

# Enginese. We speak your language.

## Enginese.

*n.* The language of partners closely tied by matters of expert engineering services for gas turbine engines and engine components.

In the aviation industry, MTU Aero Engines is known for top-notch gas turbine technology. Headquartered in Munich, Germany, MTU has been providing propulsion systems to power aircraft for decades.

MTU designs, develops, manufactures, markets and supports commercial and military aircraft and industrial gas turbines. MTU is Germany's leading independent engine manufacturer. The company has expertise in all aspects of engine manufacture and repair.

MTU has a long tradition of success in Germany, where the company has established itself as a major player in the global engine industry.

MTU Aero Engines North America (MTU AENA), a U.S. company, is a subsidiary of MTU Aero Engines. Innovation, backed by precision engineering, stands behind the company's reputation for elegant solutions tailored to each customer's individual needs.

MTU AENA provides a full range of engineering services to customers in the aerospace and power generation industries in the United States and beyond.

MTU AENA's core competencies focus on program management and engineering services (design, analytics, project and repair engineering) for gas turbines.



## A global engineering partner

The proven expertise developed through years of partnership with gas turbine engine original equipment manufacturers (OEMs) makes MTU AENA the best choice for any engineering challenge.

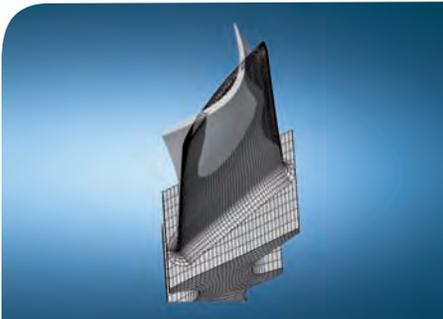
MTU AENA is part of a key market player in the aero engine industry. Most of MTU AENA's people have worked in gas turbine development programs as a partner of other OEMs.

MTU AENA's greatest strength is the unique knowledge gained through more than a decade of partnership with OEMs. Expertise in designing fuel-efficient engines drives the company's efforts to enhance customer satisfaction by ensuring that MTU AENA meets or exceeds crucial quality benchmarks.

MTU AENA's exceptional skills set the company apart from other engineering services providers. MTU AENA is experienced in meeting the needs of aero engine and land-based industrial gas turbine programs. The company's engineers often sit on the "customer-side" of the table – and they understand the need for "first time right" engineering with high quality and on-time delivery.

As a program-minded organization, MTU AENA offers particularly strong project management skills. The company not only understands the art and science of engineering, but also the reality of other challenges: the time crunches, the cost sensitivities, the export control requirements and the quality imperatives.

We speak Engineese, too.



# Delivering results through strong project management



## Customer partnerships

MTU AENA's Component Integrated Product Teams have developed the skills to take your project from design concept through after-market services. MTU AENA has developed processes for a wide range of design, analytics and project management activities with the company's OEM partners. MTU AENA takes the experience and skills learned through the company's partnerships and applies them to providing engineering services for other customers.

professionals will perform root cause analysis for service problems, handle industrial management tasks or fill gaps in your project teams. MTU AENA's logistics specialists forecast parts demand and make supply chain projections, working on site at the customer to ensure the accuracy of all communications. Project engineers at MTU AENA are well trained in tools such as Microsoft Project and Earned Value Management System (EVMS). Using these tools and their experience, they work to deliver projects to completion on time and within budget.



MTU AENA participates in key partnerships with customers engaged in aerospace and industrial gas turbine applications. MTU AENA's parent company pioneered the high-efficiency engine propulsion systems that are synonymous with excellence in aviation worldwide. MTU AENA has ready access to a German workforce with more than 75 years of experience in gas turbine engine design. The company's project engineering and management

The same thrust that drives an aero engine can generate electricity for a power plant. Beyond the aerospace market, MTU AENA is providing engineering services in the industrial gas turbine (IGT) industry. MTU AENA is expert in providing high-tech engineering for aircraft, where light, reliable, weight-optimized design is the goal. MTU AENA is now translating the same skills into technologies that use gas turbines for other applications.



# Top-notch technology



## Mastery of design disciplines

MTU AENA's team designs, models, and innovates—whether designing a single part, complex system or managing an entire project. The company is driven by its customers' requirements. MTU AENA executes conceptual, preliminary and detail design engineering, with mastery in the disciplines of modeling, drafting and checking. MTU AENA utilizes standard work processes, in combination with its own continuous improvement tools, to support all phases of a project and bring about a value-added finished product. MTU AENA employs the most advanced techniques for 3D modeling, dimensioning and tolerancing for parts and assemblies.

