

Innovate UK

Results of Competition: Analysis for Innovators

Competition Code: 1701_EE_A4I

Total available funding is £3m Innovate UK

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Adaptix Ltd	Understanding surface contamination of cold cathode emitters	£12,486	£8,740
NPL Management Ltd		£37,494	£0
Project description - provided by applicants			
Healthcare need: Computed Tomography (CT) capability in many hospitals worldwide is under-constraint, resulting in delays to planned procedures. CT scans are expensive per scan, and the increasing use (typically >10% per year) is a factor in driving healthcare costs beyond inflation. There is a need for a lower-cost, lower-dose 3D imaging capability in healthcare. Significance: 3D imaging is a fundamental clinical tool as it enhances the sensitivity and specificity of diagnosis, and allows enhanced characterisation over time. Innovation: Low-dose 3D 'Digital Tomosynthesis' ('DT') imaging is currently achieved using a source on a computer controlled mover, or using a series of separate stationary tubes. Current DT solutions (used in Breast Imaging and General Radiology) are expensive (circa \$450,000 fully installed) and so large the solution can only be fixed in place. The Adaptix Flat Panel Source facilitates a highly portable and low-cost tomosynthesis solution with enhanced resolution. Outcome: We see a way to allow to produce a 3D imaging solution, small (circa 20kg) and cheap enough (<\$100,000) to be deployed on a mobile basis within hospitals and polyclinics. The innovative analysis by NPL will enable understanding of the variation in emitter tip performance and aid developments that enhance lifetime, reduce variation and reduce manufacturing costs.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
FGV Cambridge Nanosystems Ltd NPL Management Ltd	iFLAG: innovation in Fast buLk Analysis of Graphene	£12,430 £37,500	£12,430 £0
Project description - provided by applicants			
As graphene matures, production of the material is scaling up due to applications of the material moving from the lab into commercial sectors. However, a major problem still faced by graphene producers is the ability to rapidly characterise the properties of graphene flakes as industry-scale quantities of graphene powder are generated. FGV Cambridge Nanosystems and the National Physical Laboratory are working together under the iFLAG project to investigate the feasibility of rapid analysis techniques that can be used to monitor graphene produced in a real-world graphene reactor. This will enable near real-time analysis of the flakes, speeding up the characterisation process and allowing rapid iteration of equipment modifications needed as the reactors are scaled up to meet increasing industry demand for graphene.			

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Intelligent Fingerprinting Ltd	White Light Interferometry as a method for determining the volume/mass of fingerprints.	£98,173	£68,721
NPL Management Ltd		£118,152	£0
Project description - provided by applicants			
The applicants, Intelligent Fingerprinting Limited, have developed a technology that is capable of using a fingerprint to test whether a person has had a drug in their bloodstream. This is a cheap, quick and non-invasive way of testing people at the roadside, border or prison for drugs of abuse, explosives or other substances of interest. The technology is similar in the way it works to a pregnancy test: except that a fingerprint is placed upon the square window of a sample cartridge, and a developing fluid released. The result is then read by placing the cartridge in a reader which then gives a positive or negative reading. However, to ensure such tests are accurate they must be calibrated against national standards. IFP's test has two factors that it measures that must be calibrated in this fashion before it can be accredited by national standards authorities (UKAS): the amount of substance that it has measured and the mass of fingerprint that it is measuring this substance from. The company has a method of achieving the first of these. However, no method has been found for measuring the mass of a fingerprint, although the company has invented a way of measuring the amount of fingerprint deposited on an arbitrary scale. This project will work with NPL, who have an international reputation in measurement and maintenance of standards, to test whether it is possible to measure the volume of a fingerprint using a technique call White Light Interferometry (WLI). If this is possible, then the mass can be calculated from the volume.			

