



[altairhyperworks.com](http://altairhyperworks.com)

## Simulate Everything

Altair® HyperWorks® is the most comprehensive, open architecture CAE simulation platform in the industry, offering the best technologies to design and optimize high performance, weight efficient and innovative products.

HyperWorks includes best-in-class multiphysics and multi-disciplinary modeling, linear and nonlinear analysis, structural optimization, fluid and multi-body dynamics simulation, thermal and electromagnetic simulation, visualization and data management solutions.

## Drive Innovation

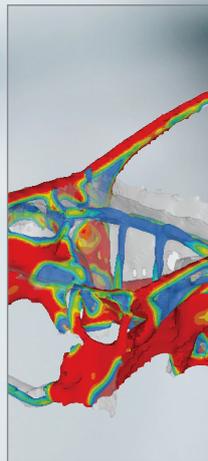
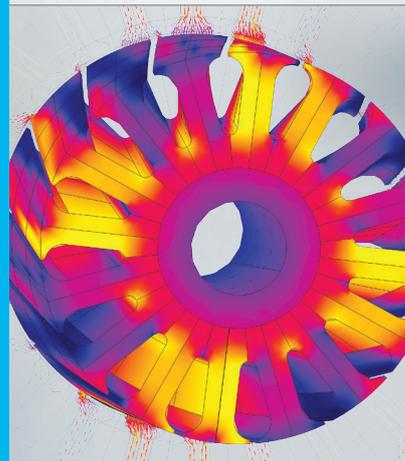
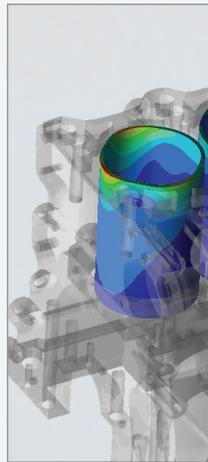
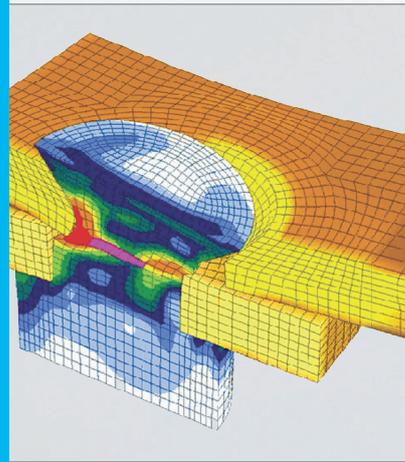
Over the last two decades, Altair has pioneered simulation-driven design to generate innovative design solutions for its clients, developing and implementing intelligent simulation technologies that significantly reduce weight, saving cost, fuel and CO<sub>2</sub> emissions.

## Save Money

Altair's patented license management system provides customers with metered usage of the entire suite of Altair products.

