Results of Competition: ATI Programme Funding for Smaller Business Full Stage

Competition Code: 2002_MMM_CRD_ATI_FULLSTAGE

Total available funding is £8,000,000

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 LIMITED	Development of an integrated system for identifying provenance of composite parts and enhanced safety-critical test	£469,741	£234,870
NCC OPERATIONS LIMITED		£179,192	£179,192

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Project description - provided by applicants
Vision: We will apply novel techniques developed for medical imaging to Non-Destructive Testing (NDT) of critical composite components in aircraft to transform the sensitivity and speed of testing, and hence transform maintenance economics. The long-term intent is to develop a new approach that can be applied in manufacture and routine maintenance. The vision is to develop NDT technologies that will be adopted by prime aircraft component manufacturers, and this will then drive adoption in the through-life maintenance programme to deliver value in terms of reduced manufacturing costs and reduced through-life cost-of-test. **Objectives:** 1\. To deliver a demonstrator for a new type of imaging modality for NDT of composites for aviation applications. 2\. The National Composite Centre ('NCC' a UK Research Technology Organisation) will work with Adaptix to integrate micro-fiducials (tiny specks whose position can be imaged) into composites and validate them for aviation use. 3\. The National Physical Laboratory ('NPL' a UK RTO as Contractor) will work with Adaptix to validate that: 3.1 The micro-fiducials do not affect critical physical properties; and, 3.2 That imaging is capable of better identifying the target failure modes than existing inspection modalities. **Focus:** We will focus on identifying delamination and wrinkles as these are the failure-modes with the greatest safety and economic relevance. In order to drive adoption, we will work with a specific early adopter and on high-value composite part to illustrate the value to an aerospace Prime. **Innovation:** We will deliver an imaging system to image composite structures tagged with micro-fiducials which will go beyond laminography in the ability to detect key failure modes. We aim to prove that the inclusion of micro-fiducials can enhance the ability to detect failure modes without adversely affecting the physical properties of a device, and in doing so overcome objections to the use of the technique.

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iCOMAT	Manufacturing and Advanced Simulation of Continuous Tow Shearing (MASCoTS)	£886,316	£443,158
DAPTABLADE LTD		£197,956	£98,978
MSC.SOFTWARE LIMITED		£214,991	£107,496
TWI LIMITED		£57,328	£57,328

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Project description - provided by applicants
The use of fibre steering to enhance composite structural performance has been seen as having significant potential for reducing material use and reduction in manufacturing costs. It also has been shown to have capabilities for aero-elastic tailoring. This allows an aircraft wing to bend with a reduced twist. Reducing twist allows the wing to be more efficient over a range of wind speeds. This will have an impact on environmental emissions and improve the economic viability in aerospace structures. This could also be extended into other sectors like automotive and wind energy. Current solutions for fibre steering are automatic tape laying (ATL) and tailored fibre placement (TFP) These have both of limitations. ATL cannot steer with a tight radius and steering causes fibre wrinkling and gaps, compromising the structural performance. TFP is a slow process so cannot deposit material fast enough for anything of a significant size. Also the stitching used compromises the structural performance. iCOMAT have created a new tape laying process, continuous tow shearing (CTS) which promises to rival the speed of ATL but without the wrinkling and gaps. It also can lay around tight radii (100mm). However there is an issue that commercial software does not exist to simplify design, analysis and optimisation of structures using CTS. The project is aiming to develop the prototype CTS head design to a level where it can be introduced to industrial applications. In parallel to this development MSC Software will develop design, analysis and optimisation tools to make it accessible to prospective users. They will also write a tool translating the final design back into fibre paths for the CTS head to follow, completing the "digital thread" in this process. DaptaBlade will develop multi-disciplinary software which will enable coupling of a wing structural model with fluid dynamics analyse to perform aeroelastic tailoring. The project will also create demonstrator structures which will be used to verify the analysis and manufacturing software. These will be structurally tested at TWI.

