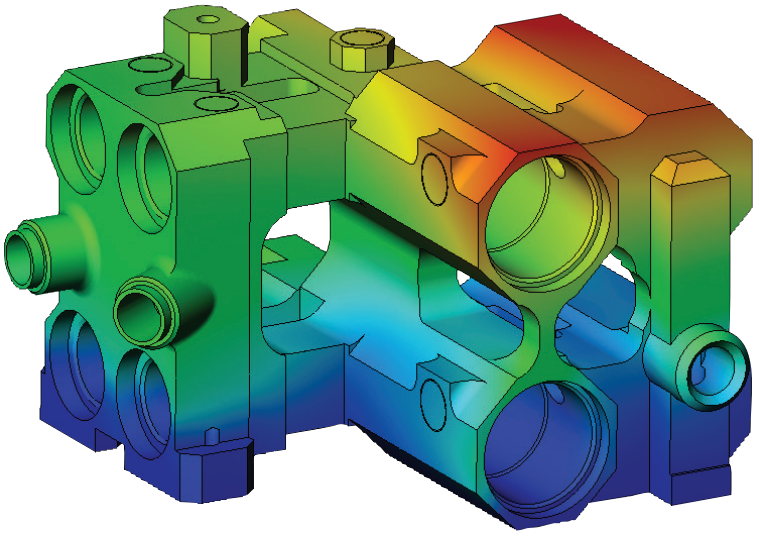
PACIFIC DESIGN TECHNOLOGIES, INC.

Developing the first deep-space cooling system with SolidWorks Simulation Professional



PDT engineers use SolidWorks Simulation to meet challenging size and weight requirements for advanced, space-based cooling and pumping systems, avoiding the cost of conducting potentially dangerous, physical "burst" tests.

Pacific Design Technologies, Inc., is a leading contract design and manufacturing company that specializes in the development of advanced fluid cooling and pumping solutions for aerospace, defense, and space exploration applications. Although the company's founders had years of experience working with the Pro/ENGINEER® CAD system, they understood the benefits of moving to a more integrated design environment, according to Eric Turner, manager of marketing and product development.

"Even though we were Pro/ENGINEER users, we realized that ease of use and data flexibility were important requirements for moving our company forward. Our work was also starting to involve increasingly complex shapes, and we needed a better way to handle our models without having to resort to file conversions and data translations at important steps along the way," Turner recalls. "We evaluated several packages and decided to go with the SolidWorks® 3D CAD software system because it was easy to use, provided a comprehensive set of design capabilities, and supported a wide set of integrated applications."

Soon after implementing SolidWorks software, PDT added integrated SolidWorks Simulation Premium and COSMOSDesignSTAR™ analysis capabilities. "We like the integration involved with SolidWorks Simulation and the ability to go right from your solid model to analysis results and back again," says Ethan Franklin, project engineer. "As soon as we saw the benefit of combining mechanical design with analysis of that design, we knew integrated analysis was the way to go."

Streamlined, integrated analysis

Design analysis is an important function in the development of PDT's advanced cooling and pumping systems. With flow rates as low as 0.01 gallons per minute (gpm) to as high as 225 gpm, PDT's systems must meet challenging size and weight requirements, particularly with space-based systems. The company's engineers use integrated SolidWorks Simulation analysis capabilities to test and optimize system designs before building qualification units.

Results:

- Accelerated design cycles
- Reduced prototype development costs
- Improved design analysis communications
- Developed the first active, deep-space cooling system

SOLIDWORKS

"When addressing stiffness and pressure requirements, our goal is to minimize trial-and-error work in actual physical testing by doing more trial-and-error, 'what if' studies on the computer," Franklin explains. "SolidWorks Simulation streamlines this process because it operates directly inside SolidWorks 3D CAD software and not as a separate program. Other analysis programs take longer than they should because you have two programs open that are both reloading and hogging memory. With SolidWorks Simulation, you operate in one program, which makes troubleshooting a design much more efficient.

"In our business, we need to have analysis results the same day and sometimes within hours," Franklin adds. "We like the streamlined approach using SolidWorks Simulation because we can get an answer in about two hours, which enables us to run five or six analyses in a single day."

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Project Engineer

Fewer prototypes, burst tests

PDT engineers use SolidWorks Simulation to validate designs for cooling and pumping systems instead of testing actual prototypes. Many of the company's projects require proof of "burst" data: pressures that would cause the system to "burst" or fail. In many instances, PDT engineers use SolidWorks Simulation analysis results to show pressure-burst analysis results instead of going through the destructive, and potentially dangerous, process of conducting an actual physical burst test.

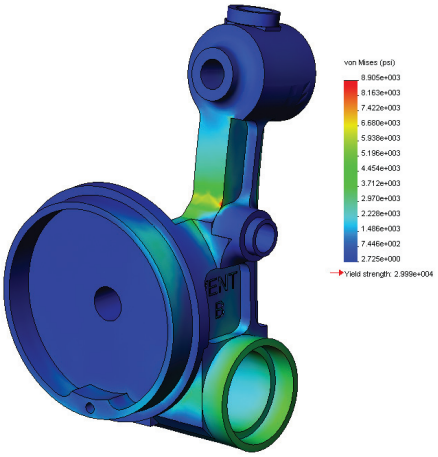
"First and foremost, by running SolidWorks Simulation analyses, we do not have to make prototypes," Turner explains. "Often, our goal is to produce a single qualification unit for testing. With SolidWorks Simulation, we arrive at that final test unit faster without having had to build prior prototypes."

"Instead of building prototypes, we run analysis iterations," Franklin adds. "We may analyze and modify a design seven to 15 times in software before a design is fully optimized. By using analysis software, we are able to optimize our qualification units, which saves money because we do not have to make as many units."

The first radiator to Mars

Using SolidWorks 3D CAD software, PDT developed the cooling system for all of the electronic systems on the NASA spacecraft that carried two exploratory rovers to Mars last year. By completing its work for NASA's Jet Propulsion Laboratories, the company accomplished a milestone for its industry: the first deep-space (beyond Earth orbit) cooling system ever developed.

"Our system cooled the flight computer and electronics," Turner recalls. "The heat circulated through our system, which then ejected heat through a radiator. SolidWorks Simulation not only enables us to validate the performance of our designs, but also provides us with an effective marketing tool. Our results have been confirmed in our testing. We even like to boast about using SolidWorks 3D CAD software and SolidWorks Simulation when we make presentations on new projects."



Using SolidWorks Simulation, PDT engineers developed the first deep-space cooling system for the NASA spacecraft that carried two exploratory rovers to Mars.

Pacific Design Technologies, Inc.
72 Santa Felicia Drive
Goleta, CA 93117
Phone: +1 805 961 9110
www.pd-tech.com

Dassault Systèmes
SolidWorks Corp.
300 Baker Avenue
Concord, MA 01742 USA
Phone: 1 800 693 9000
Outside the US: +1 978 371 5011
Email: info@solidworks.com
www.solidworks.com