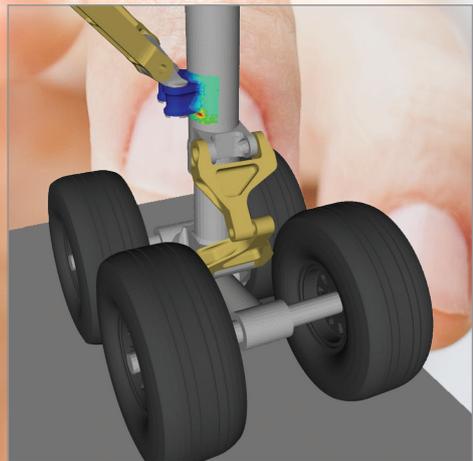
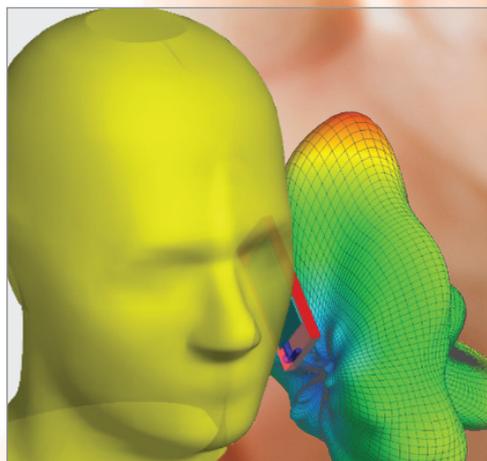
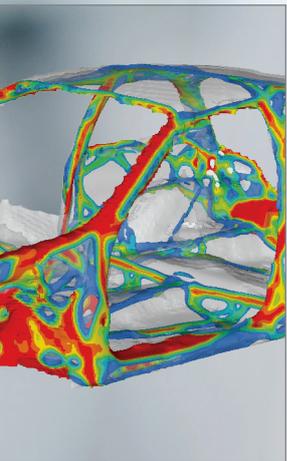
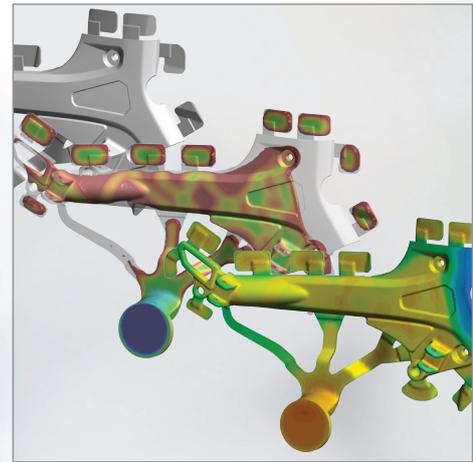
This value-based licensing model has been extended to partner products, providing a dynamic and on-demand platform that now also includes cloud-based solutions.

Learn more at [altairhyperworks.com](http://altairhyperworks.com)



"HyperWorks offers our engineers the full potential of CAE in a multidisciplinary portfolio, with third-party products, at a very competitive price."  
– EADS Innovation Works

"With HyperStudy we were able to design the best, optimal fan for one of our hammers, increasing the airflow by 10%, which translated into a better cooling of the motor." – DeWalt – Stanley Black & Decker



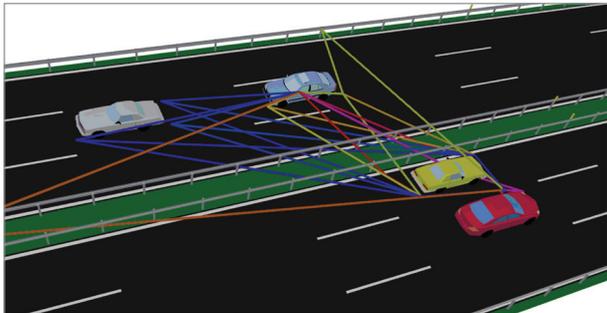
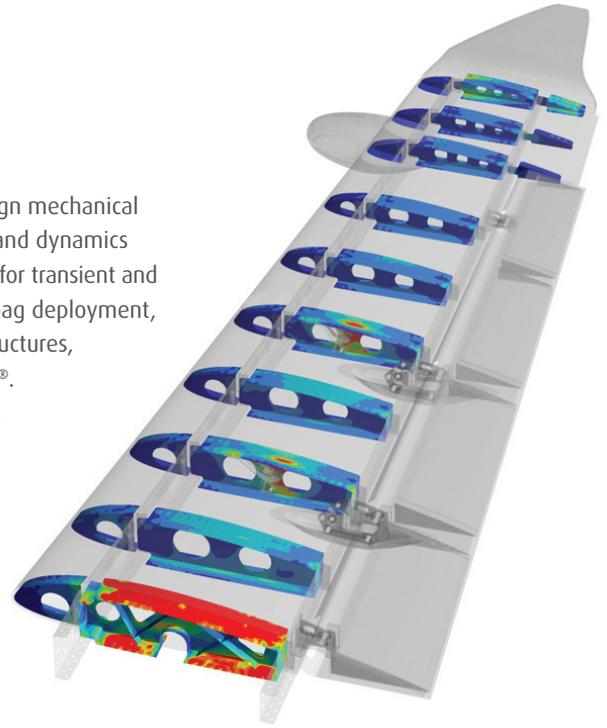
"If we didn't have HyperWorks, our jobs would be much harder, and there would be a lot more guesswork involved without substance to back it up and solve so many of the potential issues we analyze." – **Unilever**

