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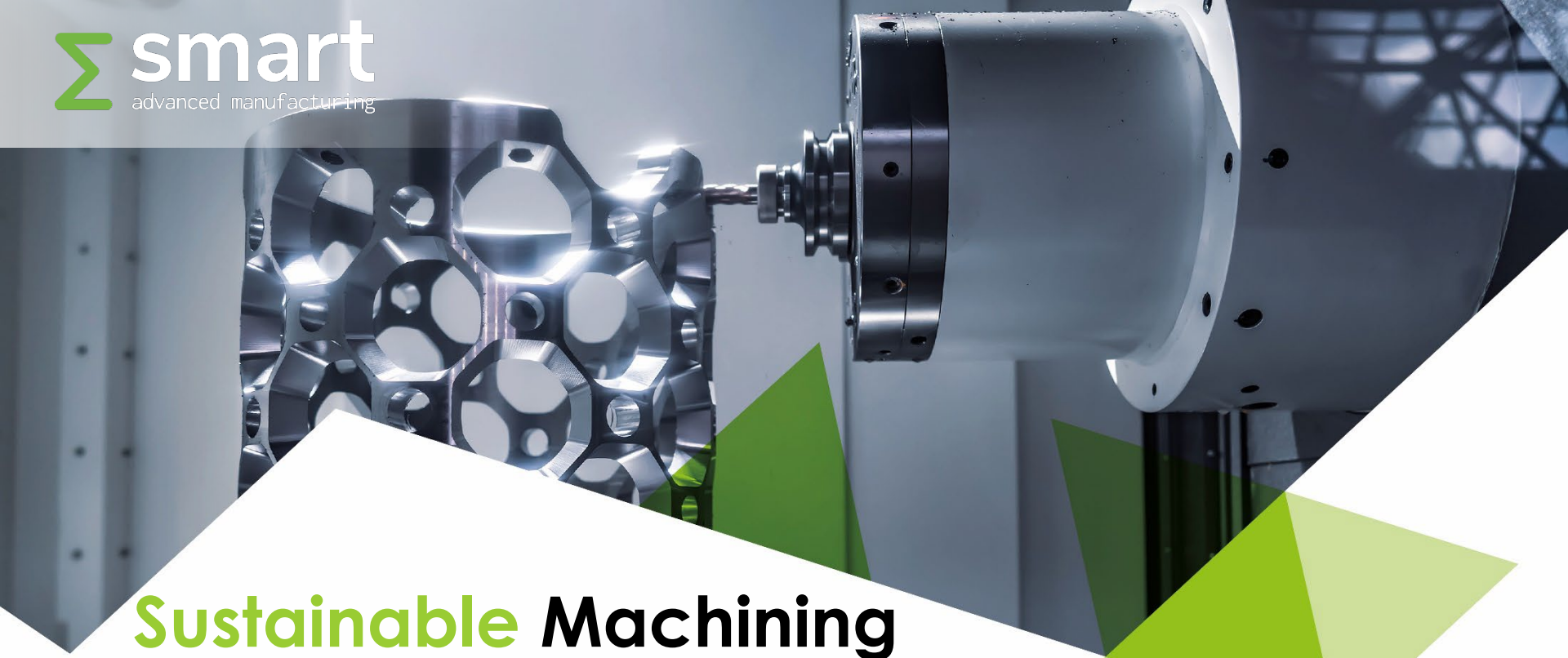

Sustainable Machining of Aluminium Alloys (S-Mach)


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ORGANISATION PROFILE

Insert brief description of the leading organisation: Name, Personnel, Size, Products/Services/Technical areas and R&D project expertise.

Name	Personnel	Size	Producs/Services/Technical areas	R&D project expertise
Swerim	Ulrika Brohede	Research Institute	Research institute, metals from mine to component.	Cutting technology, MQL and aluminium machining. Materials analysis, Theoretical modelling.
A			Alumiunum supplier and component manufacturer.	Component manufacturing, automotive/aerospace.
B			Technology- supplier, lubricoolant systems	MQL system, Cryo-MQL, …
C			Technology- supplier, cutting technology	Tools, coatings, holders, …
D			Chemical supplier	Cutting oils, vegetable solutions, green alternatives
E			Surface functionalization	Correlated to sustainable machining

PROPOSAL INTRODUCTION (I)

Vision: main project goal
Sustainable aluminum machining, by reduction of oil, water, chemicals (cutting fluids) and improvement of recyclability of materials in production (e.g. chips)

Motivation: why the project is necessary
Cutting fluids are related to large amounts of water usage, un-healthy chemicals and mineral oils. The removal of cutting fluids have several positive effects:
Improved work environment from both a health- and environment perspective.
Less handling of waste-water and maintenance correlated to the cutting fluids, leading to increased productivity.
Less polluted chips, leading to increased recyclability and value of the negative product.
Cost savings and improved competitiveness.

