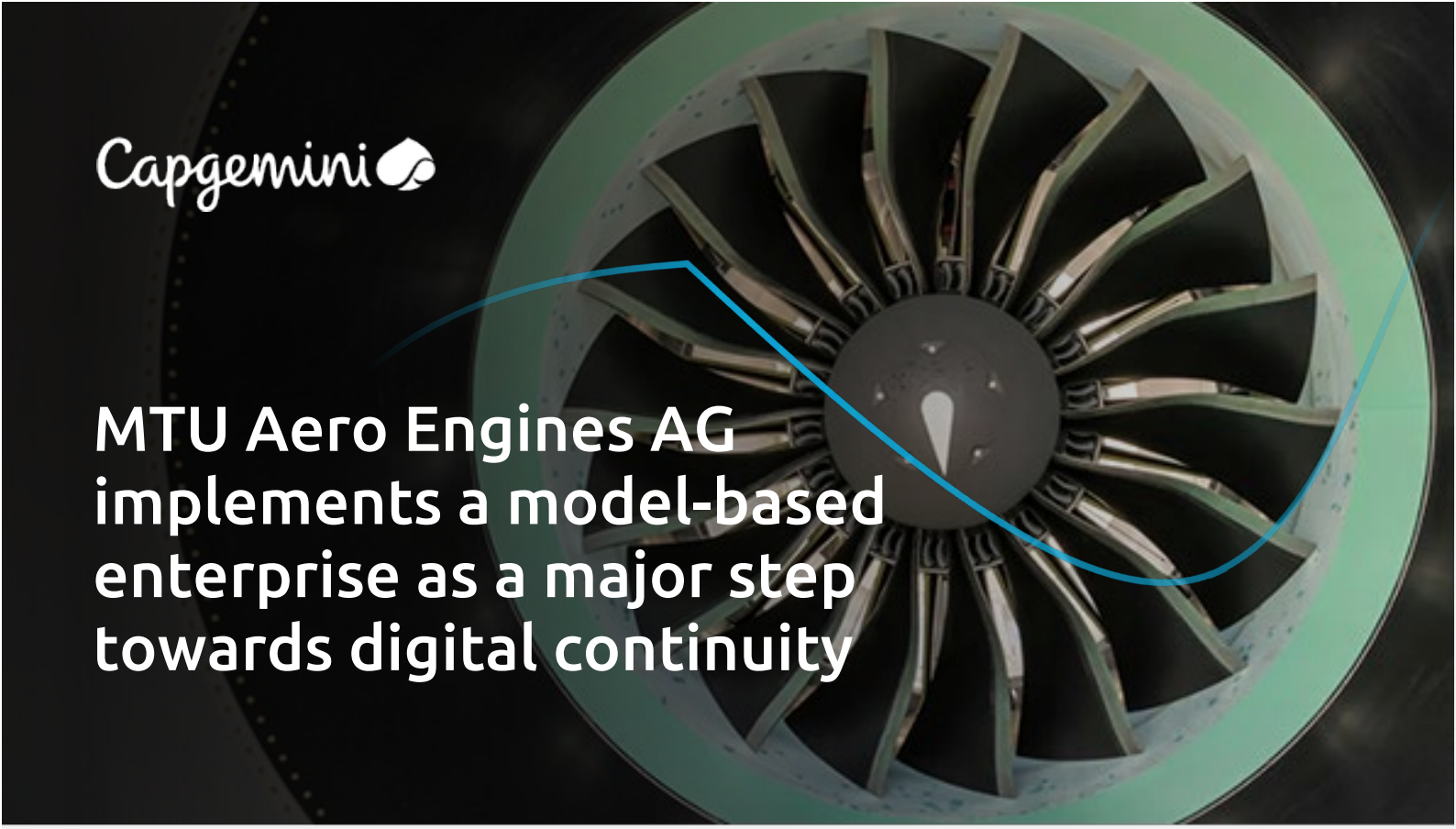

MTU Aero Engines AG implements a model-based enterprise as a major step towards digital continuity

Capgemini supports MTU Aero Engines AG in building up a continuous model based value chain by establishing a single source of truth data model for the entire product life cycle

A leader in the aviation industry

MTU Aero Engines is Germany's leading engine manufacturer and an expert in the development, production, and maintenance of civil and military engines. Its innovative engine solutions have been shaping the aviation industry for more than 85 years.

A model-based way of working will be crucial for MTU Aero Engines entire value chain. Starting with the company's own development and production, it is expected to be the standard for collaboration with partners and suppliers in future aerospace programs.

Overview

Client: MTU Aero Engines

Industry: Aerospace and defense

Region: Global

Client Challenge:

To remain competitive and manage the rising complexity, MTU Aero Engines wanted to change its siloed implementation of data and processes based on 2D drawings.

Solution:

Capgemini supported MTU Aero Engines with a strategic paradigm shift, replacing 2D-drawings by a full 3D digital master as a single-source-of-truth with digitally connectable data for the entire value chain.

