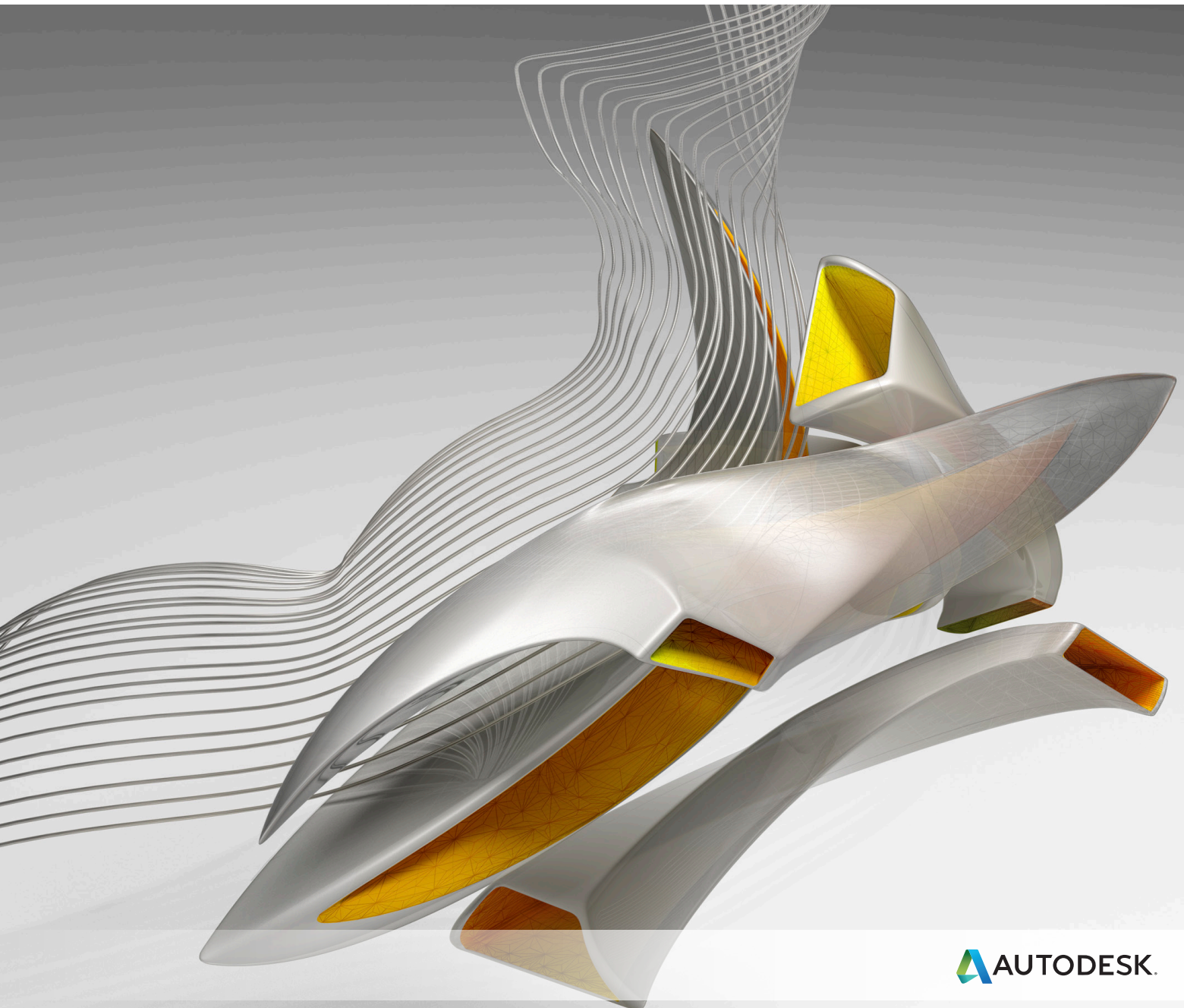# AUTODESK® CFD

Scalable, robust fluid flow and thermal simulation solution

Fast, accurate, and flexible solution to test the fluid flow and thermal performance of your design

Accurately predict behavior, optimize and validate designs with a wide range of simulation capabilities before manufacturing

Autodesk® CFD software provides fast, accurate, and flexible fluid flow and thermal simulation tools to help predict product performance, optimize designs, and validate product behavior before manufacturing—minimizing reliance on costly physical prototypes and helping you get innovative products to market faster.

Autodesk CFD enables users to easily explore and compare design alternatives and better understand the implications of design choices using an innovative Design Study Environment and automation tools. Autodesk CFD supports direct data exchange with most CAD software tools, including Autodesk® Inventor® software, Autodesk® Revit® software, PTC Creo®, Siemens NX, and SolidWorks®.

