Innovate UK

Results of Competition: Innovation Loans: Manufacturing and Materials Readiness

Competition Code: 1802_LOAN_MM

Total lending commitments are £11.8m

Note: These proposals have succeeded in the innovation assessment and credit evaluation stages of this competition. Conditions in loan offers from Innovate UK Loans Ltd have been met and loans have commenced.

Participant organisation names	Project title	Proposed project costs	Committed innovation loan
Advanced Electric Machines Limited	COALS - COmpressed coils and Advanced Lamination Solutions	£1,420,167	£956,504

Project description - provided by applicants

Since the 1500's 'Carrying Coals to Newcastle' has been recognised as the definition of a pointless exercise as the city was a leading exporter of the material around the world.

Proud of our North East heritage, with 'COALS' AEM aims to establish a new range of technologies with the potential to be create a next generation export market for the UK which will bring a whole new meaning to the phrase

Building on world class manufacturing expertise 'COmpressed Coils and Advanced Lamination Solutions' will integrate two unique new processes into a motor manufacturing production cell which will set benchmark levels of productivity and cost effectiveness at low to medium production volumes and offer the potential to supply high volume motor drives and sub-assemblies across the world.

Initially focused on Switched Reluctance Technologies, the manufacturing cell will be flexible enough to support Permanent Magnet machine production with a clearly defined and cost modelled route to scale up from 10,000s and on to 100,000 units p.a.

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Calla Lily Personal Care Ltd	New high speed production process development for a game-changing fem care product	£1,525,000	£1,000,000

Project description - provided by applicants

Application presented by company that is focused on the development of new production machinery needed to produce an innovative new femcare product. The new innovation has been created by a gynaecologist that wishes to create a hybrid tampon and pantyliner combination that provides women with a step change in comfort and hygiene. The main idea behind this new invention is a very thin elastomeric membrane that links a tampon to the pantyliner. The device enables the tampon to be inserted and removed with minimal risk of exposure to menstrual fluid. The novel tampon has been used by many hundreds of women and provides improved protection from leakage, is more comfortable and has improved levels of hygiene. Fusing the best features of pantyliners and tampons the applicants are focused on disrupting the $30b annual feminine hygiene global market.

The applicant has developed the design of the novel tampon but can currently only produce the tampon with a semi-manual process with cost-prohibitive production unit price. The purpose of this innovation loan application is to secure investment needed to develop automatic high-speed machines to produce the novel tampons at commercially viable pricing. Innovation loan investment will enable the applicants to work with crucial production machinery developers to commercially produce the first innovation in feminine hygiene for decades.

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Ashwoods Electric Motors Limited	Ashwoods IPM Manufacturing System (AIMS)	£2,232,842	£1,000,000
Project description - provided by applicants			
Ashwoods IPM Manufacturing System (AIMS.) Ashwoods Electric Motors will develop a technological step change in Electric Motor manufacturing targeted at breaking down barriers for UK manufacturing making it as cost effective as Far East manufacture for ultra low cost IPM motors. AIMS will generate a production line for electric motors that brings together Innovative manufacturing techniques and in-builds lean flexible functionality to produce Ashwoods 120 series motors in high volume at Ashwoods Technical Centre based in Exeter in the UK. AIMS will draw from Ashwoods extensive electric motor experience and class leading electric machine innovations; the project spans thirty-six months in which time Ashwoods expect to use both the loan to develop the manufacturing innovation and then add their own funds to commercialise the Innovation through the Extension period bringing the Manufacturing System online in 2021..			

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Participant organisation names	Project title	Proposed project costs	Committed innovation loan
Autonomous Manufacturing Ltd	Autonomous Additive Manufacturing Software Platform (AAMSP)	£401,968	£380,000
Project description - provided by applicants			
Additive Manufacturing (AM) has the potential to revolutionise the production of end-use parts. The production of end-use parts is the fastest growing use case for AM. The number of UK companies producing end-use parts is expected to increase from 5% in 2016 to 35% by 2021 (EY, 2016). However, the major barrier to scale AM end-use parts are high costs (60%), quality concerns (16%) and speed of production (9%) (survey of 900 manufacturers by EY, 2016). Currently, AM lacks a highly automated, scalable production process to make the production of endparts viable at scale. Project AAMSP delivers an autonomous additive manufacturing process for the production of AM endparts.			

