



SIEMENS

Ingenuity for life



Take off into
the digital age.

Productivity in aerospace
manufacturing – reliable,
efficient and secure

[siemens.com/aerospace](https://www.siemens.com/aerospace)

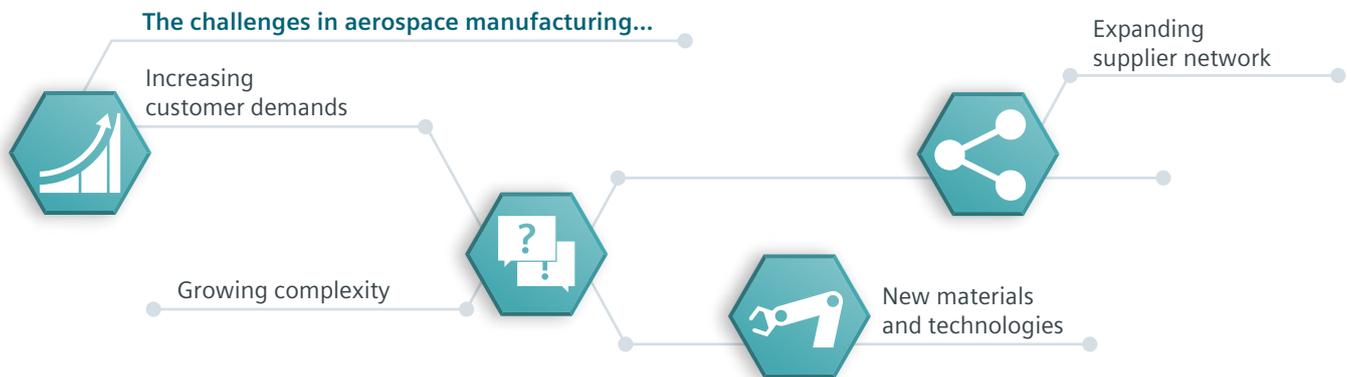
The aerospace industry of tomorrow is built today



The aerospace industry faces many challenges. It must build more aircraft with shorter time to market, while incorporating new materials and emerging technologies. Faster production rates and more efficient processes are paramount, along with increased transparency and flexibility in production, logistics and maintenance.

Digitalization powered by Siemens can transform product design, production planning, engineering, execution and service. Our Digital Enterprise Suite delivers a holistic, adaptable approach that connects every step along the value chain, from the initial design to the completed product. The result will be lighter, faster and more efficient aircraft.

The challenges in aerospace manufacturing...



...affect all steps of aircraft manufacturing...

- Engine Production
- Aerostructure Production
- Structure Assembly
- Final Assembly
- Paint Shop

...and are reflected in building technologies.

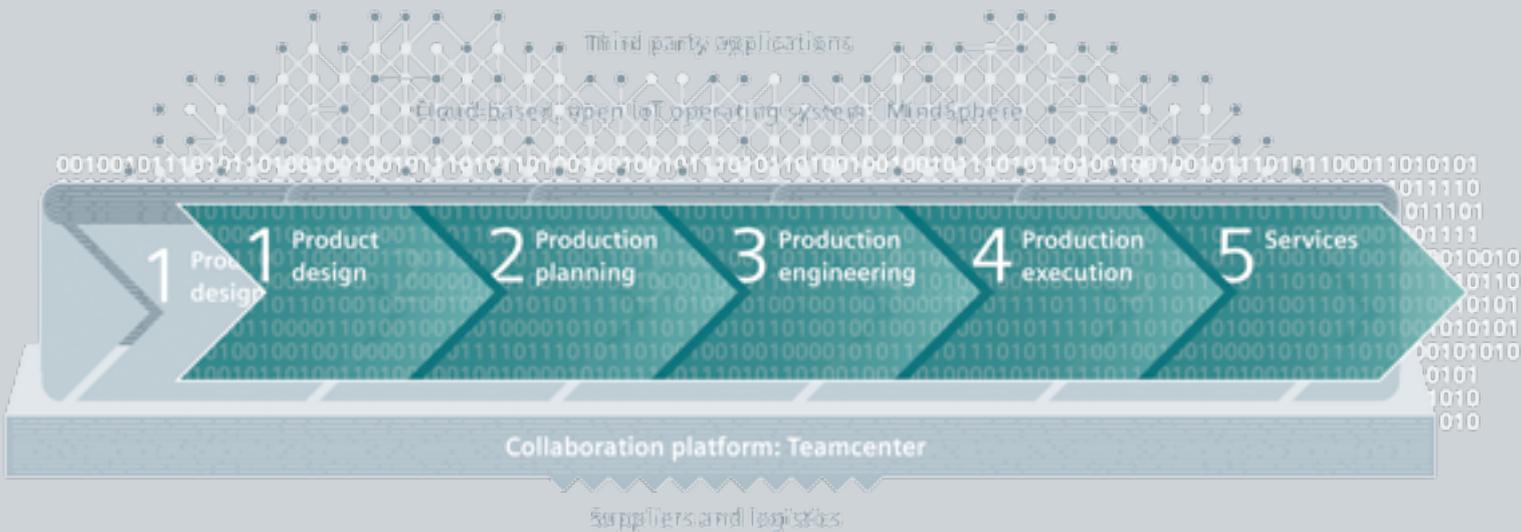
- Safety
- Security
- Heating, Ventilation & Air Conditioning (HVAC)
- Energy Efficiency
- Lighting
- Power Management
- 3rd party integration of all building disciplines

