NEWSLETTER #1

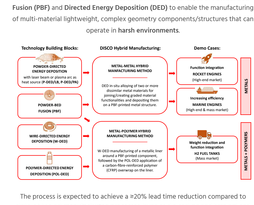
HYBRID MANUFACTURING

Multi-material | Lightweight | Complex Geometry

PROJECT WEBSITE

PROJECT INTRODUCTION

The DISCO2030 project is an EU-funded project that aims to develop **two innovative hybrid manufacturing methods** for joining dissimilar metal-metal and metal-polymer materials. The project combines the advantages of **Powder Bed Fusion (PBF)** and **Directed Energy Deposition (DED)** to enable the manufacturing of multi-material lightweight, complex geometry components/structures that can operate in **harsh environments**.



The process is expected to achieve a >20% lead time reduction compared to state-of-the-art **manufacturing processes** (such as die casting and brazing) and **manufacture multi-material parts** that have a 50% lower weight compared to reference products and a 30% higher performance (achieved among others by graded materials). The DISCO2030 project is expected to **generate significant impact** by paving the way for the creation of new dissimilar material joining and testing standards, strengthening the **EU's leadership in AM technologies**, and increasing the EU's resilience against global supply chain disruptions.

PROJECT UPDATES

GENERAL ASSEMBLY

June 20th and 21st, 2023

On June 20th and 21st, 2023, the 1st General Assembly of the #DISCO2030 Project took place in Portugal. The Disco2030 consortium met to discuss the project's progress.

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KICK-OFF MEETING

February 21st and 22nd, 2023

On February 21st and 22nd, 2023, the Kick-off Meeting was held. The **DISCO2030 consortium** met to discuss the project's progress and future actions.

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PARTNER SPOTLIGHT

Technical University of Munich, Chair of Materials Engineering of Additive Manufacturing (TUM MAT)

TUM MAT specializes in investigating **process-structure-property** relationships of metallic materials.

Regarding manufacturing and processing techniques, TUM MAT focuses on **innovative welding methods** for joining and state-of-the-art direct energy deposition processes for **additive manufacturing**.

Multi-material components and graded material structures are a **special focus** and the spectrum ranges from steel to non-ferrous metals, light and heavy metals to metal-matrix **composites**. Cross-scale material simulation, excellent characterization methods, innovative measurement and testing technology, and **state-of-the-art AI-supported data analysis** close the circle and allow us to gain insights into **materials** that would otherwise remain hidden from the human eye and mind.

In addition to being the project coordinator, TUM MAT **contributes** to the DISCO2030 project by **conducting experiments** and **material characterization** for functionally graded structures built by powder-directed energy deposition with a plasma arc. We also conduct **process modelling** and **simulation** using the latest computer-aided engineering software. Finally, TUM MAT disseminates the scientific knowledge generated within the project **together** with our project partners.

disco2030.eu/disco2030-consortium.html

PARTNER MILESTONES

After **selecting** the candidate materials for **hybrid metal-metal manufacturing**, powder-directed energy deposition experiments using plasma arc started. TUM MAT began combining **stainless steel 316L** and **copper alloy CuCrZr** because it is more **challenging** than combining nickel and copper alloys.

The experiments started with the deposition of **316L powder** on copper alloy build plates. After successfully depositing 316L on the **copper build plate**, the trials for functional grading have started. Our team is building a wall with functional grading between **copper alloy** and **stainless steel**, accompanied by material characterization. Our team will also begin experimenting with the nickel and copper alloy combination in the **upcoming months**.

Parallel to the welding experiments, **modelling of the process** in a suitable simulation environment is ongoing. Our team started to build a model that can capture the **distortions**, **temperature field,** and **residual stresses** for additive manufacturing of functionally graded structures with directed energy deposition.

UPCOMING EVENTS

Schweissen & Schneiden
11 – 15.09.2023 at
MESSE ESSEN

MTeM 2023
18 – 23.10.2023 at
Cluj-Napoca, Romania

FORMNEXT 2023
7 – 10.10.2023 at
Frankfurt, Germany

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