



 **ALTAIR**

# MULTIPHYSICS

[altair.com/multiphysics](https://altair.com/multiphysics)

Altair provides an industry-leading portfolio of multiphysics-enabled software to simulate a wide range of interacting physical models including fluid-structure interaction (FSI), flexible bodies, aeroacoustics, and thermomechanical simulation. Together with Altair's multidisciplinary optimization and scalable high-performance computing (HPC) you can solve real world engineering problems quickly and effectively.

## MECHANICAL SYSTEMS AND CONTROLS

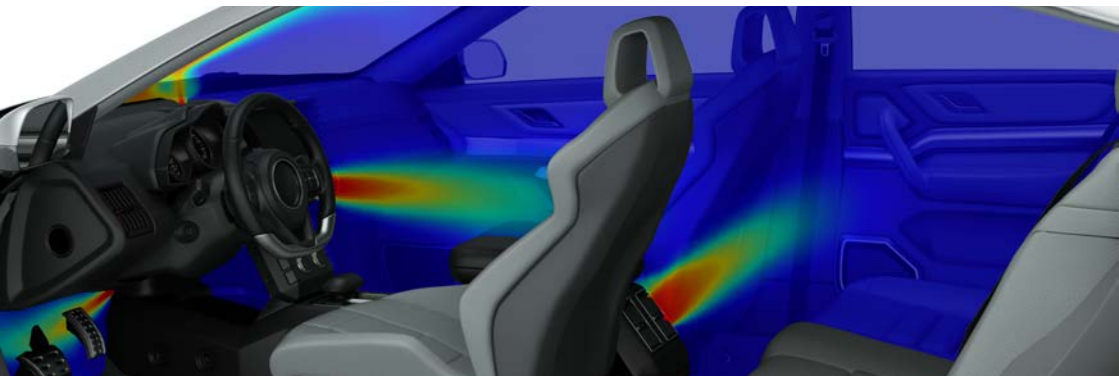
Altair MotionSolve™ performs 3D multi-body system simulations to predict the dynamic response and optimize the performance of products that move. By considering realistic motion-induced loads, environmental effects, and flexible bodies engineers and designers can be confident that their products, when made and operated, will perform reliably, meet durability requirements, and not fail from fatigue. MotionSolve® drives multi-disciplinary product development teams by enabling the combined simulation of motion and control.

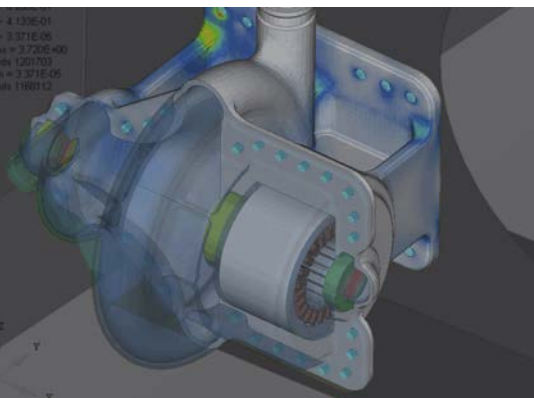
## ADVANCED ELECTROMAGNETIC SYSTEMS

Electric motors generate high frequency noise and vibrations. Altair® Flux™ computes magnetic forces to be applied as loading conditions for noise, vibration and harshness (NVH) calculations using Altair® OptiStruct®. Design exploration with Altair® HyperStudy® can maintain motor performance while reducing the noise. Heat losses can also be calculated using Flux and used as initial conditions for Altair® CFD™ to calculate temperature distribution. Multi-disciplinary simulations of antennas are also possible with Altair® Feko®.

