection technologies have disadvantages when being employed on 3D applications. Not least a slow switching speed, polarisation insensitivity and thermal sensitivity. LCD and DLP are the front-runners for digital cinema – however, both have inherent drawbacks and complex processing.

Our technology is solid state, bi-stable and switched 1000 times faster than DLP (and a million times faster than LCD). Processing is relatively simple. Our task is to employ magneto optic materials to switch in the RGB range – a task hitherto not recorded.

What is the study aiming to achieve?

We have developed unique optical structures which bode well for the next stage of development for RGB optical displays for projectors of all sizes. Initial results indicate switching speeds in the nano-second regime, bi-stability and high thermal tolerance. The study aims to prove the concept of ensuring sufficient light efficiency and contrast ratios are achievable in the visible RGB spectra. Further, IP management and commercial opportunities will also be highlighted.

What are the potential benefits?

Intelligence indicates projector sales around: digital cinema market – 130,000 worldwide with a value of £6bn. Annually, corporate projectors – £3bn; indoor venues – £2.1bn; education – £1.95bn; retail/signage – £1.3bn; other – £1.6bn. We believe the technology is disruptive with the potential for generating significant income and expanding the UK’s capability in nano-structured optical devices.

What do you need to do next – to get closer to a marketable product, service or usage?

With a further £500k we would be able to resource a small-scale array prototype to practically demonstrate the superior performance of the technology. We need to build relationships with chip manufacturers, potential investors and projector/display companies. Effective IP management is also a key element of the development.

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PCME Ltd

PCME was formed in 1990 and currently has 30 staff. We design and manufacture industrial dust sensors installed in global manufacturing plant for monitoring emissions and processes. Having built the company's reputation on a diverse range of sensors, PCME aims to continue to be competitive by creating new optical products.

What is the problem your project is trying to solve?

Emissions control regulations force low dust levels.

What is the study aiming to achieve?

The study has provided laboratory equipment which we can use as a tool to gain as much information as possible about the scattering behaviour of spatially-dispersed dust particles in order to allow us to design an optimum optical detection system for best dust detection accuracy at low dust levels.

What are the potential benefits?

Improved dust detection allows industrial processes to be operated more efficiently and, simultaneously, control emissions within stringent limits. Global demand for such improvements is already under way, and with the application of this feasibility study we expect to add to our current product portfolio, allowing extended market penetration and additional exports.

What do you need to do next – to get closer to a marketable product, service or usage?

We need to find and employ, probably on a contract basis, a software engineer skilled in embedded sensor software.

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Phase Focus Ltd

We are developing a 'lensless' microscopy technology, the Phase Focus Virtual Lens[®], that transfers the image-producing step to a proprietary computer programme. A four-employee firm founded in 2006, we are engaging with OEMs in semiconductor, photonics and life sciences areas to incorporate the software into existing and new instrumentation.

What is the problem your project is trying to solve?

The project is expected to demonstrate the applicability of the Virtual Lens to high-value manufacturing semiconductor process control applications, including overlay metrology and thin film measurement, which are currently limited by the imperfections and restrictions of conventional optical hardware.

What is the study aiming to achieve?

We have already demonstrated the technology for microscopy of materials that light can pass through (e.g. biological specimens such as cells). This study will extend the technology to the microscopy of opaque materials. Moreover, it will extend the method so that it can perform microscopy close to the specimens (near-field) as well as remotely (far-field). This in turn will greatly increase the number of applications for which the Virtual Lens is applicable.

What are the potential benefits?

Rapid shrinking of feature size and introduction of new materials continue to challenge conventional semiconductor metrology. Advantages of the Virtual Lens (e.g. elimination of lens-related distortions and mechanical focusing) are expected to help this \$2.1bn per year industry attain the measurement accuracy required in the next generation of VLSI chips.

What do you need to do next – to get closer to a marketable product, service or usage?

An investment of £250k (together with £150k from existing investors) will enable us to verify performance of the Virtual Lens in a number of near-term applications, and to execute commercialisation agreements with existing and new OEM partners.

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**Phase
Vision Ltd**

Phase Vision manufactures world-class optical inspection solutions for dimensional metrology applications. We have developed a range of technologies specifically optimised for high-speed 3D shape measurement with micro-scale accuracy. Our automated inspection systems allow in-process inspection of complex components, removing traditional bottlenecks in the manufacturing process.

What is the problem your project is trying to solve?

A known drawback of optical sensors is their performance with 'challenging' surfaces such as machined metal and composite parts, the specular reflections from which can cause large contrast variations in the images. Currently the only reliable solution is temporary coating of the part with developer powder, which is not attractive for routine measurements.

One important consequence of the specular reflections is the possible corruption of the measured data in the presence of multiply reflected light (i.e. light which arrives at the sensor after two or more reflections). This is a particular issue in the measurement of concave surfaces.

What is the study aiming to achieve?

Although our current sensors can detect the presence of multiple reflections, the removal of the invalid data-points often results in a fraction of challenging surfaces being unmeasurable. The study aims to investigate the feasibility of exploiting our highest performance patented algorithm – the Fourier Domain Ranging (FDR) method – not only to detect the multiple reflections, but also to provide valid data in their presence. If successful, the approach will

increase significantly the applicability of the technology within a £3bn market.

What are the potential benefits?

Incorporation of the FDR algorithm into our optical shape measurement products offers the potential to provide accurate, traceable and convenient inspection of large machined components at all stages of production, including component manufacture, assembly, in-service inspection and reverse engineering.

What do you need to do next – to get closer to a marketable product, service or usage?

Collaboration with aerospace and automotive beta-testers will be required to experimentally assess the new algorithm and validate the implementation. This study is expected to open opportunities in new markets that were previously inaccessible to the company, and we may need to consider new distribution strategies to meet these opportunities.

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Plasma Quest Limited

Plasma Quest Limited is an R&D company and a solutions provider for thin film sputter-deposition, specialising in a unique and patented plasma generation and sputter deposition process that results in the high-rate deposition of high-quality coatings of many different materials normally at ambient temperatures.

What is the problem your project is trying to solve?

The global market for PV technology is predicted to achieve a compound annual growth rate of between 14.9% and 17.5% from \$20bn in 2008 to an estimated \$44bn in 2013. The development of efficient thin film technologies is a prerequisite to enable this growth to be achieved.

Existing solar cells based on copper indium disulphide rely on either co-evaporation or a two-stage sputtering process involving the annealing of metal precursors in a sulphur atmosphere. This project looks to develop a single-stage sputtering process for the deposition of photoconducting copper indium disulphide.

What is the study aiming to achieve?

The aim of this project is to deposit photoconducting copper indium disulphide using Plasma Quest Limited's proprietary high target utilisation sputtering (HiTUS) equipment. HiTUS facilitates the high-rate deposition of thin film coatings with qualities that cannot be achieved using other more conventional deposition methods. This stems from the remote generation of the plasma and the independent control of the plasma density and the target voltage which results in a large sputter parameter space.

What are the potential benefits?

A successful project using simpler target materials will result in lower cost devices, especially if the ability to deposit at low temperatures is demonstrated. This will result in incoming finances to the UK, either in terms of manufacturing capability or for licensed technology to foreign organisations. Licensing is the route PQL sees as part of its business model.

What do you need to do next – to get closer to a marketable product, service or usage?

The next stage of the project will require a development programme to take the technology at least to prototype stage. Such a programme is likely to cost in excess of £500k due to the need for investment in capital plant to enable commercially attractive prototypes to be manufactured. Collaboration with an equipment supplier would be a prerequisite, and possibly an organisation that has sophisticated metrology would be required.

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**Safe Training
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We are a small company that develops instruments to detect water pollution. We have a product accepted by the water industry, but there are price barriers to our selling many units. We also manufacture training simulators for the nuclear monitoring industry – this business has produced exports of £3m in 15 years.

What is the problem your project is trying to solve?

Tryptophan is an amino acid found in the waste from all animals including man, so it is an excellent indicator of pollution from man and agriculture. It occurs at very low levels and can only be detected with sophisticated fluorescence spectrometer instruments, costing upwards of £15k. Our challenge was to design an instrument that would detect tryptophan at levels down to 0.05ppm, and which could be manufactured and sold for less than £5k.

What is the study aiming to achieve?

Our study was entirely concerned with designing a product that would achieve high sensitivity without the associated high cost normally found in scientific instruments. This was achieved by examining alternatives to the normally used optical components, designing simplified optical systems and integrating optics with modern electronics. The product of this work will be on display at the Collaboration Nation event.

What are the potential benefits?

We currently estimate sales of 30 units in the first year at an SP of £5k, which will be a significant addition to our turnover at excellent profit levels. Subsequent years are expected to have sales of 60, and then continuing at 100 units a year. We see significant markets in the US, Australia and probably Europe, and therefore expect over 60% of sales to be made in the export markets.

