



# HYBRID MANUFACTURING

Multi-material | Lightweight | Complex Geometry

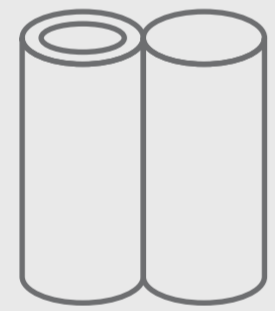
**Challenge:**  
Achieving Multi-Functionality

**Alternative:**  
AM Technology

**DISCO 2030**  
Lightweight, complex geometry multifunctional devices able to operate in harsh environments

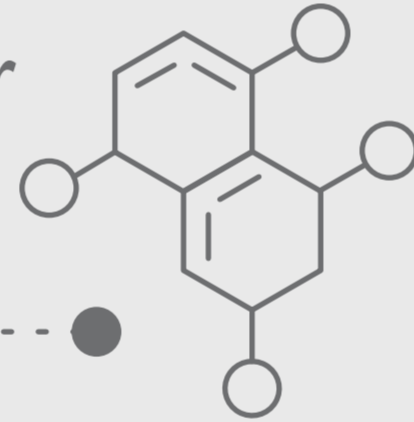
## Metal-Metal

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



## Metal-Polymer

W-DED  
POL-DED



## Hydrogen Fuel Tanks

PBF manufacturing of a heat exchanger.

DED manufacturing of an aluminium liner around the heat exchanger.

Application of a carbon fibre composite / thermoplastics overwrap on the liner.

Hydraulic and cryogenic test performance mimicking real hydrogen tank operation.

## 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.

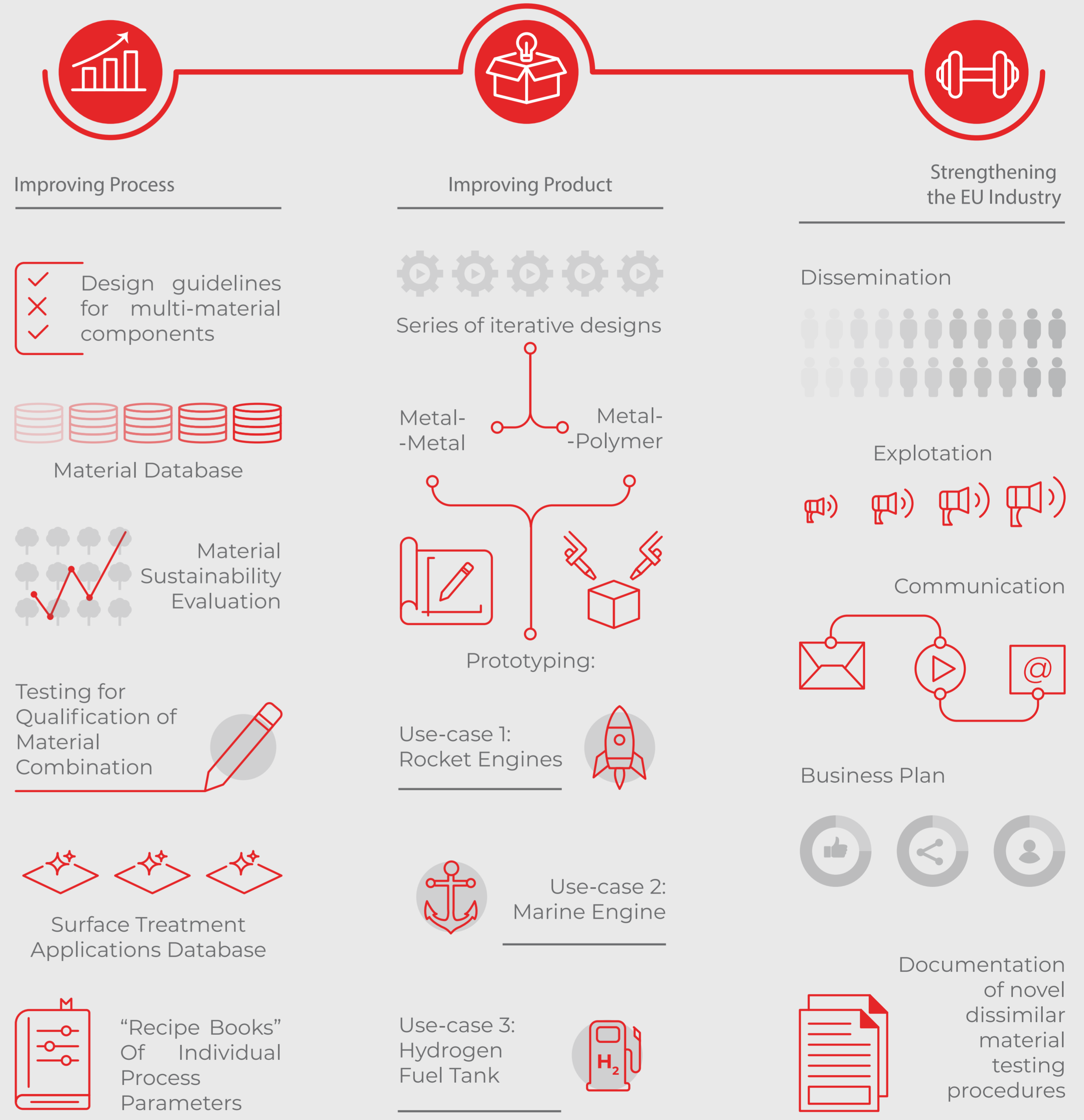
## Marine Engines

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.

## Impact



Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme. This document reflects only the author's view and that the European Commission is not responsible for any use that may be made of the information it contains.