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Revolutionizing Shape Memory Alloy Industrialization via Additive Manufacturing

ReSHAPE


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ORGANISATION PROFILE

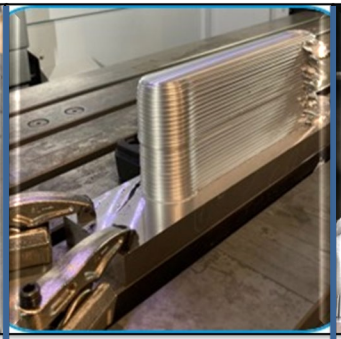
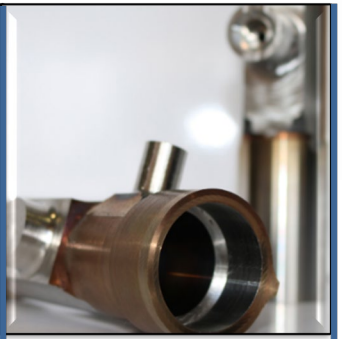
Established in 2001 as a collaboration between Boeing & University of Sheffield, the University of Sheffield Advanced Manufacturing Research Centre (AMRC) helps manufacturers of any size to become more competitive by introducing advanced techniques, technologies and processes.

We specialize in conducting world-leading research in advanced manufacturing and materials, delivering practical solutions for industry.

Additive Manufacturing Grants:

- DISTOPIA - (SMART Call 6)
- COMPADDITIVE - (SMART Call 7)
- E-SAM - (SMART Call 7)
- DIAMETER - (EU Horizon Europe)
- ECO-SUITE - (ATI)

ORGANISATION PROFILE

			
Directed Energy Deposition	Solid-state Non-fusion	Powder Bed Fusion	Hybrid Manufacturing
WAAM3D, Gefertec, Optomec LENS	MELD	Renishaw AM500Q Renishaw AM500QF Renishaw AM250 Renishaw AM400HT	DMG Lasertech 65

PROPOSAL INTRODUCTION (I)

Vision:
Advancing the large-scale wire arc additive manufacturing for shape memory alloys and smart hybrid materials, with a focus on optimizing feedstock, refining process workflows, and conducting advanced material characterization to meet application-specific requirements and reaching advanced material properties.

Motivation:
Shape memory alloys have a wide range of applications across automotive, aerospace, electronics, construction and biomedical industries, offering potential improvements in the performance of current components and materials. The integration of additive manufacturing presents a sustainable and economically viable solution, increasing material efficiency, enabling greater part complexity, and reducing lead times and associated costs.

Content:
Conventionally SMAs are used in various applications in the form of a wire. Processing conditions, parameters, post-processes and condition of the feedstock plays a crucial role on the superelastic properties when the material is expected to be manufactured in bulk form and with specific shapes. Therefore, process optimization for all manufacturing steps should be applied and validated with advanced characterization techniques. Project will utilize advanced material properties modelling tools to define and optimize the conditions.

PROPOSAL INTRODUCTION (II)

Expected outcome:
- Optimized feedstock properties for additive manufacturing
- Developed and validated manufacturing route for shape memory alloys (AM, Training, Post-Processes)
- End-user case demonstrations of the applicability of the technology

Impacts:
- Introduction of the shape memory alloys in complex geometries for wider industrial use
- Introduction of shape memory alloy feedstock optimized for the WAAM process to the market

Schedule:
- January 2026 – June 2028
- Duration: 30 months

Partner search:
- Feedstock Manufacturer
- End User – Automotive, Aerospace, Energy
- Process Modelling Expertise
- Material Characterization Expertise
- Heat Treatment Expertise – Alloy Training

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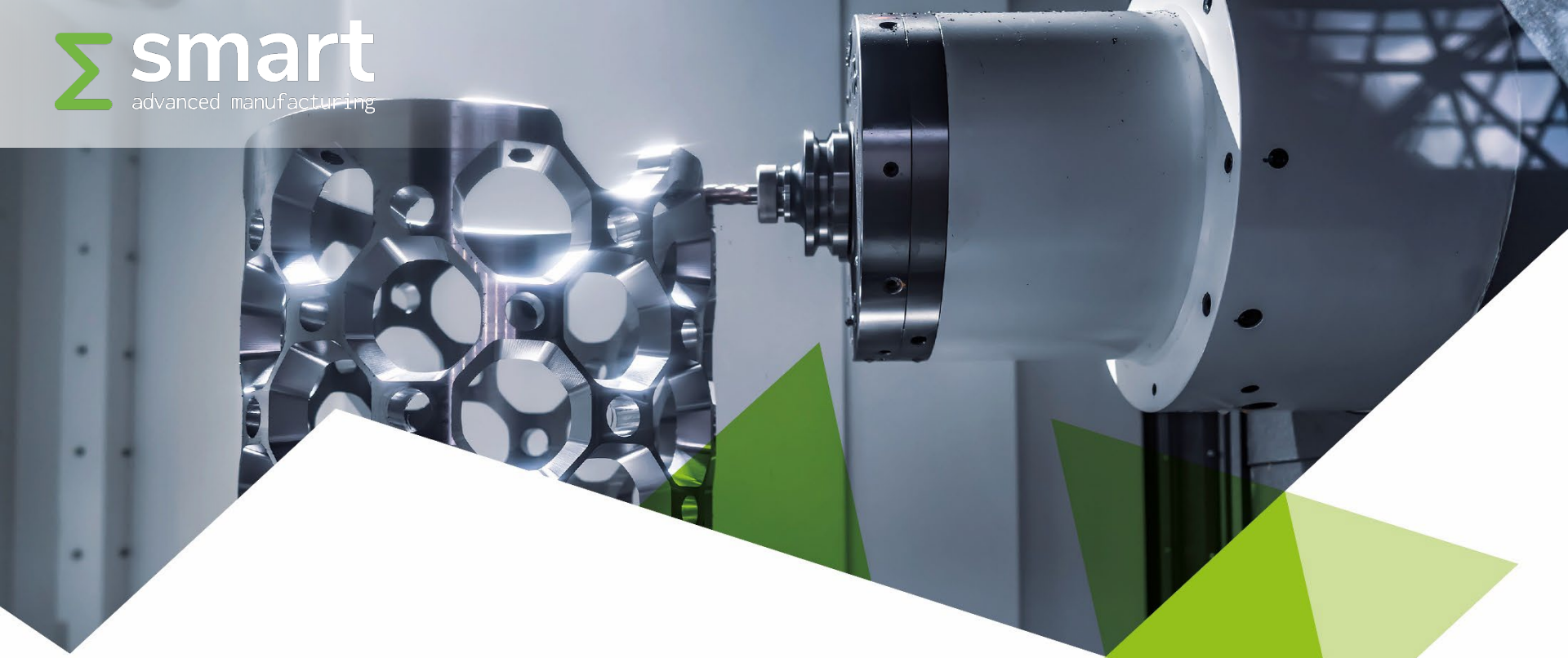

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