

PROJECT CATALOGUE



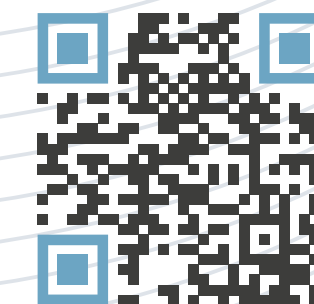
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Project Number: 101138380.

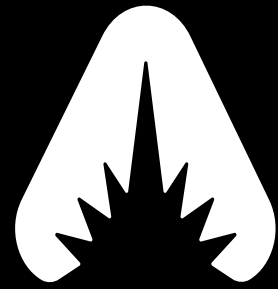


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Project Overview

Flexible Laser-Based Manufacturing



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Project Overview



The **FLASH** project aims to revolutionize manufacturing by leveraging *future-proof, highly customizable* and *energy-efficient laser-based production* systems to achieve highly precise photon distribution, with applications in **cutting**, **drilling**, **welding**, **cladding**, and **micro-machining**.

- **Funding Programme:**

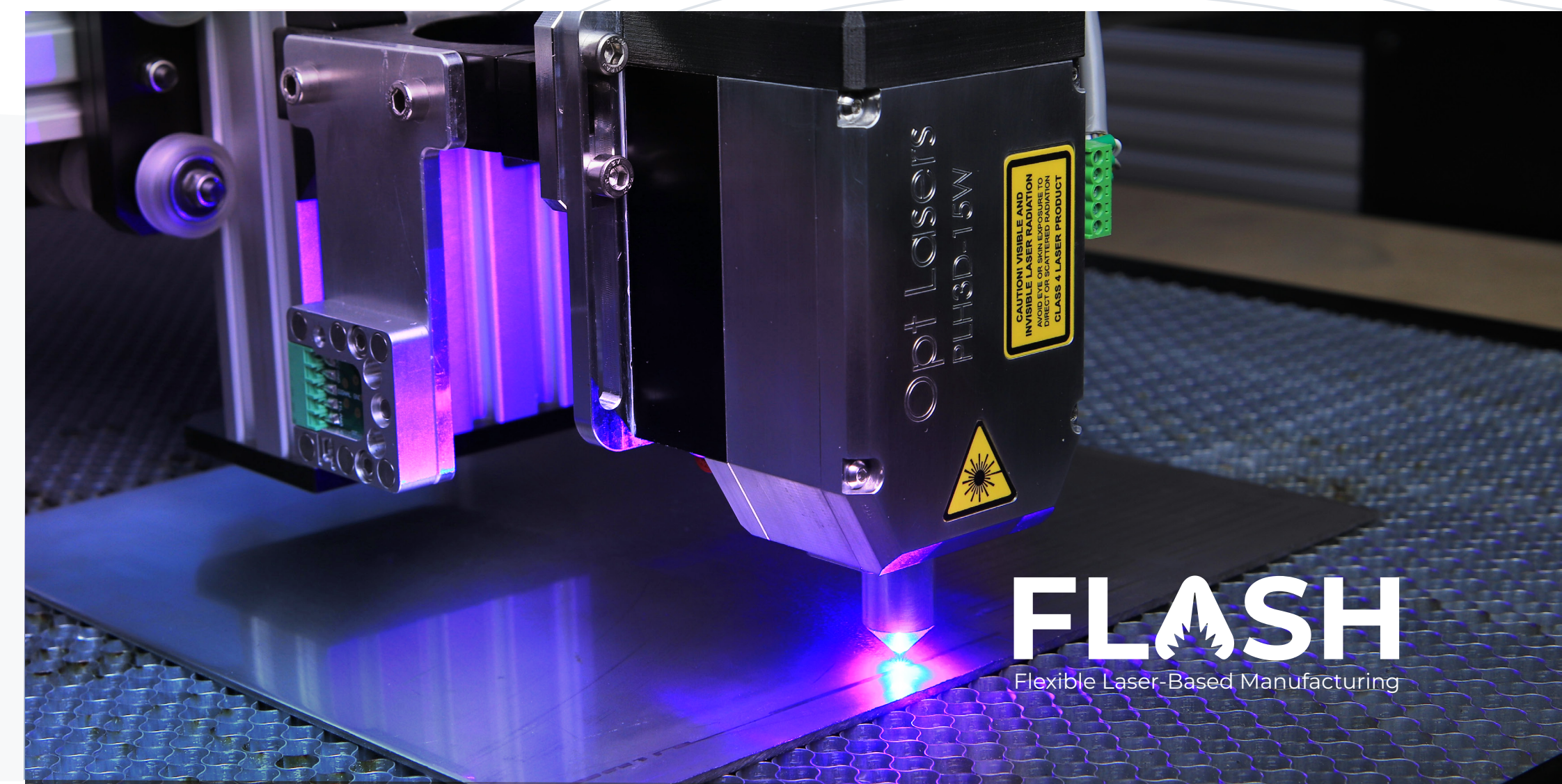
HORIZON-CL4-2023-TWIN-TRANSITION-01-02

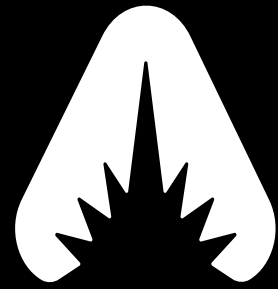
- **Project Consortium:**

16 industry leaders, from 11 different European Countries

- **Project Duration:**

36 months, 2024-2027





Project Motivation

Flexible Laser-Based Manufacturing



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Project Motivation (1/2)



Motivation #1

More Flexible



Motivation #2

Use fewer
consumables



Motivation #3

Generate less waste



