

# DESIGN DREAMS, LLC

## Transforming design dreams into reality with SolidWorks Flow Simulation



*Using SolidWorks Flow Simulation software, Design Dreams helps its clients investigate design performance, turning design dreams into reality.*

"Computational fluid dynamics (CFD) makes you look at your product or your process in a way that you would never have imagined."

So says David "Woody" Woodruff, president of Design Dreams, LLC, a Cincinnati-based engineering consulting firm that specializes in CFD analysis. Woodruff spent 30 years in the machine tool business, but always had an interest in how the physics surrounding fluid flows can affect design development and engineering. Curious and analytical by nature, Woodruff had dabbled with analysis applications for many years. He decided to forego retirement and establish his own design consultancy.

"I'd always wanted my own design business and been intrigued with CFD," Woody explains. "I got involved with the Bonneville Salt Flats land-speed-record racing community and was asked to assist in the design of a streamliner, a long, narrow racing car. That's how Design Dreams got started—I got 'salt fever' and 'CFD fever' at the same time. The assignment forced me to combine my knowledge of fluid flow and aerodynamics with an actual analysis tool."

Woodruff chose SolidWorks® Flow Simulation CFD analysis and SolidWorks Simulation Premium advanced structural analysis software to support the firm. "I had used SolidWorks at the machine tool company and had played with Simulation Xpress on some coolant nozzle designs," Woody recalls. "I knew that SolidWorks Flow Simulation was easy to use, integrated with the CAD application, and robust. I signed up for some classes and have never looked back."

Using SolidWorks Flow Simulation software, Design Dreams helped the racing team produce a streamliner designed to travel 425 mph. Woodruff also used the application to demonstrate why another streamliner crashed when its braking parachute deployed. SolidWorks Flow Simulation predicted the "kiting" effect that picked up the back of the car, contributing to the crash. However, Woodruff's association with the Bonneville Salt Flats racing community was only the beginning.

### Challenge:

Establish a successful engineering consultancy specializing in computational fluid dynamics (CFD) analysis and advanced design simulation services.

### Solution:

Implement SolidWorks Flow Simulation CFD analysis and SolidWorks Simulation Premium design analysis software.

### Results:

- Cut product development cycle in half
- Saved time and money for clients
- Developed virtual wind tunnel and virtual flow bench services
- Built relationships with land-speed-record racing community

## Fluid flows are ubiquitous

By combining his knowledge of fluid dynamics with SolidWorks Flow Simulation software, Woodruff has advanced his company's CFD expertise and grown its business. The firm's work on land-speed racers has led to more sophisticated commercial fluid-flow projects, which in turn has fed Woodruff's passion for CFD.

"Fluid flows are everywhere, and I find them fascinating," Woody says. "I can't stir a cup of coffee now without wondering how to model it. I analyzed and optimized a methane combustor that was the size of your little finger with 154 louvers in it. Then, I did the same on a 10-foot-by-10-foot-by-12-foot industrial air cleaner containing 192 filters. I've gone way beyond imagining fluid flows, because with SolidWorks Flow Simulation software I can predict not only how fluid flows behave but also how they influence design performance."

## A virtual wind tunnel and flow bench

With SolidWorks Flow Simulation software, Design Dreams offers virtual wind tunnel and virtual flow bench services that help clients gain accurate insights into design performance while avoiding the expense of physical testing. "Wind tunnels can cost several thousands of dollars an hour," Woody explains. "Using SolidWorks Flow Simulation, my virtual wind tunnel produces results very close to those produced in a wind tunnel at a fraction of the cost. CFD studies do not replace wind tunnels or physical testing. Instead, you can use the results to test the three or four best designs and find the great one. It will help racers go faster and be safer."

"The same principle applies to my virtual flow bench," Woody continues. "One of my customers wants to add a supercharger to a 1946 Cadillac flathead engine and needs to know how to optimize airflow within the engine block. Doing that with a physical test is nearly impossible. With SolidWorks Flow Simulation, I can model the engine, study the airflow, and offer modifications to optimize performance."

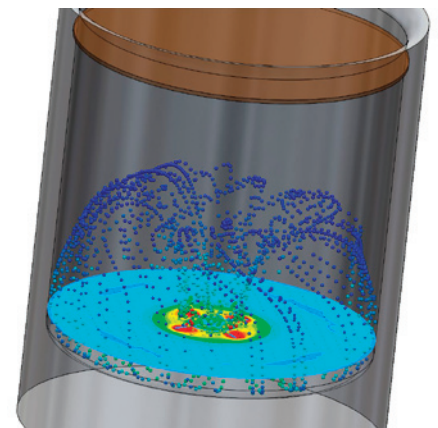
## Saving time and money for clients

Together, Woodruff's CFD expertise and SolidWorks Flow Simulation software enable Design Dreams to produce time and cost savings for its customers. For example, Design Dreams consulted on an issue related to sealing lids on aluminum beverage cans, which are assembled at a rate of 3,000 per minute.

"By conducting flow simulations on the sealant injector nozzle, we came up with solutions to the known issue as well as insight into another more serious problem that was not part of the original CFD study," Woody notes. "Our analysis work helped them cut their development cycle in half and secure a patent. That's what I like about CFD. It makes you look at your product or process in a new way, and you gain the insights that can transform design dreams into reality."

*"I'VE GONE WAY BEYOND IMAGINING FLUID FLOWS, BECAUSE WITH SOLIDWORKS FLOW SIMULATION SOFTWARE I CAN PREDICT NOT ONLY HOW FLUID FLOWS BEHAVE BUT ALSO HOW THEY INFLUENCE DESIGN PERFORMANCE."*

David "Woody" Woodruff  
President



By conducting fluid-flow analyses, Design Dreams provides its clients with greater insight into how fluid flow affects design performance, enabling them to produce better products.



Design Dreams, LLC  
P.O. Box 136  
South Lebanon, OH 45065 USA  
Phone: +1 513 403 3165  
www.designdreams.biz  
VAR: 3D Vision Technologies, Inc.,  
Cincinnati, OH, USA



Dassault Systèmes  
SolidWorks Corp.  
175 Wyman Street  
Waltham, MA 02451 USA  
Phone: 1 800 693 9000  
Outside the US: +1 781 810 5011  
Email: info@solidworks.com  
www.solidworks.com

