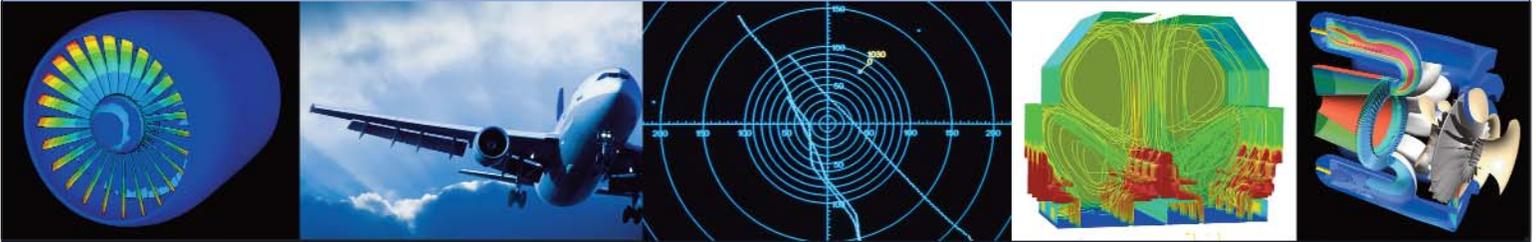


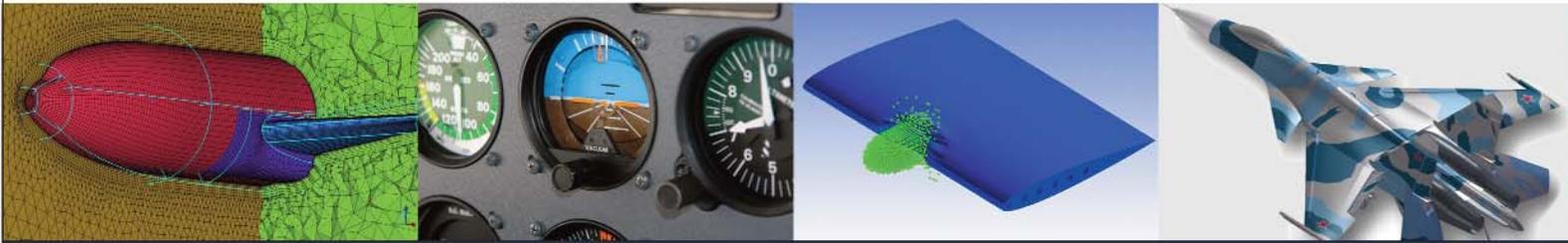


Engineering Simulation Solutions for the  
**aircraft** Industry





With the unequalled depth and unparalleled breadth of engineering simulation solutions from ANSYS, companies in the aircraft industry are transforming their leading-edge design concepts into innovative products and processes that work. Today, 97 of the top 100 industrial companies on the “*FORTUNE* Global 500” invest in engineering simulation as a key strategy to win in a globally competitive environment. They choose ANSYS as their simulation partner, deploying the world’s most comprehensive multiphysics solutions to solve their complex engineering challenges. The engineered scalability of our solutions delivers the flexibility customers need, within an architecture that is adaptable to the processes and design systems of their choice. No wonder the world’s most successful companies turn to ANSYS — with a track record of almost 40 years as the industry leader — for the best in engineering simulation.

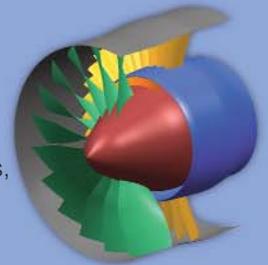


## Challenges and Solutions

Increasing oil prices, supply chain reorganization and currency valuations have put increased emphasis on innovation and competitiveness in the aircraft industry. The rise in environmental awareness is driving tighter regulations in areas such as noise and pollutants. As the provider of Simulation Driven Product Development™ tools, ANSYS, Inc. is helping aircraft companies effectively position themselves in the highly competitive aircraft market.

### High-Fidelity Simulations

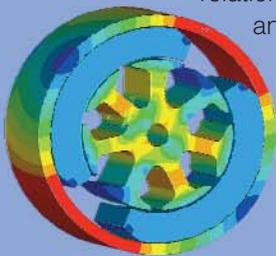
The aircraft industry has pioneered the use of engineering simulation software to increase the safety and reduce the cost of testing some of the world’s most complex systems. Today, many companies rely on software from ANSYS to accurately simulate aerodynamics, engine performance and other mission-critical behavior. Integrated and coupled comprehensive multiphysics capabilities from ANSYS account for the interactions of different physical phenomena in the industry’s highly integrated, interdependent systems. Engineered scalability enables individual users, departments or entire business units with various requirements for analysis to perform serial or parallel computations on individual laptops, compute clusters or enterprise-wide computing resources.



### Extended Enterprise and Engineering Knowledge Management

The aircraft supply chain has evolved into risk-sharing partnerships and full-system outsourcing. This close relationship between manufacturers and suppliers motivates the use of shared methods and tools, and ANSYS provides solutions for capturing and managing simulation processes and data.

The open and adaptive architecture of the ANSYS® Workbench™ platform enables easy data and process sharing as well as efficient handling of legacy data and coupling to third-party simulation tools. These features provide complete compatibility with existing PLM systems and allow for easy integration into the design process.



