ABOUT DISCO 2030

The DISCO2030 project aims to develop two innovative hybrid manufacturing methods for joining dissimilar metal-metal and metal-polymer materials. Both proposed methods are underpinned by Additive Manufacturing (AM) technologies from the emerging technology families of Powder Bed Fusion (PBF) and Directed Energy Deposition (DED).

DISCO2030 combines the advantages of PBF and DED to enable the manufacturing of multi-material lightweight, complex geometry components/ structures that can operate in harsh environments.

PARTNERS

Technical University of Munich

EWF

CRYOMOTIVE

DLR

AIT Austrian Institute of Technology

oerlikon

WÄRTSILÄ

AVIO

OBJECTIVES

O1 | Re-confirm the use-case KPIs to be achieved during the demonstration phase, qualify the candidate materials, and develop novel dissimilar material testing protocols.

O2 | Develop a first-of-a-kind hybrid manufacturing method for joining dissimilar metal-metal and metal-polymer materials.

O3 | Upscale and demonstrate the two novel hybrid manufacturing technologies in relevant environment as part of three use-cases.

O4 | Disseminate, exploit and communicate the project results, paving the way for technology commercialisation post-project.

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/company/disco2030/

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DISCO 2030

Challenge:
Achieving Multi-Funcionality

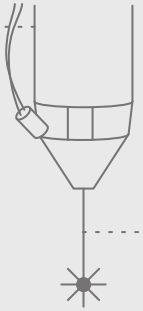
Alternative:
AM Technology

DISCO 2030

Lightweight, complex geometry multifunctional devices able to operate in harsh environments

Metal-Metal

P-DED / LB
P-DED / PA
PBF / LB



Rocket Engines

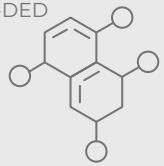
1. PBF-printing of a rocket engine combustion chamber out of copper.
2. Application of an Inconel exoskeleton via powder-based DED.
3. Hot fire test performance to confirm the expected impact of engine performance on the structure.

Marine Engines

1. PBF-printing structures of a marine engine heat exchanger.
2. DED Application of a stainless steel heat exchanger outer frame by using the DED process.
3. Real marine engine operation test performance by running 200 hours of tests on a full-scale test engine.

Metal-Polymer

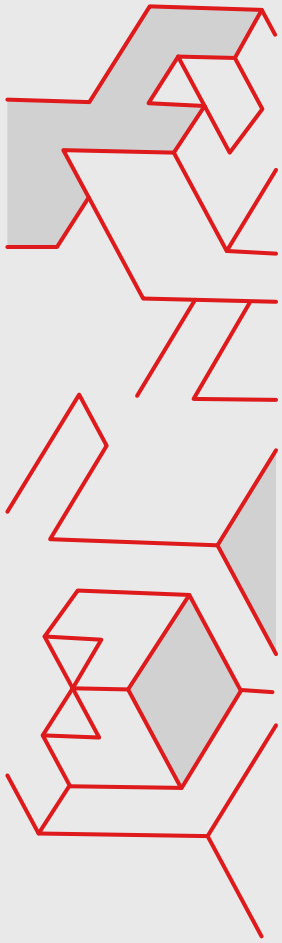
W-DED
POL-DED



Hydrogen Fuel Tanks

1. PBF manufacturing of a heat exchanger.
2. DED manufacturing of an aluminium liner around the heat exchanger.
3. Application of a carbon fibre composite / thermoplastics overwrap on the liner.
4. Hydraulic and cryogenic test performance mimicking real hydrogen tank operation.

Impact



Improving Process

- Design guidelines for multi-material components
- Material Database
- Material Sustainability Evaluation
- Testing for Qualification of Material Combination
- Surface Treatment Applications Database
- "Recipe Books" Of Individual Process Parameters

Improving Product

- Series of iterative designs
- Metal--Metal
- Metal--Polymer
- Prototyping
- Use-case 1: Rocket Engines
- Use-case 2: Marine Engine
- Use-case 3: Hydrogen Fuel Tank

Strengthening the EU Industry

- Dissemination
- Explotation
- Communication
- Business Plan
- Documentation of novel dissimilar material testing procedures