Autodesk CFD provides a complete offering of capabilities, including thermal prototyping, architectural and MEP tools, and flexible cloud solving options:

Design Study Environment

Study design iterations within an intuitive workflow. Drive innovation by providing product teams with data to make informed design decisions. Use the Design Study Environment for all stages of your design simulation process. You can manually set up individual models directly in the Design Study Environment or on multiple models with the CAD-embedded tools and automation tools. To study the effects of varying operating conditions or geometry changes, clone your simulation models, and run your scenarios sequentially or at the same time. View and compare results from your simulations both visually and numerically, and share your findings with your team with a Design Study Summary Report.

Autodesk SimStudio Tools

Quickly modify, simplify, repair, and idealize your geometry for higher-quality simulation models. Autodesk® SimStudio Tools software reads in multiple CAD file formats so you can quickly simplify assemblies, eliminate unnecessary detail, perform basic repair, or make design changes — making it faster to explore various design ideas. SimStudio Tools is a direct modeler that enables you to freely work on geometry with simple defeaturing, move, combine, edit, push, and pull commands. It acts as a companion to Autodesk CFD and your CAD system, helping you take an existing model and get it ready for simulation. Create solid and surface bodies, quickly simplify or remove small parts, create custom fluid volumes, detect and eliminate interferences, and more without affecting your original CAD model. Once your model is ready you can either push it straight into Autodesk CFD or save a neutral file for any other work you may want to do with it.

Flexible cloud solving options

Autodesk CFD allows you to work locally while you solve in the cloud. Flexible solving options help you to simulate based on your needs. Test the setup of an analysis, and use your local resources to iterate and optimize your setup. To kick off a longer, more computationally intensive simulation, use the power of the cloud and free up your local resources for other tasks.

CAD connection

Link your CAD system to Autodesk CFD analysis software to create associative fluid flow and thermal simulations. Autodesk CFD connects to virtually any CAD system, enabling you to create fluid flow and thermal simulations of your designs. If you don't have a 3D CAD system, use SimStudio Tools for geometry creation and model editing and simplification.

Automation scripting

Improve your design process—use the flexible Autodesk CFD application programming interface (API) to automate and customize a wide variety of tasks. Automate repetitive tasks normally performed in the user interface. Create custom tasks and custom results quantities. Output results in customized or specialized formats.

Intelligent automatic mesh sizing

Use geometry and solution-based meshing automation. Meshing technology helps you quickly and efficiently prepare geometry for accurate and repeatable results with automatic mesh sizing, geometry diagnostics, manual control options over local sizes and refinement regions, and solution-based adaptive sizing.

