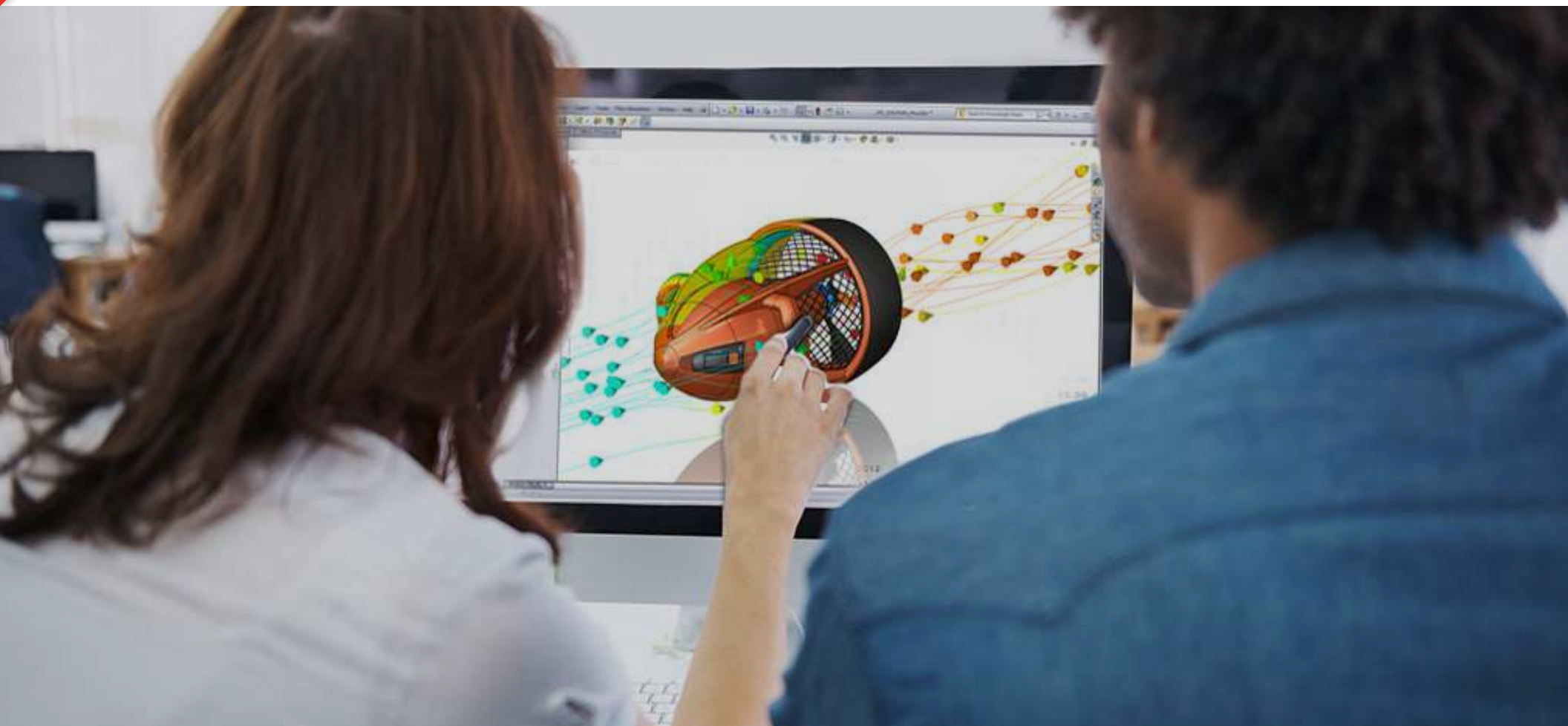
DASSAULT SYSTEMES

SOLIDWORKS

CHAPTER THREE

STEP-UP TO SIMULATION CHAPTER THREE:

ADDING ADVANCED VIRTUAL TESTING CAPABILITIES TO YOUR DESIGN WORKFLOW



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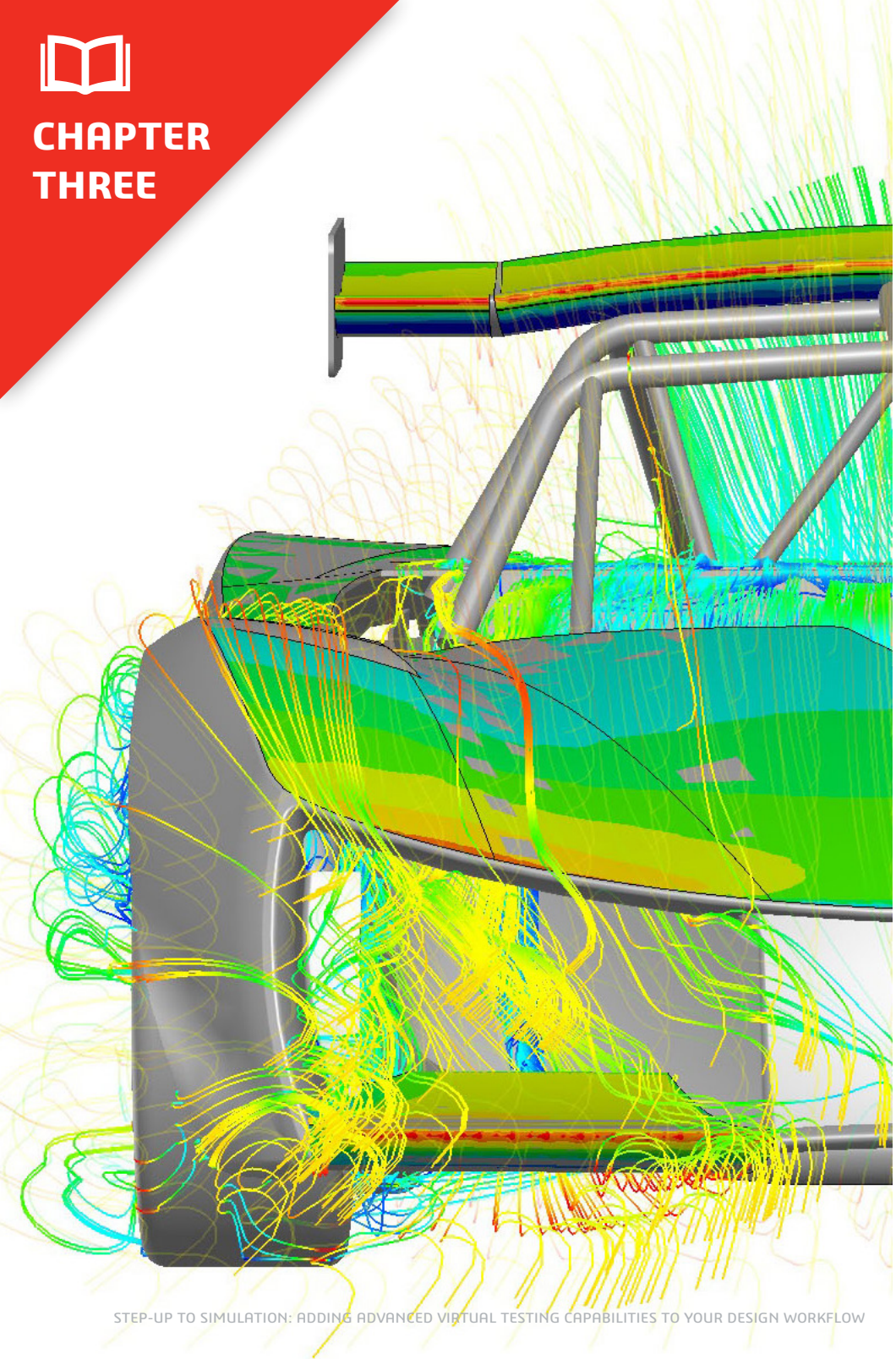


STEP UP TO A SMARTER WAY TO DESIGN

Contrary to popular belief, simulation is one of the simplest and easiest ways to perfect your designs and ensure a product that exceeds customer expectations. Simulation also plays perfectly well into the old adage, "Work smarter, not harder." Think about your products in the real world for a moment—if they don't work in the real world, then the product is a failure. That's why there's physical prototyping where we can test products to failure, go back and fix them in design, then start with a new prototype. That process is expensive and slow. And in today's business world, expensive and slow is a failure.

Thankfully, there are simulation tools that can provide the insight needed to create a truly optimized product at an affordable cost and great time savings.

SOLIDWORKS PLASTICS

For plastics part designers, the ability to optimize parts for manufacturability in the early stages of design is vital. That means utilizing a powerful CAD Simulation environment that allows you to analyze and modify designs at the same time you optimize for form, fit, and function, is paramount.

