PROJECT PROFILE

Overall Goal
Development and demonstration of an innovative powder-bed fusion process for metals (PBF-LB/M) in four industrial applications.

Funding Programme
InShaPe receives funding from the European Union's Horizon Europe research and innovation programme

Project Number
101058523

Project Duration
June 2022 - May 2025

Total Budget
EUR 6.8 million EU funding

Coordination & Technical Information
Prof. Dr.-Ing. Katrin Wudy
TUM School of Engineering and Design
Professorship of Laser-based Additive Manufacturing
Technical University of Munich
Boltzmannstraße 15
85748 Garching near Munich

Phone: +49 (0)89 289 - 55320
Email: katrin.wudy@tum.de

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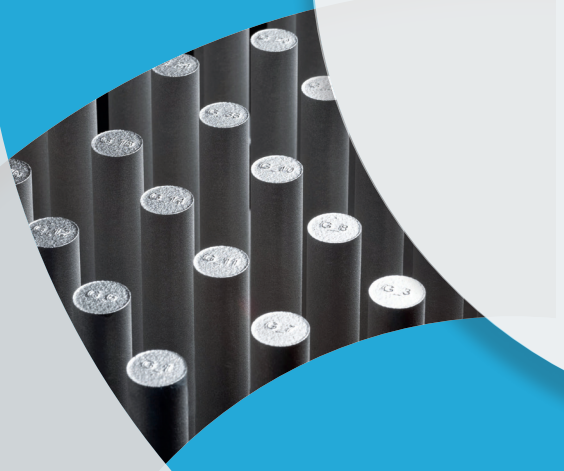


InShaPe

INNOVATION THROUGH LASER BEAM SHAPING IN METAL-BASED AM

CONTACT

Mikkel Pedersen
Head of R&D Additive Manufacturing
Oerlikon AM Europe GmbH
Kapellenstraße 12, 85622 Feldkirchen, Germany
Phone: +49 89 203015 027
Email: mikkel.pedersen@oerlikon.com

Dr. Marcus Giglmaier
Managing Director
Oerlikon AM Europe GmbH
Lead: Innovation and New Technologies
Oerlikon Surface Solutions
Kapellenstraße 12, 85622 Feldkirchen, Germany
Phone: +49 89 203015 069
Email: marcus.giglmaier@oerlikon.com

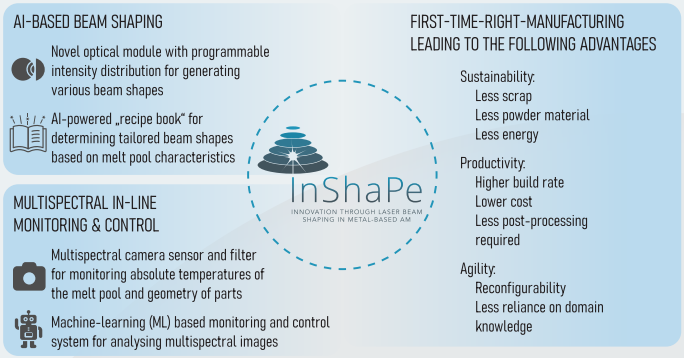
www.inshape-horizoneurope.eu

Green Additive Manufacturing through **In**novative Beam **Sha**ping and **Proc**ess Monitoring

NEXT INNOVATION LEAP IN METAL-BASED ADDITIVE MANUFACTURING

InShaPe makes metal-based Additive Manufacturing faster, cheaper, and more sustainable

In many industrial sectors, such as in the automotive industry, in aerospace or in the energy sector, the demand for lightweight metal components with a high mechanical strength, like modern gas turbines, is increasing. An important manufacturing process for this is the powder-bed fusion process of metals using a laser beam (PBF-LB/M). Depending on the application, the process is not yet always competitive compared to conventional production processes in terms of unit costs. The research and innovation project InShaPe aims to make a decisive contribution to the further development of this technology.



Objectives of InShaPe

The overall project aim is to develop and demonstrate a **novel first-time-right powder bed fusion process of metals using laser beam (PBF-LB/M)** in four different industrial use cases that is enabled by two technical innovations:

Flexible adaptation of laser beam shapes tailored to the material/geometry of the printed parts, underpinned by a **high-power optical module** with programmable intensity distributions and **AI-techniques** to determine the optimal beam shapes for the target value (e.g., determined by material type) and

A multi-spectral in-line process monitoring & control system for predictive quality analysis, enabled by transferring the **multi-spectral imaging technology** into the Additive Manufacturing domain. The InShaPe process will enable the Additive Manufacturing (AM) of **high-potential materials not printable so far**, be characterized by:

a **seven times higher build rate**,
over **50% lower cost**
and enable a truly green manufacturing with over **60% less energy use and 30% less scrap**.

Socio-Economic Impact

InShaPe will contribute to increasing the productivity, innovation capacity, resilience, sustainability, and global competitiveness of the European PBF-LB/M sector. InShaPe also plays a significant role in increasing the sustainability of industries with a high energy consumption across the four use cases in the project: aviation, automotive, space and power generation, as many of the pivotal technologies that underpin these industries use parts manufactured via PBF-LB/M-processes.

VISION

InShaPe Vision

In the long term, the successful development and marketing of InShaPe technologies is intended to strengthen the European PBF-LB/M manufacturing industry as a leading provider of highly complex parts and set new best-in-class standards for digital, resource-efficient, and agile laser-based production methods.

Consortium roles

Under the coordination of the Technical University of Munich (TUM), the Professorship of Laser-based Additive Manufacturing, ten partners from seven countries are working together on the project.

CONSORTIUM

Coordinator
Technical University of Munich, Germany

Project Partners
Aenium Engineering, Spain

AMEXCI, Sweden

Bavarian Research Alliance GmbH, Germany

BEAMIT Group, Italy

Eindhoven University of Technology, The Netherlands

EOS GmbH Electro Optical Systems, Germany

Oerlikon AM Europe GmbH, Germany

SILIOS Technologies, France

Technion – Israel Institute of Technology, Israel