

SureFire, LLC

Customer Success Story

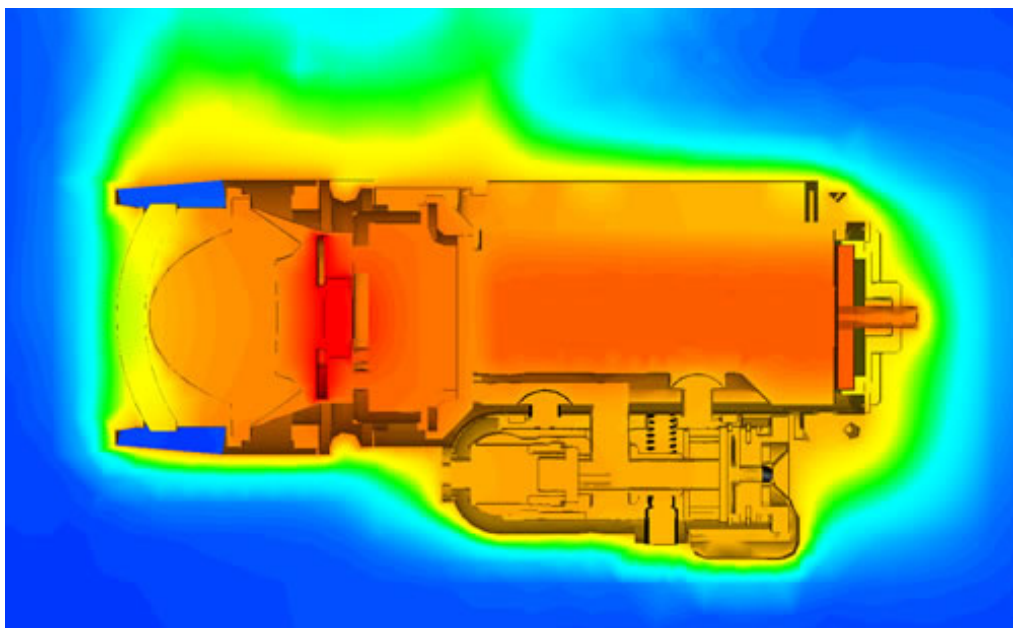
Autodesk® Simulation CFD

Autodesk Simulation CFD has provided us with a test bed to launch new ideas. In many cases, it helps us to reach concrete decisions that we can develop rapidly into practical concepts.

—Deepanjan Mitra
Thermal Analysis Engineer
SureFire

Laser precision.

Autodesk Simulation CFD helps SureFire predict the timing of laser diode failure based on a visualized temperature field.



Full spectrum of temperature results throughout the detailed design. Image courtesy of SureFire, LLC.

SureFire, LLC makes high-end illumination tools for the U.S. military and law enforcement officers. The Fountain Valley, California-based company credits up-front computational fluid dynamics (CFD) for helping it achieve design success for the X400®, the first weapon-mounted assembly to combine a light-emitting diode (LED) flashlight with a red targeting laser.

At the heart of the X400 are powerful LEDs that crank out more lumens than other light sources, but also generate a great deal more heat that must be dispersed by the light housing. Using Autodesk® Simulation CFD software early in the design process helped engineers eliminate three different design prototypes they would normally use for testing to ensure design requirements are met, saving them about 15 days of work.

The team created the preliminary design for the X400 in MCAD system, Dassault Systèmes SolidWorks®, and then opened it in Autodesk Simulation CFD. A quick analysis was followed by up-front analyses on full models with most of the cosmetic features, which helped engineers analyze more complex interactions.

Thermal analysis was crucial in two major aspects of the X400's design: optimizing the design of housings, especially thermal isolation of the laser unit, and determining the best settings for thermal

management firmware. Engineers used Autodesk Simulation CFD to perform various “what-if” scenarios, balancing heat dissipation with the need to minimize the size and weight of the weapon-mounted light.

To determine housing material and insulation thicknesses, SureFire's engineering team ran thermal simulations showing how fast heat traveled to the laser housing. The simulations enabled them to predict when the laser diode would fail based on a visualized temperature field. Autodesk Simulation CFD also helped them to determine optimal settings for the thermal management firmware.

Engineers at SureFire believe conducting thermal simulation early in the design process can benefit the entire product development cycle. In addition to material evaluation, up-front thermal simulation makes it possible to see the interplay between critical elements, such as housing fins and convection.

“Autodesk Simulation CFD has provided us with a test bed to launch new ideas,” says Deepanjan Mitra, thermal analysis engineer for SureFire. “In many cases, it helps us to reach concrete decisions that we can develop rapidly into practical concepts.”

To learn more about Autodesk Simulation CFD, visit www.autodesk.com/simulationcfd.