Benefits:

- More effective coordination with partners and suppliers
- Data continuity drives remarkable efficiency enhancement for prioritized use cases
- Improved communication and elimination of data transfer errors.

Shifting to a model-based value chain

Like most of today's manufacturers MTU Aero Engines was facing major challenges in regards to rising product and program complexity, shorter development times and rising costs as well as increasing collaboration with partners and suppliers. At the same time, the rising number of IT enterprise systems on the one hand and manual processes on the other hand caused a high amount of system and media breaks as well as data redundancies, which affect overall efficiency and costs.

To reduce this complexity and accelerate product development, it was crucial for MTU Aero Engines to build up a unique, authoritative, and consistent stream of information covering across their product life cycle – a model-based value chain.

From use case selection to implementation

Together with Capgemini Invent, MTU Aero Engines identified the model-based value chain as the first step towards a digital twin. As part of this approach, the company implemented a 3D digital master, also known as Model-Based Definition (MBD), as a single source of truth with digitally connectable data throughout the entire value chain.

The project started by selecting a reference product for which the partners would develop the first MBD. The analysis of the legacy, end-to-end design and manufacturing processes of the reference product involved internal stakeholders and experts who identified where there was a lack of data continuity in order to prevent a loss of information between enterprise systems along the product. With support from Siemens Digital Industries Software and BCT Technology as software providers, multiple model-based use cases were verified for technical feasibility. In parallel business cases have been calculated in close cooperation with management.

After a successful validation with both internal stakeholders as well as partners and suppliers, the productive implementation is currently ongoing within MTU Aero Engines' PLM transformation program INTEGRATE. Using a scaled agile framework, the prioritized use cases are translated into features and functionalities that are continuously delivered in 3-month cycles.

The new way of working is a comprehensive paradigm shift for MTU Aero Engines. To guarantee its acceptance, MTU Aero Engines and Capgemini also developed a fundamental change management concept. Finally, in combination with regular reviews from end users and management, a core team of experts has been selected to enhance the organization's technology.

Optimized communication and high-quality data

MTU Aero Engines has already achieved major milestones for enabling a model-based value chain. The company expects its overall process chain to become more efficient as it implements validated and prioritized use cases. Once created in the design phase, data and specifications defining the MBD can be reused downstream in all processes without requiring duplicates. This has already enabled MTU Aero Engines to improve internal and external collaboration and communication, avoid data transfer errors, and introduce automation to process machine-readable information.

The partners created the MBD within MTU Aero Engines' established CAD system NX, from Siemens. Together with Product and Manufacturing Information (PMI), the MBD is directly synchronized with Siemen's Teamcenter, the PLM backbone system. Within Teamcenter, all PMIs are directly linked to and visible in the MBD. At the same time, this information is assigned an independent lifecycle and can be consumed in downstream processes and workflows to ensure information consistency and avoid data redundancy.

Driving aerospace innovation together

The cooperation between MTU Aero Engines, Capgemini, Siemens and BCT Technology will continue as a part of the INTEGRATE program. Next, the partners will focus on identifying uses cases that will achieve the greatest positive impact, which will require the companies to leverage the closed loop manufacturing process and validate results with partners and suppliers

"The model-based value chain is a key enabler to improve our overall efficiency and quality. It enables us to further cooperate with all partners and suppliers along the value chain to build the next generation of sustainable engines for the future of aviation."

Dr. Frank Rick
Head of Design,
MTU Aero Engines

About MTU Aero Engines

MTU Aero Engines AG is Germany's leading engine manufacturer. The company is a technological leader in low-pressure turbines, high-pressure compressors, turbine center frames as well as manufacturing processes and repair techniques. In the commercial OEM business, the company plays a key role in the development, manufacturing and marketing of high-tech components together with international partners. Some 30 percent of today's active aircraft in service worldwide have MTU components on board. In the commercial maintenance sector the company ranks among the top 3 service providers for commercial aircraft engines and industrial gas turbines. The activities are combined under the roof of MTU Maintenance. In the military arena, MTU Aero Engines is Germany's industrial lead company for practically all engines operated by the country's military. MTU operates a network of locations around the globe; Munich is home to its corporate headquarters. In fiscal 2023, the company had a workforce of more than 12,000 employees and posted consolidated sales of 6.3 billion euros.

About Capgemini

Capgemini is a global business and technology transformation partner, helping organizations to accelerate their dual transition to a digital and sustainable world, while creating tangible impact for enterprises and society. It is a responsible and diverse group of 340,000 team members in more than 50 countries. With its strong over 55-year heritage, Capgemini is trusted by its clients to unlock the value of technology to address the entire breadth of their business needs. It delivers end-to-end services and solutions leveraging strengths from strategy and design to engineering, all fueled by its market leading capabilities in AI, cloud and data, combined with its deep industry expertise and partner ecosystem. The Group reported 2023 global revenues of €22.5 billion.

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