Content: which are the developments to be made in the project
Influence on work piece from MQL-oils and cryo-MQL by *in situ* monitoring of cutting forces and temperature, *ex situ* hardness change and fatigue properties under temperature load etc.

Influence from tools, coatings, cutting fluids on machining process, regarding the productivity and sustainability measures.

Influence on chips from cutting fluids and machining strategy (tool, cutting parameters, etc.) on the smelting and recyclability properties.

PROPOSAL INTRODUCTION (II)

Expected outcome:
Sustainable machining solutions for aluminum machining of automotive components from extruded low-Si alloys or sandwiched aluminum alloys used for aeronautics applications. By sustainability priority 1 is the removal of cutting fluids on production.

Impacts:

- Reduced or eliminated cutting fluid cost ~€15000/year and per machine center.
- Reduced water/coolant waste and cost connected to purchase/handling.
- Dry components need less cleaning, thus lowering the production lead time,
- Dry chips can be easily recycled and reused at a higher selling price.
- Reduced need for handling and transportation of dry chips going direct to foundry.
- Safe and healthy working environment at the shop floor.
- Increased efficiency due to ~25% decreased loading time between machine cycles.

Schedule:
Planned project duration: Q3 2023 – Q2 2026

PARTNERS

Sweden:

Swerim (RE) – Research provider with expertise in aluminum machining and MQL-system. Access to machining lab and a wide range of material analysis and theoretical modelling.

Aluminum component manufacturer for demonstration and end user perspective of sustainable machining solutions.

Machining solution providers, to provide tools, functional coatings, tool holders, spindle systems, lubri-coolant systems, chemicals and other smart innovations for sustainable machining of aluminum,

CONTACT INFO

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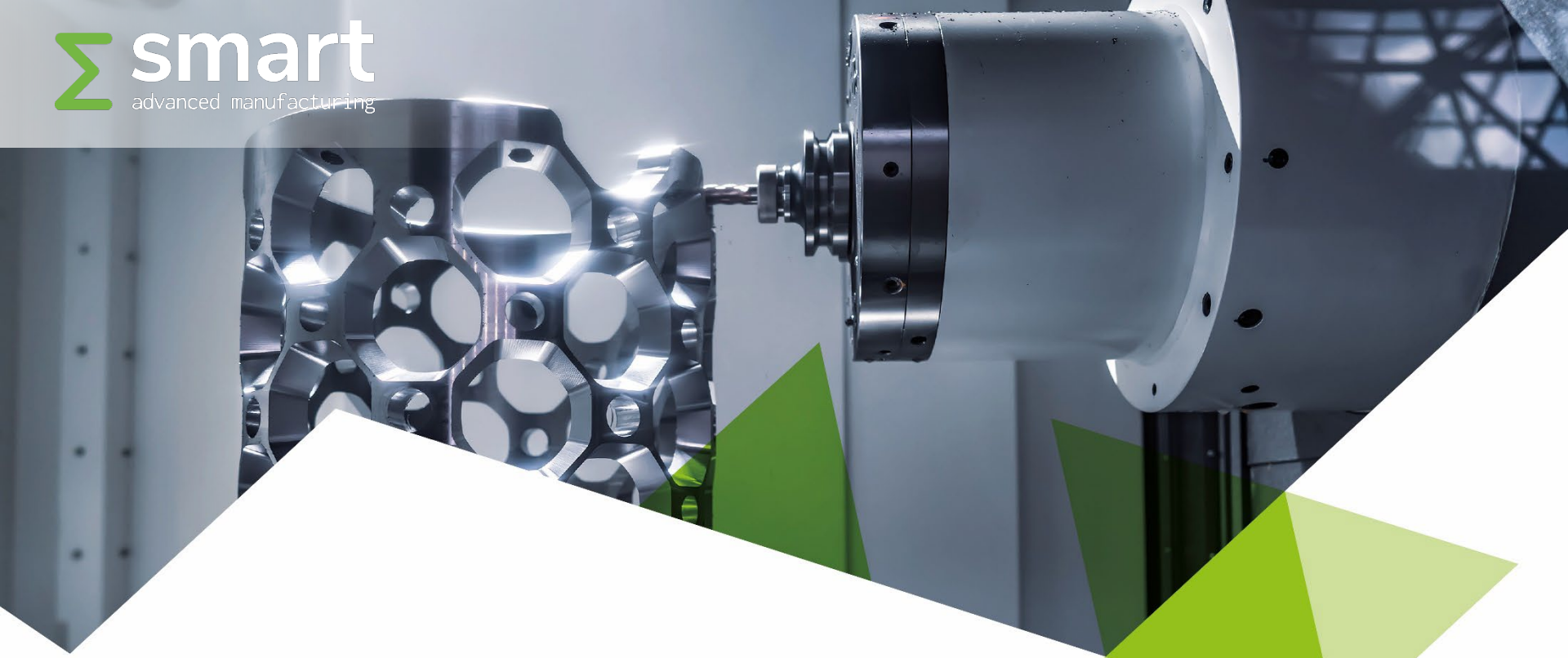

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