"HyperWorks' capabilities are an improvement over what other software companies provide. The HyperWorks units licensing model allows us to choose what we want. It is exactly the kind of software package to meet our needs." – **American Railcar**

# Simulation Technology

## Mechanical

HyperWorks includes a complete set of analysis and optimization solutions to design mechanical systems and structures. **OptiStruct**<sup>®</sup> is well-suited for linear and nonlinear statics and dynamics including stress, NVH, thermal, and buckling. **RADIOSS**<sup>®</sup> is a highly scalable solution for transient and nonlinear problems including crash and safety, impact and blast, drop testing, airbag deployment, and material failure. Heterogeneous materials such as composites, honeycomb structures, and reinforced concrete can be analyzed and optimized with **Multiscale Designer**<sup>®</sup>. **MotionSolve**<sup>®</sup> provides a modern solution for vehicle dynamics, robotics, complex mechanism and mechatronics design. In addition, MotionSolve supports flexible and rigid body dynamics as well as large and multi-disciplinary system models.

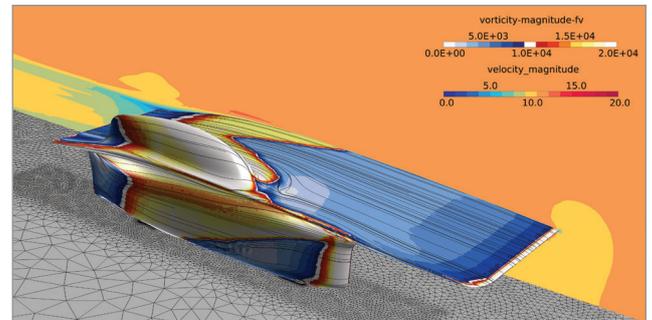


## Electromagnetics

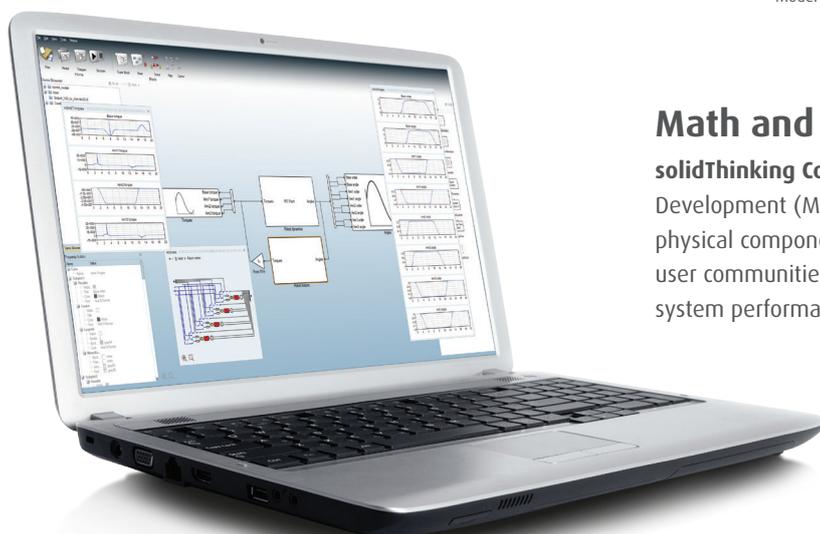
The broad range of electromagnetic problems covered by HyperWorks spans from static to low and high frequencies. **Flux**<sup>®</sup> is a low frequency electromagnetic and thermal solution for design of motors, actuators, and high power electrical systems. **FEKO**<sup>®</sup> addresses the high frequency spectrum including electromagnetic compatibility (EMC), antenna design and placement, radio network planning, and wave propagation.