High-quality visualization

Combine analysis results from Autodesk CFD with dedicated visualization tools to create photo-realistic renderings. Gain interoperability with Autodesk® Showcase®, Autodesk® VRED™, Autodesk® 3ds Max®, and Autodesk® Maya® software.
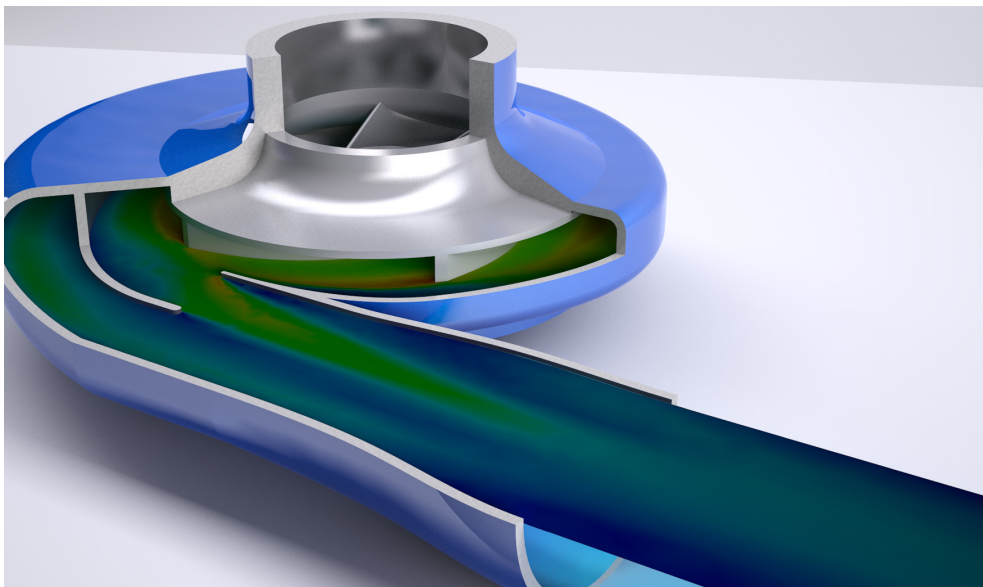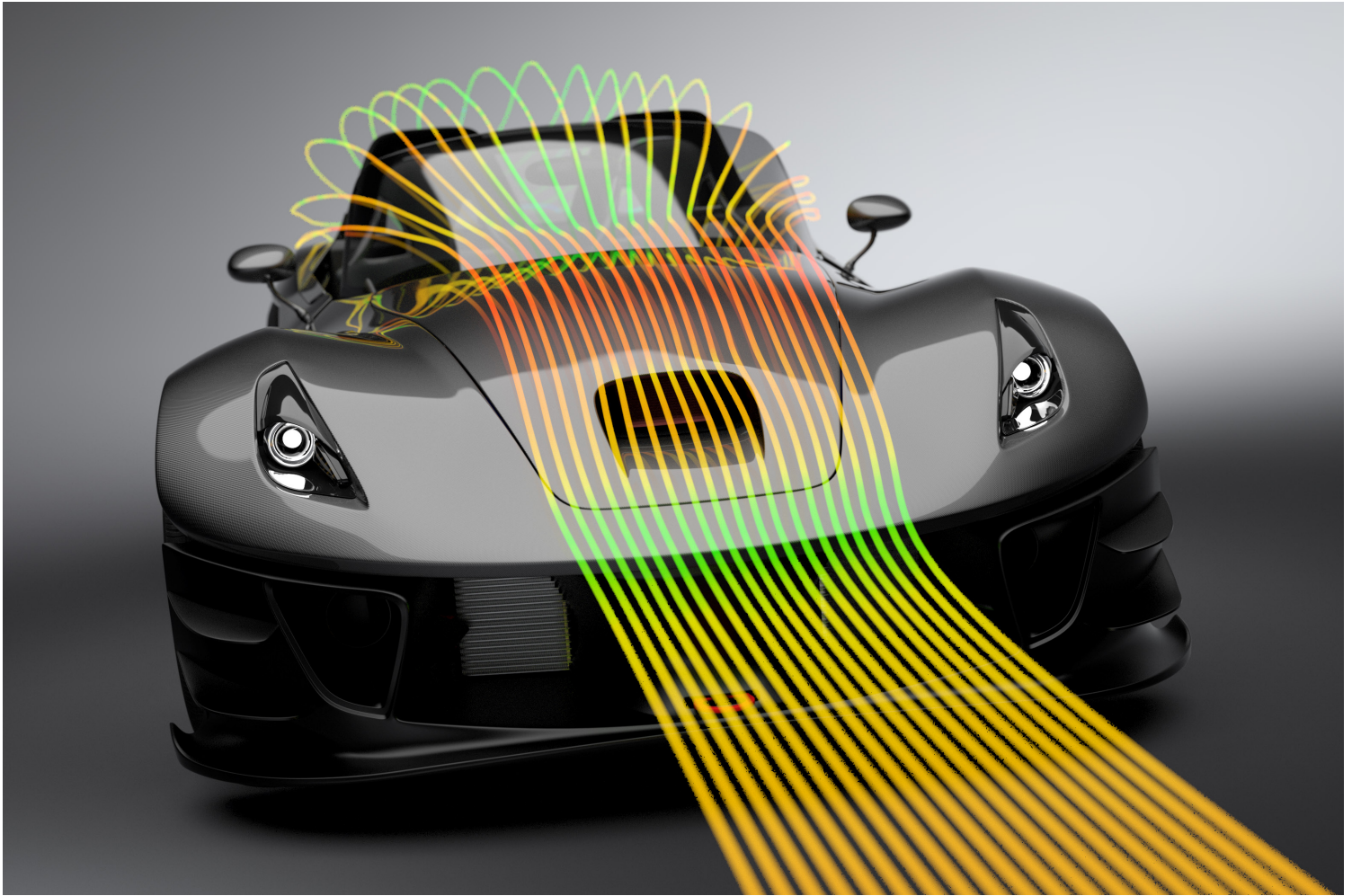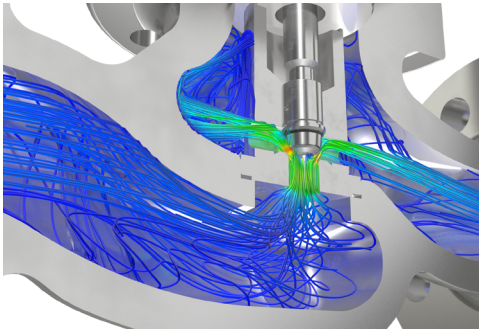
Image courtesy of Local Motors

Autodesk CFD industry applications

Image courtesy of Huntair

Industrial flow control

Autodesk CFD can help manufacturers of flow control devices like valves, regulators, turbines, and compressors to simulate the fluid flow through a 3D CAD model. The intuitive interface works directly with your Inventor or other 3D CAD models.

