

Granta enables world-leading Additive Manufacturing project (AMAZE)

AMAZE

AMAZE (Additive Manufacturing Aiming Towards Zero Waste & Efficient Production of High-Tech Metal Products) is a collaborative project that aims to dramatically cut the costs of producing high-tech metal products and to almost eliminate waste from the process. The 28-strong group of organizations* in this European Union FP7 project is the largest and most ambitious ever assembled on this topic and the partners have a broad range of backgrounds and skills.

Aiming towards zero waste and halving production costs

The goal of the project is to rapidly produce large, defect-free additively-manufactured (AM) metallic components up to 2m in size, ideally with close to zero waste, for use in the following high-tech sectors: aeronautics, space, automotive, nuclear fusion and tooling. Four pilot-scale industrial AM factories have been established and enhanced to give European manufacturers and end-users a world-dominant position in AM production of high-value metallic parts by 2016. A further aim is to achieve 50% cost reduction for finished parts, compared with traditional processing.

Materials information and Granta's role

The project generates a large volume of engineering, processing, economic, and environmental data relating to the materials used in additive manufacturing with metals. It is essential to make the best possible use of this data in order to improve understanding of the AM process and to then share and apply this newly-developed knowledge. Granta is providing an overarching materials information management system for the consortium, enabling partners to pool materials data and to create a single go-to source of knowledge on materials, processes, and properties for process refinement and coordination. The database captures all the key project data from materials procurement, manufacturing, inspection and testing.



This materials information management system is based on GRANTA MI, the world's leading materials information management system for engineering enterprises. GRANTA MI has specialist data structures for managing the complexities of materials data. It is possible to configure these structures (the so-called 'schema') to the specific requirements of the user organization or project. Within AMAZE, the Granta team worked closely with the project partners to develop and implement a detailed schema that can manage the different types of data of interest for additive manufacturing—for example, on material properties of particular interest, equipment and process parameters, test data, simulation, and qualification of parts.

Key benefits of using Granta's technology and tools

Use of GRANTA MI ensures efficient and secure management of materials data—for example, access to particular parts of the database can be limited based on the authorization levels of the partner. GRANTA MI provides tools that make it easy for the consortium members, based in nine countries across Europe, to easily submit, share, browse, query and apply project data. For example, large quantities of data can be quickly and easily uploaded through easy-to-use web apps.

This data is then used, for example, in simulation work to understand and optimize AM processes. It helps to assess the potential impact and benefits of AM design and production throughout the supply chain. It can also help to construct a clear picture of the cost structure and environmental footprint of a given metallic component.

Conclusion

AMAZE shows how Granta technology can support a complex, multi-partner, multi-national project to share and apply materials information more effectively in an evolving area for engineering innovation. The experience of building the data schema for the AMAZE project has helped to inform development of the GRANTA MI:Additive Manufacturing software package, which is now available to other organizations and projects wishing to manage additive manufacturing data.

* Project members: Airbus Defense and Space, Avio, AvioProp, BAE Systems, BCT, Bombardier, Concept Laser, Cranfield University, Enbio, École Polytechnique Fédérale de Lausanne, European Space Agency, ESI, Friedrich-Alexander-Universität Erlangen-Nürnberg, Fraunhofer ILT, Granta Design, Irepa Laser, Manchester University, Manufacturing Technology Centre, Norsk Titanium, Politecnico di Torino, Renishaw, Swansea University, Tecnalía, Thales Alenia Space,

Trumpf, United Kingdom Atomic Energy Authority (Culham Centre for Fusion Energy), University of Birmingham, Volvo.