Unleash the power of Siemens Digital Enterprise



Digital Enterprise: where the digital twin comes to life
 The Digital Enterprise Suite (DES) is based on Siemens' collaborative data platform Teamcenter, and offers an integrated portfolio of software-based systems and automation technologies.

Intelligent software – such as Product Lifecycle Management, Totally Integrated Automation, Automation and Motion Control, and Lifecycle and Data Analytics – digitalizes the entire value chain and creates a digital twin. In a completely virtual environment, products can be developed, simulated, tested and optimized, which results in increased flexibility, quality and reduced time to market.



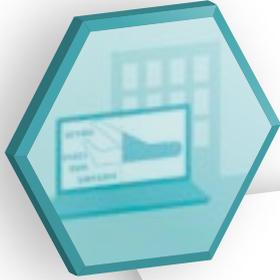
Optimize the entire value chain

Now is the time to integrate the Digital Enterprise Suite and achieve more flexible, cost-effective, and sustainable operations.

Discover the Digital Enterprise Suite: ● ● ●

www.siemens.com/des

Virtual steps lead to real-world impact



1 Product design

Challenge

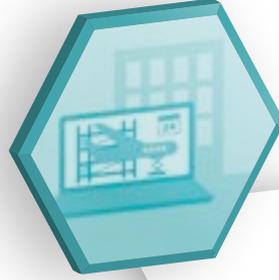
Product development and prototyping are time-consuming and cost-intensive tasks. They require an open and modular approach, as well as the proper simulation of all products and components. Various parts, materials, functions and external factors have to be considered, even before the first prototype has been built.



Solution

Siemens NX is a leading design software that covers the entire design process and uses Simcenter for integrated simulation. Using the digital twin that represents every detail, the aircraft can be simulated, tested and optimized before production.

For example, before building a prototype, a Global Finite Element analysis enables holistic stress modeling of internal loads and safety margins. All data created during the design process is stored and accessed to ensure that the simulation and optimization results can be effectively implemented in production planning, production engineering and final production.



2 Production planning

Challenge

Development of production and assembly processes includes a variety of equipment, such as robots and automated guided vehicles. The manufacturing process must be set up perfectly to ensure maximum output and efficiency, while configuration-based documentation with visual 3D images and graphics are vital to increasing visibility into process information.



Solution

Siemens' Tecnomatix software aligns production planning and product design via a virtual production area. It enables the placement of robots and additional equipment for process simulation and optimization. Plant Simulation software simulates the material flow and helps eliminate production bottlenecks, plus it generates 3D instructions for maximum clarity and minimal authoring costs.

All data collected can help reduce automation engineering efforts during production planning, alongside faster verification of the manufacturing process and reduced time to market thanks to the digital twin.

For full information, visit:

www.siemens.com/plm



3 Production engineering

Challenge

Growing engineering complexity and increasing order backlog require faster time to market and a flexible production environment. Connecting the virtual worlds of design and planning with the real world of automation is a major undertaking. Reliable data is crucial and any inconsistency must be detected before the start of production.