Advanced physics available in Autodesk CFD help you solve tough design challenges. Tackle compressibility problems such as supersonic flow, water hammer, or even cavitation. Fluid mixing, particle tracking, mechanical erosion, and the interaction of moving solids are some of the capabilities that our customers utilize to gain insight and improve product performance and longevity.
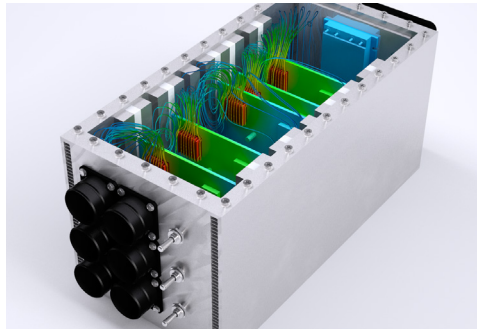
Electronics cooling

Use Autodesk CFD to test the thermal performance of your electronics designs. Tackle challenges such as optimum locations of heat sinks and heat pipes, thermal management, and transient effects.

Autodesk CFD contains material devices and idealizations integral to simulating e-cooling effectively. Devices in Autodesk CFD include heat sink, compact thermal, LED, thermal interface material, fan, PCB, and thermoelectric cooler models.

Architectural and mechanical, electrical, and plumbing

Architects and mechanical, electrical, and plumbing (MEP) professionals can take advantage of Autodesk CFD to understand airflow and thermal behavior in the built environment.

Effects like solar radiation, thermal comfort, air quality, and energy usage by air conditioning units are typically studied to create optimal interior or exterior design spaces.
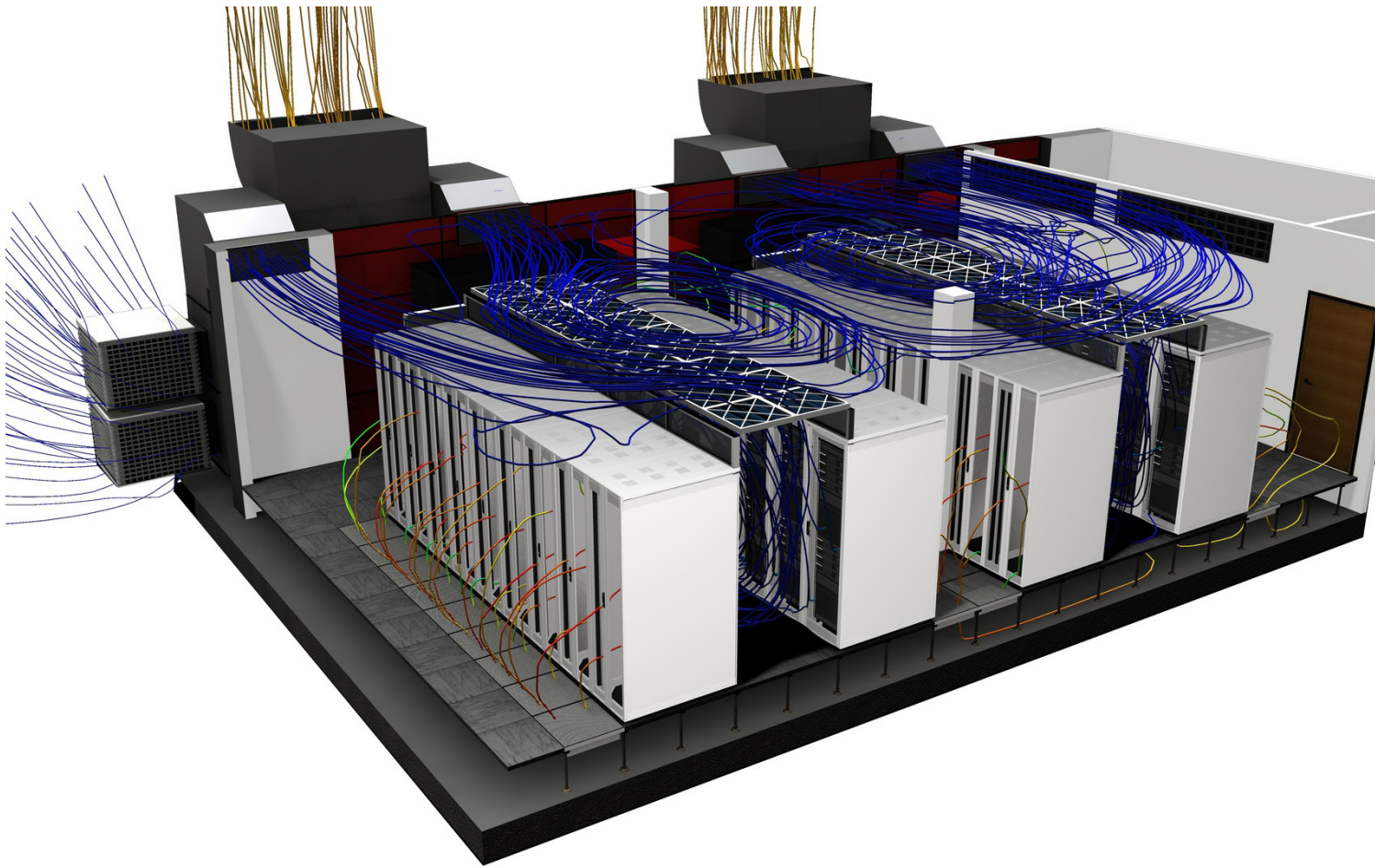
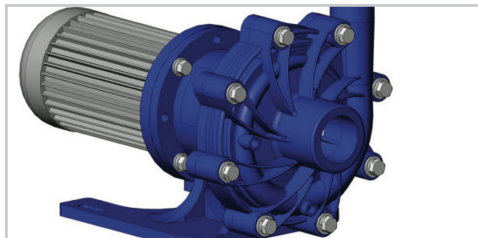Image courtesy of Sudslows