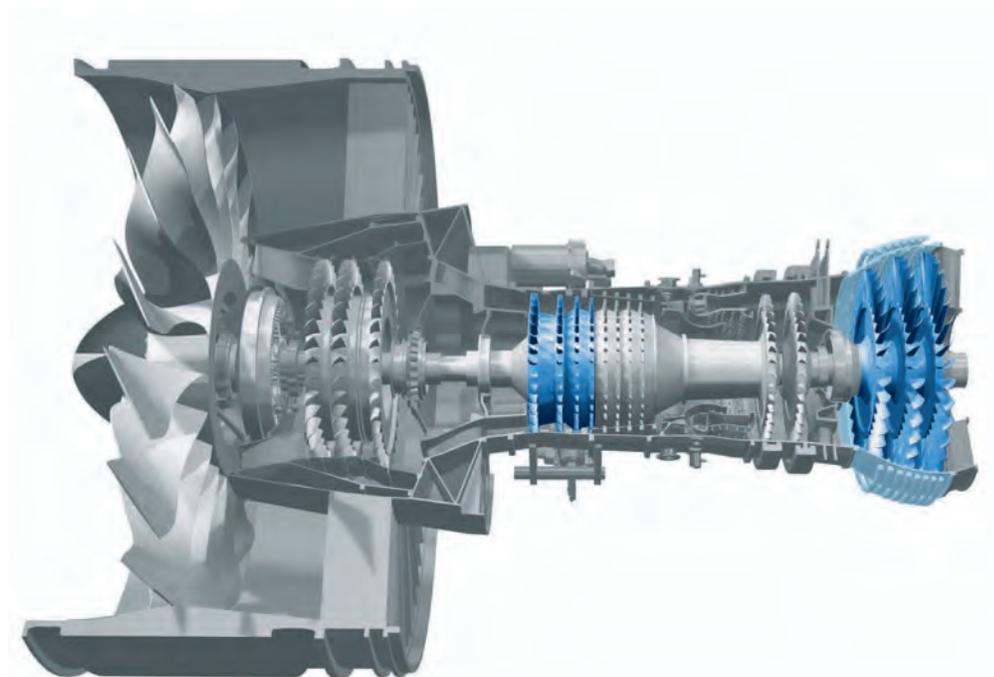
High-tech tools have revolutionized the ability to visualize components for aero and industrial gas turbine design, reverse engineer, overhaul and repair, and aftermarket services. MTU AENA visualizes individual parts and assemblies to optimize designs or recreate engine components, using the following software packages:

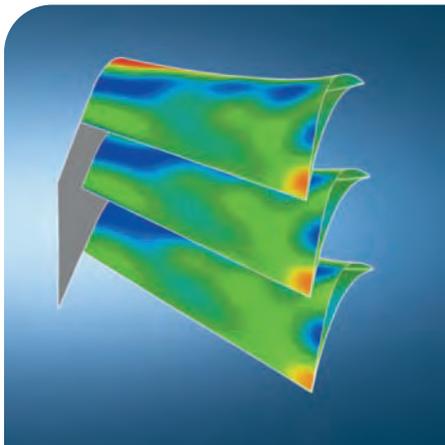
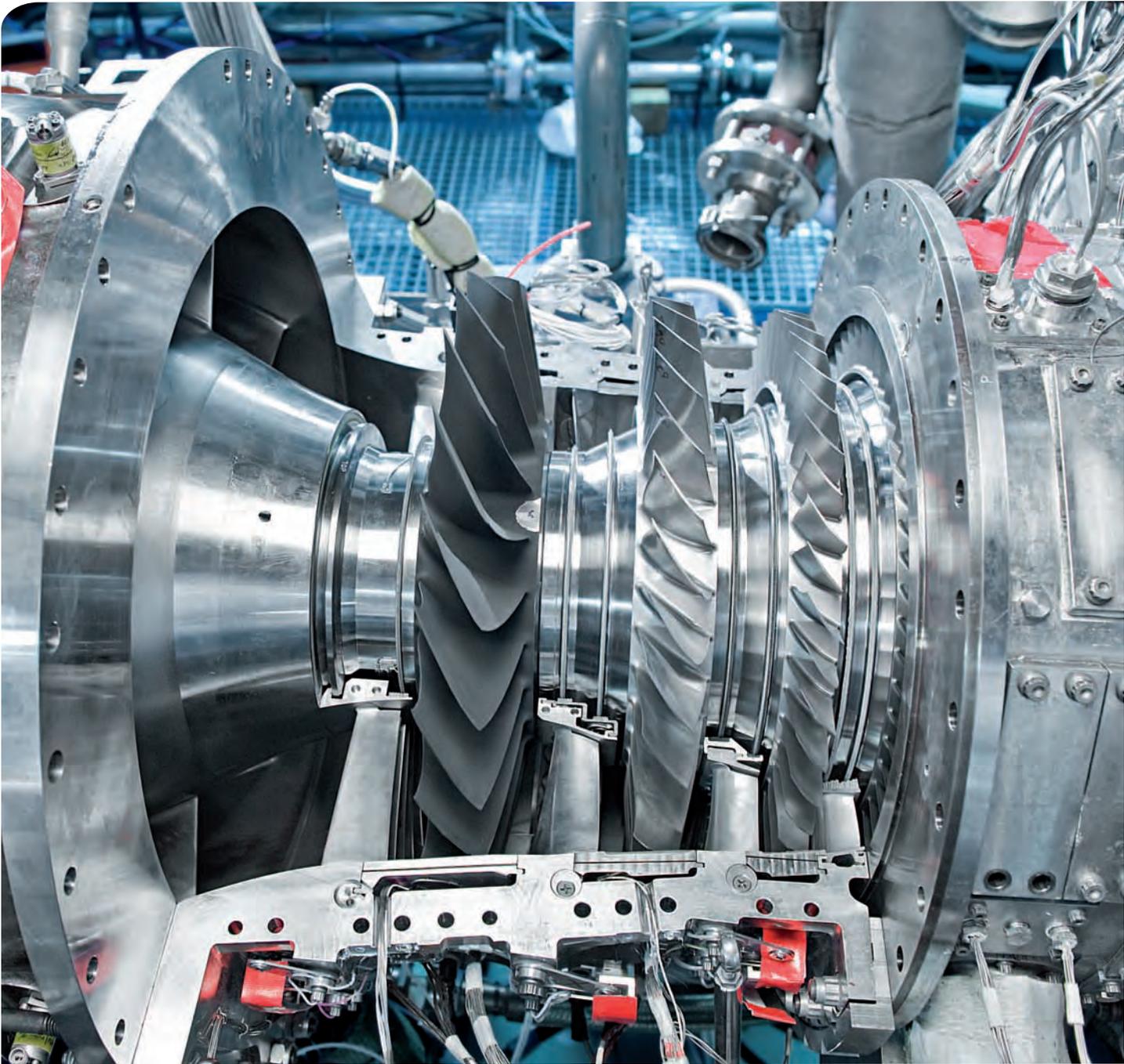
- Unigraphics
- Pro/Engineer
- Geomagic

