



On-board  
electronics

## Thermal optimization of an on-board electronic system and its packaging

### Objective

On-board electronic systems are strategic for many transport modes, especially in the defense industry. The capacities required for safety, mechanical resistance, size or even reliability need special attention during the development phase of these systems. Some electronic boards are embedded on a fixed packaging inside the aircraft fuselage or using a POD that is fixed to the aircraft. Within the framework of a client project, we intervened to optimize the integration of the on-board electronic system.



### Implementation

Zelin has set up a calculation process that's dedicated to model this type of flow:

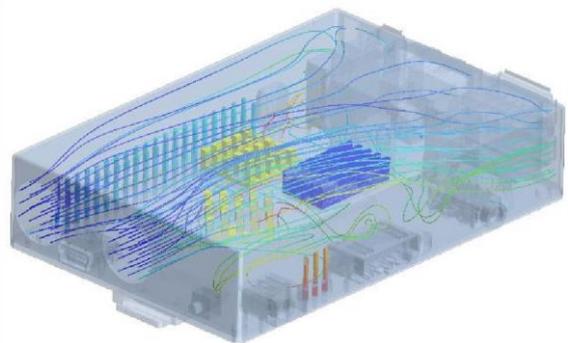
- 3D model of the on-board system
- Material resources: HPC cluster (200 cores) & SIEMENS StarCCM+ software
- Some analytic examples:
  - o Advanced mesh sensitivity (up to 15 million cells)
  - o Multiphysics coupling: thermal fluid - structure
  - o Fluid flow modeling (RANS)
  - o Implementation of a specific methodology that combines numerical data and flight test results.

### Result

These numerical simulations made it possible to evaluate the performance of the system under different conditions of use and to identify the worst possible configurations.

Several solutions for improving the system design and packaging were proposed, validated and digitally tested.

Finally, the design optimization helped to successfully meet up with the ambitious constraints set by the client. The thermal requirements set by the client were met by the optimal design.



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