Motivation #4

Allow digital control



There is a
need for
machining
tools that are:

Project Motivation (2/2)

Laser-based Manufacturing



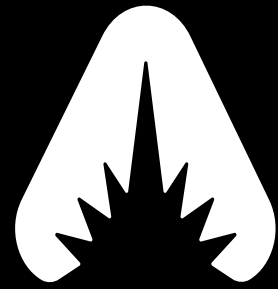
*Traditional Mechanical,
Chemical, or Thermal Processes*

**Cutting, Welding, Drilling, Machining,
Milling and Polishing.**

Existing laser-based machines are for **single applications**;

Traditional laser-based processes are generally **unsuitable** for manufacturing advanced composites and highly reflective materials;

There is a **lack of know-how**, making process design slow and expensive.



Project Objectives

Flexible Laser-Based Manufacturing



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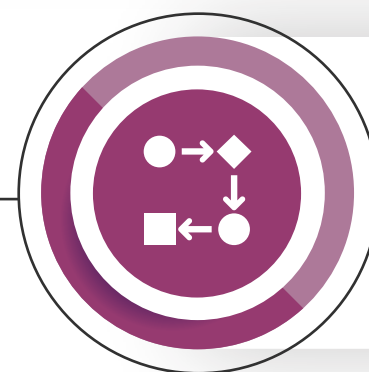
Project Objectives

The **FLASH** project aims to pioneer the next generation of laser machining through four key technology developments. The project will exploit new, advanced *methods laser-based* to enable *flexible* and *customizable production*.



Integrate 3 laser sources in a single laser module:

- 3 beam delivery heads & Dynamic beam shaping.



In-process monitoring and control:

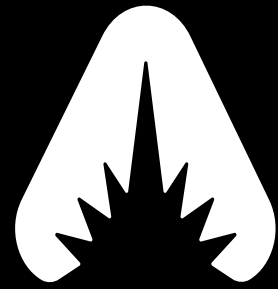
- Acoustic Sensors & Optical Sensors.



