



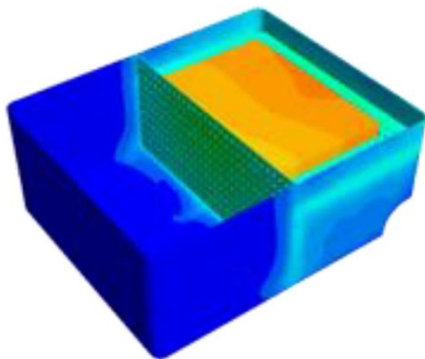
System reliability

Thermal optimization of an electronic unit

Objective

The inclinations towards the densification of PCBs and the rapid increase in the power of electronic systems have created a real challenge for developing reliable thermal management solutions. It becomes primordial to find effective temperature control and heat dissipation devices inside the electronic units in order to ensure their safe and durable operation.

The objective for Zelin in this aerothermal digital study is to define the optimal cooling system (passive, active) that will guarantee the integrity of the system.



Result

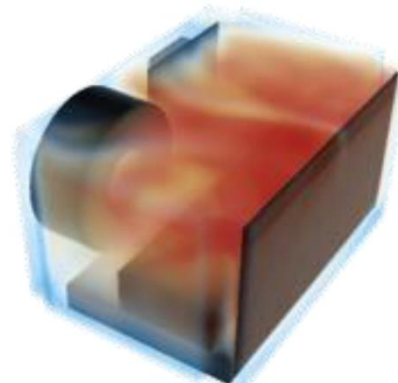
The simulations carried out enabled the establishment of a thermal mapping of the interior of the housing, as well as the identification of the areas with heavy thermal loads.

Considering the surface temperatures of the unit estimated under operational conditions, which would be dangerous for any manipulator, two solutions were proposed to the client in order to achieve optimal safety of the device: modifications to the internal arrangement of its components and the change of the cooling system by alternative cooling methods (active system).

Implementation

Zelin has set up a dedicated calculation process for modeling this type of system:

- 3D model of the housing, components and cooling system
- Material resource: 32-core HPC station & Siemens STARCCM+ / FLUENTv18 software
- Some analytic examples:
 - o Thermal / fluidic modeling by steady (RANS) and unsteady (URANS) approach
 - o Detailed aerothermal analysis by advanced post-processing: temperature fields, volume rendering, streamlines



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