ENCOMPASS – An Integrated Design Decision Support Solution

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Introduction

The Manufacturing Technology Centre

- Independent UK Research Technology Organisation
- Bridge the ‘valley of death’ between Academia and Industry
- Over 100 industrial members
- Home to the National Centre for Additive Manufacturing

- The largest of the High Value Manufacturing Catapult centres
Today

- Challenges of Additive Manufacturing
- The MTC’s Strategy for AM
- The ENCOMPASS Project
- Integrated Design Decision Support (IDDS) Solution
Challenges of Additive Manufacturing

- No digital coverage over the whole AM process chain
  - To enable effective management of the large amounts of data available from AM the relevant knowledge must be captured, stored and properly managed for easy query and analysis

- Highly expensive and time consuming to get from component design to pre-production runs and through the whole process chain

- Lack of expert knowledge

- Variable quality outcomes
  - Lack of reliability and robustness for the process

- Slow uptake
The MTC’s Strategy for AM

1. Create a platform for partners to test digital tools
   1. Host members at the National Centre for Additive Manufacturing
   2. Provide access to very latest technology
   3. Environment to get and manage data, to understand the IT infrastructure required

2. Develop and showcase tools that improve the AM process chain
   1. Increase confidence in AM
   2. Reduce time (and cost!) to manufacture

3. Provide a Knowledge Base & Insights
   1. De-risk AM adoption

Flagship AM Projects:
- Engineering Compass (ENCOMPASS)
- Digitally Reconfigurable Additive Manufacturing for Aerospace (DRAMA)
The ENCOMPASS Project
Overview

- Funding:
  - European Commission – H2020 project

- Project Length:
  - October 2016 – September 2019 (extended to December 2019)

- Aim:
  - Create a fully integrated design decision support (IDDS) system to cover the manufacturing chain for a laser powder bed fusion (L-PBF) process.

- Consortium Members:
The ENCOMPASS Project

Solution

- A knowledge repository
  - Design rules, recommended strategies, etc.

- Interfaces to capture knowledge from the relevant sources

- A Design Interrogation System (DIT) that evaluates the part design for its buildability with AM

- Support across the full AM process chain with data capture & storage, and subsequent analysis
Integrated Design Decision Support (IDDS) Solution

Overview

- Part designed to requirement specification
- CAD Model loaded into the “Design Interrogation Tool” (DIT)
  - Design evaluated against Knowledge Base’s Design Rules
- Downstream Actions sent from Database via DIT
- Process data captured
- User considers changes to Design Rules based on Analytics of Process Data
Thank You

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