Stablish processes for laser-based manufacturing:

- Identify the best sequence of individual processing steps.





Project Impact

Flexible Laser-Based Manufacturing



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Project Impact

The **FLASH** project is expected to be transformative *across several dimensions*, influencing the **manufacturing industry** and **associated sectors**. The advancements introduced have the potential to **reshape industrial practices** and contribute significantly to the **competitiveness of European manufacturing** on a global scale.

Provide agility, speed, cost-effectiveness, material flexibility, and energy savings compared to existing technologies



Agility

Quick/automated
change laser beam
settings: 10-15 seconds
(vs minutes/hours)



Speed

Reduction in
cycle time by up
to 50%



Low CAPEX and space needs

Capital investment
saving of at least €700k
Physical footprint ~86% less
than 6 separate machines.



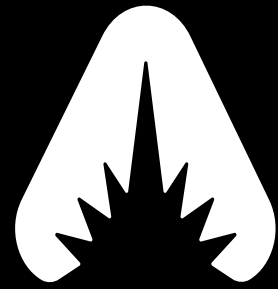
Material Flexibility

High-quality machining
of advanced reflective
metals for innovative
materials.



Energy Savings

Up to 78% energy savings
vs. single-step laser
processing and 66% vs.
three laser machines.



Project Implementation

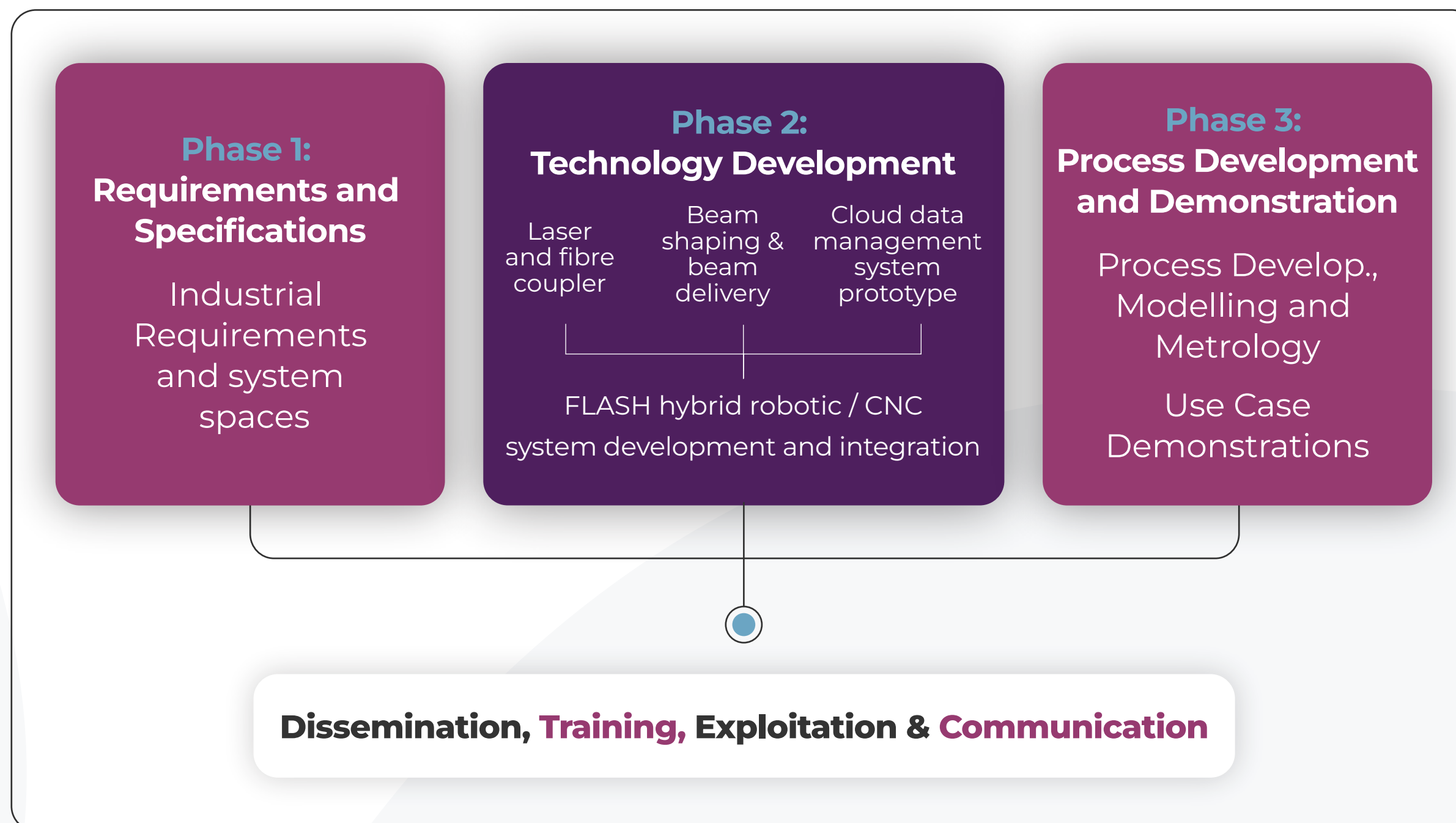
