# NABLAWAVE

Advanced Engineering

WHO WE ARE

- Team of Aerospace and Mechanical Engineers, Ph.D.
- Mix of experiences from industry and research
- 10+ years of experience in modeling complex physical systems, optimization algorithms and machine learning, advanced analysis and design tools to manage the most complex structural and fluid dynamics problems.
- 5+ years of experience in the experimental testing: gas turbine engines, **rocket engines up to 1 ton of thrust**
- We strongly believe in **technology transfer** from the aerospace sector to ground applications and viceversa
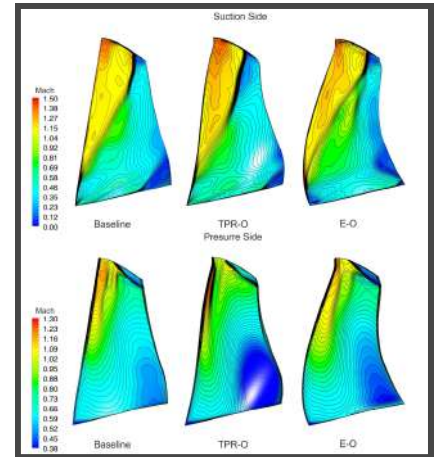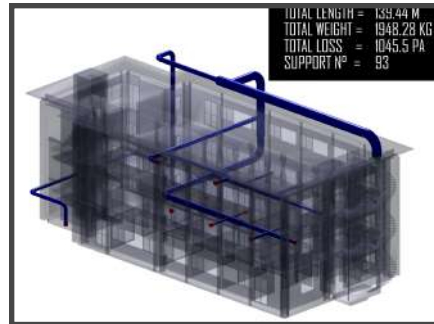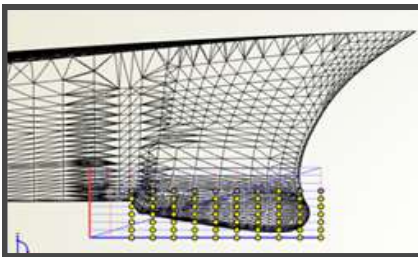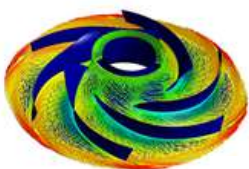

WHAT WE DO

Design

- Mechanical design
- Technical consulting
- 3D CAD model realization and executive drawings

Experimental tests

- Design of experiments
- Test bench design, sensor selection, data acquisition
- Assistance during tests and trials

Numerical analyses

- FEM structural simulations
- CFD fluid dynamics simulations
- Vibro-acoustic analyses
- Combustion modelling
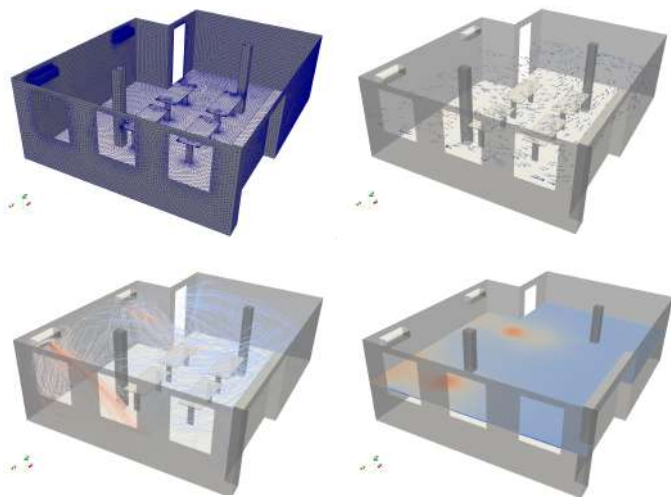- Fluid-structure interaction