## FLUID-STRUCTURE INTERACTION (FSI)

FSI simulates the behavior of fluids and structures simultaneously. FSI methods in Altair® Radioss® are employed in airbag inflation, airplane ditching, and bird strike simulations. Through code coupling Altair CFD supports the FSI simulation of wind turbines, shock absorbers, offshore oil pipelines, blood vessels, racecar wings, and other complex systems, in addition to aeroacoustics problems. Altair CFD coupled with MotionSolve can also solve fluid-motion problems such as tank sloshing.





## THERMOMECHANICAL SIMULATION

Thermomechanical simulation captures deformation and stresses in solids based on the combined effect of mechanical loading and thermal loading, including thermal expansion. OptiStruct® has the capability to solve both the thermal and mechanical physics in a single simulation. This enables engineers to understand how automotive and aircraft engine parts behave under real world conditions. Other applications include printed circuit boards and heavy off-highway machinery.

## MULTI-DISCIPLINARY SYSTEM SIMULATION

Altair Activate™ rapidly models multi-disciplinary systems as 1D models. By simulating the performance of an entire product engineers can understand overall behavior earlier and recognize key interactions between components and subsystems. Activate allows mixed signal-based and physical modeling including pre-defined libraries for mechanical, electrical, and thermal components. The powerful built-in functionality is extended by open standards such as Modelica and FMU to couple 1D and 3D models. The dynamic response of complex mechatronic systems can be quickly simulated, combining multi-body analysis mechanism with electrical and electronic subsystems.

## DISCRETE ELEMENT MODELING

Altair® EDEM™ is the market-leading software for bulk and granular material simulation. Powered by industry-proven discrete element modeling (DEM) technology, EDEM quickly and accurately simulates and analyzes the behavior of coal, mined ores, soils, fibers, grains, tablets, and powders. EDEM couples with all of the major computer aided engineering (CAE) technologies such as finite element analysis (FEA), multi-body systems (MBS), and computational fluid dynamics (CFD).

## MULTI-DISCIPLINARY DESIGN EXPLORATION

HyperStudy® is a multi-disciplinary design exploration, study, and optimization solution for engineers and designers. Using design-of-experiments, metamodeling, and optimization methods, HyperStudy creates intelligent design variants, manages analysis runs, and collects data. Users are guided through the process to conclude data trends, perform trade-off studies, and optimize design performance and reliability. A direct interface to the most popular CAE solvers enables the incorporation of multiphysics evaluations.

## MULTIPHYSICS WORKFLOWS WITH CAD ASSOCIATIVITY

Altair SimLab™ is a process-oriented multidisciplinary simulation environment to accurately analyse the performance of complex assemblies. Multiple physics including structural, thermal, electromagnetics, and fluid dynamics can be easily applied using highly automated modeling tasks, helping to drastically reduce the time spent creating FEA models and interpreting results. The highly efficient, feature-based modeling approach allows the creation of templates to enable CAE automation of multiphysics analyses locally or in the cloud.



## MASSIVE VIRTUAL EXPLORATION

Altair Unlimited™ boxes up software, system administration, and infrastructure as a service into a single, intuitive platform. It is a turnkey, state-of-the-art private appliance, available in both on-premises and cloud-based formats. Altair Unlimited delivers unlimited use of Altair solver software. To keep it all working at maximum efficiency, HPC resource management and user-friendly web portal software also comes included with every system in the industry-leading Altair PBS Works™ package.

Learn how Altair can help you [altair.com/multiphysics](https://altair.com/multiphysics)

### **Expanded Options. Faster Results. Better Products.**

The Altair Partner Alliance (APA) features on-demand third-party applications that run on the Altair licensing platform. Through the APA customers benefit from a growing portfolio that extends their simulation and design capabilities to help create better products faster.

Multi-physical simulation is crucial to the designing complex systems. The APA features an impressive portfolio of partners applications that enhance modeling and simulation of overall systems including hydraulics, mechanicals, electronics, or other components.