What do you need to do next – to get closer to a marketable product, service or usage?

We now need to do things – build the market and further develop the instrument. We have recently taken on an employee skilled in marketing, so think that we will make rapid progress in market penetration and the development of a distributor network. Our research has indicated that there are a number of other fluorescent chemicals that we may be able to measure, given modifications to the instrument developed, probably at a cost of £10k.

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**Solus
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Ltd**

Solus Technologies develops and manufactures semiconductor disk lasers (SDLs) – a hybrid of semiconductor and diode-pumped solid-state laser technologies. SDLs provide exceptional performance, flexibility, reliability and value, and are tailored to meet application requirements. We aim to deliver customised yet cost-effective novel products that enable customers to advance their applications with clear USPs.

What is the problem your project is trying to solve?

To significantly increase the value of our novel laser systems by improving the utility of their control systems. Typically laser systems are supplied with a generic control system that has little or no direct relevance to the customer's application and thus does not extract the full value for the system.

Using an onboard digital signal processor, modular electronic hardware and an Ethernet web server communication system enables these control systems to be simply adapted to any customer application. Furthermore, simple web-based graphical user interfaces (GUIs) will control and integrate the system, delivering significant benefit to the customer.

What is the study aiming to achieve?

The project aims to show the significant gain in value that can be achieved through the coupling of a new type of solid state laser (SDL) with a one 'box' solution to the system electronics that provides: a simple and easily reconfigurable user interface (web pages); a robust, fast and ubiquitous communication conduit (Ethernet); a real-time data analysis provision (digital signal processor); electronic hardware modules (current drivers, temperature control, signal acquisition, etc). The project output will be a

proof-of-concept demonstration of an internet-enabled SDL system. Critical parts will be bread boarded with discrete hardware and a system-specific integrated GUI.

What are the potential benefits?

The diode-pumped solid-state laser market is currently \$425m, made up of biotech, semiconductor, scientific and entertainment markets, all of which are addressable through this project. Initial target sectors are biotech and chemical sensing. After completing a further development programme we expect this project to result in significant direct sales by 2012; UK customers will also have access to new disruptive technology which should generate significant revenue.

What do you need to do next – to get closer to a marketable product, service or usage?

Find suitable partners – ideally application developers to help guide the development of targeted SDL-based OEM solutions, and to help with sales channels, application development knowledge and final product integration. These solutions would bring clear USPs with advantages in cost and performance to the end-users.

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Spiral Scratch Ltd

Spiral Scratch is a developer of imaging systems for a number of industries. Formed in 2003, it has developed a portfolio of intellectual property for a number of systems aimed at the advanced manufacturing and computer game markets.

What is the problem your project is trying to solve?

3D scanners are expensive (£5,000 to £250,000), require weeks-to-months training, and are time consuming to use – yet they fail universally to produce results that do not need significant post processing. Depth from Defocus is a new low-cost, high-performance 3D imaging technique which promises much but suffers from several problems such as illumination and colour issues. This study will address these as well as investigating design concerns associated with the development of a completely automatic system.

What is the study aiming to achieve?

If successful the study will demonstrate proof of concept and enable the partners to develop new service and product offerings to the CAD, online retail and other industries. It is anticipated that a low-cost scanning service will be the first product offering, followed by supply of low-cost 3D scanners once fully developed. This will enable UK OEM users of the system to leverage time, and therefore cost, savings when developing new product and/or commercialising them in 3D online virtual marketplaces.

What are the potential benefits?

CAD is a \$6.6bn industry with 5.3 million users of CAD software. The first applications of the 3D scanner will target this sector. It will compress development times from days to minutes, and facilitate reverse engineering to enable reconstruction of auxiliary objects. Further OEM producers, from jewellers to shoe makers, will be able to unlock the potential of 3D internet as a significant sales revenue stream.

What do you need to do next – to get closer to a marketable product, service or usage?

Once the study is completed the next step will be to develop a production implementation of the scanner based on the prototype. While this uses low-cost components the design task will require further investment to bring the system to market. It is possible that the hardware and electronic design would be outsourced to a design specialist rather than developed fully in-house, although this remains an option. Associated software plug-ins to suit existing CAD systems will also be required in the next stage of commercial development.

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TISICS Ltd

A pilot-scale manufacturer of silicon carbide fibre reinforced titanium metal matrix composites. We have 10 staff, about £1m turnover, and formed in 2005. Our expertise is the manufacture of silicon carbide fibre (non-US source) and the design and lay-up of composite reinforcement for optimum performance, which we aim to scale up to aerospace supply within three to five years.

What is the problem your project is trying to solve?

Weight is a major economic and environmental issue for the aerospace industry; 1kg weight saved on short-haul single-aisle airliners equates to 440kg of CO₂ per year emission reduction. New metal matrix composite materials provide one route to reducing aircraft weight, but options are limited.

Fibre reinforcement of aluminium alloys could deliver up to three times the strength of the un-reinforced alloy, enabling replacement of certain titanium or medium grade steel parts with aluminium composite providing a 50% weight saving. Al-Mg-Sc composites will also provide greater corrosion resistance and that a potential option for achieving weight savings and contributing to reduced environmental impact.

What is the study aiming to achieve?

The challenge for this study is to demonstrate that TISICS established techniques used to fabricate continuous silicon carbide fibre reinforced titanium composite can be successfully transferred to the fabrication of continuous fibre reinforced Al-Mg-Sc composite. This feasibility study aims to show the integrity of Al-Mg-Sc alloy bonding in the presence of aluminium oxides and chemical compatibility of alloy and silicon carbide

fibre during processing of the composite matrix. It will also assess the mechanical performance of the resulting composite compared to theoretical predictions and demonstrate the ability for near net shape manufacture.

What are the potential benefits?

Success will enable weight savings on aircraft, thus helping improve environmental efficiency of air transport and helping achieve ACARE environmental targets for the industry. Increased demand for this high technology material enhances the UK position as a world leader in fibre reinforced metal matrix composite technology and will lead to new products and revenues for the company.

What do you need to do next – to get closer to a marketable product, service or usage?

The next step towards a marketable product(s) will necessitate collaborative work with major aerospace companies to optimise fabrication route and processing conditions for performance and economics, identify components and systems where reinforced aluminium is beneficial, and characterise the material appropriately for aerospace qualification.

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What is the problem your project is trying to solve?

Subsea well operators use metal plugs with elastomeric seals to isolate flows for maintenance, repair, new drilling works or well closure. This technology is susceptible to abrasion damage and long-term deterioration, particularly in deeper and more demanding environments. The cost to replace a failed seal is very high, typically \$1m to install and three days lost production at \$800k each day.

TISICS is proposing to develop a composite to metal seal in a novel valve and seal system capitalising on the extremely high compressive strength of silicon carbide fibre reinforced titanium.

What is the study aiming to achieve?

TISICS will design and manufacture a prototype composite to metal seal system and test rig. Pressure testing the seals will aim to prove the concept of a composite to metal seal and assess what the composite tube will carry in terms of axial loads for compression into a seal as well as in terms of high radial pressures that act on its internal and external surfaces. Results will allow comparison with protocol and specifications defined by the oil and gas industry and thus potential for a composite to metal valve and seal.

What are the potential benefits?

Demonstration of feasibility is critical for acceptance by and expansion into the oil and gas sector. The technology could help access new reserves or extend life of existing ones. TISICS, the only non-US fibre source and composite fabrication expertise, is ideally placed to capitalise on such an opportunity for itself and the UK.

What do you need to do next – to get closer to a marketable product, service or usage?

The next step towards a marketable product will necessitate collaborative work with North Sea oil and gas companies to optimise seal performance, gain access to more representative scale rig testing and acceptance.

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TouchType

TouchType is an innovative technology company which creates revolutionary text prediction solutions for mobile and computing devices. We work alongside leading technology manufacturers, mobile operators and software developers to bring our customers the highest standards in text prediction software.

What is the problem your project is trying to solve?

Our research has shown that effective prediction requires knowledge from multiple language sources, and the ability to adapt to specific applications and language domains. To achieve such relevant, user-focused prediction requires a radical new model for adaptive text prediction which combines cutting-edge techniques from the fields of machine learning and natural language processing. This approach provides natural and contextually relevant predictions, creating a sophisticated prediction engine superior to any comparable solution available today.

What is the study aiming to achieve?

The study is focused on assessing the feasibility of an adaptive text prediction solution, provided through a PC-based demonstrator. It will perform real-time analysis of the user's text to intelligently assess and deploy the optimal language model configuration within the prediction engine. The output from this study will be a PC solution, clearly demonstrating the application of the technology on a pair of language models (e.g. football and motor racing).

What are the potential benefits?

