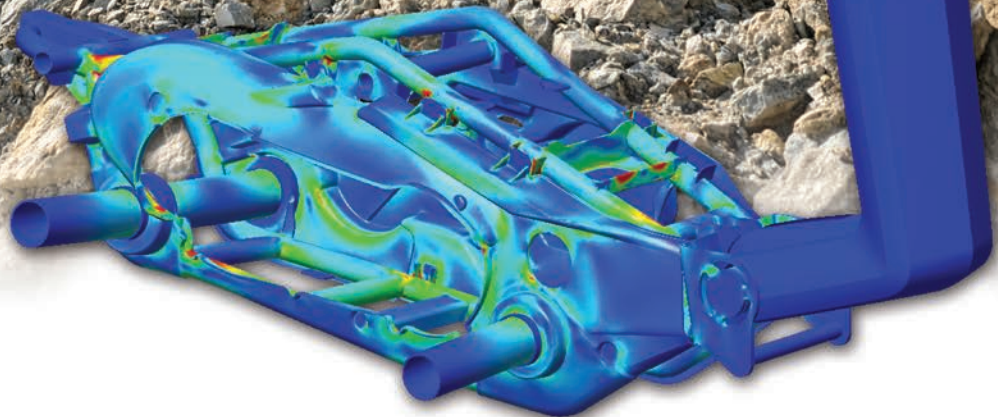
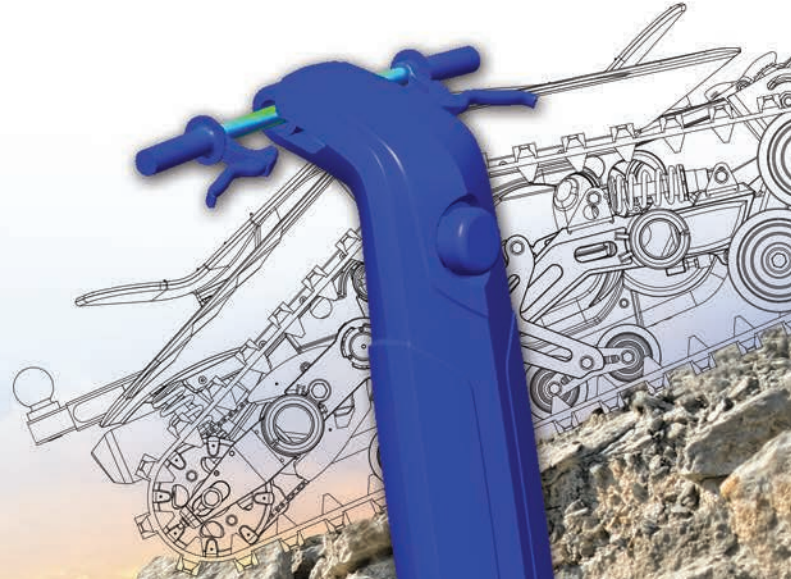


