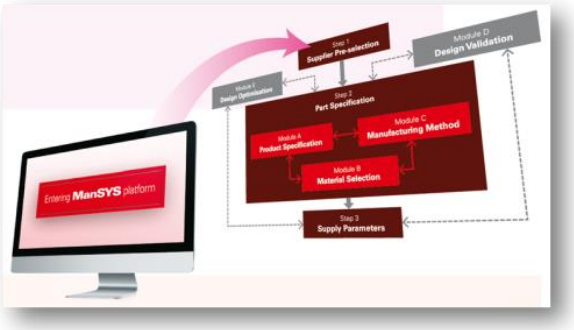
Building a platform for 3D printing

Summer 2013 twelve European companies joined forces to develop and test a complete decision making system and robust supply chain management system for metal additive manufacturing (AM), enabling production and delivery of quality assured, highly customised products and services. They started the ManSYS project.

Halfway through the project the first results can be shared. Advances have been made with regards to the supply chain network, support for design optimisation, standards, quality assurance, robust modelling and systems integration.



Supply Chain Network

An integrated supply chain network architecture was developed, based on full process descriptions and information flows of all partners involved in the supply chain. The ManSYS architecture is designed to provide streamlined material flow between all partners, reducing lead time and reducing costs of waiting for raw materials, sub-assemblies, sub-processes and thereby for finished products by the customer.

Support for Design Optimisation

Guidelines for design optimisation for AM have been formulated, and three demonstrator component designs have been optimised: a GE Aviation jet engine bracket, a Smith & Nephew intramedullary nail, and a Wisildent dental bar. Impressive weight and volume reductions (22 – 80%) were accomplished.

Standards, Formats and Interfaces

AM is a relative new and innovative production technology and has not yet reached the TRL level to meet high quality standards for applications where 100% reliability is required. The ManSYS consortium defined quality and standardisation aspects for procedures on exchanging data and materials. This will guarantee reliable and traceable products and help meeting customer and certification demands.

Quality Assurance

Quality requirements have been mapped, in close cooperation with the ManSYS demonstrator partners. General quality assurance, control procedures and operational instructions for the use of EBM/SLM are defined. A control framework for an EBM or SLM based supply chain was drafted, validated and applied to demonstrators.

Robust Modelling

Failure of one subsystems may lead to failure of the entire ManSYS supply chain. Therefore a thorough risk analysis has been performed. Commercial, managerial, physical and technical risks were identified, categorized and evaluated. A mitigation and contingency plan is formulated, to reduce the identified risks to a minimum and act upon them might they still occur.

System integration (based on Streamics™)

All of the aspects above will be integrated in one backbone system. To do so, scenarios were analysed and user interfaces were designed, encircling both technical (e.g. scalability) and non-technical (e.g. safety) requirements. The ManSYS portal will be accessible to end-users as an internet interface. The design upload, supplier selection and production process parameters will be managed by Streamics™, a Materialise software package.

Exploitation

The ManSYS consortium is committed to further develop the aforementioned innovations and translate them into business opportunities. Market analysis shows that industry specific approaches are required. Two exploitable propositions are investigated right now:

- building an integral AM platform for the dental industry
- building a generic platform for quality assurance / quality control

Might you want to learn more or get involved in the ManSYS network, for instance as a service provider or a future user of the 3D printing platform, please visit us at www.mansys.info or email us at info@3Dprintingplatform.com