Start-end date:
1st September 2023 – 28st February 2027

Duration:
42 months

Funded under:
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NewAIMS combines a well-tailored steel chemical composition and a non-conventional time-temperature process for additive manufacturing

In this way, the aim is to obtain advanced microstructures with better performance than those currently obtained with conventional additive manufacturing and to optimize the performance of the material and the final printed parts.

On the other hand, NewAIMS proposes two high-performance steel grades and a demonstration of printing solutions based on Powder Bed Fusion (PBF), a rapid prototyping and additive manufacturing technique, while linking processes and microstructures to their final performance.

NewAIMS

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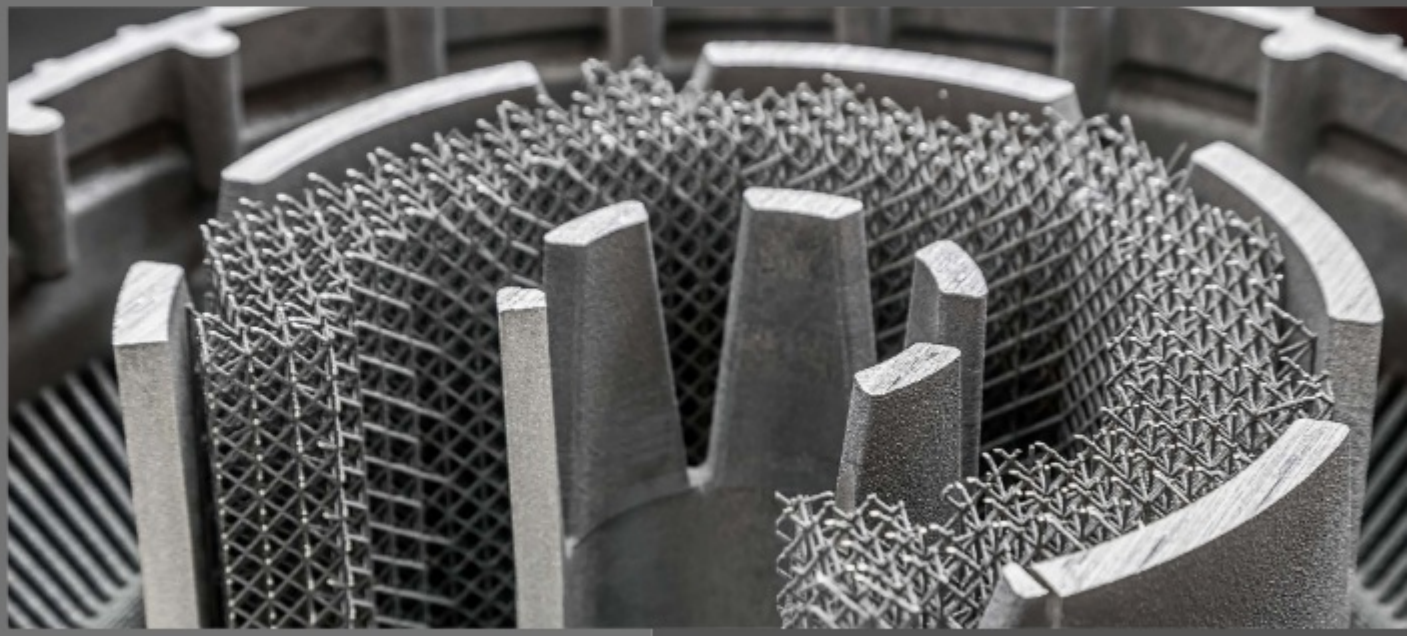
NewAIMS

New approach to Additive Manufacturing of Microstructurally Optimized Steels



Funded by
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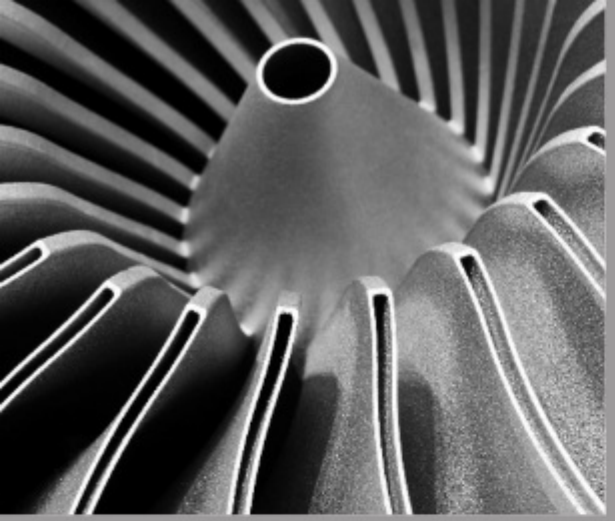

Conceptualization, study and demonstration of strategies to obtain cost-effective high-performance steel in metal 3D printing processes

The main objective of NewAIMS is to research, study and demonstrate strategies to obtain cost-effective high-performance steel in AM processes, through concepts of modified AM with integrated heat treatments.

In addition to generating fundamental knowledge, NewAIMS will propose two high-performing steel grades and a demonstration of printing solutions based on Powder bed Fusion (PBF); while linking processes and microstructures to their final performance.

NewAIMS will demonstrate these solutions in a use case based in tool steels, an essential family of steels used in virtually all manufacturing processes, and where the characteristics of AM offer immediate advantages and transversal implementation.

NewAIMS objectives

Generation of fundamental knowledge on viable strategies to obtain complex microstructures through steel AM routes

Development of high-performance tool steel grades specifically designed for Powder bed Fusion

Development and demonstration of temperature-enhanced AM materials using complex microstructures in high-C steel

Achievement of material performance rivalling wrought material with AM

> By combining a well-tailored steel chemical composition and a non-conventional time-temperature process for AM, it is possible to obtain microstructures beyond the usual rough solidification-based features found in conventional AM, leading to improved material performance.

NewAIMS expected results

Strategies for combined AM and heat treatment

Demonstration that it is possible to generate different "designed" microstructures through tailoring process and alloy and evaluation of results

Demonstration of the use of E-PBF for processing high Carbon steels and obtaining multiple microstructures, and its effect and differences with L-PBF

Demonstration of how heated chamber L-PBF that can be used for microstructural design through systematic fundamental study

Demonstration of two high-performance tool steel grades, (1) a high-C, high hardness, wear resistant steel and (2) a high thermal conductivity steel; with properties better than H13 steel