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AGILE GROUP SYSTEMS & SERVICES LIMITED	Predictive Analytics for Capacity Mapping	£631,970	£284,386
PACKAGING AUTOMATION LIMITED		£77,383	£33,275
UNILATHE LIMITED		£116,234	£45,331
WARREN SERVICES LIMITED		£95,813	£45,032

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Project description - provided by applicants
Original Equipment Manufacturer (OEM) competitiveness is reliant on its supply chain's performance. It's a known issue that OEMs cannot find sufficient capacity to support their requirements (e.g. BAE). To achieve aircraft build-rate projections the industry needs to increase capacity and visibility of available capacity. Current Overall Equipment Efficiency (OEE) within Aerospace is c40-60% with many companies not measuring OEE or reliant on manual data-set updates. We will transform UK aerospace manufacturing productivity and agility by developing a real-time visualisation of aerospace manufacturing capacity and demand, compatible with our existing MRP software. Increasing OEE levels by up to 50%, providing real-time visibility of aerospace capacity and bottlenecks.

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ADVANCED MANUFACTURING (SHEFFIELD) LIMITED	Automotive Excellence in Aerospace (AXIS)	£640,260	£320,130
METTIS AEROSPACE LIMITED		£250,027	£75,008
University of Sheffield		£169,996	£169,996

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Project description - provided by applicants
The current business and regional jet aircraft market is expected to expand significantly in the next five years, requiring up to a threefold increase in production rates for higher volume components such as aerofoils for the associated aero-engines. As a result, the supply chain needs to make a step change improvement in its production rates on these types of components. As such, AXIS presents a project that aims to bring together innovative technologies for rate production in automotive applications into an aerospace cell to vastly improve production rates. These technologies combine digital connectivity between supply chain partners, advanced shipping and condition of supply information to drive predictive programming, automated part loading using flexible fixtures, and advanced machining techniques to meet this challenge. The principle project output is a functioning demonstration cell for business and regional jet engine aerofoil manufacture with a connected supply chain component. This cell will show the capability to achieve the desired three-fold increase in production rate for this aerofoil component market. The optimised demo cell provides the immediate route for engagement with an OEM in the development of a supply chain contract. The innovative aspect of the project is bringing together the four technologies in the work packages into a high rate production aerofoil cell. This includes the digital connectivity, automated loading of aerofoil geometry, adaptive measurement and control, and advanced machining techniques. All have been proven to work in other applications but bringing them together in an automotive style production approach to aerospace is the unique aspect of this project.

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DISTRIBUTED AVIONICS LIMITED	Project SCAFFold (Safety Critical Avionics for Future Flight)	£349,479	£174,740
University of Southampton		£49,504	£49,504
WINDRACERS LIMITED		£111,304	£55,652

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Project description - provided by applicants
In order to deal with key challenges facing mankind, the future of aviation must change radically. Reduction of emissions, more electric aircraft, and autonomous systems are essential to meet these challenges. Autonomous drones will be increasingly used for commercial applications such as delivery of medicines, remote community logistics, and electric powered aircraft will be developed to reduce pollution and congestion in cities. SCAFFold will demonstrate how new autonomous technologies can meet and conform to existing well defined safety standards whilst exploiting the latest technology from neighbouring sectors. Advances from the consumer electronics sector (such as miniaturised sensing, more capable processors, advanced user interfaces) can then be safely and cost-effectively integrated within the flight control system. Manned aircraft are very reliable and provide the safest means of transport. This reliability is possible through the use of extremely rigorous quality control, which is very expensive. In order to achieve equivalent levels of safety but at significantly reduced cost, Distributed Avionics have developed a new network-based control system architecture with high levels of robustness, and therefore reliable, at low cost. Distributed Avionics' solution will be directly applicable to UAS, UAM, and Civil applications and will be a key enabling technology in the shift to all electric, more connected aircraft. The solution achieves this reliability improvement through a novel, patented Masterless control architecture which forms the backbone of a no single point of failure (SPoF) control system. The removal of SPoFs reduces the requirement for highly reliable individual components, which are expensive to produce and challenging to integrate and evolve. For cost sensitive aerospace applications such as UAS and UAM, this approach offers clear advantages, where traditional aerospace products are too expensive to form a sound economic use case.