## Fluid & Thermal

Computational Fluid Dynamics (CFD) helps engineers to analyze and improve fluid flows. **AcuSolve**<sup>®</sup> provides highly accurate solutions on unstructured meshes for complex, steady-state, and transient fluid and thermal analyses, supporting a variety of turbulence models. Combined with **Altair Virtual Wind Tunnel**<sup>™</sup>, AcuSolve also enables engineers to evaluate the exterior aerodynamics of vehicle performance.



Model courtesy of the University of Michigan Solar Car Team

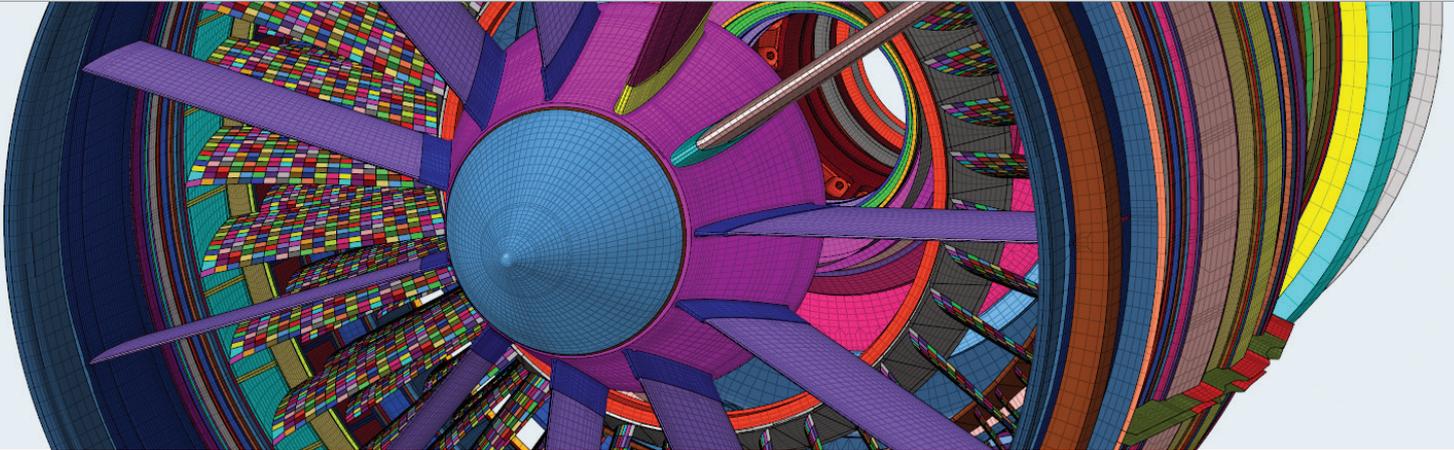
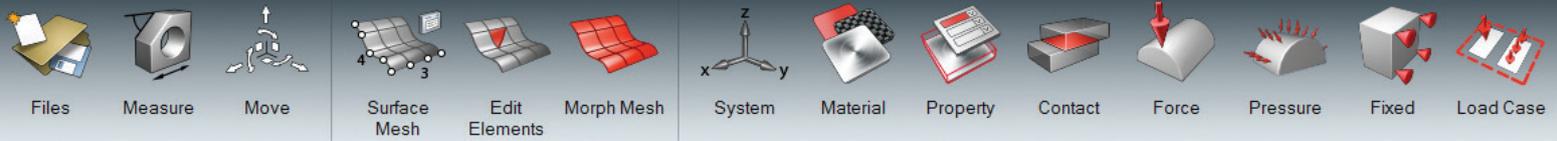


## Math and Systems Modeling

**solidThinking Compose**, **Activate** and **Embed** help leverage Model Based Development (MBD) technologies by combining math, signal-based, physical component and 3D modeling capabilities. These tools unify broad user communities enabling collaboration for concept studies, control design, system performance optimization, and controller implementation.