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Sistemic Scotland Ltd	Measurement of pluripotent stem cell contamination in cell therapy products	£86,194	£60,336
LGC Ltd		£60,000	£0
Project description - provided by applicants			
Sistemic Ltd is a company whose primary business is focused on providing innovative microRNA-based tools for areas of unmet need within cell therapy research, development and manufacturing markets. Cell therapies are seen as the future of treatment and are expected to have great potential, revolutionising medical care capabilities in a range of chronic diseases, such as diabetes and myocardial infarction. Cell therapies are increasingly using pluripotent stem cells (PSCs) to generate derived cell therapy products. However, PSCs can form tumours, which is a safety issue requiring the need to demonstrate the level of contaminating PSCs. Currently there is no simple established way to assess contamination. We have developed a prototype product based around using biomarkers to detect contaminating PSCs in a derived cell therapy product. Innovate UK will support Sistemic through access to innovative and advanced measurement and analytical technologies offered by a partnership with LGC. The outcome of this project will facilitate the safe clinical progress of PSC-derived cell therapy products to bring them to a clinical product more quickly. This will in turn result in patients getting quicker access to these novel therapies during clinical trial development phases, and ultimately, to a successfully launched clinical product and therefore improvements in quality of life.			

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2-DTech Ltd	Functionalising graphene for improvements in dispersion for enhancement of graphene reinforced composites	£60,541	£42,300
NPL Management Ltd		£90,611	£0
Project description - provided by applicants			
A problem regularly faced when trying to incorporate graphene nanoplatelets (GNPs) into systems such as thermoplastics and epoxy resins is achieving a good dispersion of the GNPs within the target medium without re-agglomeration occurring which leads to poor and inconsistent final materials performance in the graphene composite systems. This, along with a lack of reliable materials characterisation are key barrier to adaptation of these materials in markets such as motorsport and construction. Functionalisation of GNPs can help improve the dispersion within systems, however the processes used to impart the functional groups upon the GNPs can damage the basal plane of the materials, thus decreasing materials performance in areas such as mechanical reinforcement and electrical conductivity. Here 2-DTech (2DT) will work closely with the National Physical Laboratory (NPL) to produce a range of functionalised GNPs via wet chemical and plasma approaches with an aim of improving GNP dispersion within target polymer systems. The expertise and instrumentation available at NPL will be used to determine that the correct functional groups are present within the final functionalised materials and that the basal planes remain defect free via a suite of high-end instrumentation and measurement techniques. This will allow for the development of optimised functionalised GNPs which will be incorporated into polymer systems and be tested to show consistent final performance, thus elevating two of the key barriers to adoption for these materials.			

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AgPlus Diagnostics Ltd	Quality Control Test for a Carbon Electrode in a Point-of-Care Diagnostic Test Cartridge	£62,865	£44,006
NPL Management Ltd		£85,432	£0
Project description - provided by applicants			
AgPlus Diagnostics produces medical test devices that can be used by a doctor to give patients information on their health in less than 10 minutes during a single doctor's appointment. Our medical device is used by inserting a test cartridge into a handheld reader that performs the medical test using AgPlus's unique signal detection chemistry. This is called electrochemical signalling and requires a particular component called a carbon electrode to be built into the test cartridges in order to work. The electrodes are made by another company and we have found that around one third of these electrodes are defective which can lead to a wrong medical test result. At AgPlus, we must screen out these defective electrodes during manufacturing but currently we cannot do that until we have fully made the medical test cartridge. This is very wasteful, so AgPlus needs to better understand what causes this problem with our electrodes. Based on this knowledge, we can determine the best approach for the electrode manufacturer to minimise these losses. Also we will then have a test to check each batch of electrodes at AgPlus when we receive them from the supplier so that the defective ones can be screened out and discarded as early as possible in the manufacturing process. This will help our company reduce manufacturing costs and material wastage significantly. The knock-on effect of this is that it will help AgPlus sell more tests and for the company to grow and employ more skilled people.			

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Welldata Subsurface Surveillance System Ltd NPL Management Ltd	Tubing Defects	£34,970 £65,088	£24,479 £0
Project description - provided by applicants			
W3S has developed a patented technology for measuring fluid levels in oil and gas wells. The sensor system uses the reflection of microwave radar signals to measure both single and multiple fluid interfaces to a high degree of accuracy in both static and dynamic conditions. The outstanding feature of this technology is that it is wholly non-intrusive; the system can be permanently fitted to the wellhead and provide continuous, near real time feedback negating the need for a well intervention. The current project aims to extend the capabilities of the system to detect (and, where possible, quantify) the presence of different types of defects in the tubing wall. Types of defects to be considered within the programme include erosion, corrosion and scaling. The success of the project will deliver a sensor capable of providing both fluid level information and condition monitoring of the production conduits. Since the sensor may be installed permanently on the wellhead, the rate of defect formation may be recorded.			