# SOLIDWORKS SIMULATION

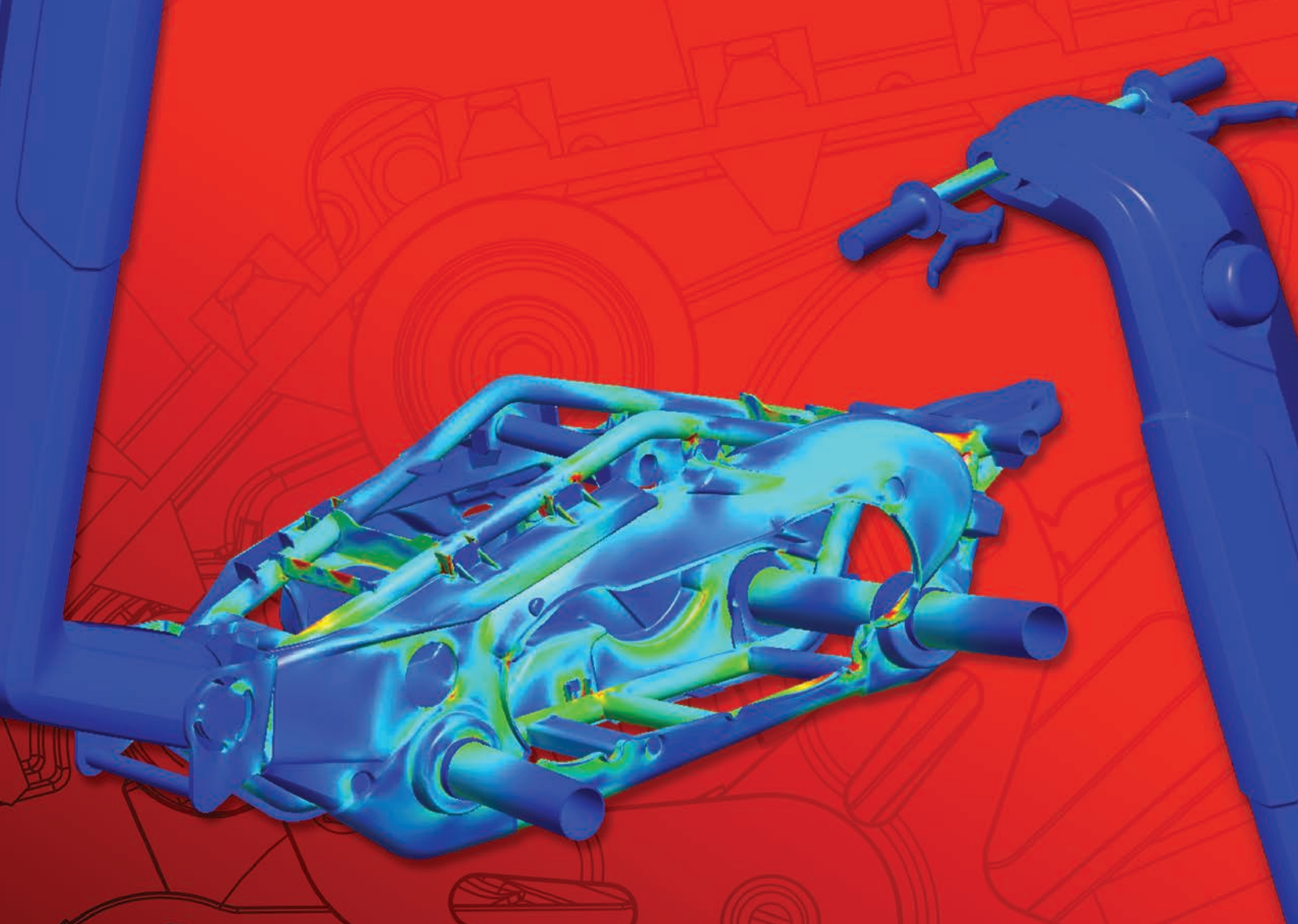
GET DESIGN INSIGHTS TO DRIVE MARKET WINNING INNOVATION

von Mises (N/mm<sup>2</sup> (MPa))



**SOPHISTICATED  
SIMULATION IS  
NO LONGER JUST  
FOR SPECIALISTS**

“What if?” It’s the inspiration that fuels innovation—and with SolidWorks® Simulation software, you remove the risk and replace it with a **3DEXPERIENCE** workspace to virtually test your new ideas, develop new designs, and accelerate your products to market.



## **SOLIDWORKS SIMULATION MAKES IT EASY FOR PRODUCT ENGINEERS TO ASK—AND ANSWER—COMPLEX AND IMPORTANT ENGINEERING QUESTIONS**

With SolidWorks Simulation you'll reduce the risk involved in exploring new and innovative design solutions, and get products to market faster—and with less prototyping. By understanding product performance early in the design process, you avoid costly over-design and reduce the risk of warranty issues.