Mobile manufacturers and operators are increasingly using software as a means to enhance customer experience and differentiate their products and services. Developing a means to bring this technology to market has the potential to revolutionise the smartphone and touchscreen PC text entry market currently worth around \$100m each year.

What do you need to do next – to get closer to a marketable product, service or usage?

We would like to bring this product to market as quickly as possible through collaboration with appropriate delivery partners: technical partners – online digital content provider (e.g. media organisation) and online hardware provider; delivery partners – leading operator or mobile OEMs to demonstrate the implementation of the technology; and business partners – looking for further investment in early summer.

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WFS

WFS is the world's leading developer of through-water and through-ground communication systems, with over 70 global patent applications. WFS products have begun a revolution in subsea oil and gas, environmental monitoring and renewable energy, and homeland security and defence markets. Headquartered near Edinburgh, we have offices in Belfast and Aberdeen (UK), and Houston and Washington (USA).

What is the problem your project is trying to solve?

Investigation of pollution incidents requires significant investment of time and labour. An agency that wishes to monitor the body of water has two options: visit the site to take a sample then return to a laboratory for analysis and reporting; or deploy an instrument cabled to the shore, which involves arranging access, digging trenches, providing mains power and hard-wired communications.

What is the study aiming to achieve?

WFS has pioneered research into radio technologies that communicate through water and air. Early products are gaining traction in the homeland security, defence, and oil and gas sectors. Products have been trialled by the UK Environment Agency and are deployed in high-value environmental applications such as monitoring dredging operations. An underwater radio modem can be deployed on a river bed interfaced to monitoring sensors.

The WFS radio system relays data from the river bed and through the water-air interface to a land-based WFS modem. The land-based modem relays the data via a mobile phone data link, which is then available over the global telecoms network. WFS will investigate

what would be required to develop a mobile environmental pollution alarm system, including the availability of suitable low-cost sensors, reducing the cost and size of the WFS radio system; how to get data relayed in real-time via standard cell phone or conventional radio technology; integrating the different components into a single system to enable simpler, cheaper deployment; the manufacturability of such a system; and the market requirements (price, performance and route to market).

What are the potential benefits?

A system is needed where data can be gathered and reported instantly, where the monitoring device is not visible, and where civil engineering works are not required. This would enable more investigations to take place, more rapidly and more successfully.

What do you need to do next – to get closer to a marketable product, service or usage?

The next steps are to engage closely with developers of environmental monitoring instrumentation and explore the opportunities for an integrated device.

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Xanals Ltd

Xanals develops and markets a range of software solutions that are used by intelligence analysts and investigators to collect, manage and analyse data. Our technologies include: text mining, data visualisation and analysis, and major case management. Xanals has clients in the UK, Canada, US, Russia and Australia.

What is the problem your project is trying to solve?

Criminal investigations can generate thousands of documents, each of which needs to be reviewed and consolidated in light of the current evidence/knowledge. Xanals develops a text mining technology that 'reads' investigative documents, extracting details of key entities and relationships. However, the problem with the current technology is that it does not determine the relevancy of the data it generates in relation to the current state of the investigation.

A solution that identifies and ranks documents would ensure that this information would be processed first, leading to more efficient investigative processes and improved case closure metrics.

What is the study aiming to achieve?

The project will use a number of different techniques that compare the contents of an incoming document (tip from public, witness statement, report, etc) with data already residing in the case that has been deemed of high importance (persons of interest, key events, physical descriptions, etc). Documents will be ranked according to their 'closeness' to this case data. The solution will also allow the user to inspect the reasoning used to make the

rankings – for example, new information matches data that is of high importance, or is highly 'connected' with other data.

What are the potential benefits?

In the area of public safety, the solution could lead to more efficient investigations by directing policing resources to the most appropriate lines of enquiry. The solution could also be used in other investigative domains, helping analysts rapidly identify documents relevant to their investigative tasks.

What do you need to do next – to get closer to a marketable product, service or usage?

The technology requires validation with larger data sets, including documents from different domains. We would also like to implement an integration API and incorporate some of the usability recommendations received from our research partner on this project. We have records of interest with our existing case management clients and a large technology partner.

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XCAM Ltd

We are a company of approximately four FTEs making high-performance custom digital CCD cameras for large science experiments. Over the past three years we have experienced annual growth in turnover of 80%, with approximately 80% of sales being exports.

What is the problem your project is trying to solve?

Many customers are increasingly interested in using L3 or EM CCDs in experiments because of their ability to 'noiselessly' see individual light particles or photons. These CCDs are capable of operating at very speeds, in photon-counting modes, but available off-the-shelf systems are designed to provide the maximum range of operation for these devices, rather than 'formula one' operation at the single photon level. Moreover, off-the-shelf systems do not offer the flexibility of operation that many of our customers require.

We identified an opportunity to collaborate with Cambridge University's Institute of Astronomy, using the techniques and methods that they had developed for low light level, high frame rate astronomical applications, to offer these advantages to scientists in a variety of areas.

What is the study aiming to achieve?

The study aims to cost-effectively transfer knowledge into the business, which can be quickly transferred to other areas of science. The knowledge transferred is a very good 'fit' to our existing activities and will help us to develop expertise in strategic areas that strengthens our core activity whilst also extending the range of

experiments that we can supply into, therefore increasing growth, turnover, profit and employment.

What are the potential benefits?

To enable the company to develop a new product line which operates 10 times faster than our current range, and which can offer increased sensitivity in some applications. The work should lead to an increase in turnover and profitability, which will be used to create new job opportunities.

What do you need to do next – to get closer to a marketable product, service or usage?

We would like to be able to cool these devices more efficiently, but this is difficult to do in a vacuum without the inconvenient cryogenic cooling techniques our academic knowledge transfer partner is able to use. With a further £50k we could investigate the use of novel coolers which might permit deeper cooling, and we would also strengthen our knowledge relating to the enclosure design for these devices.

Life Sciences



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360 Genomics

We are a diagnostics company founded in 2007. We commercialise nucleic acid amplification and detection technology with particular application in the fields of infectious disease, cancer and non-invasive prenatal diagnosis. Our lead technology, PointMan, can detect 0.001% point mutated DNA in wild type and is being licensed to commercial partners.

What is the problem your project is trying to solve?

There is a need for cheaper, sensitive and more selective genomic diagnostic tools. Most current genomic diagnostics platforms are based on PCR technology. Our groundbreaking polymerase chain displacement reaction (PCDR) technology has given more sensitive and faster results compared to conventional PCR methods. The technology therefore offers the potential for faster, cheaper detection of genetic diseases. In turn this could lead to earlier and improved clinical intervention.

What is the study aiming to achieve?

The idea involves the development of the PCDR, a significant improvement over the industry standard PCR. 360 Genomics has a core patent (PCT/GB2007/003793) covering our PCDR technology. PCDR is considered the next generation of amplification and detection technology.

Our first prototype product will be the generation of a highly sensitive and rapid hepatitis type C virus (HCV) detection kit. It is expected that the successful demonstration of the study could trigger widespread use of the PCDR. On a broader scale, exemplifying the PCDR platform through an HCV detection kit

would allow us to demonstrate the power of a PCDR platform to ultimately increase the scope of the diagnostic tests.

What are the potential benefits?

PCDR is applicable to the generality of nucleic acid amplification and detection where PCR is currently used. The sale value of quantitative PCR (qPCR) products in 2007 was US\$1bn, having an annual forecasted growth rate of between 20% and 25%. We intend to initially penetrate a small portion of the qPCR market, focusing initially in the infectious disease diagnostics field, where PCDR has clear advantages over existing techniques.

What do you need to do next – to get closer to a marketable product, service or usage?

In follow-on to this Technology Strategy Board-funded project, further research is required to overcome some technical challenges uncovered by this project.

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**Applied
Nanodetectors
Ltd**

Applied Nanodetectors is a leading developer and supplier of nanosensor-based solutions for environmental, healthcare and medical worldwide markets.

What is the problem your project is trying to solve?

Antibiotics are commonly prescribed in primary care for respiratory tract infections for both adults and children, even though in most cases they are viral infections. Breath analysis is a non-invasive rapid process that could be used for diagnosing common respiratory infections. Rapid identification of bacterial pathogens using a simple diagnostic test is critical for effective patient care and this would reduce the financial burden of treatment and antibiotic prescriptions.

What is the study aiming to achieve?

This project will investigate the use of nanosensor-based arrays to detect, distinguish and quantify the volatile metabolites associated with common respiratory bacterial infections, which would form the basis of a breath analysis diagnostic test.

What are the potential benefits?

If the feasibility study is successful this would be an important critical step towards the development of a breath analyser diagnostic tool. This device would have significant clinical impact and associated cost savings. Physicians would be able to make treatment decisions with faster knowledge, and antibiotic prescription rates would go down.