The next generation of optical measuring is white light scanning, which provides higher resolution and better tolerances than laser scanning, with comparable tolerances to traditional CMM. For legacy turbine engines still in service, white light scanning provides an optimal way to recreate models and drawings that may no longer exist or be supported. It also provides a resource for capturing “as made” manufactured parts. This data can then be compared to the original CAD model and any non-conformances identified. MTU AENA techniques for data analysis include:

- White light scanning
- Rapid prototyping
- Tolerance expansion
- Laser scan or CMM

Inspection is a key component of the design process. MTU AENA provides custom services tailored to the needs of aerospace or industrial gas turbine manufacturers. MTU AENA's design professionals are experienced in design interface management as well as ANSI & ISO GD&T standards. MTU AENA's design teams provide the highest quality design services, on time and at a competitive cost.





# The way forward



As MTU AENA looks toward the future, the goal is to expand the company's capabilities while training and growing its young workforce. MTU AENA pursues continuous improvement and has earned AS9001 and ISO9001 certifications. The company's goal is to become a top-tier provider of engineering services in the gas turbine industry.

MTU has identified an integrated approach to addressing the challenges of the aviation industry. MTU AENA is committed to designing gas turbines that are cleaner and quieter than ever before. The company is diversifying as it expands its customer base and moves into new industrial markets through partnerships with Siemens and other OEMs.

In the aerospace business, the company's innovative strategy is being successfully put into practice in Pratt & Whitney's Geared Turbofan™ engine. The fuel-thrifty GTF developed by Pratt & Whitney in partnership with MTU will debut on the A320NEO, the Mitsubishi regional jet, the Irkut MS-21 and the Bombardier CSeries family of aircraft, among others. The company's streamlined processes are setting the standard for work with aerospace and industrial OEMs.

## Progress and people

Company-wide career development activities help employees chart a path toward success. Training is a critical component of growth in a company that values education and promotes employees from within its ranks. The flat hierarchy provides easy access to all management levels. MTU AENA promotes a healthy work-life balance with company events, team-building and recreational activities.

MTU AENA works hard to assure the health and wellness of all employees with health, life and disability insurance and a 401(k) retirement plan. In addition to a generous benefits package, including tuition reimbursement and professional development, the company offers flexible hours, employee recognition, support for military personnel, performance pay and the opportunity to work abroad, among many other advantages.

MTU's focus is data-driven. The company believes the most important quality benchmark is responsiveness to its customers. Customers know MTU AENA will invest the necessary time to provide the highest-quality service and support.

Communication pays extraordinary dividends. MTU AENA endeavors to understand the requirements up front. Clarity means understanding expectations. MTU AENA strives for excellence and continuous improvement in everything it does.

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