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Participant organisation names	Project title	Proposed project costs	Committed innovation loan
Hexigone Inhibitors Limited	MaCRoSCoPIC	£680,958	£547,000

Project description - provided by applicants

Corrosion is a very big problem; it is estimated by NACE International (the worldwide corrosion authority) to cost the world economy 2.5 TRILLION USD per annum. As a result, large industries have been established to address corrosion problems with global markets worth tens of millions of USD per annum. However, many of the leading corrosion solutions used today are based on highly toxic and environmentally harmful materials, including chromates and cadmium.

This is a very real problem for these industries as the EU, other world authorities and end-users are seeking to ban these materials from manufacturing processes and products. Whilst this problem has been a concern for over a decade, researchers worldwide have been unable to deliver environmentally sound, comparably performing alternatives to existing materials and chemistries; that is, until now…

Building on fundamental Materials Science principles and experimental techniques pioneered by the Swansea University Coatings & Corrosion group over many years, an environmentally acceptable ion-exchange based corrosion protection system for architectural steel products (such as the steel sheeting found on many industrial / commercial buildings) was developed. This discovery is now in the process of being scaled-up and commercialised through the creation of a new UK business and will replace the use of hexavalent chromates (highly toxic) as a corrosion inhibitor in the primer layer of the coating.

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Participant organisation names	Project title	Proposed project costs	Committed innovation loan
Valuechain.com Enterprises Limited	DNAam - building blocks for Additive Manufacturing Optimisation	£1,561,840	£962,820
Project description - provided by applicants			
This project will develop and pilot smart production control software to streamline, standardise and digitise best practice processes for the full spectrum of additive manufacturing technologies used within the growing aerospace sector, supporting companies of all sizes to embed artificial intelligence to optimise AM product quality, productivity and ROI, in the rapidly evolving additive manufacturing sector.			

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Participant organisation names	Project title	Proposed project costs	Committed innovation loan
Advanced Manufacturing (Sheffield) Limited	Advanced Shaft Manufacturing	£3,204,343	£900,000

Project description - provided by applicants

AML will create a new advanced process for product manufacture on behalf of a global OEM. The Innovation Loan funding will also be used be used to enable AML to prove the technology approach and to be production ready to apply this technology on a global stage.
The project will deliver:
1.Cost-saving opportunity for blue chip advanced manufacturer across global markets
2.Innovative machining technologies
3.Deliver fully accredited manufacturing process from Proof of Concept
4. UK leading innovation applied in the global renewable energy market

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Ultromex Limited	Industrial scale, novel, closed loop aluminium waste treatment plant	£922,795	£922,795
Project description - provided by applicants			
Global aluminium (AI) consumption set to reach 120M tonnes by 2025, AI production and recycling are large and important global industries. Slag and drosses are hazardous residual wastes from the AI smelting industry; historically, after treatment for metal recovery, the residue was landfilled but landfill is no longer permitted by EU waste regulations. While some metal can be recovered at specialist processing plants, it is extremely expensive with very high-energy burden and requires hazardous and toxic waste to be transported across Europe, making recovery uneconomic, but necessary. Closed-loop processing is a key driver for AI smelting, enabling maximum metal recovery, cost savings, efficiency gains, greater materials control, minimisation of hazardous outputs and a reduced carbon footprint. In this project Ultromex will radically improve the resource efficiency of AI production with regard to salt slag waste treatment. By the closed loop approach that our technology offers, giving recovery of metal and salts treated slag waste and conversion of residual solids into product-grade material. This is a front-running technology with confirmed interest and demand from many of the large AI smelters. The technology offers a solution to the industry's waste disposal challenge and a radical economic enhancement of the overall metal production process. Removing the need for transporting hazardous material across the EU, minimising landfill and reducing transport, storage and processing costs.			