What do you need to do next – to get closer to a marketable product, service or usage?

The next step would be to carry out tests on real breath samples to confirm detection of bacterial pathogens and to create a robust solution. Following the successful outcome of the project we would look for other partners for private and public funding and develop the manufacturing supply chain.

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BioBullets Ltd

BioBullets is a spin-off from Cambridge University. We have patented technologies for the environmentally friendly control of invasive pests in aquatic environments. Our current focus is the control of zebra mussels in water treatment plants and power facilities. This pest costs US industry as much as \$5bn each year.

What is the problem your project is trying to solve?

We have produced and are testing a control product for fouling by invasive mussels in shrimp farms. The products greatly increase toxicity of active ingredients by micro-encapsulation in edible coatings that the mussels actively filter from the water. Uneaten material rapidly degrades to harmless concentrations.

What is the study aiming to achieve?

We aim to illustrate the production of a viable product meeting our optimal criteria, and to test toxicity compared with raw ingredients in the laboratory. Tests are being conducted at a Colombian shrimp farm.

What are the potential benefits?

Recent invasions by the mussels have reduced productivity by 10% due to interference with shrimp feeding, increased bird predation through increased water clarity, and reduced market value of shrimps due to their reduced pigmentation in response to increased water clarity. The current cost of mussels to the Oceanos shrimp farm, Cartagena, is about £1.5m and market value is estimated at £0.5m per year.

At least three other Latin American shrimp farms have reported similar problems, and there is an expectation that problems will spread through mussel-contaminated water along with the trade of shrimp larvae. Existing farms are currently experiencing an increase of fouling intensity and distribution at 10% per year.

What do you need to do next – to get closer to a marketable product, service or usage?

Our primary partner would have a link with the supply process within global shrimp farms. Experience of conducting business in Latin America would be a distinct help to us.

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Bioinduction Ltd

Bioinduction is a developer and manufacturer of neuro-stimulation devices for the relief of chronic pain. We are developing an implantable neuro-stimulator based around a new method of controlling arrays of implantable electrodes. This technology is applicable to many conditions including pain, and also a number of other emerging indications.

What is the problem your project is trying to solve?

To facilitate tunnelling of the electrodes from the implant site to the neuro-stimulator device it is important that the electrodes and neuro-stimulator are separable. Commercially available neuro-stimulator connectors are complex, relatively large in comparison to the neuro-stimulator electronics, and very expensive if manufactured using noble metals, which provide the best combination of long-term corrosion resistance and biocompatibility.

What is the study aiming to achieve?

Neuro-stimulators offer promise for the treatment of many chronic conditions but their acceptance has been limited in part by the very high cost of devices and the size of implants, which increases the complexity of the surgical procedure. The primary aims of the project are to produce a compact, cost-effective and highly reliable interconnect solution to allow an in-line array of eight concentric electrodes on a 1.3mm lead to be connected to the neuro-stimulator electronics.

What are the potential benefits?

In January 2010 we received notice that we will be granted a UK patent for our proprietary method of controlling the output on an array of implanted electrodes. This feasibility study will allow us to progress quickly to a proof-of-concept implant for a spinal cord stimulator for the treatment of chronic pain.

What do you need to do next – to get closer to a marketable product, service or usage?

We need a large medical-technology player as a potential partner in the spinal cord stimulation market. I have held preliminary talks with one such partner. Furthermore, I would like to explore ways of working with the NHS to validate the implant. This exercise is likely to be beneficial to both parties as currently the NHS pays a high price for competing technologies.

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DataLase Ltd

DataLase is a materials company with a portfolio of products and IP in the field of colour change technology. We have 14 staff (six in R&D) and our turnover in 2009 was £1m, which represents 60% growth. DataLase sells its unique colour change pigment to the coding and marking industry.

What is the problem your project is trying to solve?

The aim was to assess the feasibility of using certain light reactive monomers to create conductive polymers that could ultimately be used in printed and plastics electronics applications.

Currently inkjet printing cannot deliver the resolution required to create the feature sizes required for many of its target applications. However, lasers have been shown to be capable of printing characters small enough to meet the feature size requirements for printed electronics. Also many conductive polymers are notoriously difficult to process. This project looked at using lasers to create conductive polymers from easily processable light reactive monomers.

What is the study aiming to achieve?

The goal was to demonstrate that light reactive diacetylene monomers could be applied to a substrate, and then polymerised using a light source such as a UV bulb or laser to give conductive polydiacetylenes. The literature reports that pure polydiacetylene can be made with metallic conductivity using a dopant such as iodine. Thus the effect of iodine doping on the conductivity of the polydiacetylene product during this project will be assessed.

A testing rig to determine the conductivity of the polydiacetylene species will also be constructed.

What are the potential benefits?

The benefits over traditional printed electronics processes include: easier manufacturing processes (an ultra clean room is not required); can be applied to flexible substrates such as polymer films; very high resolution imaging/feature sizes; proven robustness of lasers. The light reactive technologies also have a better environmental profile/carbon footprint. A UK-based company or consortium generating IP in this field now will generate technologies that will be owned and exploited in the UK further downstream.

What do you need to do next – to get closer to a marketable product, service or usage?

DataLase would like to be part of a consortium that would build on the results generated by this project. Other partners should have knowledge of substrate manufacture, organic chemistry, photonics and electronic devices. This longer-term, second project would require about £1m of funding. The goal is a technology demonstrator.

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**Farfield
Group**

Farfield supplies scientific instrumentation characterising proteins and other molecules. We have customers in 19 countries, mainly academia but with growing industrial interest. Our core patented technology is an optical interferometer which captures the molecules on a glass slide and measures sub atomic conformational changes as they interact.

What is the problem your project is trying to solve?

Farfield's scientific instrumentation allows users to see very subtle changes in how molecules interact and is a fundamentally new way of studying biochemistry. It has generated considerable interest in academic (early adopter) markets but is still perceived as technology that requires a level of user skill beyond the mass (industrial) markets. This project is intended to simplify one aspect of the user experience – the handling, performance and reliability associated with the precision yet disposable glass slide at the heart of the instrument.

What is the study aiming to achieve?

Our feasibility study examined the practicality of packaging the consumable glass slide used in the instrument in a more convenient, robust, higher performance yet still disposable form. This requires the adoption of different microfluidic designs and sourcing appropriate manufacturing processes for prototype manufacture and evaluation.

What are the potential benefits?

Moving Farfield's technology from an early adopter market to a mass market will transform the company's future. In use, the characterisation of proteins is at the heart of biochemistry, as protein malfunction is the cause of disease and the intervention in function is the basis for drug discovery. Our users are at the very forefront of their field, and our equipment will contribute to the comprehension and cure of a host of diseases with major societal benefits not just in the UK but worldwide.

What do you need to do next – to get closer to a marketable product, service or usage?

The next step with respect to packaging is to commit to tooling costs for manufacture (£30k). Other aspects of the 'industrialisation' of the product including aspects of liquid handling, automation and data processing are well advanced. Funded from revenues we project this to be available for beta testing in early 2011. Funding to accelerate this timetable or interest from an industrial partner would be very welcome.

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HP Technical Ceramics Ltd

R&D and manufacturing of nano-porous ceramic components for various emerging technologies in the fields of bioscience, chemistry, low carbon, diagnostics, drug screening, biochips, bio-imaging, forensic science and functional materials.

What is the problem your project is trying to solve?

We are trying to solve some of the critical technical difficulties through in-house experiments, and seeking help from academic experts in the related fields.

What is the study aiming to achieve?

We intend to develop a nano-porous functional substrate (NPFS) – a 0.5mm thick impervious ceramic plate with a 2 micron thick, continuous layer of nano-porous ceramic attached to its surfaces. The nano-porous ceramic layer has an interconnected porous structure, a volume porosity of 50-60% and pore size of around 10 nm. The nano-pores on the substrate surface can be used to store and immobilise functional chemical species for biological, chemical, optical and electrical/magnetic applications.

What are the potential benefits?

The UK has many prestigious institutions and high-tech companies – they will be the first to take advantage of NPFS developed by us. If the high-tech community in the UK invents more high-value added products and prospers, then that will create wealth for all.

What do you need to do next – to get closer to a marketable product, service or usage?

The feasibility project has been successful, and we have developed a prototype that can be used to immobilise various functional chemical species. Now we need to identify a partner who may take advantage of this new concept and product in the fields of bioscience, chemistry, low carbon, diagnostics, drug screening, biochips, bio-imaging or forensic science.

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Isogenica Ltd

Isogenica specialises in providing nanoscale protein engineering using its core technology, 'CIS display', to pharmaceutical and biotechnology companies for the rapid discovery, identification and design of new peptide, polypeptide and antibody lead compounds from libraries of up to 100 trillion different clones.