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Energy Technology Centre Ltd	Real time measurement of sample erosion	£8,118	£8,118
NPL Management Ltd		£41,850	£0
Project description - provided by applicants			
Wind turbine blade leading edge erosion is an important issue for the wind energy industry. Energy Technology Centre and the National Physical Laboratory are undertaking a feasibility study to investigate the use of state of the art measurement techniques to measure the real-time erosion of test samples in a rain erosion test rig. A candidate technique will be selected and trialled on an operational rain erosion test rig at Energy Technology Centre for evaluation and demonstration. If successful, the measurement technique will be used in testing, research and development, supporting the accelerated technology development of blade leading edge erosion protection systems, leading to improved efficiency, reliability and maintainability of wind turbines..			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Tata Steel UK Ltd	Surface Finish Quantification for Hollow Tube Sections	£102,270	£51,135
NPL Management Ltd		£102,402	£0
Project description - provided by applicants			
Tata Steel (TS) UK's hollow section business manufactures square and rectangular tubes for the construction, lifting and excavating markets. A key 'high-value' differentiating product line behind Tata's strategy to secure UK steel operations, tubes are often used for applications where the cosmetic appearance of the tube is as critical as tube strength. This project will investigate a system which is capable of measuring, quantifying and categorising surface finish for square and rectangular hollow sections and which is capable of operating on-line in a hostile mill environment. An online measurement system will require novel and innovative approaches to achieve high measurement resolution and throughput within TS UK's hostile manufacturing environment, and to compensate for pit occlusion by residual mill scale. TS UK and the National Physical Laboratory (NPL) propose a feasibility study and technology demonstration for surface inspection of square-section tubes, a significant first step towards in-process quality control for tube production. Project success is expected to unlock further collaborative investment for this critical product line, and translation to other applications. This project would expand NPL's dimensional surface metrology expertise and problem-solving into an important and high profile UK industry.			

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Haydale Composite Solutions Ltd NPL Management Ltd	Dispersion Analysis of Graphene in Laminated Composites (DiAGra)	£127,522 £86,334	£89,265 £0
Project description - provided by applicants			
Graphene is the world's first 2D material and since its isolation in 2004 it has captured the attention of scientists, researchers and industry worldwide. It is ultra-light yet immensely tough. It is 200 times stronger than steel, but it is incredibly flexible. It is the thinnest material possible as well as being transparent. Graphene and other nanofillers can be used in polymer composites to enhance mechanical and physical properties for example increased tensile strength, tensile modulus, impact strength, electrical and thermal conductivity and to reduce exotherms. However graphene is an inert carbon nanomaterial which is prone to aggregation and difficult to disperse within a polymer matrix. HCS has access to a patented functionalisation process at its sister company Haydale Ltd in South Wales. Functionalisation helps with the dispersion of the graphene within the polymer matrix. To optimise the use of graphene as a reinforcement in composite materials requires a knowledge of where the graphene is within the structure of the laminated materials and how well dispersed it is. This project will use the knowledge and analytical capabilities of NPL to assist Haydale Composite Solutions to better disperse the graphene within laminated composite materials and to better understand how to influence the properties on an industrial scale.			

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Gold Standard Phantoms Ltd	Traceable calibration for an MRI Perfusion Measurement	£71,468	£50,028
NPL Management Ltd		£70,187	£0
TUV-NEL		£28,250	£0
Project description - provided by applicants			
Perfusion represents the amount of arterial blood delivered to an organ, and is of clinical importance for dementia, stroke, cerebrovascular disease, and cancer. It can be measured by Magnetic Resonance Imaging (MRI) using a technique known as Arterial Spin Labelling (ASL). ASL provides images in which every pixel has a given value; however, due to the lack of an existing device allowing to simulate what happens in the body, ASL has not yet seen a major clinical uptake, despite its advantages over other techniques. We have developed a product which can be used to calibrate ASL images, in which every pixel is guaranteed to have the proper value. Such a product would allow radiologists to use ASL as a clinical tool for diagnosis; however, in order for this to happen, we need to understand the uncertainties that apply to our own organ model, and how precisely MRI can measure perfusion. This project will be in partnership with NPL and NEL, using NPL's expertise in mathematical modelling, in particular in evaluating the uncertainty in both our model and the MRI measurements, and NEL's expertise in simulation of fluid velocities. Through this collaboration, we hope to further develop our device and allow our product to have positive impact on radiology worldwide.			

