

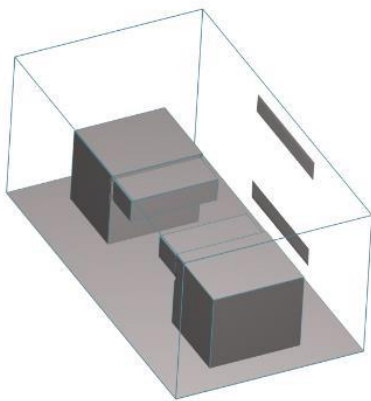


Buildings and cities  
of the future

## Optimization of a clean room design

### Objective

More and more products require production environments with very high particulate air cleanliness conditions. At a space industry manufacturer, a satellite assembly room requires impeccable air cleanliness. The manufacturer's main challenge consists in maintaining a good level of ventilation while guaranteeing a low and controlled rate of contamination. For this project, Zelin carried out the CFD study of a clean room with unidirectional flow, with as objective, the designing and validation of the blowing system in its operational environment, in order to achieve the objectives that were set by the client.



### Implementation

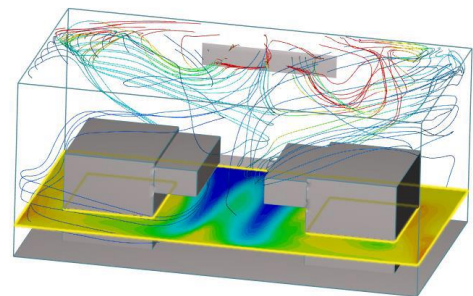
Zelin has set up a calculation process that is tailor-made for modeling this type of flow:

- 3D model of the assembly bench and the surrounding part
- Material resources: HPC cluster (128 cores) & StarCCM + code
- Methodology:
  - o Simulation of several possible flow scenarios by steady approach (RANS)
  - o Modeling air particles with different diameters and predicting their concentration
  - o Precise analysis of air flow and impact of ventilation on the recirculation of air
  - o Data comparison with regulatory requirements

### Result

Several solutions have been proposed based on Zelin's expertise, including the modifications to the ventilation system.

All these works make it possible to envisage very significant improvements in the overall performance of the installation.



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