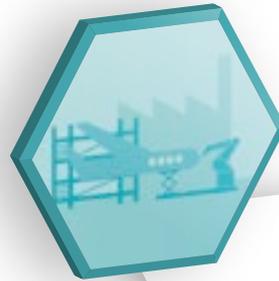
Solution

Production System Engineering connects the mechanical design process to electrical data. It automatically generates PLC programs and E-CAD layouts, while all mechanical, electrical and automation data enables faster and easier changes. Controllers, distributed I/O, HMI, drives, motion control, and motor management are seamlessly integrated into a single environment, Totally Integrated Automation Portal (TIA Portal), which supports global standardization. The TIA Portal empowers Totally Integrated Automation, which includes scalable and compatible automation hardware.

Pre-production simulation and machine task review help to overcome the complexity and high value of aircraft components. When our SINUMERIK virtual NC kernel (VNCK) is combined with the simulation software NX CAM and Teamcenter, the NC program can be simulated and the planning process can be executed.

For full information, visit:

www.siemens.com/tia



4 Production execution

Challenge

Airplane production is complex. It requires utmost precision in automated and manual production and assembly in order to produce an airplane from thousands of parts. Reliable and high-quality airplanes depend on global supply chains, synchronized production operations and real-time plant visibility.



Solution

The Manufacturing Operations Management software consolidates all production processes to improve execution process and quality management, as well as advanced planning and scheduling. SIMATIC IT, Siemens' Manufacturing Execution System, sends individual configuration information to the correct stations on the production line. It continuously monitors production to ensure high-quality manufacturing and assembly.

For high-precision machining, the high-end CNC SINUMERIK 840D sl delivers maximum CNC performance, a high degree of flexibility and revolutionary openness for almost every machine concept. For the effective integration of digital solutions, CNC Shop-floor Management software is particularly tailored to the requirements arising on machine tools and allows the management, analysis and optimization of machine tool manufacturing.

For full information, visit:

www.siemens.com/mom
www.siemens.com/sinumerik



5 Services

Challenge

For aerospace manufacturers, maximizing productivity and optimizing the Total Cost of Ownership of production equipment are the crucial success factors to maintain long-term competitive advantage. In addition, entering the digital era means utilizing machine and systems' data to master operating time, predict energy cost and gain flexibility across the entire production lines.



Solution

Thanks to a long-standing focus on aerospace manufacturing, Siemens is your competent partner for traditional and digital services.

Industry-specific services focused on optimal asset management help avoid unplanned downtime in aging production lines as well as in new factories. These services comprise support and maintenance contracts to suit your need: from standard maintenance practices all the way to implementing preventive maintenance and outsourcing.

On the path to digital production, our portfolio can help machine operators identify untapped optimization, ensure cybersecurity and improve production by better integration in IT processes and modern data analytics.

Our experts are there to provide advice and guidance, with an eye of regard for the aerospace industry.

For full information, visit:

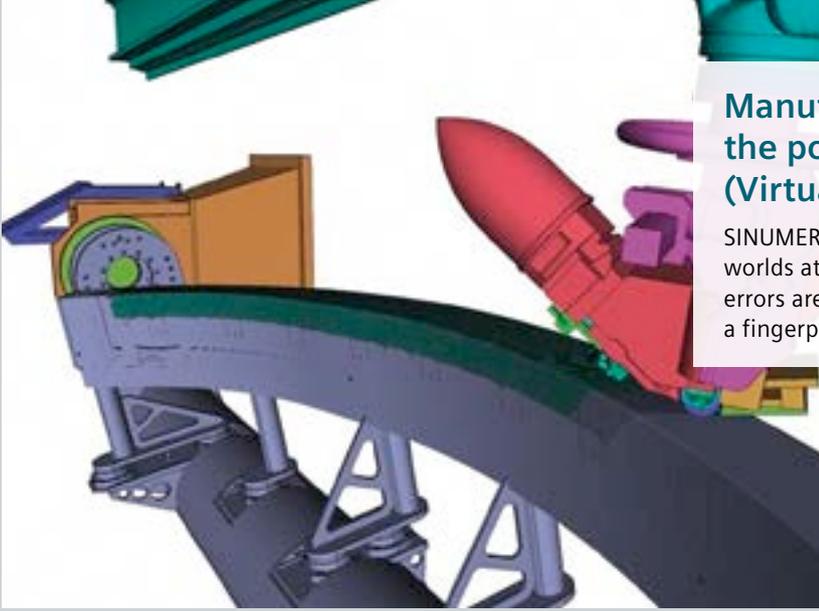
www.siemens.com/industryservices

Turn complex processes into digital success

Digitalization remarkably enhances the value chain, as it eliminates separate interfaces that make processes prone to error. A common data backbone is critical, one that delivers consistent communication and serves as an innovation platform.