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Participant organisation names	Project title	Proposed project costs	Committed innovation loan
Adaptix Limited	Loan to mobilise high-value manufacture in BioCity in Scotland for 100% export market	£1,156,630	£1,000,000

Project description - provided by applicants

The purpose of this project is to achieve the 'heavy-lift' in taking a pre-manufacturing prototype product and taking it to manufacturing scale, including the necessary regulatory compliance, product registrations and statistical testing to take a product with huge potential to market, and in doing so create high-value manufacturing jobs in a region of the UK that has suffered from a reduction in employment due to the transfer of jobs to off-shore manufacturing locations. This is an example of Great British science, supported by InnovateUK, the National Physical Laboratory ('NPL') and the Science and Technology Faculties Council ('STFC') creating jobs in advanced manufacturing in Scotland.

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Participant organisation names	Project title	Proposed project costs	Committed innovation loan
The Electrospinning Company Limited	Orthopaedic repair nanofibre scaffold manufacturing scale-up	£714,471	£714,471

Project description - provided by applicants

The Electrospinning Company supplies novel biomaterial components to a Fortune 500 company for use in two medical device products for shoulder repair, having supported product development with a series of studies leading up to FDA 510(k) approval and launch. Electrospun biomaterials can support repair and regeneration of damaged tissues and this is one of the first commercial applications to reach the market. TECL currently manufactures the electrospun material on a pilot production line that lacks the capacity to meet the forecast future demand. During the Project, TECL will develop and set-up the first electrospinning manufacturing process that can fabricate clinical grade, highly-aligned nanofibre based materials, at commercially relevant scale and cost. The approach will involve innovation in machine and component design, as well as fabrication and quality control processes. The Project is critical to the business. Its success will enable TECL to grow with its lead client as demand increases and secure an ongoing profitable revenue stream. The enhanced capability will enable TECL to attract new customers for its development and manufacturing service and to increase its proprietary product development.

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Participant organisation names	Project title	Proposed project costs	Committed innovation loan
Stream Bio Ltd	Stream Bio Ltd - Nanoparticle Manufacture and Product Base Expansion	£272,606	£272,606
Project description - provided by applicants			
Stream Bio produce and develop a new innovative molecular imaging probe nanotechnology, Conjugated Polymer Nanoparticles (CPNs) for use in the life sciences, ie research, diagnostics, environmental detection and therapeutics. CPNs superior properties in brightness and photostability (they do not fade), have the ability bring a wide range of industry improvements, particularly in low level protein detection, cell labelling and tracking. The Innovate project is intended to scale up and develop further the manufacturing process, add new products to Stream's portfolio, which in turn will allow growth and expansion into new markets and territories.			

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Korn Wall Limited (T/A KwickScreen)	Manufacturing process for bi-stable composite tubes	£400,854	£350,000
Project description - provided by applicants			
Korn Wall Ltd manufactures and distributes globally the patented KwickScreen product using a secret manufacturing process that it has developed through many years of inhouse R&D. The company has grown organically to now have 12 members of staff to undertake the complete process of design, sales, marketing and production. The R&D team are looking to reinvent the method of manufacturing the core component of the product in order to increase capacity and reduce product cost. This 3-year project will transform the business to become a global leader in healthcare partitions, enabling the KwickScreen to completely replace curtains used in healthcare environments. This will increase the scale of the business leading to a virtuous circle of further efficiencies, such as justifying a dedicated production facility to be set up in a lower cost UK location thus creating more jobs and value for the UK. Another outcome of the project will be the extra products that will now be achievable given the lower cost of production and the removal of the bottleneck that this part of the production process is now. The project will turn what is now a limiting factor in the business to the enabling element for the business to see explosive growth in the future. There are many unique products that we have in our sights for the new material to be developed into. These products will be explored in parallel with the development of the new manufacturing process and will be commercialised alongside the new KwickScreen when the process is implemented.			