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MIRICO Ltd	Real World Validation of Laser Dispersison Spectroscopy	£165,478	£115,835
NPL Management Ltd		£124,700	£0
Project description - provided by applicants			
With growing concerns on environmental pollution and its adverse impact on human health, it has become increasingly important to measure and control industrial processes, reduce emissions from fossil fuel power plants, and better understand the ambient air quality around us. To date, precision instrumentation capable of high sensitivity and accurate concentration measurements are cumbersome to use, require continuous calibration and maintenance, and often limited to use in controlled environments. MIRICO's Laser Dispersion Spectroscopy technology is a revolutionary approach for highly sensitive measurements of gases, offering high versatility and enabling new approaches to emission monitoring that provides more realistic, robust and reliable data of emission sources. In collaboration with NPL, MIRICO will test this new spectroscopic technique, utilising NPL's state of the art facilities to demonstrate the technologies superior performance in demanding environments. The resulting technology will improve environmental measurements, enhance product yields in industrial processes, and provide policy makers with the tools to reduce emissions of pollutants and enhance the ambient air quality to mitigate the impact on human health.			

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Evolution-X Ltd	Measuring Human Traffic Flow Across Cities Using Doppler Radar	£24,525	£24,525
NPL Management Ltd		£25,475	£0
Project description - provided by applicants			
The project is a feasibility study to assess the viability of various low cost motion detection modules embedded in small easily deployable smart sensors as a means to anonymously and accurately monitor crowd flow and measure crowd numbers across a specified location. We will work in partnership with the National Physical Laboratory to design, test and develop a sensor, supported by cutting edge machine learning algorithms and probabilistic inference methodologies capable of achieving our ambitious and wide reaching business goals. If successful, the impact to our customers and the wider urban society will be dramatic and would enable the creation of a whole host of new smart city services.			

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Air Quality Research Ltd LGC Ltd	Measuring Hydroxyls & Other Radicals to Optimise our Disinfection Process	£68,609 £55,500	£48,026 £0
Project description - provided by applicants			
The project is a feasibility study to assess to viability of various low cost motion detection modules embedded in small easily deployable smart sensors as a means to anonymously and accurately monitor crowd flow and measure crowd numbers across a specified location. We will work in partnership with the National Physical Laboratory to design, test and develop a sensor, supported by cutting edge machine learning algorithms and probabilistic inference methodologies capable of achieving our ambitious and wide reaching business goals. If successful, the impact to our customers and the wider urban society will be dramatic and would enable the creation of a whole host of new smart city services			

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Bramble Energy Ltd	Diagnosis of Coating Failure in Fuel Cell Components	£12,907	£12,907
NPL Management Ltd		£37,093	£0
Project description - provided by applicants			
Hydrogen fuel cells are a promising technology which can provide clean electricity from an alternative fuel. They have long been hailed as a means to provide more sustainable energy, however they have been hampered by high costs and complexity of manufacture. At Bramble Energy, we have developed a low-cost fuel cell based on printed circuit board technology. By using materials already produced at large volumes, integrated with well-established manufacturing methods, we are able to scale production quickly and at lower cost. In order to further improve the performance of our systems we want to extend their lifespan beyond the acceptable values which we can currently achieve. By working with NPL we intend to study the ways in which our cells lose performance under accelerated degradation conditions. By understanding the mechanisms leading to degradation we intend to improve our the lifetime of our product to exceed that achievable by other technologies.			

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Astrimmune Ltd	Enabling UV Analysis of Circulating Tumour Cells	£12,500	£12,500
LGC Ltd		£37,500	£0
Project description - provided by applicants			
We urgently need earlier detection of cancer and other diseases. Earlier detection leads to lower costs, better survival and higher quality of patient life by allowing earlier and more effective treatment options. Astrimmune responded to this challenge with an advanced filter product that allows the isolation of circulating tumour cells and other rare cells, from liquid biopsies, like blood and urine. A cost effective, non-invasive general population screening for cancer or other diseases is a very worthy goal that will save money and extend lives. We started out monitoring people that already had cancer before attempting general screening. We encountered a problem with autofluorescence of the filter while conducting fluorescent microscopy of cells retrieved on the filter. Autofluorescence is the natural emission of light by structures when they have absorbed light. Autofluorescence from U.S. paper money is used to identify counterfeit money. This Innovate UK grant is to develop alternative dyes for the purpose of identifying cancer cells and other rare cells of interest that are captured on our filter. Our current state-of-the-art disposable filter is superior to competitor filter designs and is more cost-effective than expensive processes currently being used. Our goal is to eventually have an inexpensive way to screen the whole population, on a regular basis, to identify health problems sooner. The earlier the problems are identified, the better the chances of a long and healthy life. Solving the autofluorescence problem will be a big achievement, immediately helping researchers, patients and providers of care.			