Find out what the APA has to offer you at [altair.com/APA](https://altair.com/APA)

# DISCOVER HOW ALTAIR CAN REVOLUTIONIZE YOUR APPROACH TO INNOVATION

Altair pioneered a patented, units-based, subscription licensing model for software which has transformed the way our customers streamline product innovation and get to market faster. Customers have full access to all our software instantly, including more than 150 partner products, and can run these applications on-demand locally or in the cloud. Packaged as a comprehensive set of applications, our units-based structure is scalable, shareable, and more cost effective than obtaining individual licenses.

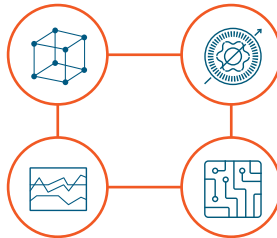


## POOL OF UNITS

Users draw units from the pool to access multiple products, across any location.

## CHOICE OF APPLICATION

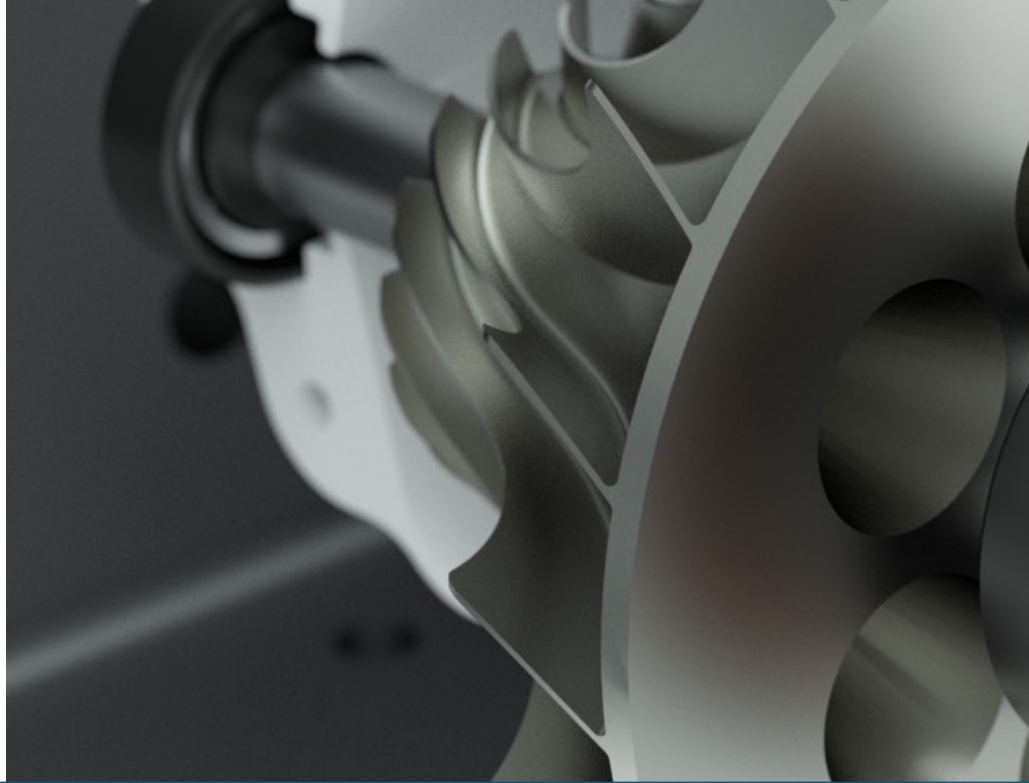
Maximizing software dollars through the flexibility of choice.



## FREEDOM TO USE HOWEVER NEEDED

Best of all, you can maintain your license and run workloads anywhere your team's infrastructure is located, on your workstations, servers and HPC resources that are on premises, in the cloud or in a hybrid environment.





Altair is a global technology company that provides software and cloud solutions in the areas of simulation, high-performance computing (HPC), and artificial intelligence (AI). Altair enables organizations across broad industry segments to compete more effectively in a connected world while creating a more sustainable future.

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