Software development

- Tailor-made software for engineering simulations
- Development of analytical models and performance prediction algorithms
- Artificial intelligence for design and analysis
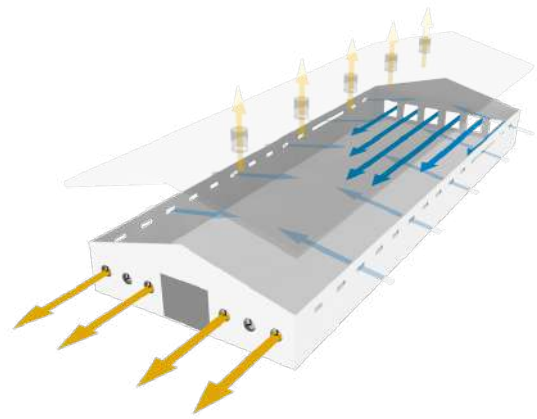
NABLAHVAC

Automated HVAC Analysis Software

An indoor ambient simulation is useful to quantitatively assess the performance of Heating, Ventilation and Air Conditioning (HVAC) systems and predict the air flows needed for optimal comfort in any season.

By means of these analyses we can reduce energy consumption, simulate air purification, enhance thermal comfort, and optimize HVAC configurations, especially when different system solutions are integrated in the same building.

Results

The computational resources to make the calculations are allocated in cloud where the simulation speed is accelerated. Moreover, the CFD solver used is open-source, so that customizations are possible.
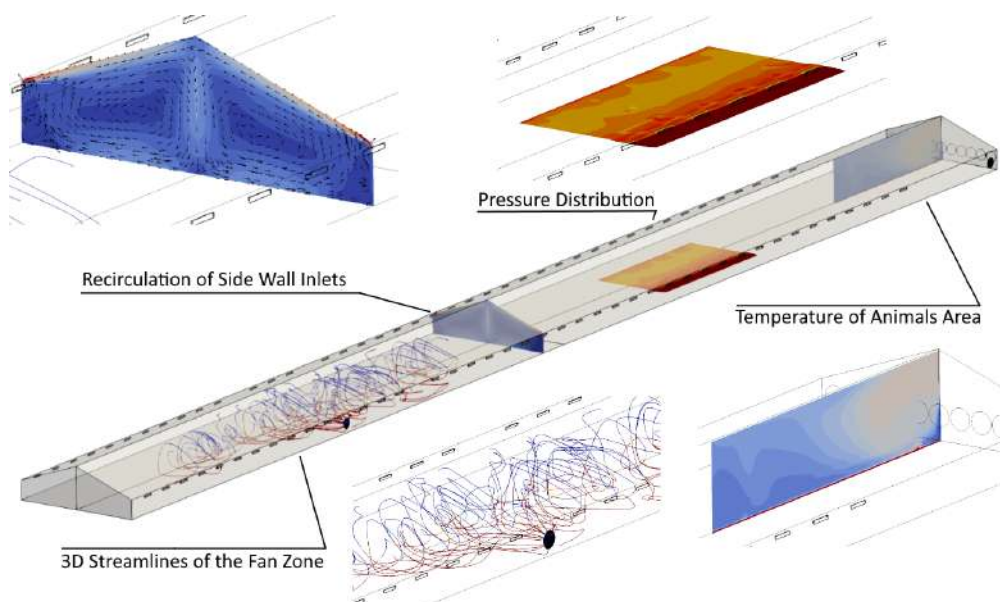
While eliminating the need for highly skilled experts and fast computers, the designers get automatic report formats where temperature distribution and air flows are clearly visible.

They can analyse and improve their designs, determining heating/cooling losses, areas of air stagnation and optimizing flows to obtain a more uniform aeration of the environment, avoiding recirculation zones.

It is possible to perform analyses in different environmental conditions (summer/winter) in order to identify the correct setting aimed at improving comfort and reducing energy consumption.

Solution

- Upload of 2D or 3D CAD model
- Geometry simplification through automatic filters in order to eliminate superfluous details that burden the calculation
- Definition of heat/cooling sources and air inlet/outlet positions
- Automatic meshing operation
- Download of the results

Applications

- air conditioning in commercial/residential spaces
- ventilation of complex buildings
- air flows control in warehouses/industrial plants
- improvement of air purifying machinery installed in offices and large-scale shared spaces

Recirculation of Side Wall Inlets

Pressure Distribution

Temperature of Animals Area

3D Streamlines of the Fan Zone

NABLAWAVE

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