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Tecrea Ltd	Track and measure polymeric nanoparticles	£49,397	£34,578
NPL Management Ltd		£49,433	£0
Project description - provided by applicants			
This project aims to develop a method to track and measure a polymer in skin, blood and milk. The polymer (Nanocin) is being used by Tecrea Ltd and partners to improve drug delivery for human and animal health applications. As with any drug development program, it is important to be able to accurately measure the ingredients. The experts at NPL will work with Tecrea scientists to apply high resolution stimulated Raman scattering (SRS) microscopy to solve the analysis challenge. The custom-built SRS microscope will be used to measure levels in blood and visualise the distribution in skin with sub-micrometre resolution. If successful, the new method will enable Tecrea to understand the mechanisms involved in the polymer-based nanoparticle drug formulations. Also, the data will help the SME, partners and regulatory agencies to assess the safety situation prior to initiation of field and clinical trials.			

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The Falcon Project Ltd	Internal structure of energetic materials	£8,890	£6,223
Diamond Light Source Ltd		£47,000	£0
Project description - provided by applicants			
Awaiting Public Project Summary			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
TMD Technologies Ltd	Research Enabling Spherical Part Orientation aNd Spacing In Vacuum Electronics	£56,415	£33,849
NPL Management Ltd		£76,475	£0
Project description - provided by applicants			
Travelling wave tubes (TWTs) are vacuum electronics devices used as microwave-band amplifiers in defence, medical and space applications. While solid state amplifier technologies continuously improve, demand for higher frequency and power handling means the most demanding applications always require TWTs. At higher frequencies, TWT components must be smaller, and higher powers require TWTs to be made more precisely. At present, the capability to accurately measure positioning and alignment of components has become a limiting factor in TMD's build processes. This project aims to develop an accurate and repeatable method of measuring the position and alignment of the control grid - a key component of the electron gun. This grid determines the initial trajectory and focus of the high-intensity electron beam which allows TWTs to achieve their unparalleled amplification effect. Micron-level variation in grid positioning can adversely affect TWT performance, potentially resulting in failure. Development of a successful technique will reduce costs, build time and scrap value, but will also unlock further capability allowing TWTs of more ambitious design to be built.			

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The Coconut Collaborative Ltd	Screening Rancidity of Coconut Cream	£4,556	£4,556
Science and Technology Facilities Council		£22,500	£0
LGC Ltd		£22,500	£0
Project description - provided by applicants			
The project is to develop an on-line method for screening and detecting the rancidity and quality of coconut cream. The objective is to be able to detect traces of rancid coconut cream ahead of its use in the production of coconut Yogurt, with production yield and quality control benefits. The outcome of the project is likely to have wider applicability in the UK since coconut cream is a growing alternative to dairy ingredients in an increasing number of foods. The project is lead by The Coconut Collaborative, an innovative manufacturer of Coconut Yoghurts and supported by LGC and STFC who will respectively investigate the suitability and sensitivity of Multispectral Imaging and Raman spectroscopy as an on line measurement method for screening for coconut cream rancidity.			

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Hydrason Solutions Ltd	Deepwater Acoustic Sensing	£31,367	£21,957
NPL Management Ltd		£18,185	£0
Project description - provided by applicants			
Hydrason Solutions supplies innovative ultra-wideband sonar systems and services for subsea surveys. This project, in conjunction with the National Physical Laboratory (NPL) is helping Hydrason to extend its operations to deep water (>1000m depth). This opens up new international markets for Hydrason's systems to provide the information required for safe installation, operation and decommissioning of subsea infrastructure.			