Flexible Laser-Based Manufacturing

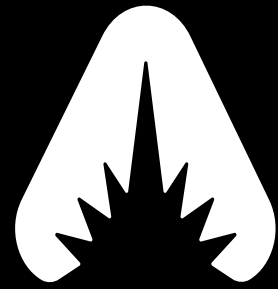


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Project Implementation

The **FLASH** solution introduces the potential for emerging business models by implementing *flexible* and *customizable tools*. This approach ensures modularity, aligning the *solution dynamically* with market demands.





Project Results

Flexible Laser-Based Manufacturing



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Project Results



Five industrially relevant process designs for **laser-based manufacturing** of commercial components.



Standardisation **recommendation** report and roadmap.



FLASH work-based **learning** and **training** resources .

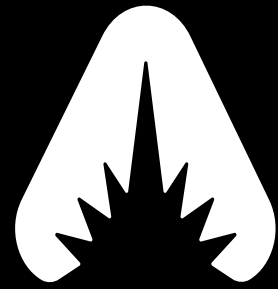


Technology transfer plan for **uptake of processes** by end-users.



Exploitation plan for **commercialisation** of modular machine platform.





Project Study Cases

Flexible Laser-Based Manufacturing

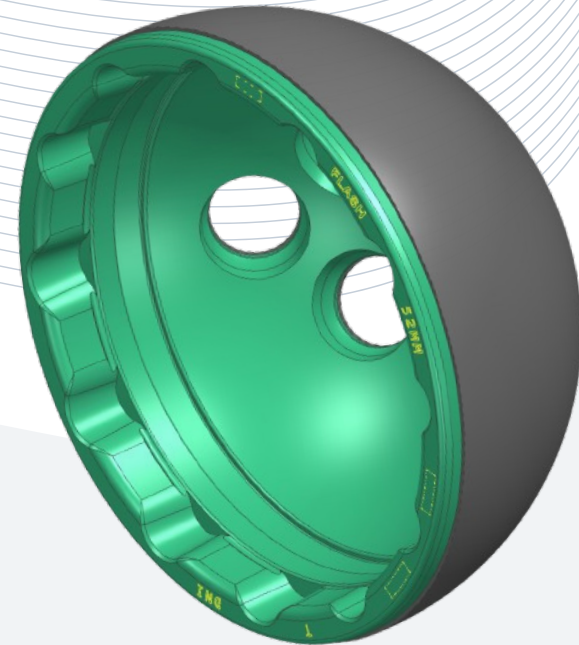


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Project Study Cases (1/2)

5 PROJECT STUDY CASES

- Superabrasive Grinding wheels;
- Microdrills with a longer time life;
- Automotive cross-car beam joining;
- Copper hairpin stripping and welding;
- Acetabular orthopaedic implant component.