# aircraft



“ The ANSYS Workbench platform’s surface-to-surface contact element technology enabled us to efficiently and accurately model the numerous parts that touch one another in the T-34 aircraft lower spar carry-through structure. Without this capability, the simulation that was critical in getting the planes safely back in the air would have been much more time consuming, error-prone and difficult to perform. The ability to perform stress analysis and fatigue life prediction within the same program also was highly useful in providing insight into the overall problem. ”

Kevin Kwiatkowski  
Senior Structural Engineer  
Raetech Corporation

## Capabilities

- ▶ **Pre-Processing Solutions:** 3-D parametric modeling; wrapping technology; bi-directional CAD connectivity; geometry creation and editing; decomposition; structured; unstructured; polyhedra; CAD import and export; automation; scripts; legacy data handling

**Key Products:** ANSYS® ICEM CFD™, GAMBIT®, TGrid™, ANSYS® DesignModeler™, ANSYS ICEM Hexa CAA V5, ANSYS® BladeModeler™, ANSYS® TurboGrid™, ANSYS® Mesh Morpher™, ANSYS ICEM CFD Cart3D

- ▶ **Mechanical Solutions:** Static, modal and harmonic analyses; transient and spectrum analyses; buckling and fatigue analyses; automated contact analyses; composites; deformable geometry; geometric nonlinearity; linear and nonlinear materials; component mode synthesis; rigid and flexible multi-body dynamics; rotordynamics; explicit dynamics; topological optimization; variational sensitivities; customizable loads; full suite of multiphysics element technology; iterative solvers; direct solvers; parallelized

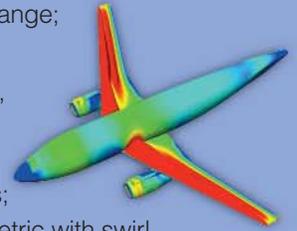
**Key Products:** ANSYS® DesignSpace®, ANSYS® Fatigue™, ANSYS® Mechanical™, ANSYS® Professional™, ANSYS® Structural™, ANSYS® Multiphysics™, ANSYS Rigid Dynamics, ANSYS® AUTODYN®, ANSYS® LS-DYNA®

- ▶ **Electromagnetic Solutions:** 2-D planar and axi-symmetric; 3-D; magneto-static and quasi-static eddy currents; electrostatics; steady-state current conduction; low-frequency electromagnetics; high-frequency electromagnetics; ion optics; circuits; isotropic and anisotropic materials; excitation sources; iterative solvers; direct solvers; fast-frequency sweeps

**Key Products:** ANSYS Mechanical, ANSYS Multiphysics, ANSYS® Emag™, ANSYS® Iceboard®, ANSYS® Icechip®, ANSYS® Icemax®, ANSYS® Icepak®, ANSYS® Icepro™, ANSYS® TAS™

- ▶ **Thermal Solutions:** Steady and unsteady; conduction, convection and radiation; phase change; mass transport; fluid elements; parallelized

**Key Products:** ANSYS Mechanical, ANSYS Multiphysics, ANSYS® CFX®, ANSYS® FLUENT®, FloWizard®, FLUENT® for CATIA® V5, ANSYS TAS



- ▶ **Fluids Solutions:** Application-specific, CAD-embedded and easy-to-use general interfaces; moving and deforming geometry; steady and unsteady flow; 2-D, axi-symmetric, axi-symmetric with swirl and 3-D flow; incompressible and compressible flow; inviscid and viscous flow; laminar, transitional and turbulent flow; LES/DES/SAS; aero-acoustics; convective, conductive, radiative and conjugate heat transfer; species transport and reactions; dispersed and mixed phases; combustion; rotating machinery with stage interfaces; customizable physics and user interface; segregated and coupled solvers, PPD and PMV comfort indices; parallelized

**Key Products:** ANSYS FLUENT, ANSYS CFX, FLUENT for CATIA V5, ANSYS CFX-Flo, FloWizard, ANSYS TAS, ANSYS ICEM CFD Cart3D

aerodynamics • aerostructures • fluid structure interaction •  
 turbomachinery • crashworthiness • bird strike • anti-icing •  
 composites • landing gear • hydraulic systems • **aircraft**  
 • dynamics of rigid and flexible bodies • environmental control  
 systems • fuel systems • braking systems • avionics cooling •  
 EM interference • fatigue • aeroacoustics • emissions control •  
 RF/microwave components • EMI/EMC • electric motors •  
 generators • bearings • particle accelerators and detectors • MEMS

## About ANSYS, Inc.

ANSYS, Inc., founded in 1970, develops and globally markets engineering simulation software and technologies widely used by engineers and designers across a broad spectrum of industries. The Company focuses on the development of open and flexible solutions that enable users to analyze designs directly on the desktop, providing a common platform for fast, efficient and cost-effective product development, from design concept to final-stage testing, validation and production. The Company and its global network of channel partners provide sales, support and training for customers. Headquartered in Canonsburg, Pennsylvania, U.S.A., with more than 60 strategic sales locations throughout the world, ANSYS, Inc. and its subsidiaries employ approximately 1,700 people and distribute ANSYS products through a network of channel partners in over 40 countries.

Visit [www.ansys.com](http://www.ansys.com) for more information.

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