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Innovate UK

Results of Competition: Analysis for Innovators

Competition Code: 1701_EE_A4I

Total available funding is £3m Innovate UK

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Biocompatibles UK Ltd	Embolic Microspheres	£11,483	£11,483
NPL Management Ltd	Characterisation	£38,425	£0
Project description - provided by applicants			
Embolic beads are commercially available products for the treatment of primary liver cancer (HCC) and are used to occlude the vessels and prevent blood supply to the tumour. They are also capable of localised delivery of chemotherapeutic agents. These embolic bead products are delivered using a microcatheter, directly into the arteries supplying the blood to the tumour, and the critical process of administrating these beads is important to ensure successful occlusion of the vessels. It is important to consider the ability of the product to be administered through the confinement of a microcatheter, and to understand any unique physical, chemical or surface interaction properties of the beads, that may restrict this process. Due to limitations in currently available methods for characterising and linking the surface chemistry of beads to their administration, we propose a novel series of experiments to develop methods and where identified, to provide a specific functional evaluation of bead chemistry and the subsequent effects on microcatheter compatibility. It is considered that through a more effective understanding of these surface interactions, translation into enhanced device usability for physicians and improved functionality possible.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
SouthWestSensor Ltd LGC Ltd	Wearable Chemical Sensor - Cortisol	£128,400 £36,120	£89,880 £0
Project description - provided by applicants			
The wearable chemical sensor-cortisol project is an industrial research project that will allow SouthWestSensor (SWS) Ltd to offer a novel chemical sensor device for the measurement of cortisol, to be used in hospitals, community care and sport science. SWS Ltd has already established sensor devices for the measurement of chemical concentrations for a variety of biomarkers from body fluids such as glucose, lactate and thiols. This project will set up a new collaboration between SWS and LGC group, to develop a novel device for continuous measurement of cortisol an important hormone indicator to many diseases. Because cortisol changes in circadian cycles, with the magnitude varying from person to person, the single point measurements currently performed in hospital do not give a representative picture of cortisol in the subject. This new device will provide a step forward for the thorough and accurate measurement and better diagnostics of related diseases. Since cortisol is linked to stress wearable devices can also provide a real time and continuous measurement of training effect and the body condition of elite athletes.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Semelab Ltd	Non-destructive testing method for inspecting the quality of plated piecepartd and soldered joints	£14,949	£14,949
NPL Management Ltd		£34,938	£0
Project description - provided by applicants			
This proposal aims to develop a method of evaluating the quality of plated pieceparts and soldered joints using a technique which addresses the non-destructive inspection technologies and engineering measurements example under the competition brief. The products that are manufactured at Semelab all contain soldered joints to bond materials together, typically materials that are plated. The quality of the plating of the incoming pieceparts is evaluated using a destructive bend test and solderability test that are performed on a sample basis but does not guarantee to highlight all potential faults in the plating. For example recently a plated pin from a supplier was found to have 5% defective parts within the lot that was not exposed during incoming destructive sample testing, processed through the assembly line and identified during 100% screening tests, leading to a significant delay to the customer. The approach taken will be to explore current techniques with NPL, for example Lock-in Thermography, Time Domain Reflectroscopy (TDR) and electrical noise measurements to evaluate whether these techniques are capable of detecting defective plated pieceparts and soldered joints. The success of this project would revolutionise the electronics manufacturing process as currently there is no known non-destructive technique of evaluating soldered joints directly after the manufacturing process which would lead to higher quality levels of product and less potential for suspect modules to be delivered to customers.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Exnics Ltd	Wellstream Surveillance	£15,000	£15,000
TUV-NEL		£35,000	£0
Project description - provided by applicants			
Exnics is a subsea technology company determined to solve big industrial problems with innovative new products. The team take a market led approach and has a history of successfully identifying structural inefficiencies and bottlenecks within the industry and then resolving them with new fast to market technologies and products. Exnics is developing a low cost, low power, non-intrusive and retrofittable subsea tool for monitoring well performance and flow assurance of subsea oil and gas wells. A cost-effective method for monitoring individual wells will lead to improved recovery rates for subsea wells, boosting profitability.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
LMAT Ltd	Volumetric changes in non-homogeneous materials	£129,473	£90,631
NPL Management Ltd		£80,043	£0
Project description - provided by applicants			
