



Developing right-first-time composite parts from wise,
decisive machine tools (COMPWISE)

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smart

advanced manufacturing

ORGANISATION PROFILE

The Advanced Manufacturing Research Centre (AMRC)
Approx. 450 people across 3 UK sites

CORE STRATEGY:

where we assign "70%" of our resources, efforts, funding and management time

SUSTAINABILITY



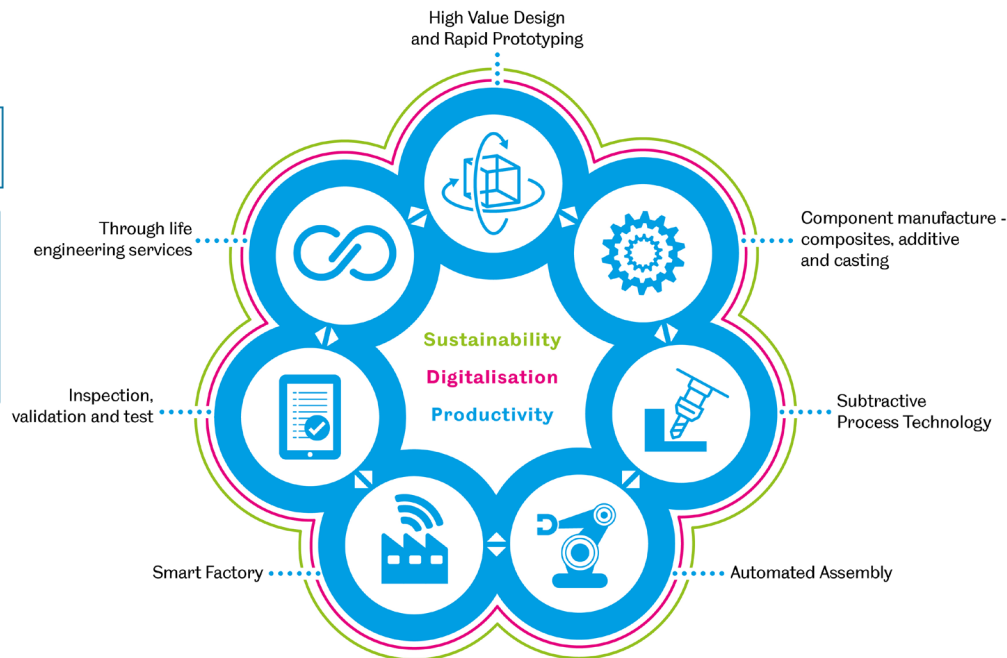
DIGITAL



FUTURE PROPULSION



SUPPLY CHAIN RESILIENCE + PRODUCTIVITY



PROPOSAL INTRODUCTION (I)

Developing right-first-time composite parts from wise, decisive machine tools (COMPWISE)

Vision:

Produce parts right every time by using real-time and historical data.

The objective would be to use machine learning and SPC methods to implement a closed-loop machining parameter update approach to prevent composite part defects once the initial training period has been completed.

Motivation:

Reduce scrap, improving profitability and environmental impact.

Providing machining centres with the ability to make decisions regarding the quality of part being produced can significantly reduce scrappage and re-work rates whilst also enabling better part-to-part repeatability.

Content:

- Conduct machining trials of composite parts
- Record data from machine, external sensors and metrology information
- Correlate machine parameters to quality of parts
- Upgrade machine software, control, and hardware to provide better parts moving forward

PROPOSAL INTRODUCTION (II)

Expected outcome:

Refined controllers, and control, of machining centers

Establish a framework for a machine tool manufacturer to enhance the intelligence / wisdom / decision making capabilities of current machine tools in industry over time using existing process responses along with next generation control methods.

Impacts:

- Improved machining centers which will increase demand
- Potentially new market for AI/ML startups to use IP across any machine vendor
- Reduced environmental impact
- Higher quality part production

Schedule:

Approx 2 years

PARTNERS

Current Consortium:

- AMRC
- Doosan (interested) – South Korea based machine maker
- Interest from a number of composite part manufacturers

Partner search:

- End users of tech
- Domain specific algorithm development
- Other machining center manufacturers

Other Key Project Areas (just a few)

- **Additive Manufacture** – Bulk metallic, polymer, composite/novel
- **5G** – Standalone and non-standalone infrastructure used in manufacture
- **Cyber Security** – Shop floor and device security
- **Human Centric** – Human Factors in current manufacturing facilities, and their place in future manufacturing
- **Electrical and Hydrogen Propulsion** – Battery pack assembly, lightweight, pressure vessel design and manufacture
- **Cognitive Robotics** – Making robots do human tasks, how robots react to what a person is thinking/how they are feeling
- **Connected Factory** – Implementing connected facility research focusing on Unified Name Spaces (UNSSs)
- **Smart Buildings** – Environmentally and Socially sustainable manufacturing facilities enabled through data, primarily IoT

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