What is the problem your project is trying to solve?

Pain is the most common symptom for which patients seek medical assistance. Intractable pain is defined as a severe, constant pain that is not curable by any known means. Analgesic drugs for the treatment of pain are considered to have several drawbacks including safety concerns and psychotropic side-effects, dependency and tolerance.

What is the study aiming to achieve?

Within this nanotechnology healthcare application we wish to develop nanocarriers for the treatment of pain. We have discovered peptides that modulate a pathway that is a primary driver of the pain response. We wish to derivatise these peptides so that they can be attached to PEG nanocarriers for better in vivo activity.

What are the potential benefits?

A successful study will be to the first stage in the development of peptide-PEG nanocarriers that will be more specific than current drug therapies for the treatment of pain. This market was valued at approximately \$14bn in 2004.

What do you need to do next – to get closer to a marketable product, service or usage?

We are seeking further investment in order to take this through in vivo studies to demonstrate its value as a potential therapeutic development candidate.

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Michelson Diagnostics Ltd

Michelson Diagnostics Ltd is a world leader in the field of optical coherence tomography (OCT) imaging. We sell OCT scanners for medical and biomedical research applications, and aim to sell a scanner for early diagnosis of skin cancer in the next two years.

What is the problem your project is trying to solve?

Our existing products are suitable for imaging of samples, and in vivo imaging of skin. In principle it is possible to extend our OCT imaging technique to any part of the body which can be reached by endoscopic probe (rigid and flexible types). This will open up many further applications – for example, cancers of the mouth, larynx, broncha, oesophagus and lung. The study is to assess the feasibility of miniature probes.

What is the study aiming to achieve?

Assess the miniature technologies that could be used to make OCT probes – rigid probes of a few millimetres diameter, and flexible probes of maximum diameter 2.5 mm.

What are the potential benefits?

Access to new clinical applications by the availability of a miniature probe would greatly increase the potential market addressable by at least ten-fold, i.e. from £1bn to more than £10bn.

What do you need to do next – to get closer to a marketable product, service or usage?

Develop a prototype miniature OCT probe and evaluate it with our clinical partners on human subjects with cancers. We will need about £100k of funding to do this.

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Mirada Medical

Mirada is a new Oxford-based SME working in image analysis. Mirada Medical designs, manufactures and distributes software for the diagnostic reading of medical images. We specialise in software applications for handling multi-modality images such as PET/CT, CT/MR or SPECT/CT.

What is the problem your project is trying to solve?

Multi-disciplinary meetings (MDM) are mandated as the primary means of delivering personalised, evidence-based, best practice care to patients. The efficacy of MDMs is contingent upon members' familiarity with current best practice. Moreover, case preparation time adds a significant overhead to a clinician's working week.

This feasibility study is investigating a clinical case presentation and decision support system for cancer MDMs. Attributes of such a system include: rapid creation of patient casebooks that include the full history with images and an intelligent reasoning engine encoding the latest disease-specific guidelines, facilitating the concise presentation of relevant patient information along with appropriate management options.

The key question is whether a system can be developed that supports multiple cancer types and locale-specific guideline variations.

What is the study aiming to achieve?

The project is attempting to build a prototype of the MDM application and develop an understanding of both the technical and customer requirements of such a system. Such systems have been developed in the

academic domain; however, we believe that little if nothing is available commercially. The first part of the prototype will enable the user to present patient information including imaging results to the MDM audience, and the second part will present treatment decision options.

What are the potential benefits?

There is a significant overhead associated with organising and preparing for MDT meetings. We estimate that the combined costs of MDT meeting overheads, ineffective treatment and mismanagement-based litigation to be £50m per year in the UK and £200m per year in the US.

What do you need to do next – to get closer to a marketable product, service or usage?

We will need clinical expertise to develop a range of guidelines for different cancers. This can only be done by working with hospitals or OEMs from the medical imaging industry. To take this aspect of the project forward, we would need to apply for further grant funding and/or find an OEM sponsor. However, it does seem that some aspects of the proposed application could be developed into a product if there was sufficient market demand.

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Moor Instruments

Moor Instruments was established in 1987 to develop, manufacture and distribute laser Doppler systems, used for the measurement of blood flow in the microvasculature. The company is registered to ISO13485:2003 for its quality control. We have 24 staff and an annual turnover of £2m.

What is the problem your project is trying to solve?

The main issue is: can speckle contrast blood flow imaging be successfully done with a hand-held device? The idea of this feasibility study is to identify and investigate the technical problems associated with the development of a low-cost, hand-held blood flow imager and propose solutions to the problems.

What is the study aiming to achieve?

The aims of the study are to investigate the problems of blood flow imaging during hand-held operation, and evaluate various hardware and software means for image stabilisation and removing noise images due to camera movement. The study will also aim to identify key issues associated with the development of a hand-held blood flow imager and define a technical specification for the imager.

What are the potential benefits?

The development of a low-cost, hand-held imager is seen as a major precursor for advances in a number of clinical applications, with the potential to influence these similar to the impact made by hand-held ultrasound Doppler devices in obstetrics and vascular

medicine. The imager is expected to be seen as a useful aid in a number of hospital departments and clinics, including plastic surgery, burns, vascular surgery, diabetes and dermatology. This technology would also aid screening for risk of pressure ulcers and other conditions in care homes and GP practices.

What do you need to do next – to get closer to a marketable product, service or usage?

To develop a marketable hand-held blood flow imager for clinical use we need to work on two areas: clinical study and product development. We are seeking collaboration with clinical groups to identify specific clinical applications which will benefit most from the hand-held imaging device, and to define user requirements for the device.

For product development, we would like to work with a partner who has skill or design capabilities in camcorder development and device miniaturisation. With a further of £100k funding we would be able to produce a prototype for clinical evaluation.

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OptoSwim Technologies Ltd

OptoSwim Technologies was formed in 2007 to commercialise a novel device using LED technology to encourage optimal swimming in cultured fish, bringing the benefits of exercise to intensive cage aquaculture. We plan to launch our product during 2010, and more than double our present team of three during the year.

What is the problem your project is trying to solve?

Exercise is known to bring benefits to farmed fish, but this can normally only be achieved in tanks where currents can be manipulated.

Our technology is designed to exercise fish in cages using lights to create an optical illusion, which are controlled by surface mounted electronics (these were previously submerged with the lights). The control electronics must in turn be capable of communicating with software operating on a remote PC.

We need to develop systems which are sufficiently robust to operate reliably within the harsh marine environment, and withstand the rough handling that takes place in the fish farm environment.

What is the study aiming to achieve?

We are developing a submersible LED device producing a 'moving pattern' of lights swimming speeds in farmed fish. The study aims to evaluate a means by which to encapsulate the LEDs and connect them to control electronics mounted above the water surface. Designs for an appropriate interface between these two parts of the device, along with software modifications, are required. Electronics

housing, cables and connectors which will withstand the marine environment and remain practical for operation in situ are also essential. The light device and control box must also lend themselves to economic manufacturing processes.

What are the potential benefits?

Exercise brings improvements in fish growth and production efficiency, fish health and welfare, and flesh quality – benefiting the fish farmer, the fish and the consumer. Savings in production efficiency are forecast at about £30m per year for the UK salmon industry and £120m per year for salmon producers worldwide.

What do you need to do next – to get closer to a marketable product, service or usage?

We now need to develop a prototype design to be built, tested and used to collect longer-term data from the commercial environment. For this we need to recruit an in-house engineer to work with a marine design engineer, a manufacturing engineer, electronics and LED manufacturers, and plastics moulding engineers.

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PolyTherics Ltd

PolyTherics is a London-based company dedicated to using biomedical polymers to optimise pharmaceuticals, in particular biopharmaceuticals, for the treatment and cure of the world's most important diseases. Founded in 2002, PolyTherics has expertise in the half-life extension and stabilisation of biotherapeutics through its proprietary advanced site-specific PEGylation technologies.

What is the problem your project is trying to solve?

A strong commercial and clinical need exists for an improved interferon beta (IFN-beta) formulation with superior stability and that requires less frequent dosing as a treatment for multiple sclerosis. The feasibility draws upon the expertise of two companies with complementary technologies: PolyTherics has expertise in the half-life extension and stabilisation of biotherapeutics through its proprietary PEGylation technologies; Arecor has expertise in the stabilisation of proteins through its proprietary formulation technology.

What is the study aiming to achieve?

The project represents the first steps in developing a new IFN-beta medicine, by demonstrating that a stable PEGylated IFN-beta can be prepared with economically viable yields. The project seeks first to explore ways of improving protein yields from inclusion bodies obtained from bacterial expression systems by enhancing protein stability and solubility using Arecor's technology and specialist expertise. The purified, refolded and stabilised IFN-beta will then be used to demonstrate that PolyTherics' PEGylation technologies can be applied and a commercially viable product obtained.