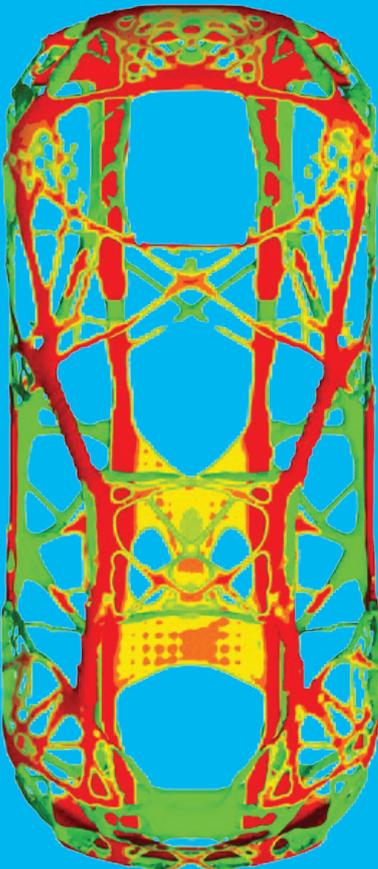
# Modeling & Visualization

File Edit View Geometry **Model** Tools +



## User Experience

HyperWorks enables engineers and designers to accomplish a broad and deep range of simulation, optimization, modeling and visualization tasks while remaining in a single ecosystem. An industry leader for more than 25 years, HyperWorks continually evolves to meet customer needs with innovative solutions, refined usability and maximum efficiency.



## Model Build and Assembly

HyperWorks includes some of the most popular tools for rapid, finite-element meshing of large and complex models. **HyperMesh**® interfaces with PLM systems and lets you generate multiple variants of a product from one database, while **SimLab**® offers a process-oriented, feature-based modeling approach. Together, these tools provide a comprehensive array of 1D, shell, solid meshing, and model building capabilities for complex assemblies.

## Vertical Applications

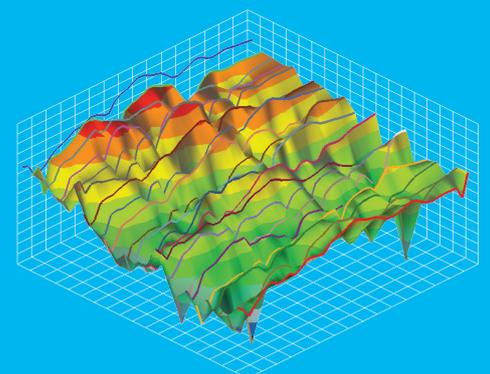
HyperWorks helps democratize the use of simulation in the design process by removing the complexities of high-end technology without compromising functionality. Applications include **HyperCrash** for crash and safety evaluation, **Click2Form**™, **Click2Cast**™ and **Click2Extrude**™ for manufacturing processes, as well as tailored solutions for impact, NVH, squeak and rattle, and other standard simulation processes.

## Visualization and Reporting

HyperWorks helps organizations analyze, interpret and share simulation results. Offering a powerful environment to quickly process models with millions of elements, **HyperView**® and **HyperGraph**® help many industries gain insight into complex design problems and make the right decisions based on CAE and test data.

## Open Architecture

Combining the broadest set of direct interfaces to the most popular CAD systems and CAE solvers with virtually unlimited user-defined integrations, HyperWorks' open architecture provides a flexible environment that fits seamlessly within a myriad of simulation scenarios.



# Industry Trends

## Simulation-driven Innovation®

In the early 1990s, with the release of **OptiStruct®**, an integrated topology, size, shape and composites optimization tool, Altair brought cutting-edge technology to structural engineers, nurturing a culture of improvement in the product development teams of many of the world's most technically advanced companies. Today **solidThinking Inspire®** delivers the same technology to the designer's desktop in an amazingly accessible package. **HyperStudy®** enables users to explore, understand and improve their system designs using methods such as design-of-experiments and optimization. HyperStudy's intuitive interface enables users to make better decisions and optimize the performance, reliability and robustness of their systems.