Acetabular Cup

At least 50% reduction in total machining time, and elimination of process consumables and waste.



Cross Car Beam

Process energy saving of 65% and weight saving of 1.5 kg per cross car beam.

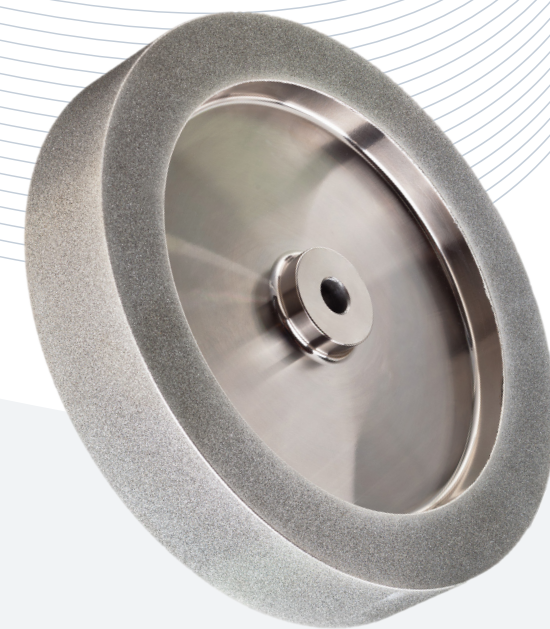


Project Study Cases (2/2)



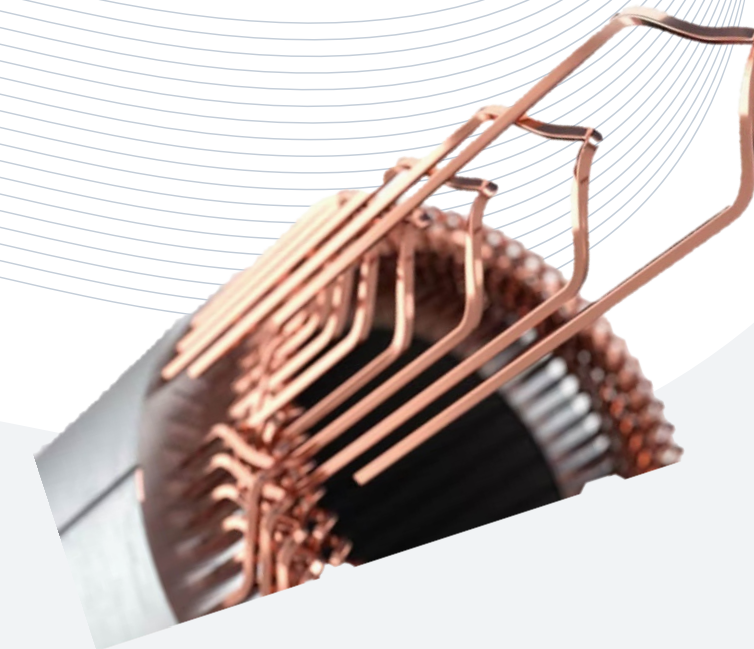
**Polycrystalline
Diamond Micro
Drill**

Reducing material waste by up to 20%, whilst delivering tools with a 10x longer lifetime.



Grinding Wheels

Eliminating the polluting chemicals used in the galvanic electroplating process, reducing process waste by 30% and extending tool lifetime by 3 times.



**Copper Hairpin
Stripping and
Welding**

Increasing the rate of stripping by 70% vs SOTA laser processing and increasing final weld quality whilst reducing energy consumption by 60% vs SOTA IR laser welding.



Thank you.



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Any Questions?

"If there are any questions or if something needs further explanation, please, [don't hesitate to ask!](#)"



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