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AI-enabled smart recoating for Laser Powder Bed Fusion (LPBF)

Smart Recoat


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ORGANISATION PROFILE

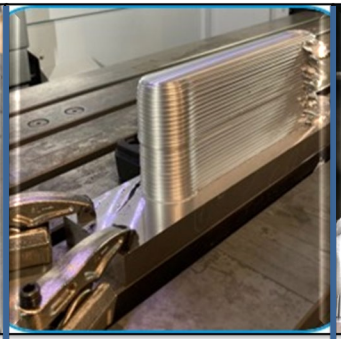
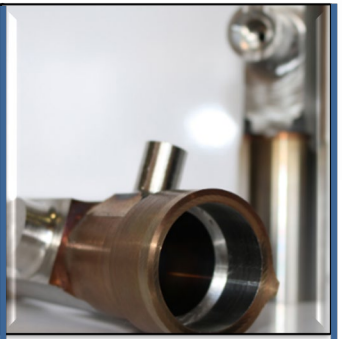
Established in 2001 as a collaboration between Boeing & University of Sheffield, the University of Sheffield Advanced Manufacturing Research Centre (AMRC) helps manufacturers of any size to become more competitive by introducing advanced techniques, technologies and processes.

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

The project aims to develop an AI-enabled smart recoater mechanism to expand the manufacturing limits in LPBF by reducing/eliminating process and feedstock related issues.

Motivation:

- Powder spread ability on the build platform with some materials such as Al alloys.
- Collision of the recoter with the component due to edge effect / geometry relaxation resulting from residual stress.
- Difficulties in manufacturing complex components.

Content

A new smart recoating tool with multifunctional capabilities will be developed in this project. An AI-enabled process monitoring tool will also be developed based on camera imaging. The process monitoring tool will have the capability to identify defects upfront and communicate with the smart re-coater to ensure that the powders are evenly spread in the build platform.

The AI-based software will also analyze those real-time and provide inputs to the re-coater to use various types of blades to compensate or allow flexibility to complete the build without part failure.

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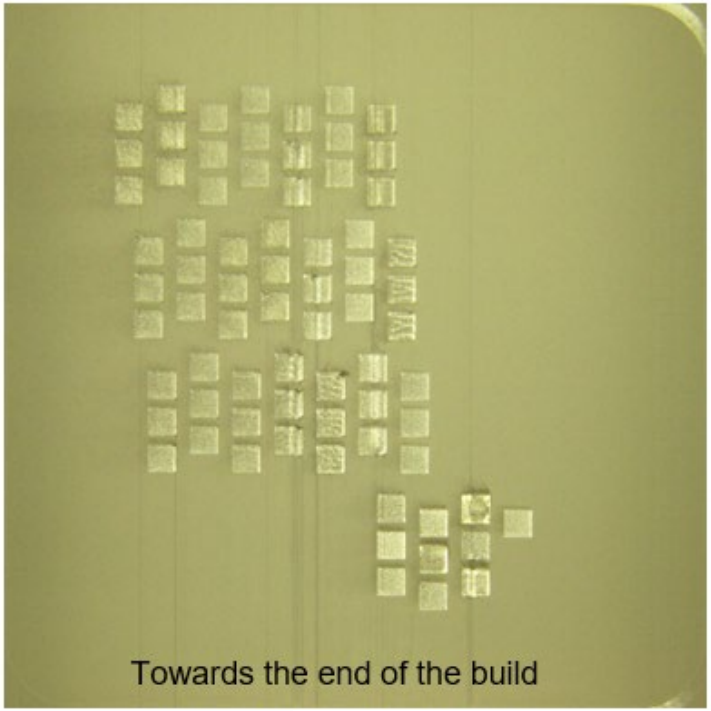
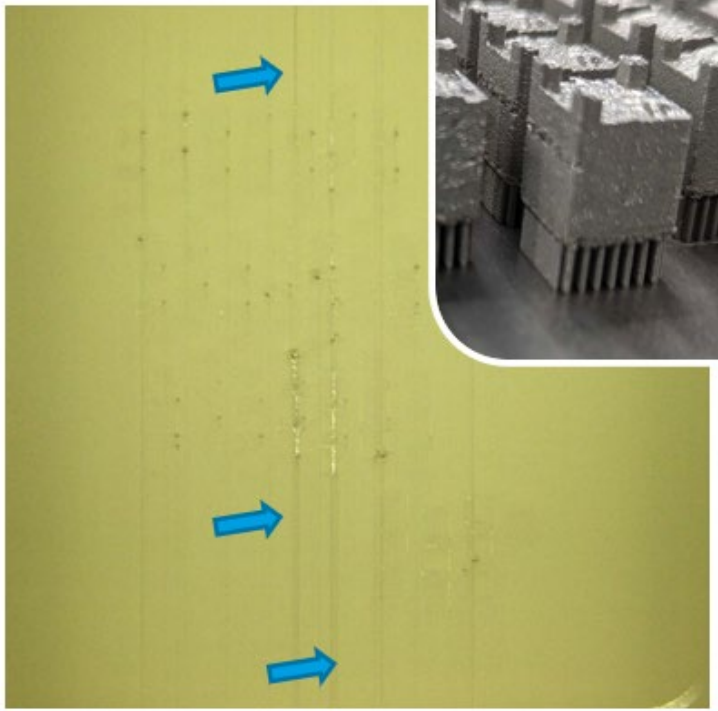
An example:





PROPOSAL INTRODUCTION (II)

Expected outcome:
- New dual-purpose re-coater tool.
- AI-enabled process monitoring software

Impacts:
- Ability to manufacture complex geometries
- Increase manufacturability and eliminate local defects due to spreadability, re-coater collisions -- first-time-right approach

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

Partner search:
- Tools, Jig & Fixture, Product development companies
- AI software developer
- End user: Heat exchangers, fuel injectors, metal filter manufacturer

CONTACT INFO

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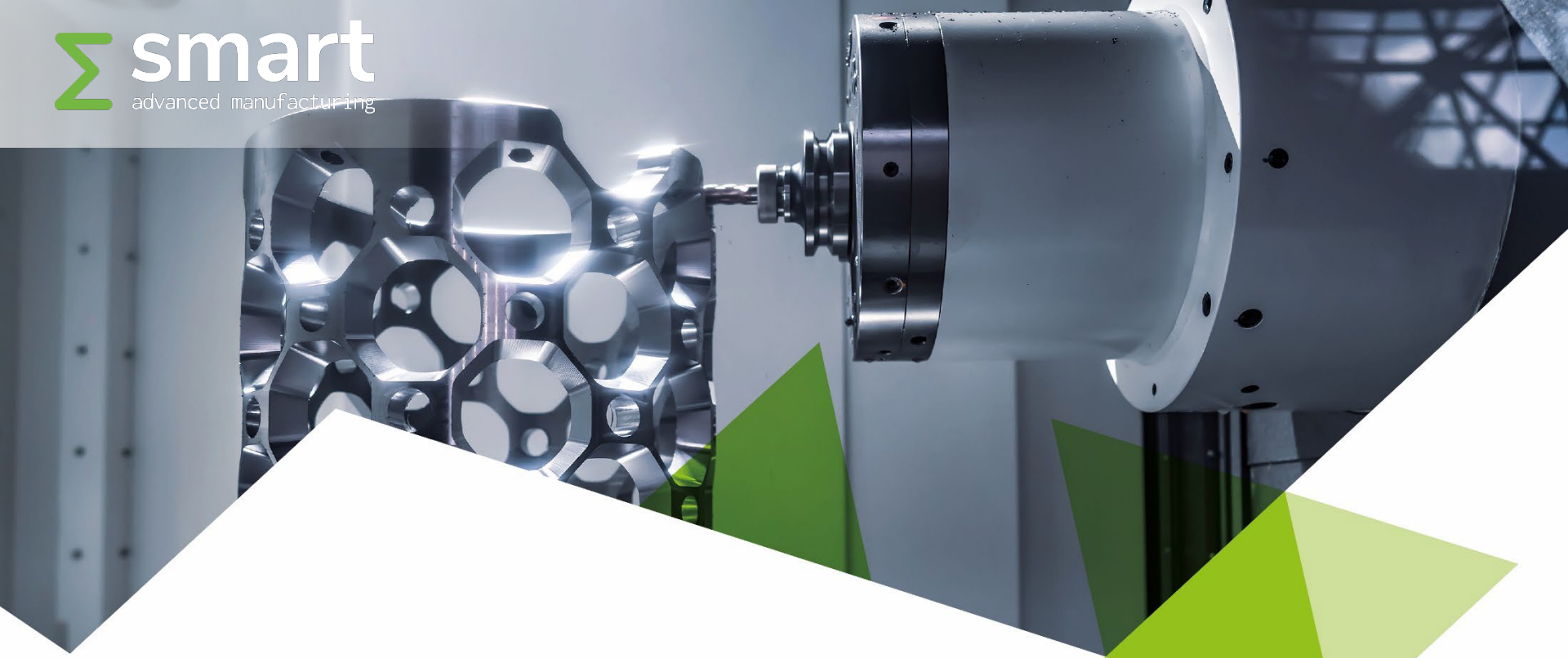

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