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Project MEMAS: ontology-based database system for manufacturing and simulation data in the field of composite materials

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Simulation of aerospace or automotive structures can be ultimately improved by reflecting the actual manufacturing status of the produced parts in detail. This is especially the case for composite structures in view of the complexity of the involved manufacturing processes and their influence on the product reliability. High-fidelity numerical models have to be developed to reflect the actual state of the produced structures and cover their load-bearing capability individually. The more accurate the simulation can describe the actual product, the more it is accepted as a mean to allow the structure certification through Certification by Analysis (CbA) with reduced effort for independent testing. This methodology promises cost reduction and time saving in the product certification programs for aeronautic and automotive structures. To this goal, specific tools should be developed to manage the complex datasets, multiple data structures and data formats produced along the part manufacturing and establish a link to simulation models.

In the recent years, the DLR worked on the development of an integrated data management system (IDMS) called shepard for the storage of research data according to the FAIR principles (Findable, Accessible, Interoperable, and Re-usable). In its first phase, the project MEMAS aims at developing an ontology for the labelling of manufacturing, testing and simulation data to structure and bridge these different fields in composite engineering. The coupling of the IDMS to a multi-field ontology should enable the creation of high-quality and well-documented datasets, which can be converted into predictive numerical models. This presentation will cover the first project phase and present the ontology development and its coupling to the IDMS at DLR.

Please assign your contribution to one of the following topics

Metadata annotation and management close to the research process

Please specify ”other” (stakeholder)

In addition please add keywords.

ontology, manufacturing, simulation, composite parts, database management system

Please assign yourself (presenting author) to one of the stakeholders.

Researchers

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