Teamcenter PLM software from Siemens offers powerful data management solutions in the aerospace industry. It creates a robust and easy-to-operate foundation, providing access to data from all steps of the value chain. The result: all-around increased productivity.



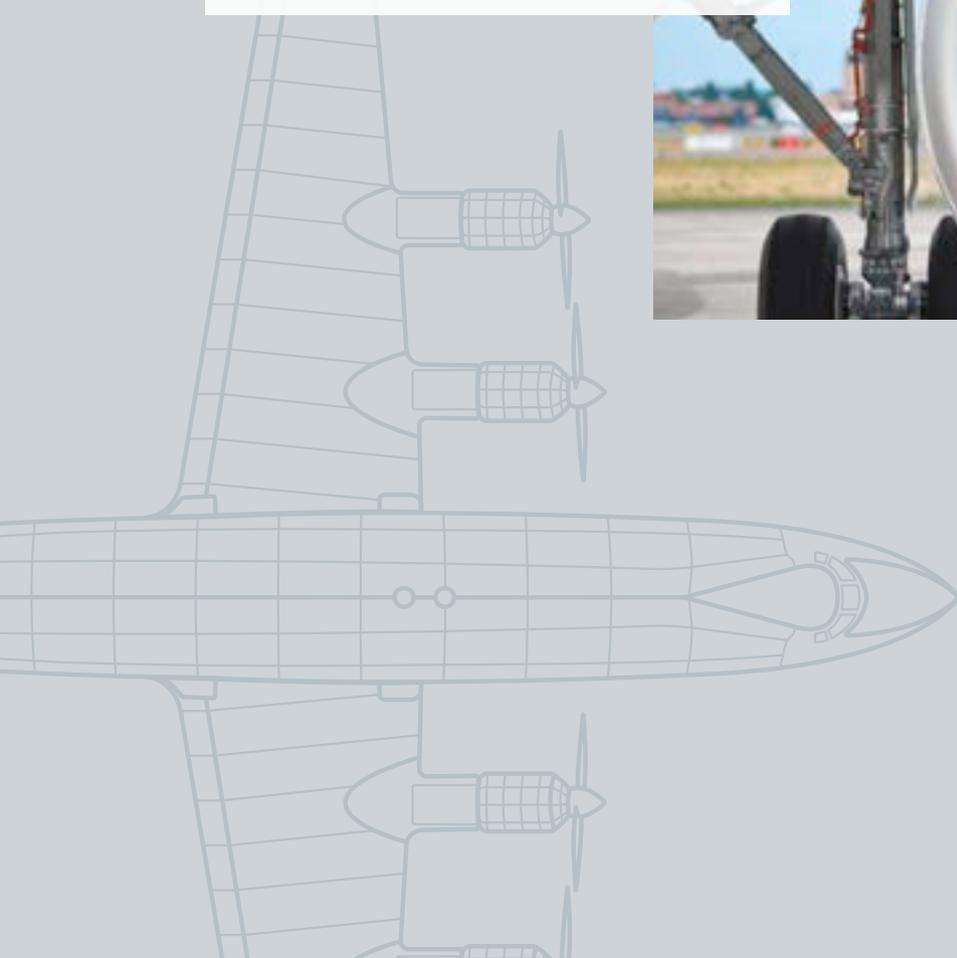


Manufacturing optimization: the power of SINUMERIK VNCK (Virtual NC Kernel).

SINUMERIK VNCK connects the virtual and real worlds at Premium Aerotec – and all process errors are virtually identified and archived like a fingerprint.

Increased production: MTU Aero Engines boosts its output with SINUMERIK CNC controls.

SINUMERIK enables a lot size of up to 1 to be identically manufactured on any machine.



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