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UNiKLasers Ltd	Single-Frequency UV Lasers for OEM Applications	£544,413	£421,322

Project description - provided by applicants

This project will address the productionisation and commerialisation of CW, single-frequency UV lasers. These lasers are demanded by end-users but current products on the market generally suffer from significant lifetime issues due to the UV light degrading the optics within the laser itself. One of the primary applications for these systems is metrology and inspection in the semiconductor manufacturing process, where high stability of the laser output at ever shorter wavelengths is required. The use of the UniKLasers proprietary, patented BRaMMS technology platform allows UniKLasers to offer smaller, more efficient and lower-cost laser solutions than our rivals, and these advantages read-across as the basis of our growing UV lasers range. The TRL level will be raised by concentrating on materials innovations and on production process improvements to target the UV degradation issue and to extend our systems' operating lifetimes. Our business will be competitive in the market since the base cost of our lasers is lower than many competing technologies. By achieving the required lifetime we will enter that market at a new, lower pricepoint than is currently available.

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Participant organisation names	Project title	Proposed project costs	Committed innovation loan
Spiro Control Ltd	Cooperative Distributed Model Predictive Control	£1,544,938	£1,000,000

Project description - provided by applicants

The Industrial Internet of Things (IIoT) offers new opportunities for process operators to improve efficiencies, the development of open, secure, and interoperable systems architectures is key to delivering that potential. Cooperative Distributed Model Predictive Control is a technology being developed by Spiro Control designed to manage dispersed systems, and can stabilize and optimize a process having many manipulated and controlled variables in the face of disturbances. Rather than using a single, centralized solution, multiple control agents are used in a distributed design. These control agents operate in a cooperative manner to achieve a shared objective function which approaches the global optimum even when significant interactions are present. The technology has the potential to harness the power of IIoT connectivity to deliver robust system wide control with significant operational benefits. Additionally, it has the advantage of a simple, modular design and utilizes existing control standards and infrastructure. In addition to optimisation benefits, advantages include scalability of the solution, and improved resilience and reduced complexity over centralised optimisation. The focus of our project is further development and commercialisation of this technology.

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Participant organisation names	Project title	Proposed project costs	Committed innovation loan
Milkalyser Limited	M2Farm2Scale	£562,579	£400,000

Project description - provided by applicants

Our aim is to increase the longevity of dairy cows with a biosensing technology to improve fertility management with an automated system for measuring progesterone in milk. It will allow better detection of ovulation for optimal insemination and pregnancy and allow cows to have longer more productive lives. It will reduce the number of animals kept as replacements and thereby reduce greenhouse gas emissions from agriculture. It will improve the farmer's margins for milk production and reduce the number of veterinary interventions needed.?This project will enable us to launch this technology to a global market.

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COREteQ Systems Limited	Modular Motors for Electrical Submerssible Pumps (MMESP)	£1,067,906	£975,000

Project description - provided by applicants

Electric Submersible Pump (ESP) systems provide an efficient and reliable artificial-lift method for pumping a variety of production fluids from wellbores. The ESP system typically comprises a multi-stage centrifugal pump driven by an electric motor in an integrated unit. A robust motor is a vital component of this system. A reliable motor will enable longer run-life and thus more reliable oil production. Reducing workovers and lost production will enhance operating costs. COREteQ's motor was engineered have a run life of up to 3 times longer than existing products, which makes it ideal for offshore subsea and remote well applications such as Alaska, Arctic, and Desert. The high-temperature capability will also allow application in the growing market of geothermal-based energy applications.

COREteQ has completed the development of its core technology and built motors that meet the need of the oil and gas industry. From the start, COREteQ has selected materials and developed manufacturing and assembly methods that are fit for purpose, competitive and readily scalable. The Company is now engaged in further optimisation of the manufacturing methods and elimination of material post-processing requirements as if these remain unaddressed, it will limit the Company's competitiveness in terms of manufacturing cycle time, manufacturing yield and related costs. The processes developed to date, even though suitable for small batches, they are not considered optimal for volume manufacture to support the Company's anticipated demand