

# MASCoTS, an ATI funded project to drive development of composite tow shearing in UK aerospace industry

The *Manufacturing and Advanced Simulation of Composite Tow Shearing* project, known as MASCoTS, commenced in September 2020. The 20-month £1.4 million project, supported by the Aerospace Technology Institute (ATI) programme and managed by Innovate UK, the UK's innovation agency, looks to develop hardware to commercially manufacture steered fibre composites using iCOMAT's rapid tow shearing process (RTS). This patented manufacturing method allows for drastically improved steering capabilities compared to existing processes. To make this technology accessible the project will also develop design and optimisation tools.

Fibre steering holds promise for drastic mass reductions in aircraft structures, by expanding the design space and allowing to align fibre orientations with the primary load paths. Fibre steering also enables stiffness tailoring of flexible wing structures, which can further increase aircraft performance.

## Project goals

The aim of MASCoTS is to develop an end-to-end process for the design, manufacturing and testing of fibre-steered components.

To increase the TRL of the RTS tape laying system, a second generation machine will be developed, focusing on improving productivity and reliability. To facilitate the commercial adoption of fibre steering, design and simulation software will be developed to enable designers and analysts to implement the RTS technology. The analysis to manufacture process will be demonstrated with physical prototypes which will be tested to demonstrate correlation of analysis to reality.

The combined capability offered by the consortium will enable OEM and Tier 1-2 suppliers to design and manufacture using fibre steering and harness the associated benefits.



## iCOMAT, Project lead

iCOMAT is a University of Bristol spin-off, producing RTS tape/fibre placement systems that enable defect-free fibre steering capabilities. iCOMAT is currently working alongside leading OEMs in aerospace and automotive to develop the initial commercial applications. During MASCoTS, iCOMAT will develop a second generation RTS machine, placing emphasis on reliability and productivity to address the needs of the aerospace sector.

Evangelos Zypeloudis, CEO, iCOMAT, commented: "We are honoured to receive the support of the ATI in maturing our novel manufacturing process and we look forward to working with the MASCoTS consortium to develop composite fibre steering capabilities in the UK."

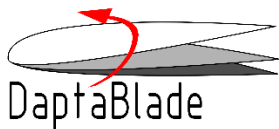


## MSC Software

MSC Software is one of the first ten software companies in the world and a leader in computer aided engineering. The company helps companies improve quality, save time, and reduce costs associated with design and test of manufactured products. For MASCoTS they will develop software integrated into MSC Apex, using the analysis and optimisation capabilities of MSC Nastran. This will enable design from initial sizing through to

a fully optimised product, including creation of tool paths. This will create a tightly integrated digital thread from concept to manufacture.

Andrew Main, senior consultant at MSC, said “We are excited to help bring this ground-breaking technology to realisation.”



### **DaptaBlade**

DaptaBlade provides design automation solutions for multidisciplinary engineering teams that use simulation to develop sustainable and higher performance products faster and more efficiently. For MASCoTS they will be focusing on delivering a software library that provides methods and tools for aeroelastic optimisation of a wing structure using RTS.

Olivia Stodieck, CEO, DaptaBlade commented: “The MASCoTS ATI project will allow us to demonstrate that the use of efficient multidisciplinary simulation tools is crucial to incorporating RTS technology into the design process. We are delighted to be part of this ATI project and we look forward to working with our partners to further enhance composites expertise in the UK.”



### **TWI**

TWI is a Global leader in R&D with strong heritage in engineering, materials and joining technologies. TWI, being a non-profit organisation and membership-based company provides engineering consultancy to its Members and stakeholders with authoritative and impartial expert advice and knowhow related to engineering technologies. In the MASCoTS project, TWI will manage the testing activities and apply 3D digital image correlation (DIC) to the two components that will be used to validate the benefits of the composite tow shearing technology.

Chris Worrall, Consultant at TWI commented: “TWI is delighted to be able to contribute to the MASCoTS project by applying its extensive expertise in bespoke structural testing and interpretation of the behaviour of advanced composite structures”.

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