This powerful set of simulation tools is fully integrated within the SolidWorks environment, with seamless operation for designers and simulation experts alike at every stage of product development. Through powerful results visualization you can study the forces affecting your design—displaying stresses, displacement, fluid velocity, pressures, and temperature. You can calculate measurements for any point, surface, or volume, and then graph and list results for all types of simulations.

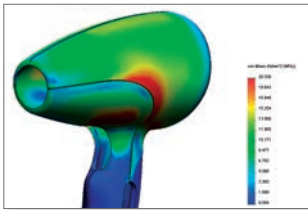
SolidWorks Simulation provides a complete range of tools for analyzing the structure, motion, and multi-physics of your parts and assemblies, or exploring fluid dynamics and heat flow around and through your design. As part of the SolidWorks suite of product development solutions—covering design, simulation, sustainable design, technical communication, and data management—SolidWorks Simulation is intuitive, yet powerful enough to tackle the most complex engineering challenges. You can predict the performance of your design under real-world operating conditions to innovate, detect potential issues, and correct them before prototyping, tooling, and production.

# SOLIDWORKS SIMULATION PROFESSIONAL

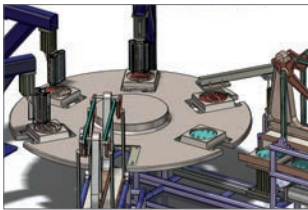
## PERFORM 3D VIRTUAL TESTING OF PARTS AND ASSEMBLIES FOR PRODUCT INNOVATION



Drive your design with powerful simulation to improve product performance.



Determine the structural impact of thermal loads on your design.



Virtually prototype the most challenging machines with event-based motion simulation.



Estimate component life based on calculated loads with fatigue simulation.

**SolidWorks Simulation Professional gives you a powerful virtual testing environment for sophisticated simulation, so you can answer engineering challenges with complex load scenarios and multi-physics solutions.**

### Verify your design with powerful structural analysis

- Test products made of weldments, sheet metal, and volume geometry with mixed mesh
- Evaluate strain and stresses between contacting parts, including friction
- Apply bearing loads, forces, pressures, and torques
- Optimize designs based on structural, motion or geometric criteria
- Use connectors or virtual fasteners to model bolts, pins, springs, and bearings, and dimension them under applied loads
- Have your CAD toolbox fasteners translated automatically into connectors for fast and accurate assembly analysis
- Activate the Trend Tracker and Design Insight plots to highlight optimal design changes while you work
- Assess large assembly behavior focusing on critical zones with submodelling
- Evaluate complex problems early in the design cycle with plane stress, plane strain, and axisymmetric linear static analysis
- Access an extensive materials database with metal properties and fatigue curves

### Understand the effects of temperature on your design

- Study conduction, convection, and radiation heat transfer
- Utilize isotropic, orthotropic, and temperature-dependent material properties
- Determine the combined stresses and deformations due to structural and thermal loads

### Analyze assembly motion for process and task workflow with event-based simulation

- Define motion studies based on model event and assembly actions
- Trigger actions through new motion sensors, time, or the completion of a previous task
- Evaluate characteristics like actuator force and joint loads for motion optimization
- Gain greater control of model actuators with servomotors

### Study the effects of cyclic loading on product life

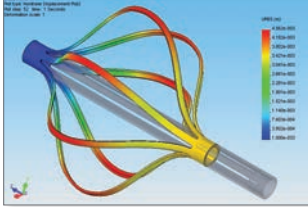
- Check a system's expected life or accumulated damage after a specified number of cycles
- Import load history data from real physical tests to define loading events

### Simulate frequency or buckling in your designs

- Examine how vibrating or unstable modes can shorten equipment life and cause unexpected failures
- Assess the effects of load stiffening on frequency and buckling response

# SOLIDWORKS SIMULATION PREMIUM

GET A DEEPER VIEW OF YOUR DESIGN PERFORMANCE WITH A COMPREHENSIVE SIMULATION SOLUTION

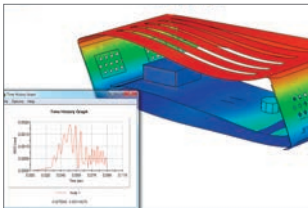


Study nonlinear problems that involve large displacement and complex material models.