What are the potential benefits?

Two forms of IFN-beta are in clinical use. PEGylation has the potential to reduce the frequency of IFN-beta dosing in the clinic by substantially increasing the serum half-life, as well as improve the stability of the protein and reduce the formation of neutralising antibodies, which can limit treatment options.

There is currently no PEGylated IFN-beta with marketing approval, despite the success of PEGylated IFN-alpha molecules, which have taken over and expanded upon the market of the unPEGylated IFN-alpha. It is hoped that success in this proof-of-principle study will lead to further investment to allow the pre-clinical development of a new IFN-beta biopharmaceutical medicine in the UK.

What do you need to do next – to get closer to a marketable product, service or usage?

To build on the feasibility study will require further funding to optimise the processes developed. This will enable us to produce a data package demonstrating an improved protein formulation and method of production so we can partner with biotech and pharmaceutical companies interested in developing a new IFN-beta medicine.

Low Carbon



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CPI Innovation Services

CPI Innovation Services is the trading arm for one of the Centres of Excellence, the Centre for Process Innovation in the North East of England. We are developing an increasing capacity and knowledge in the area of anaerobic digestion and have one spin-out company in this field, Anaerobic Energy Ltd.

What is the problem your project is trying to solve?

The disposal of bio-organics to landfill is to be banned across the EU by 2020; this is concurrent with the introduction of the new UK Feed-in-Tariffs for micro-renewables. We feel there is a case for establishing small-scale anaerobic digestion (AD) plants at various locations around the UK, thus encouraging the creation of efficient distributed energy systems and reducing the costs of transportation and disposal of biomass to landfill.

What is the study aiming to achieve?

This study's key aim is to assess the possibility of scaling down the standard AD design by carrying out technical and economic evaluations of the best available technologies potentially available for descaling to a small-scale AD unit that would be capable of 50 kWe. This study will also undertake initial engineering design, safety and hazard studies on a small AD design.

What are the potential benefits?

It is anticipated that currently there is a target market for over 2000 small-scale AD plants in the UK. Each unit is anticipated to cost in the region of £450k. This would give a minimum target market for small AD units in the UK of about £900m, with a further EU potential market of in excess of £10bn (with a 1% market penetration per annum this would give AE a revenue stream of £90m in the UK alone based on purchase of equipment).

What do you need to do next – to get closer to a marketable product, service or usage?

In order to move to the next stage we are looking for in the region of £0.3m-0.5m to commission a fully working prototype. With this prototype we expect to be able to raise significant venture money to develop a business in this sector.

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eminate Ltd

eminate Ltd was formed in 2005 and has 20 staff. We offer state-of-the-art solutions to apply in-house process technology to differentiate or develop customer products. From contract development projects through to licensing and joint ventures, eminate offers solutions based on customer and market needs. We have four divisions: Coatings, Powders, Food and Drug Delivery.

What is the problem your project is trying to solve?

Hydrogen offers huge potential for mobile energy generation through fuel cell technology. However, there are problems in trying to meet the targets laid down by the US Department of Energy for mobile hydrogen storage; e.g. gravimetric capacity of 5.5 wt% by 2015.

High capacity hydrides are the focus of much research; however, these materials suffer from irreversibility, slow kinetics and require high operating temperatures. A further complication is that while very fine particles offer the opportunity to optimise kinetics, they are difficult to handle as part of manufacturing processes.

What is the study aiming to achieve?

Our aim is to establish the feasibility of producing hydrides with medium capacities that exhibit fast kinetics and good storage parameters. To address this, we propose to investigate the deposition of nanometre thin films onto close size tolerance, micron-sized powders.

The intention is that these films will act as catalysts as well as protecting the powders against inadvertent exposure to air (preventing pyrophoric reactions) or 'poisons' (from the H₂ fuel). The overall aim is to demonstrate

the feasibility of producing functional, coated powders by a route that offers a practical solution to the demands of industrial-scale production.

What are the potential benefits?

If only 1% of the European car market is taken up by fuel cell vehicles in the target time of 2015-2020, the market for hydrogen storage materials can be estimated to be £500m per year. We believe our approach has the potential to establish the UK as market leader in the field with benefits to companies in the automotive and advanced materials sectors, and further possibilities for stationary applications.

What do you need to do next – to get closer to a marketable product, service or usage?

Having demonstrated feasibility, we need to carry out research to optimise the coating process in terms of storage performance, and look at issues of scaling-up production and incorporating the powder materials into storage devices that can be installed in fuel cell applications. We envisage a three-year project with four partners (powders, coatings, devices and systems), total cost about £1m.

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Green Structures

We are an award-winning and innovative sustainable built environment consultancy and architectural practice with substantial experience in energy saving construction and retrofits designed to solve climate challenges. We specialise in holistic low energy building solutions in the public, commercial and residential sectors, and the development of low carbon innovations.

What is the problem your project is trying to solve?

Airtight buildings need ventilation. Ventilation needs heat recovery to conserve energy. Mechanical heat recovery ventilation uses energy to recover heat. Carbon saving is minimal while electricity demand increases. There are no retrofit-specific passive heat recovery ventilation units (PHRVU) or systems either on or near market. The PHRVU developed by Green Structures can recover 90% of heat from outgoing air, uses no electricity and is designed for retrofit installation (500% larger market than construction).

What is the study aiming to achieve?

We are testing and optimising the viability of our designs relating to passive heat recovery unit modules and components. This specifically relates to developing manufacture ready assembled prototypes while minimising airflow resistance of our super efficient 'organic form' heat recovery module, as well as testing, verifying and maximising the performance of our discrete 'wind catcher chimney pot' for both air supply and extraction.

What are the potential benefits?

If every UK dwelling was retrofitted with PHRVUs we would be saving 20m tonnes of CO₂ annually. If every house already had a mechanical heat recovery ventilation system and that was replaced with PHRVUs we would be saving over 12m tonnes of CO₂ annually. Unit cost is expected to fall to about £700 fitted if mass produced, with no intrusive disruption suffered by the dwelling during installation.

What do you need to do next – to get closer to a marketable product, service or usage?

We need to experiment with the best/most cost-effective heat transfer materials, optimise extraction, conduct wind tunnel trials to establish the optimum chimney pot shape for all wind speeds, develop a finalised pre-market, assembly optimised module, apply for BRE assessment, gain UK certification, and design/develop the production process. All of the above is expected to cost in the region of £400k to £500k.

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What is the problem your project is trying to solve?

Buildings need renewable heat to meet future climate and regulatory challenges. Heat pumps draw power from the grid, CHP produce heat throughout the summer, biomass boilers need large storage for shrinking supplies of biomass. None of the above is ideal for retrofit. Our passive solar heating system (PSHS) is 100% renewable, multimodal – it provides installation method and heat distribution flexibility, easy to install during the retrofit, and is cost effective to produce, fit, maintain and run. We estimate the finished product to cost 30% less fitted than an average ground source heat pump (GSHP).

What is the study aiming to achieve?

We are assembling the first fully functioning PSHS prototype to prove its validity, analyse and overcome assembly and fitting-related issues (within an occupied dwelling), and monitor initial performance in situ. This will help us identify potential design misconceptions, system faults, and design and installation improvements.

What are the potential benefits?

DECC unveiled plans to retrofit 7 million properties by 2020, and 25 million by 2030. This

translates into 200,000 suitable new builds and up to 700,000 retrofits per year from 2013 requiring low carbon space/water heating systems which are convenient to install and operate as well as being cost effective. If successful we could assume sales of about 100,000 units per year or higher. Compared with a GSHP which consumes 2,500 kWh per dwelling per year, we are looking at a total of 200,000,000 kWh per year potential energy savings.

What do you need to do next – to get closer to a marketable product, service or usage?

Learning from the first prototype we need to construct and fit four to five further renewable heating systems to fully assess alternative thermal storage and heat distribution methods in both retrofit and new build conditions. This needs to be monitored for at least a year. Then we will need to design and develop a streamlined, optimised product that maximises the potential of economies of scale while providing straightforward installation. At the later stage of development we'll need to apply for appropriate BRE accreditation.

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Hycagen Ltd

Hycagen is an R&D company developing superior fuel compositions and renewable chemicals based on a combination of microbial and chemical synthesis. In the fuels area the fuel is first designed then routes for synthesis are considered based on the required properties.

What is the problem your project is trying to solve?

In the biodiesel industry current methods of synthesis lead to a product containing primarily fatty acid methyl esters. These suffer from varying degrees of poor performance at low temperature due to clouding and freezing. In addition, their methods of synthesis involve toxic reagents and generate large volumes of wet, caustic glycerol that require disposal.