## Internet of Things

The Internet of Things (IoT) is set to be the 4th industrial revolution, and a strong differentiator for many industries. Extending Product Lifecycle Management (PLM) to include in-service IoT operation requires robust digital twin creation and analytics. Design challenges such as advanced sensing and actuating functions, easy programming and customization, managing and planning interconnections with seamless connectivity, and miniaturization can all be addressed through HyperWorks' multi-disciplinary capabilities. Altair's solutions for the IoT provide customers with the complete stack of technology they need to create, simulate and manage their new connected products over complete lifecycles.

## Additive Manufacturing

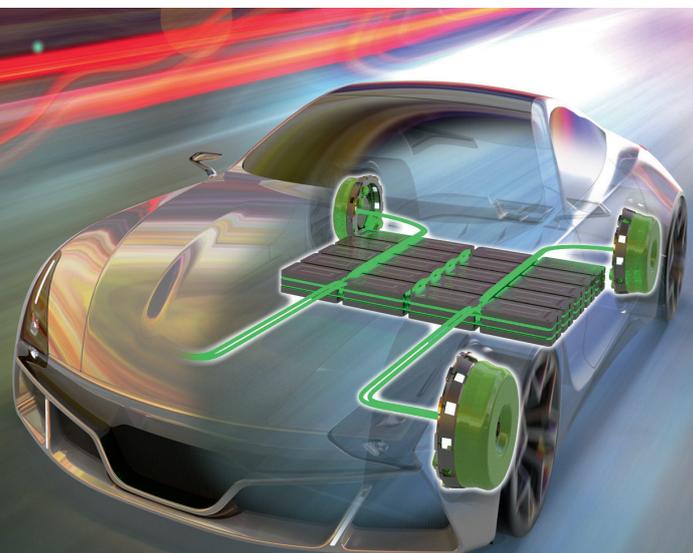
Additive manufacturing enables the creation of highly complex structures, which often cannot be produced with traditional manufacturing methods. Altair's award-winning optimization technologies in OptiStruct and Inspire generate efficient, organic-looking shapes that are ideal for advanced manufacturing methods. Coupling additive manufacturing and topology optimization greatly expands design freedom and creativity to get the best possible design. Additive manufacturing can help achieve light-weighting targets and increased component performance.



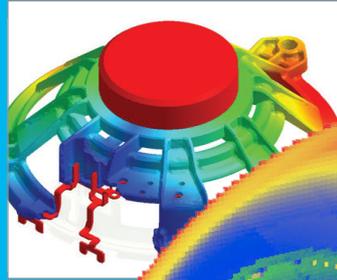
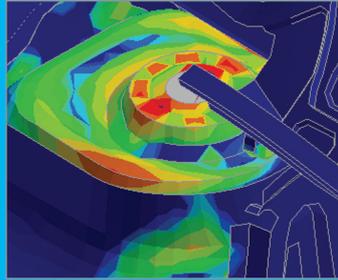
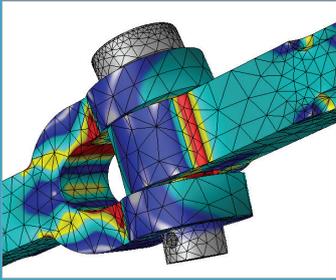
Image courtesy of Renishaw and Materialise

## e-Mobility

Increasing application of electronics, communication, sensing, electrification, and other technologies related to autonomous driving bring entirely new challenges to vehicle engineering organizations. HyperWorks' comprehensive suite of multi-physics solutions in Flux, FEKO, OptiStruct, and RADIOSS address key elements of vehicle development related to power generation, storage, and transmission along with comfort and safety features including vehicle-to-vehicle communication and automated cruise control (ACC).