SolidWorks Simulation Premium includes all of the capabilities of SolidWorks Simulation Professional, plus additional features like composite materials and powerful analysis tools for simulating nonlinear and dynamic response.

## Analyze your design in the nonlinear world

- Easily transition between linear and nonlinear simulations for comprehensive evaluation
- Examine deformations caused by overloads, contact, and flexible materials
- Determine residual stresses and permanent deformations in metals after material yield
- Study nonlinear buckling and snap-through events
- Investigate designs with hyperelastic materials, such as rubbers, silicones and other elastomers
- Conduct an elasto-plastic analysis to study plastic deformation and the onset of yield
- Examine creep effects and material changes with temperature
- Test the performance of your molded plastic part taking into account in-mold residual stresses and temperature with SolidWorks Plastics



Plot product response versus dynamic loads.

## Perform dynamic analyses of parts and assemblies

- Simulate time history, steady-state harmonic, response spectrum, and random vibration excitations
- Study stress, displacement, velocity, and acceleration variations with time, as well as RMS and PSD values
- Carry out impact analysis using the nonlinear dynamic capabilities

## Simulate composite materials

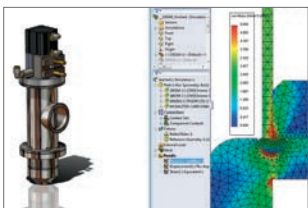
- Study multilayer composite components to examine the effects of layer material, thickness, and orientation on product performance
- Use the revolutionary user interface to dynamically control and display ply orientation
- Determine the correct composite lay-up and orientation for the operational loads
- Utilize sandwich and graphite or carbon-fiber composites, including honeycomb and cellular foam



Validate the performance of composite materials, including stiffness and ply failure results.

## Easily tackle complex problems with the 2D planar simplification tool

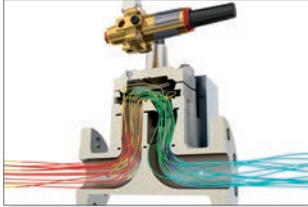
- Create plane stress, plane strain, and axisymmetric nonlinear analysis
- Solve complex contact problems in a fraction of the time with no loss of accuracy
- Use 3D CAD models without modification to generate 2D sections for analysis



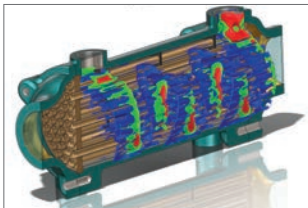
Study a whole class of problems quickly and easily with the 2D planar simplification tool.

# SOLIDWORKS FLOW SIMULATION

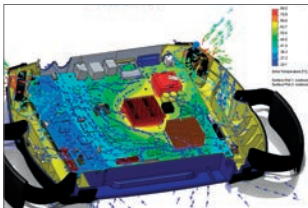
*INTUITIVE AND POWERFUL CFD SIMULATION FOR PRODUCT ENGINEERS*



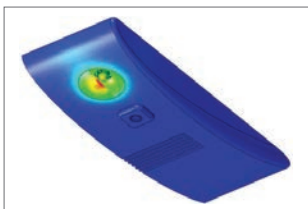
Examine complex flow in and around components to detect turbulence and recirculation issues.



Prevent heating problems by inspecting temperature distribution and heat fluxes.



Use the Electronic Cooling Module to optimize thermal performance of your electronic components.



Study thermal behavior of lighting systems with advanced radiation capabilities of the HVAC module.

