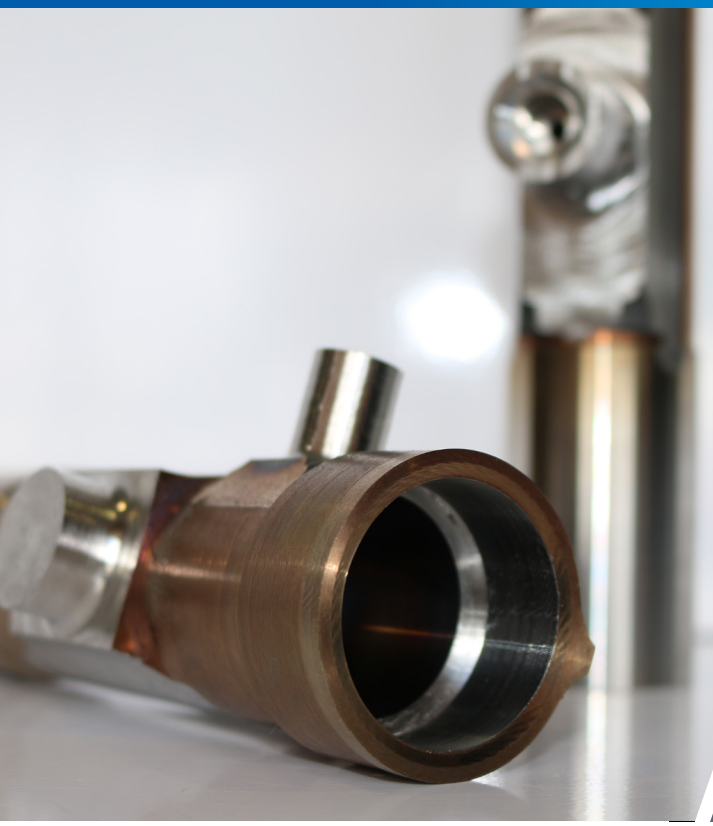
AMRC
ADVANCED MANUFACTURING RESEARCH CENTRE

The University Of Sheffield.

Machining Group
Case study

AMRC helps move toward industrialisation of hybrid manufacturing in aerospace



Engineers at the University of Sheffield Advanced Manufacturing Research Centre (AMRC) have developed a novel method for manufacturing aerospace components using hybrid additive and subtractive manufacturing techniques.

An investigation was carried out by the AMRC's Emerging Machining Technologies team, within the Machining Group, as part of the Interrupted Hybrid Manufacture (IHYM) project, which has been funded by Innovate UK.

Technical Fellow in Emerging Machining Technologies, Nikolaos Tapoglou, said: "As part of the program a case study part made out of 15-5PH stainless steel was generated to showcase the achievements of the project and the component selected was an actuator component for the aerospace industry."

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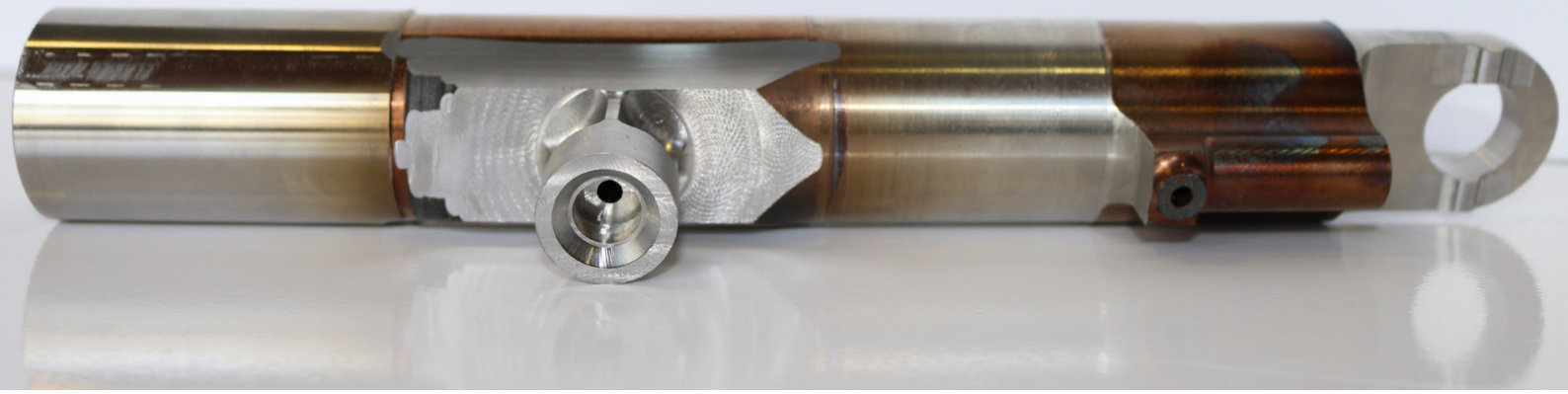
"The AMRC has developed a world-class method of manufacture for the demonstrator component that showcases these benefits in a complex high value component application."

Terry Turner, Business Development Manager – Additive Manufacturing at DMG MORI UK



The current production route for this aircraft engine component uses a solid bar feedstock, but using hybrid manufacturing the stock material can be changed to a tube material. Additive and subtractive processes can be optimally sequenced so that stock is added on the tube, increasing the stability of the machining operations and generating the final required geometry.

Nikolaos continued: "The use of hybrid manufacture enabled simpler strategies in the machining of features. Hybrid trials have suggested that similar cycle times can be achieved, whilst reducing cost by 23% and providing a large decrease in buy-to-fly ratio from 31:1 to 2.5:1."

Terry Turner, Business Development Manager – Additive Manufacturing at DMG MORI UK, said: "The demonstrator part manufactured in the AMRC is amongst the best application examples within the DMG Mori customer base of the LT65 3D Hybrid, in terms of exploiting the benefits of Hybrid Additive/Subtractive manufacturing.

"The AMRC has developed a world class method of manufacture for the demonstrator component that showcases these benefits in a complex high value component application."

The Emerging Machining Technologies team are performing research in additive and subtractive operations in a range of materials including stainless steel (316L and 15-5PH) and nickel alloys (Inconel 718). Additionally, the team is developing shielding methods that would enable the safe deposition of titanium alloys.

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