What is the study aiming to achieve?

We are aiming to define a new biological oil-derived diesel replacement that has superior properties to existing biodiesel. In particular the product will have better properties at low temperature such as its freezing point, yet maintain essential performance characteristics such as high combustion energy. The route by which it is made will require no toxic reagents, need minimal processing and generate little or no waste.

What are the potential benefits?

The new product could replace existing biodiesel with a superior fuel and thus broaden the scope of its application, in particular at low temperatures. As the process is simpler the fuel could be produced more cheaply. It could be produced either locally on-farm using low-tech methods allowing farmers to become self-sufficient or at centralised facilities.

What do you need to do next – to get closer to a marketable product, service or usage?

It is estimated that a further investment of £100k is required to fully characterise the new fuel and fine-tune the process by which it is made. We also need to establish relationships with both the raw material providers and with future manufacturing partners.

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Mineral Industry Research Organisation

The Mineral Industry Research Organisation is a leading international collaborative research and technological development facilitator and provider of collaborative research project management services to the minerals and related industries. Our aim is to add value to our members' businesses through the provision of cost-efficient and industrially relevant projects.

What is the problem your project is trying to solve?

By linking a low-energy variation of Portland cement manufacture to a novel process for accelerating setting and hardening in precast concrete products, this proposal aims to cut direct and indirect carbon emissions during manufacture by up to 30%, saving up to 1 million tonnes of CO₂ annually in the UK. Our three main objectives are to develop a low energy process for cement manufacture, to sequester CO₂ captured from cement manufacture in precast concrete products by accelerated carbonation curing, and to optimise the closed-loop process by modelling.

What is the study aiming to achieve?

The study aims to provide experimental proof that a low-energy self-pulverising cement can be synthesised as anticipated, and that it can develop acceptable strength when subjected to accelerated carbonation.

We will support experimental work by theoretical studies which will address the challenges of scale-up to manufacturing with commercial raw materials and assess commercially viable CO₂ capture technologies for cement works. We will evaluate whole life sustainability gains for the proposed process, including the possibility of

using wastes as raw materials. We will research opportunities for marketing the process and products, and investigate possible revenue from licensing and equipment sales.

What are the potential benefits?

We estimate that CO₂ emission reductions arising from the new process will reduce the UK's GHG inventory by over 800,000 tonnes, with further indirect emission reductions arising through carbon trading and/or process licensing in the UK and overseas. These sustainability gains will produce substantial cost benefits.

What do you need to do next – to get closer to a marketable product, service or usage?

We seek funding of around £750k for a three-year project with industry partners in order to build a pilot plant which will demonstrate the process on a commercial scale using 'natural' raw materials calcined by novel low-energy methods, and which will produce full-scale precast concrete products.

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Molecular Solar Ltd

Molecular Solar is a spin-out company from the University of Warwick dedicated to commercialising promising research in molecular photovoltaics. We were incorporated in December 2008 and aim to become the leading developer of molecular photovoltaics, from material synthesis through to module fabrication and integration into device applications.

What is the problem your project is trying to solve?

Today it costs about \$5 to convert the sun's radiation to 1 watt of useful output power. When this cost is reduced to less than \$1 solar power will be a viable competitor to fossil fuel power generation.

Organic solar cells are attracting growing support in the solar power industry because they offer a feasible path to this cost target, the materials and processing involved in their manufacture being inherently low cost. Additionally organic solar cells are extremely thin and flexible, which opens up a host of new applications for the technology, which will further accelerate market penetration and expansion.

However, commercialisation of the organic photovoltaic technology requires significant improvements in device performance, in particular cell efficiency and lifetime. Molecular Solar's strategy is to double cell efficiencies over the next two to three years to facilitate the commercialisation of our technology.

What is the study aiming to achieve?

The aim of this project was to undertake proof-of-concept studies that will lead to the development of a family of new molecular materials for small molecule organic solar cells, enabling improved device efficiency and stability through novel modifications of proven organic semiconductor systems. In addition to delivering improvements in device performance, these studies will allow us to strengthen the intellectual property position of Molecular Solar in the area of photoactive materials, and help us secure the necessary funding to commercialise this emerging third-generation solar cell technology.

What are the potential benefits?

The potential of the technology being developed by Molecular Solar to reduce the UK's carbon footprint and create jobs in a growing high-tech sector is very significant.

What do you need to do next – to get closer to a marketable product, service or usage?

We are actively seeking equity investment to grow our business.

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Motor Design Ltd

Motor Design Ltd is a UK-based SME. We have been developing electric motor simulation software since 1999 and are world leaders in the development of advanced software design tools for thermal analysis of electrical machines. We supply software to the aerospace, automotive and industrial sectors and have customers throughout the world.

What is the problem your project is trying to solve?

Some time ago we developed a heat transfer analysis library in Portunus. The main deficiency of the tool developed so far is that the cooling fluid flow is not calculated and must be input by the designer. An additional library to calculate fluid flow is required so we can calculate fluid velocity and make an accurate estimate of convective heat transfer. This step is crucial in the optimisation of cooling systems. Using the new library, designers will be able to minimise temperatures and resulting losses, maximising energy efficiency of devices such as electric motors and generators, transformers and power electronics.

What is the study aiming to achieve?

We are developing a flow network analysis library within the Portunus system simulation environment. This work has involved research to find the most appropriate analytical formulations for pressure drops due to changes in flow such as expansions, contractions and bends, and duct wall friction. The library components have been implemented using an open high-level language called VHDL-AMS to provide maximum flexibility. The implementation has involved the development of an innovative method to

account for the non-linear interaction between the flow network library and heat transfer library. The models created have been validated using computational fluid dynamics.

What are the potential benefits?

The Portunus libraries can be used to analyse the cooling of a wide range of devices, such as electric motors, generators, transformers and power electronics. The need for such software is increasing dramatically as cooling of electrical devices is gaining more importance due to the push for increased energy efficiency.

What do you need to do next – to get closer to a marketable product, service or usage?

We need to make further developments of the flow network and heat transfer libraries in Portunus. We must allocate sufficient time to carry out the software coding. We also need end users, such as power electronics manufacturers, to evaluate the software and provide feedback required for future development.

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NetComposites

NetComposites is a global research, consultancy and online media company. We develop new technologies that will make the composites industry even more economically competitive and environmentally responsible, with the aim of developing highly applied technologies that we can help take to market. We focus on naturally derived materials, nanocomposites and self-reinforced plastics.

What is the problem your project is trying to solve?

Due to increased environmental awareness, a number of biocomposites are now commercially available, albeit for non-structural applications. These could potentially offer lightweight, sustainable alternatives to standard glass reinforced plastics. However, poor mechanical properties and fire resistance are both barriers that current biocomposites face, preventing their widespread use in more structural applications. This is a significant problem – without addressing it, biocomposites may be limited to non-structural, cosmetic applications.

What is the study aiming to achieve?

This project aims to widen the use of composites from renewable resources using aligned natural fibre reinforcements with furan resins. These thermoset resins are derived from agricultural waste products, and preliminary trials have indicated impressive fire resistance. By using these materials, fire-resistant high-performance composites will be produced, overcoming the barriers that current biocomposites face particularly in the automotive and construction industries.

What are the potential benefits?

The potential market for fire-retardant bio-derived materials is huge, considering the current combined market for composites in the automotive and construction sectors is estimated at around £160m per year. These markets are currently dominated by GRPs, some of which could be replaced by the materials that are being developed in this project, in applications such as cladding, furniture, interior and external panels. Following further development and launch, we would hope to gain a small but significant share of this market.

What do you need to do next – to get closer to a marketable product, service or usage?

It is anticipated that this study will prove the feasibility of furan-based biocomposites in demanding applications. Although this work will reduce the time to market of the materials, significant developments will still be required, in particular to optimise the resin to overcome the issues of viscosity, as well as upscaling the prepregging process and proving the performance of the materials in a range of applications. To do this we will need to collaborate with raw materials and machine suppliers and end users in the automotive and construction sectors. We may consider seeking external investment.

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Oxford Advanced Surfaces

Oxford Advanced Surfaces develops novel 1-500nm surface coatings for applications into diverse industries. Current projects are based around anti-reflective coatings, particle formulations and adhesion.

What is the problem your project is trying to solve?

The project will demonstrate a low-cost single-layer coating on polymer substrates, which will reduce the reflectivity of the substrate by over 85% with zero haze.

What is the study aiming to achieve?

We aim to produce prototype anti-reflective coatings on polymer, primarily polycarbonate. Demonstrate different substrate morphologies and have a mathematical model relating the microstructure to the optical and mechanical properties.

What are the potential benefits?

The technology has the potential to increase efficiency of solar cells, improve display viewability and have applications to ophthalmics. The anti-reflection coating market is worth \$2.94bn per year (2008 figure).