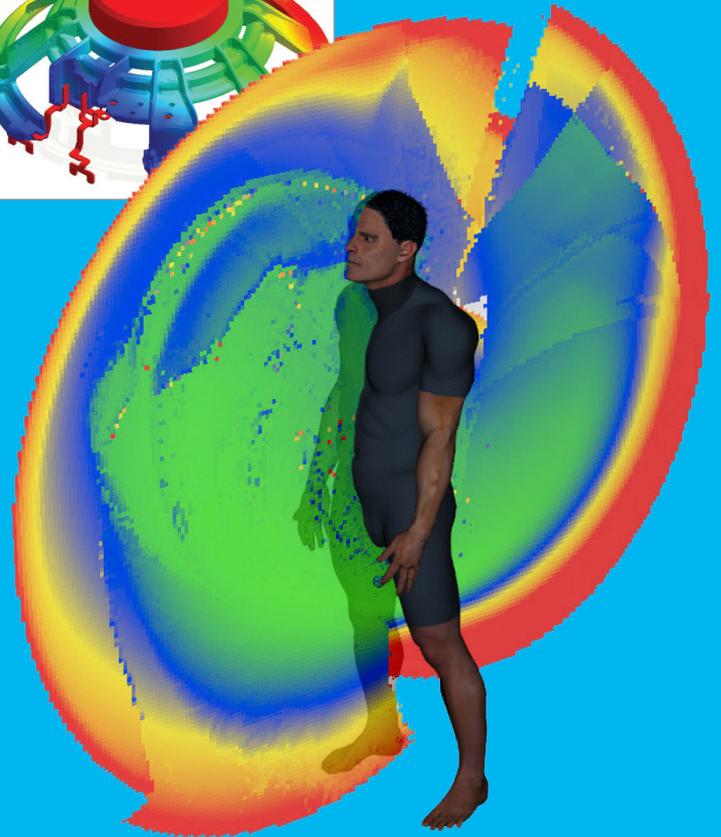


# Partner Ecosystem



The **Altair Partner Alliance** (APA) provides HyperWorks customers access to a broad spectrum of complementary software products, using their existing HyperWorks Units (HWUs) at no additional cost.

This flexible platform provides designers and engineers with an ever-expanding set of tools for improving product design, ensuring that the right tools for a given project are accessible within a single licensing environment. The APA's solution library includes software applications covering durability & fatigue analysis, composites modeling, thermal analysis, manufacturing simulation, and much more.



## Cloud & HPC Solutions

Altair's Cloud & HPC solutions simplify access and control of HPC resources for engineers, scientists and system administrators in private, public and hybrid environments.

### **Simulation Cloud Suite**

Simulation Cloud Suite manages the complete simulation lifecycle starting from CAD/BOM to CAE reports/dashboards in a collaborative environment with full traceability of inputs, outputs and their connections to HPC, PDM and CAE applications.

### **HyperWorks Unlimited™ Physical Appliance**

A Fully managed CAE appliance with state of the art HPC hardware and software offers unlimited use of all HyperWorks engineering applications on premise.

### **HyperWorks Unlimited™ Virtual Appliance**

Through an easy web interface, a fully-managed CAE virtual appliance offers unlimited and on-demand use of all HyperWorks engineering applications on the public cloud for HyperWorks solvers that leverage HPC, and HyperWorks interactive applications that leverage GPU.

# About Altair

Our vision is to transform product design and organizational decision making by applying simulation, optimization and high performance computing throughout product lifecycles.

We are a leading provider of enterprise-class engineering software enabling innovation across the entire product lifecycle from concept design to in-service operation. Our simulation-driven approach to innovation is powered by our broad portfolio of high-fidelity and high-performance physics solvers. Our integrated suite of software optimizes design performance across multiple disciplines encompassing structures, motion, fluids, thermal management, electromagnetics, system modeling and embedded systems, while also providing data analytics and true-to-life visualization and rendering.

We were founded in 1985 in Michigan, and have a balanced global footprint with 67 offices in 23 countries, and over 2600 engineers, scientists and creative thinkers.

**Learn more at [altair.com](http://altair.com)**



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