Dishing Up Savings

SOLIDWORKS® Plastics injection-molding simulation and analysis software brought the savings in-house for Carlisle Food Service Products. A maker of foodservice, sanitary, and healthcare products and equipment, the company faced competitive pressures to boost productivity and shorten development cycles.

By switching to SOLIDWORKS Premium design and analysis, SOLIDWORKS Plastics injection-molding simulation, and SOLIDWORKS PDM, the company has been able to bring these functions in house.

The decision proved a wise one: the company realized 12-15 weeks in annual time savings, reduced consulting costs by $20,000 a year, and sped up development cycles. "SOLIDWORKS software is ideally suited to the type of product that we design and manufacture," said Brad Tilman, R&D Engineer.

Advanced Warning in the Design Phase

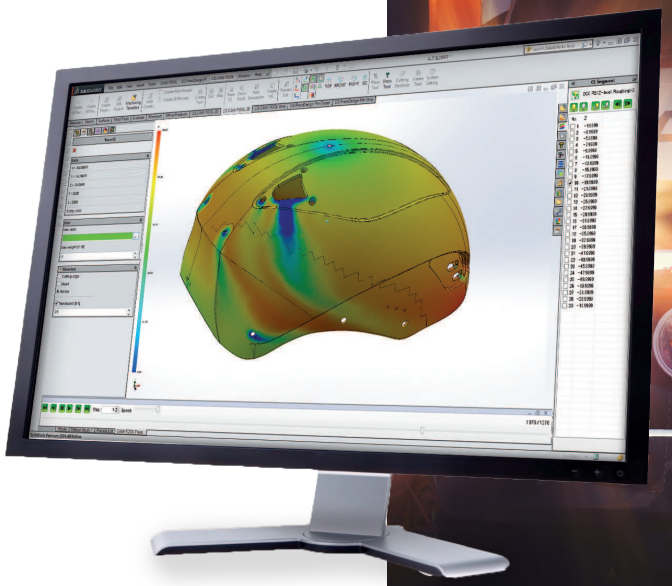
Ambulances, police cars and emergency vehicles around the world rely on Electronics Design Company (ECCO) emergency lights to make sure their vehicles are highly visible when they're travelling at high speeds. For ECCO, speed was a key factor in its decision to make SOLIDWORKS Plastics part the design-to-manufacture process. With SOLLIDWORKS Plastics, the ECCO design team can simulate mold flows, identify potential issues and optimize their design long before the first part gets produced.

The first of its products to benefit: its four-foot and six-foot emergency light bars. ECCO used SOLIDWORKS Simulation structural analysis results to increase the stiffness of its emergency light bars' bases by adding ribs, fins, and ridges, and then used SOLIDWORKS Plastics to simulate the mold filling process. This led to additional design changes that ensured optimal manufacturability.

ECCO Mechanical Design Engineer John Aldape explained, "With SOLIDWORKS Plastics, I modified the design to improve the flow of plastic in the mold. I added a large post for the injection sprue and ribs heading out from the post to serve as runners to improve flow. Instead of having to go back and add runners, which would have resulted in a delay, I had already done it. All the mold maker had to do was change a gate dimension."

Simulating a New Look

SOLIDWORKS Plastics also helped ECCO enhance the appearance of its products. "When knit lines land in the functional, fine polish area of optical components, they obscure light. When they are noticeable in any component, they detract from product aesthetics," noted Aldape. "With SOLIDWORKS Plastics, we can position knit lines where they are hidden by a feature or textured surface, which enhances the overall look of our products."



"If we didn't have SOLIDWORKS Plastics, we wouldn't have as much confidence in the manufacturability of a design. It helps us avoid going back and forth with the mold maker after the fact."

— John Aldape, Mechanical Design Engineer, ECCO

OPTIMIZING TOOLS FOR PLASTIC PARTS

Simulation tools like SOLIDWORKS Plastics can be used to optimize wall thickness, gate locations, and runner system size and layout, to ensure the mold works right the first time. The ability to predict how the plastic will react helps ensure potential issues are addressed at the earliest stage of product development.

Fully Integrated

Using a simulation tool that's plugged into an existing CAD environment allows you to multitask and design more efficiently. You can also analyze and modify designs while you optimize for form, fit, and function.

Intuitive and Easy to Learn

Novice designers and engineers can now complete tasks, with minimal training, that would otherwise require years of experience working with simulation software.

Improved Communication and Collaboration

With built-in automated report generation tools, development teams have an easier time when it comes to sharing and interpreting simulation results.