What do you need to do next – to get closer to a marketable product, service or usage?

We aim to develop prototype systems to sample leading players in the industry and enter into technical development programmes.

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Plurion Ltd

Plurion is a start-up company developing flow battery energy storage. With a significant research and development facility we are currently at pilot-stage testing, and hope to have demonstrator units in a working environment within 12 months.

What is the problem your project is trying to solve?

The consequence of our battery's exceptionally high cell voltage is the highly corrosive nature of the electrolyte, which is otherwise environmentally benign. Carbon, the basis of most redox battery electrodes, corrodes under the extremely high oxidising conditions. Titanium on the other hand will withstand the oxidising environment of one half of the cell, but not the reducing nature of the opposing half. Plurion's challenge is to demonstrate the use of a bipolar electrode of sufficient conductivity, functionality and chemical stability, that is cheap both in raw materials and manufacture.

What is the study aiming to achieve?

Titanium powder can be produced from waste swarf at a fraction of the cost of new – for example, from the aerospace industry – which can then be processed into a metallic plastic composite. Plurion aims to combine a titanium-based positive electrode and a carbon-based negative electrode into a single bipolar electrode and demonstrate its effectiveness in our batteries.

What are the potential benefits?

Energy storage has the potential to become a multi-billion-dollar industry. Applications include integration with renewables to tackle intermittency, the replacement of fossil-fuel generators to provide power at times of peak demand, arbitrage and off-grid microgeneration.

What do you need to do next – to get closer to a marketable product, service or usage?

Plurion aims to further develop links to improve the electrode manufacturing process to reduce costs and improve consistency. In parallel, long-term testing will take place to optimise the operation of the battery with the new electrode materials. £100k is expected to be needed for this to cover capital expenditure and manpower.

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RE Hydrogen Ltd

RE Hydrogen Ltd is developing a novel technology to upgrade pyrolytic bio oil by hydrogen synthesis. The company was formed in May 2009 based on 10 years' research on electrolyser technology. We are also developing a patented low-cost renewable electrolyser.

What is the problem your project is trying to solve?

The conventional pyrolytic bio oil has high acidity (pH = 2-3), low energy (16-19 MJ/kg), high elemental oxygen (35-40% by wt), low carbon (55%), and relatively low elemental hydrogen (5-7%) compared with diesel and petrol, which prevent their direct integration with oil refineries.

What is the study aiming to achieve?

We are developing catalyst assisted pressurised flash pyrolysis to produce upgraded, hydrogenated pyrolytic bio oil. Flash pyrolysis is the fastest process to produce bio oil, with a retention time of less than 2 seconds, compared to at least 20 minutes with gasification, and several days to a few weeks with anaerobic digestion (AD). The shorter retention time with flash pyrolysis will therefore lead to a much smaller reactor than with AD and gasification, thus lower capital cost for the same output.

What are the potential benefits?

The overall bio oil market in the UK is equivalent to 18 GW or 250,000 billion barrels per day, which is about 10% of the UK's daily oil consumption. Our technology can be directly integrated with the existing oil refineries. Using our technology we believe we could generate significant revenues for the UK economy.

What do you need to do next – to get closer to a marketable product, service or usage?

With a further £250k we would be able to develop a prototype product to produce upgraded pyrolytic bio oil. We will file a patent on our novel technology based on the current progress made. We are interested in collaborating with industrial partners for technology development and marketing our technology.

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Stingray Geophysical Ltd

Stingray provides advanced permanently installed reservoir monitoring solutions to the global oil and gas industry. Our monitoring system uses advanced fibre-optic sensing technology, allowing oil companies to increase recovery factors over the life of an oil field by enabling improved reservoir management strategies.

What is the problem your project is trying to solve?

Modern seismic sensors like Stingray's are providing more and more accurate information about undersea oil and gas reservoirs, increasing yield from existing fields, and improving the ability to identify new fields with minimal environmental impact. For best performance in high-density deployments, the smallest possible sensor package is required.

What is the study aiming to achieve?

We are taking the first steps in developing a new form of miniature optical seismic sensor. With a sensing element the size of a thumbnail, we hope the new technology has the potential to replace or augment current sensor technologies, which are fundamentally limited to multi-centimetre-cubed dimensions.

What are the potential benefits?

The total market for seismic sensing in the oil and gas area is projected to reach £800m by 2014. It is expected that this novel sensor system could ultimately displace a significant proportion of this market, bringing considerable benefits to the oil and gas industry and beyond.

What do you need to do next – to get closer to a marketable product, service or usage?

With a further £100k the sensor design could be fully optimised for best performance, price and reliability, making it suitable for a wide range of geophysical sensing applications.

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Sunamp Ltd

Sunamp is responding to the need for low to zero-carbon heating, cooling and hot water systems in domestic and commercial heating, ventilation and air conditioning applications. We have invented a high-power heat battery using phase change materials and are researching and developing an integrated heat store and processor.

What is the problem your project is trying to solve?

This study is addressing one of the main obstacles to phase change material (PCM) thermal storage – whether it is possible to develop a combination heat exchanger and PCM-filled heat storage module with both very high power density and energy density (significantly better than water tanks). If such a storage module proves feasible, it will enable thermal stores one-quarter the size of today's traditional water-based systems to be developed – a significant factor given the premium value of space in buildings.

What is the study aiming to achieve?

In this feasibility study Sunamp is building and conducting laboratory experiments on two example heat batteries, each with different heat exchange surface areas and composition of advanced thermal storage materials. From these experiments, a predictive model will be developed for the intervening combinatorial design space. We expect to achieve a detailed understanding of the feasibility of the proposed heat battery design and also the next R&D steps required on the path to successful commercial exploitation, taking account of predictions from the model.

What are the potential benefits?

Successful commercial exploitation of the results of this feasibility study should lead to the establishment of a long term, high-tech, knowledge-intensive and globally recognised R&D business for heating, ventilation and air conditioning (HVAC) in the UK, employing in excess of 50 well-qualified scientists and engineers; and a measurable reduction (in ppm) of global CO₂ emissions attributable to our technology.

What do you need to do next – to get closer to a marketable product, service or usage?

With a further £100k-200k we will develop a scale model of a complete heat store and processor based around the heat battery. We wish to build a relationship with an existing HVAC product design, manufacturing and sales company interested in supporting the development and trialling of a full-size prototype product.

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Wax RDC Ltd

Wax is a specialist design consultancy developing and supporting innovative low carbon technologies and products. Formed in 2006, Wax has two full-time staff and employs specialists as per project requirements. Skills include product design, eco-design, lifecycle assessment, interface design and collaborative R&D.

What is the problem your project is trying to solve?

From showers alone, the typical UK household sends over 40,000 litres of heated water down the drain each year. This wastes energy, water and money. The spread of water metering, increasing pressure on water and energy supplies, and their associated CO₂-eq emissions make this waste significant. Whilst grey water recycling systems exist, there is currently no small-scale system available to clean and reuse this type of waste heated water.

What is the study aiming to achieve?

This study aims to establish the feasibility of cleaning and reusing waste heated water, by designing and building a prototype system to filter out particles, bacteria and detergents from the waste heated water. The study also investigates potential market applications.

What are the potential benefits?

Should this study prove the feasibility of system, for a shower application, estimated results indicate an annual saving of over £100 and a quarter of a tonne of CO₂ emissions per UK household from reduced energy and water demand. Larger savings are likely in other global markets with greater water constraints.

What do you need to do next – to get closer to a marketable product, service or usage?

Funding is required to develop and refine the system, further investigate markets and commercialisation.

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Xanfeon Ltd

Xanfeon Ltd provides consultancy and advisory services to business in the areas of ecodesign, resource efficiency and carbon footprinting. We have created Carbonclick as a new service. This provides users with information on ways in which the environmental impact from printing and related activities can be reduced.

What is the problem your project is trying to solve?

The feasibility study focused on toner printer cartridges. The aim was to design and construct a prototype online tool for remanufacturers and users to determine the carbon footprint associated with their choice of cartridge (new compared with remanufactured) for a given number of refill cycles and wide range of models.

What is the study aiming to achieve?

We have developed the online tool – called Carbonclick – and it is being launched as a carbon footprint calculation service for remanufacturers. The tool allows a remanufacturer to specify what components have been replaced in a given refill cycle and what happens to spent components and materials.

What are the potential benefits?

We believe this is the first online tool available that provides remanufacturers with a way of estimating the carbon footprint of a refurbished product under different scenarios of component replacement. The carbon footprint reductions that can be achieved are significant, ranging up to about 70% compared with new products.

What do you need to do next – to get closer to a marketable product, service or usage?

Our aim is internationalise the Carbonclick service to be able to provide online carbon diagnostics and services to users of print services.

