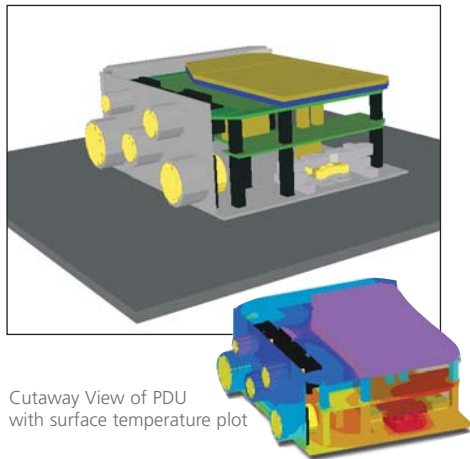
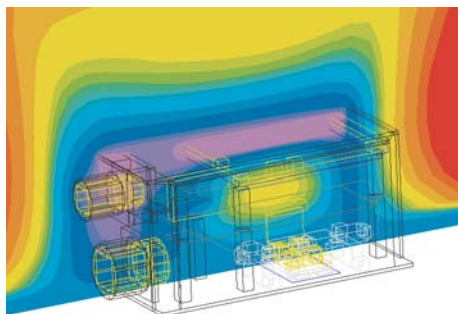


## Flomerics Inc. Consulting Service Aids Smiths Aerospace



Cutaway View of PDU with surface temperature plot



Cut Plane Temperature Plot of Wire frame View of PDU

### Design Challenge

Smiths Aerospace Electrical Power is working on a U.S. Navy hypersonic missile program that explores the feasibility of a better high altitude air vehicle. Smiths Aerospace is investigating the design of a power distribution unit (PDU) that would reside on the air vehicle.

One of Smiths' tasks was to determine if the environment that the air vehicle provided for the electronics and the PDU was tolerable. The electronics needed to function within certain extreme temperature specifications. The unique aspect of the environment consisted of a transient simulation with a limited lifetime over the flight profile. The environment temperatures had a transient profile in addition to the joule heating of the electronics.

The customer provided the environment temperature versus time. It was up to Smiths Aerospace to determine if the PDU could withstand the peak temperatures during the time it was exposed to the environment within the air vehicle during the flight.

### Solution and Benefits

Instead of mocking up the unit, conducting expensive experiments and investing major resources, Smiths turned to the consulting services provided by Flomerics Inc. The process of modeling the unique transient environment that the PDU would be exposed to is a strength of the Flotherm analysis software. In only a few days the PDU was rendered in the Flotherm software and the transient environment was applied in a simulation. The analysis showed that components would exceed their temperature limits. Design changes were made within the PDU to modify the heat paths and to add additional mass in the form of gap pads and heat sinks. The added mass contributed to a larger thermal time constant for the PDU, which slowed the heating of the components resulting in an acceptable design. The complete modeling process was done in only a few days with no prototype, lab or actual air vehicle flight expenses.

### Customer Testimonial

*"Flomerics Consulting, simulated multiple design modifications in a short time and verified a working solution. Without Flotherm, it would be too costly and time consuming to run an empirical equivalent."*

Smiths Aerospace