Technology Strategy Board
Driving Innovation

Results of competition:
Technology-inspired innovation - August 2013 - Collaborative R&D - Advanced materials

Total available funding for this competition was £8m from the Technology Strategy Board.

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

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Alstom Limited (lead) Applied Inspection Limited Goodwin Steel Castings Limited	INMAP - Industrialisation of Novel MarBN Steel for Advanced Power Plants	£498,433	£259,134
Project description (provided by applicants)			
MarBN steels are the most promising approach to increasing the temperature capability of creep resistant martensitic steels to above 620c. Previously, MarBN steel has been successfully developed in the Technology Strategy Board project, IMPACT (2010-2013) and showed significant improvements in creep strength (20-40%) compared to the current state-of-the-art steels, Grade 92 and CB2. It is essential as the next stage of material introduction to upscale and demonstrate the manufacturability of industrial components and the INMAP project will develop and validate the casting technology and NDT inspection procedures required to produce a demonstration component. The key technology for non-destructive tests (NDT) with enhanced detectability for this compositionally complex steel will be developed. Weld repair for the casting component will be applied if any surface defects exist. Finally, the integrity of the casting will be characterised through extensive mechanical tests including creep and low cycle fatigue (LCF) to establish that the benefit apparent from laboratory tests is maintained in industrial components.			

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Ansell UK Limited (lead) Qudos Technology Limited Sefton Technologies Ltd University of Liverpool	Nanotechnology Enabled Infection Prevention Surgical Gloves (NEIP-SG)	£489,266	£320,301
Project description (provided by applicants)			
Hospital Acquired Infections (HAIs) cost the NHS £2bn per annum and are a leading cause of death. The project aims to develop methods to impart antimicrobial properties to an important class of materials, which come in contact with patients and via which pathogen transmission occurs most frequently. The consortium aims to do this by utilising the expertise of a world leading manufacturer, two innovative SMEs and a leading UK university. The latest technologies, covering the nano to macro-scale, will be employed and a multidisciplinary team of chemists, biologists and engineers will tackle the significant challenges in this exciting project.			

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Applied Materials Technology Limited (lead) Aerospace Metal Composites Ltd LPW Technology Limited The Manufacturing Technology Centre Total Carbides Ltd	Shell HIP Shaping Process (SHIPSHAPE)	£449,177	£305,926
Project description (provided by applicants)			
The SHIPSHAPE project unlocks the commercial potential of the Powder-HIP process. In Powder-HIP, a sacrificial metal canister is filled with fine metallic powder which is then consolidated at high pressure and temperature, in a Hot Isostatic Pressure (HIP) vessel, to form a fully dense part. Powder-HIP provides an effective method of producing complex, high-performance metal parts, with little or no material waste, making it particularly attractive for processing high-value, scare materials (such as nickel superalloys, hardmetals, and Ti64 and Metal Matrix Composites), however the limitations of the current canister manufacturing methods severely restricts its use. In the SHIPSHAPE project, a novel electroforming method will be developed to enable complex canisters to be produced quickly and cheaply. Basic proof-of-concept has already been demonstrated and the project will focus on extended the capability to a wider range of powder-HIP materials. In addition, key issues such as cost, scalability and productionisation of the SHIPSHAPE approach will be addressed.			

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Crown Packaging UK Plc (lead) Verdex Limited	SUPERBCOAT- Sustainable Packaging from Emerging Renewable Bio-derived Coatings	£495,424	£261,662
Project description (provided by applicants)			
Demand for food and beverage packaging continues to grow globally, with consumers increasingly focused on packaging that is sustainable. Although metal packaging is inherently recyclable with an established global infrastructure, current metal coating materials (to protect the metal and form a barrier between the metal and the contents) are considered less sustainable as they are derived from fossil-based feedstock. In addition, processing is energy intensive and produces a range of volatile organic compounds (VOCs) which require careful management or abatement. This will require the development of new coating formulations that are both easily processable and fit for purpose. To help us achieve this, this project will facilitate rapid iteration of coating formulations and faster optimisation to reduce time to market with respect to traditional methods of experimentation, as well as introducing novel, and more sustainable curing techniques.			

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European Thermodynamics Limited (lead) Scionix Limited University of Southampton	ELECTRO-TEG - Electrodeposition of thermoelectric materials to produce novel thermoelectric generator devices	£499,969	£359,957

Project description (provided by applicants)

Material advances (in particular in nano-structuring) have produced a step change in the thermoelectric performance over the last five years which has led to some water heat energy recovery technologies being commercialised within the automotive sector. As a result, there is increased market pull and the market for these TEGs is growing considerably. However, the relatively high cost of large-scale manufacture due to labour intensive material consolidation, machining and hand assembly is hampering widespread commercialisation. It is therefore becoming clear that unless cost-effective manufacturing technologies for the production of the thermo-electric material and their integration into efficient devices are developed, then mass production will be exported to low-cost economies.

ELECTROTEG will address these limitations through the development of a low-temperature thermoelectric electro-deposition process that will enable the commercial manufacture of fully dense nano-structured thermo-electric materials in-situ, eliminating the need for material consolidation, machining and hand assembly.

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Johnson Matthey Technology Centre (lead) Johnson Matthey Technology Centre Phoenix Scientific Industries Limited Solar Capture Technologies Limited University of Sheffield	Development of cost-effective silver alloy front-side paste for silicon solar cells (HiLoSilver)	£499,984	£345,284
Project description (provided by applicants)			
This project will investigate the prospect of commercialising silver alloys as cost-effective and low silver alternatives to front-side pure silver paste in solar cells whilst maintaining the key properties of low resistivity, oxidation resistance and solderability. Such a paste will also integrate well into the existing manufacturing infrastructure and supply chain. This makes the new paste much more attractive and could lead to significant reduction in cost per Watt, thereby enabling solar cells more affordable. The Johnson Matthey-led consortium is made up of two SMEs (PSI Ltd and SCT Ltd.) and the University of Sheffield who have the right skills and expertise to deliver the objectives of the project.			

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Microlab Devices Limited (lead) Analox Limited Microlab Devices Limited Pall Europe Limited University of Leeds	Advanced online biosensor for aircraft cabin safety	£278,906	£198,364
Project description (provided by applicants)			
A multidisciplinary team are looking to develop a sensing system which can be deployed on commercial aircraft to monitor the quality of cabin air in a hope to guard against or quantify passenger exposure to toxic molecules; caused by toxins contained in bleed air which is taken from the engines to pressurise and heat the cabin. Exposure to such neuro toxins have been thought by responsible for a health condition called "aerotoxic syndrome", which in extreme circumstances has been shown to be life-threatening. International legislation is being written to enforce mandatory monitoring by airliners to alert crew should the toxin be detected during flight. This said technology capable of being deployed on an aircraft does not presently exist. The team is being lead by MicroLab Devices and uses sensing technology developed by the University of Leeds to perform the detection. Analox Systems will help work-up the technology and package it ready for aircraft deployment by Pall Europe.			