Sechan Electronics, Inc.

Customer Success Story

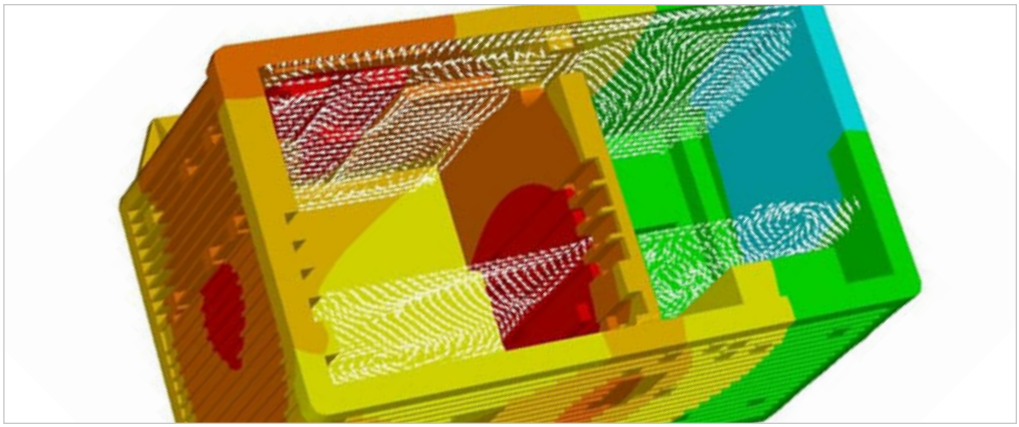
Autodesk® Simulation CFD

Autodesk Simulation CFD allowed us to achieve our objective four months faster than if we had relied on traditional prototyping and testing methods.

—Jim Smith
Lead Mechanical Engineer
Sechan Electronics, Inc.

On-target temperatures.

Autodesk Simulation CFD helps Sechan accurately predict thermal performance of new digital fire control system.



Thermal flow patterns inside the digital fire control system. Image courtesy of Sechan.

Sechan Electronics, Inc. provides electronic contract manufacturing services to the U.S. Department of Defense. Recently, the Lititz, Pennsylvania-based firm was tasked with developing a new digital fire control system for the Paladin self-propelled Howitzer. Soldiers count on the reliability of this unit and Sechan backed it with a protracted warranty. To help ensure maximum reliability and performance, Sechan's engineering team turned to Autodesk® Simulation CFD.

The digital fire control system required a single chassis to house three single-board computers and associated hardware. Maintaining safe operating temperatures for all devices within the chassis was essential. Due to the sealed nature of the chassis and the shock mounting configuration, cooling of the chassis depended solely upon free convection and radiation from its exterior. Heat from the internal electronic devices was transferred to the chassis essentially by conduction—fans were not an option.

Critical thermal management required an accurate prediction of the buoyancy-driven convective flow and radiation heat transfer. Autodesk Simulation CFD provided Jim Smith, lead mechanical engineer at Sechan, with an efficient up-front simulation platform to systematically evaluate and interactively visualize conduction, convection, and radiation heat transfer modes simultaneously.

Smith used the parametric relationship between Autodesk Simulation CFD and the PTC Creo™ assembly to evaluate several design alternatives. "I ran a number of simulations, starting with simplified geometry and more encompassing assumptions, and progressing to more detailed and realistic models," says Smith. "For example, radiation was ignored initially and the PTC Creo model was extensively de-featured. Gradually, the model became a more authentic representation of the actual hardware and environment."

Additionally, simulations were conducted on the heat pipe assembly and components, and the single-board computer frames, to minimize the weight while maintaining structural robustness. "The integration with PTC Creo was excellent and essentially transparent," says Smith. "We were dealing with fairly complex geometries and assemblies without incident." He adds that "meshing was painless and predictable" with Autodesk Simulation CFD.

By incorporating computational fluid dynamics (CFD) up front in the design process for the digital fire control system, Smith says Sechan was able to eliminate the costs associated with two rounds of prototypes. He adds, "Autodesk Simulation CFD allowed us to achieve our objective four months faster than if we had relied on traditional prototyping and testing methods."

Smith says another advantage of using Autodesk Simulation CFD is being able to see the total product performance picture. "There's no way data from a collection of thermocouples could have given us the same level of knowledge and confidence about our design," he explains. "Verification of the CFD simulation by testing in an environmental chamber demonstrated the accuracy of the model with close correlation of temperature data."

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

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