# 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
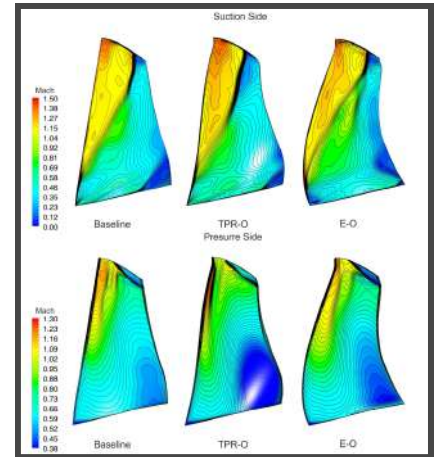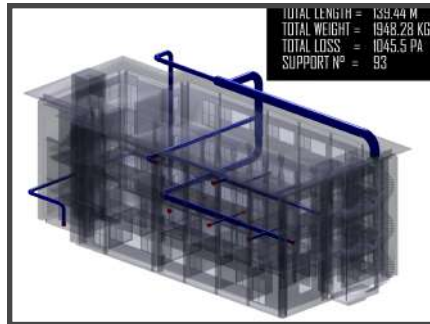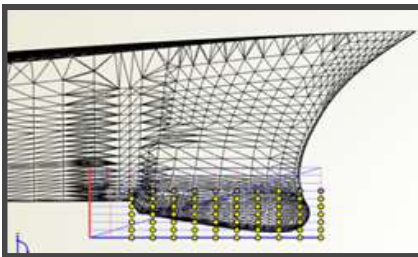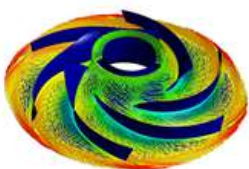

WHAT WE DO

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
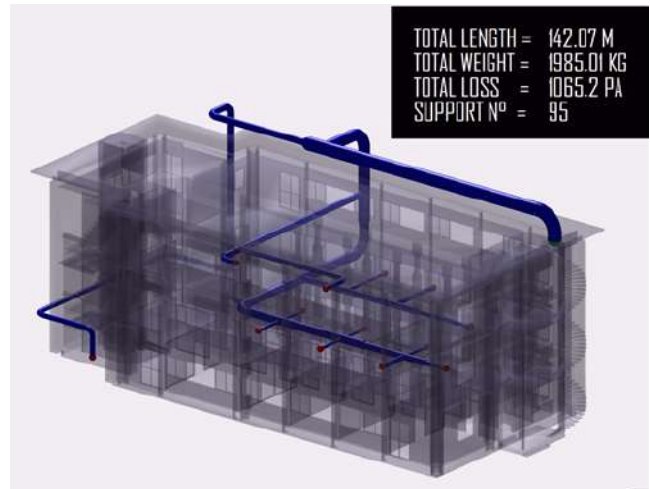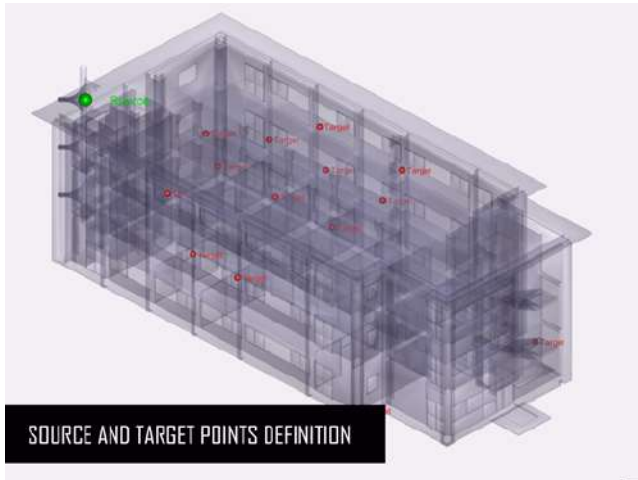- Fluid-structure interaction

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

NABLADUCT

Automatic piping and duct routing

We developed a semi-automatic software for optimal route design, in order to automate the pipe path generation operations in a factory, a task currently carried out manually with CAD.

The software can be integrated inside the customer's tools in use through open source code routines and optimization algorithms.

SOURCE AND TARGET POINTS DEFINITION

TOTAL LENGTH = 142.07 M
TOTAL WEIGHT = 1985.01 KG
TOTAL LOSS = 1065.2 PA
SUPPORT N° = 95

Results

The result is a drastic acceleration of the 3D duct and piping design process, especially at higher pipeline complexities.

The designer is exempt from repetitive tasks and can devote himself to choosing between different Pareto-optimal configurations , based on the importance he assigns to each parameter (weight, pressure losses, etc.)

Solution

The tracing of ducts and pipelines in 3D space requires to consider many variables:

- fluid type
- flow rates, pressures, head losses
- spatial design constraints
- positioning of components in the system (tanks, reactors, burners, combustors, etc.)
- quantity and type of pipe supports

As a starting point, the software imports a CAD model that defines the 3D space where to place the pipelines. The geometry is simplified by means of filters to eliminate all superfluous details that would burden the calculation.

Applications

- civil and industrial plant engineering (hydraulics and ventilation)
- chemical and pharmaceutical plants
- aeronautical and aerospace engines sector
- harness design
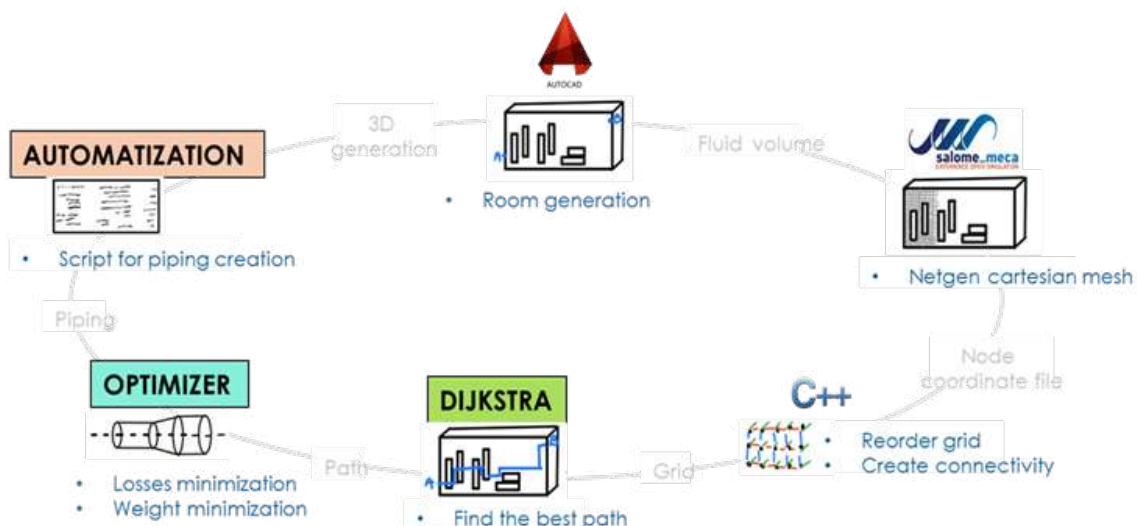
NABLAWAVE

CONTACT US

Headquarters

Viale dell'Industria, 23
35129 Padova
Italy

Ph. +39 333 8104232

Contact person

Mr. Gianluigi Misté
g.miste@nablawave.com

+39 349 353 2646

www.nablawave.com