Stepping up to Plastics Professional and Plastics Premium

While SOLIDWORKS Plastics Standard provides plastic part designers with improved injection-molding simulation, as well as advanced Computer-Aided Engineering (CAE), SOLIDWORKS Plastics Professional and Premium extend these analysis tools even further.

Plastics Professional

With SOLIDWORKS Plastics Professional you can optimize your injection mold designs, specify the best gate locations, and create efficient feed systems to reduce or eliminate mold rework, minimize manufacturing cycle times, and maximize molded part quality.

Plastics Premium

With Plastics Premium, you can design and analyze simple or mold cooling line layouts. You can also optimize cooling system design, to minimize cycle times and decrease manufacturing costs, while optimizing part and mold design.

> "Our injection-mold specialist used SOLIDWORKS Plastics software to determine where the gating locations should be to minimize the appearance of sink marks and knit lines. The simulations also enabled us to understand that by keeping the device in the mold a little longer and at higher pressure, we could contain the sink marks to an acceptable level. SOLIDWORKS tools saved us time while improving quality."
>
> — Mario Simoes, Chief Engineer

In addition to leveraging SOLIDWORKS modeling software to design the ABBI diagnostic device, CAMLS used other specialized tools, such as SOLIDWORKS Composer technical communication and SOLIDWORKS Plastics mold-filling simulation solutions, to accelerate product development.

SOLIDWORKS FLOW

If you are focused on reducing costs and time-to-market, a simulation tool that makes it easier and faster to determine the real-world impact of a liquid or gas flow on your product during the design phase can change everything. Just ask Palatov Motosports.

A Race to the Clouds

The Pike's Peak International Hill Climb in Colorado, also known as The Race to the Clouds, is a grueling 12-mile race in which customized vehicles climb 14,110 feet on grades averaging 7.2 percent. Since its inception more than 100 years ago, many have raced its course in hope of claiming the glory. One such competitor is Palatov Motorsports. Founder Dennis Palatov stresses how the race is one of the few opportunities he gets to see how his unconventional vehicle designs stack up against the competition in the most rigorous test possible.

Before tackling the track each year, Palatov and his team work to ensure they build a vehicle with the design best-suited to win. By using SOLIDWORKS Simulation software, Palatov Motorsports gains insights into the critical factors of racing, including airflow, drag, and downforce. The results are applied to optimize front/rear distribution of force and allow for aerodynamic adjustments.

Powerful Computational Fluid Dynamics (CFD) Tools

These tools enable designers to quickly and easily simulate fluid flow, heat transfer, and fluid forces that are critical to the success of designs. Pressure drops, velocities, and turbulences can all be tested by using a specialized simulation toolset.

"What if?" Analysis

Ask critical "What if?" questions with a multi-parametric optimization tool that lets you select geometry or simulation parameters as variables. For each variable, you define the range of variation and the target optimization goal, such as maximize, minimize, or match a value.

Automate Meshing

Utilize Automated Boundary Cartesian Meshing, as well as Turbulence Models and Boundary Layers, to streamline your workflow.

HVAC and Electronics Cooling

SOLIDWORKS Flow Simulation includes add-ons for HVAC and Electronics Cooling for cooling simulation. The simulation tools for HVAC designers, as well as engineers who need to simulate advanced radiation phenomena, enable you to tackle tough challenges when designing efficient cooling systems for large scale environments, lighting systems, or efficient contaminant dispersion systems.

HVAC module features include:

- Comfort calculations, for eight parameters, to measure thermal comfort and identify potential problem areas
- Advanced radiation simulation and tracer study for more comprehensive results
- An expanded engineering database with a wide range of standardized components

Electronic Cooling module features include:

- Two-resistor compact model to accurately simulate electronic packages
- Heat pipes for modeling a predominate cooling approach
- PCB generators
- Joule Heating calculation
- An engineering database with an extensive range of new fans, thermoelectric coolers, two-resistor components, interface materials, and typical IC packages

DOWNLOAD NOW

Don't miss the next chapter in our *Step-Up to Simulation* Series.

CHAPTER 4

BENEFITS OF SIMULATION

Only One More Step to Take

The SOLIDWORKS Step-Up to Simulation series continues in Chapter 4. Join us as we explore the hard numbers behind the benefits of simulation, and how they compare to manual calculations and traditional forms of physical prototyping.

Visit solidworks.com/STEPUPTOSIM for more!

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