**SolidWorks Flow Simulation software is a powerful CFD (computational fluid dynamics) tool that takes the complexity out of flow analysis and enables you to easily simulate fluid flow, heat transfer, and fluid forces so you can investigate the impact of a liquid or gas flow on product performance.**

## **Evaluate and optimize complex flows**

- Examine complex flows through and around your components with parametric analysis
- Align your model with flow conditions, such as pressure drop, to satisfy design goals
- Detect turbulences and recirculation issues with animated flow trajectories
- Understand the flow of non-Newtonian liquids, such as blood and liquid plastic
- Assess the impact of different impellers and fans on your design
- Include sophisticated effects like porosity, cavitation, and humidity

## **Reduce the risk of overheating in your designs**

- Visualize and understand temperature distribution in and around your products
- Couple flow with thermal analysis, simulating convection, conduction, and radiation effects
- Apply time- and coordinate-dependent boundary conditions and heat sources
- Find the best dimensions to satisfy your design goals, such as heat exchanger efficiency
- Get thermal heat sources and PCBs layer definition from EDA thermal properties

## **Optimize the thermal performance of your PCBs and electronic components**

With the Electronic Cooling Module, you can include Joule heating effect, simulate components with two-resistor compact model, with heat pipe compact model, and include PCB properties to evaluate and boost cooling efficiency.

## **Predict and achieve airflow and comfort parameters in working and living environments**

The HVAC Module includes advanced radiation modeling (such as semitransparent material and wavelength-dependent radiative properties), comfort parameters, and a large database of building materials to evaluate gas movement, temperature in working and living environments, and radiation.

## **Gain valuable insights with powerful and intuitive results visualization tools**

- Utilize Section or Surface plots to study the distribution of resultant values, including velocity, pressure, vorticity, temperature, and mass fraction
- Compare the Fluid Flow results for various configurations with the Compare Mode
- Measure results at any location with the Point, Surface, and Volume Parameter tool
- Graph results variation along any SolidWorks sketch
- List results and automatically export data to Microsoft® Excel®
- Communicate your CFD results in 3D with eDrawings®

## SOLIDWORKS PRODUCT DEVELOPMENT SOLUTION

SolidWorks software creates an intuitive **3DEXPERIENCE** development environment that maximizes the productivity of your design and engineering resources to create products better, faster, and more cost-effectively. See the full range of SolidWorks software for design, simulation, sustainable design, technical communication, and data management at [www.solidworks.com/products2014](http://www.solidworks.com/products2014).

### LEARN MORE

To learn more about SolidWorks Simulation, visit [www.solidworks.com/simulation](http://www.solidworks.com/simulation) or contact your local authorized SolidWorks reseller.

## SYSTEM REQUIREMENTS

- Windows 7 (x32 and x64) or Windows 8 x64
- 2 GB RAM (minimum)
- 5 GB disk space free (minimum)
- Video board (certified recommended)
- Intel® or AMD® processor
- DVD or broadband Internet connection
- Internet Explorer 8 or later

For additional details, visit [www.solidworks.com/systemrequirements](http://www.solidworks.com/systemrequirements)

## Our 3DEXPERIENCE Solutions powered by our brand applications serving 12 industries

Dassault Systèmes, the 3DEXPERIENCE Company, provides business and people with virtual universes to imagine sustainable innovations. Its world-leading solutions transform the way products are designed, produced, and supported. Dassault Systèmes' collaborative solutions foster social innovation, expanding possibilities for the virtual world to improve the real world. The group brings value to over 150,000 customers of all sizes in all industries in more than 80 countries. For more information, visit [www.3ds.com](http://www.3ds.com).



3DEXPERIENCE

Visit us at [3DS.COM/SOLIDWORKS](http://3DS.COM/SOLIDWORKS)



**Americas**  
Dassault Systèmes  
175 Wyman Street  
Waltham, Massachusetts  
02451-1223  
USA

**Europe/Middle East/Africa**  
Dassault Systèmes  
10, rue Marcel Dassault  
CS 40501  
78946 Vélizy-Villacoublay Cedex  
France

**Asia-Pacific**  
Dassault Systèmes  
Pier City Shibaura Bldg 10F  
3-18-1 Kaigan, Minato-Ku  
Tokyo 108-002  
Japan