During curing of thermosetting composites the resin undergoes cross-linking reactions that lead to an increase of material density and reduction in volume. The process of volume reduction, usually referred to as chemical shrinkage, can lead to development of high locked-in stresses. Both thermal and resin shrinkage induced stresses can subsequently cause distortion and premature cracking of the polymeric mouldings as shown in Appendix A. A deeper understanding of cure shrinkage mechanisms is critical to LMAT in order to design manufacturing processes and tooling for composites with high dimensional tolerances. This project will provide the required understanding of material behaviour by combining physical testing and numerical simulation to find the best method of measuring cure shrinkage induced strains and stresses. A successful outcome to the project will help to maintain and enhance the UK's position at the forefront of composites manufacture.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Sonardyne International Ltd	Sound speed sensor accuracy and stability	£24,445	£14,667
NPL Management Ltd		£72,819	£0
Project description - provided by applicants			
An analysis of the performance of the transducer used in our sound speed sensor, particularly under conditions when deployed subsea and investigation into any physical changes that may occur.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Lewtas Science & Technologies Ltd	Phase change control by very low power ultrasound	£46,500	£21,500
Project description - provided by applicants			
The use of very low power ultrasound to significantly affect phase changes such as crystallisation has been discovered, patented (GB1603981.1 and PCT filed on 7th March 2017) and published (J Chem Phys 145, 2016). Many applications are already being developed in several industries but we believe that this technology should be applicable to all materials and many other applications. We are a very small company and looking at the most attractive markets will take too much time if we do it empirically. We need to understand this phenomenon at the molecular level during molecular clustering prior to and during nucleation and subsequent crystallisation - in real time. This will give us the knowledge to refine and target the technology much quicker and, most importantly, help define our IP strategy for future competitive advantage.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
J&M Inertial Navigation Ltd	Personal Inertial Navigation Sensor Evaluation	£23,000	£23,000
NPL Management Ltd		£27,000	£0
Project description - provided by applicants			
Our project uses the expertise of the World-famous National Physical Laboratory to transform our life saving personal inertial navigation products, helping them to protect the emergency services and people operating in hazardous subsea environments. The same technology forms the basis of a range of 'pro-sumo' diving products for leisure and commercial use.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Precision Products (UK) Ltd	Chrome Plant Productivity	£57,450	£34,470
NPL Management Ltd		£97,435	£0
Project description - provided by applicants			
Ships carrying cargo across the World's oceans are powered by marine diesel engines. Engine components require precision coatings which impart important performance characteristics, e.g. wear and corrosion resistance, to ensure they perform reliably in extreme environments. As such, components, e.g. piston rings, are coated using hard chrome which is deposited via electroplating. However, process complexity makes maximising productivity and, subsequently, competitiveness in a global market challenging. It is imperative that the overall process productivity and quality is improved to continue UK production and compete with global competitors. We propose to develop a deeper understanding of the variables within the process that dictate the output and then, through a statistical experimental approach, identify the key variables and subsequent control levels that are paramount to improving the process productivity and quality.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Senior UK Ltd	Automation of Quality Inspection Process	£250,000	£125,000
Project description - provided by applicants			
This project will develop new measurement techniques (instrumentation and processes) with a higher degree of automation. The early focus on these new techniques and measurement technologies will ensure high productivity processes are established at an appropriate pace to support rapid growth for the business. This work package will be developed by Senior Aerospace BWT working in partnership with the National Physical Laboratory.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Datum Alloys Ltd	Optimising solder paste application for manufacture of ultrafine pitch printed circuit boards	£14,950	£14,950
NPL Management Ltd		£34,938	£0
Project description - provided by applicants			
Electronic components are added to printed circuit boards using a process called Surface Mount Technology (SMT). Key components are a stencil, squeegee blade and solder paste which are housed in an automated printer for high volume production. Squeegee blade action forces solder paste from the top side of the stencil through the apertures to create a pattern on the circuit board which matches where the components are to be placed. As electronic devices get smaller and more powerful there is a need to install smaller components in a higher density - to do this the stencil apertures become smaller and closer together making it more difficult to deposit and control the small volumes of paste required. To date all innovation has been focused on the materials used and coatings for the board side of the stencil and the apertures themselves. Datum has developed an approach to modifying the characteristics of the squeegee side of the stencil as well as the apertures and independent tests have indicated a significant improvement in transfer of paste. The purpose of the grant is to understand the impact of changing the material characteristics of the stencil on the squeegee side and use this information to optimise the process. A positive outcome will improve the capability of electronics manufacturing and result in Datum selling materials to create the optimum surface finish on the squeegee side of the stencil.			

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