Customer success

Image courtesy of Finish Thompson

Reduced testing time: Finish Thompson

Finish Thompson cuts testing time by an estimated 33 percent on a new line of magnetic drive pumps using Autodesk® CFD.

Autodesk CFD software helped Finish Thompson's engineering team gain insight into pump performance early in the product design process—allowing them to cut development time and substantially reduce the amount of physical prototyping and testing required.
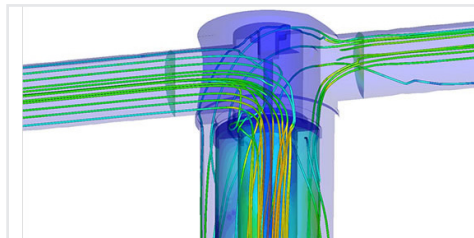

Image courtesy of Parker Hannifin

Virtual product development: Parker Hannifin

The world's leading manufacturer of motion and control technologies and systems, Parker Hannifin provides precision-engineered solutions for a wide variety of mobile, industrial, and aerospace markets. Engineers for its Hydraulic Controls Division in the United Kingdom were unable to solve an instability issue with a wheel loader spool design after 18 months of applying conventional design, build, and test methods. They used Autodesk CFD software to create a virtual product, identify the problem, and design the solution.

"Autodesk CFD gives us a better understanding of product performance and, in turn, enables us to develop cost-effective, innovative, and more reliable designs in less time than using conventional methods of building and testing physical prototypes."
— Bruno Fairy, Simulation and Analysis Engineer, Hydraulic Controls Division Parker Hannifin
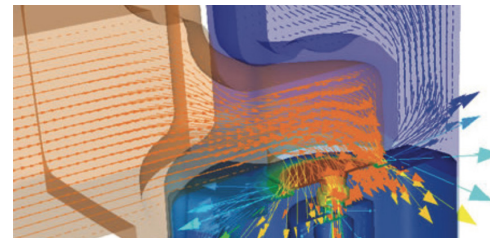

Image courtesy of Betts Industries,Inc.

Ease and efficiency of use: Betts Industries, Inc.

Betts Industries, Inc., designs, engineers, manufactures, and sells components for highway cargo tanks and other industrial applications. The company chose Autodesk CFD software to design a new model of its pressure/vacuum vent, to ensure that they could use native data for design studies without hiring a specialist or outsourcing the work.

"With Autodesk CFD, we could easily see the flow inside the model, where it was moving quickly, and where the pressure pockets were —something you can't do in real life or on a flow bench."
— Kyle Anderson, Design Engineer, Betts Industries, Inc.

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