

Cloud-based design of yacht sails

Fortissimo Experiment Facts:

- Industry Sector: **Maritime**
- Country: **United Kingdom**
- Software Used: **AeroSimPortal**

ORGANISATIONS INVOLVED

Cape Horn Engineering is a UK-based Computational Fluid Dynamics (CFD) consultancy company which specialises in the design of racing yachts and commercial ships, and renewable energy.

PLUS Solutions is an Italian company which specialises in tailored software solutions and virtual prototyping in multiple sectors such as Computer-Aided Engineering (CAE).

HPC resources and expertise were provided by the Italian HPC centre CINECA.

THE CHALLENGE

Cape Horn uses computer simulation to design the best sails for its boats. However, sail design is a very computationally intensive process. Sail design workflows need to analyse the sail's "flying shape", which affects the airflow and pressure. This is achieved with a complex Fluid-Structure Interaction (FSI) coupling between a CFD and Finite Element Model (FEM) software packages.

97% of businesses in this area are SMEs. In this sector, there are still technological and cost barriers to accessing HPC-based simulation.

THE SOLUTION

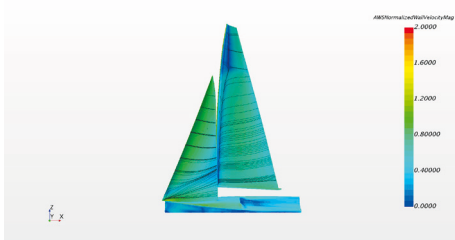
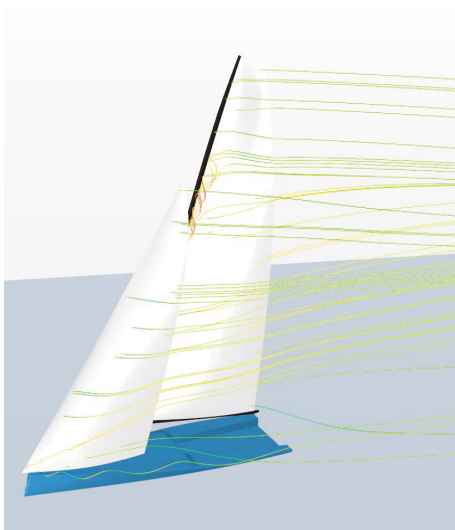
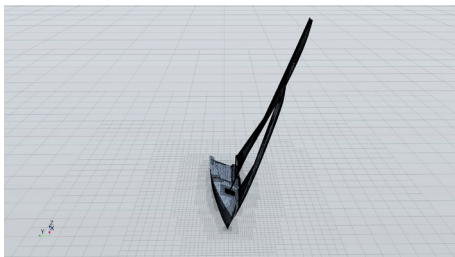
The outcome of this experiment was the development of AeroSimPortal, an easy-to-use tool for sail design studies. This tool removes previously-existing barriers that prevented small companies from using CFD services. Through the use of an HPC web- and cloud-based simulation platform, all of the necessary tools to analyse sails are made easily available to companies.

The simple graphical user interface (GUI) allows the user to launch complex CFD/FSI simulations by only uploading a geometry and sailing conditions as inputs. Behind the GUI, there is a fully automated simulation workflow. Even inexperienced users can now access design tools that they would previously have been unable to utilise.

BUSINESS IMPACT

The AeroSimPortal platform constitutes an innovative and sustainable approach to deploying specialized sail design workflows. A cloud-based solution is especially useful to SMEs, which would not normally need these services regularly enough to justify the cost of purchasing their own HPC hardware.

The revenue streams resulting from this experiment will include both consultancy services and SaaS fees.

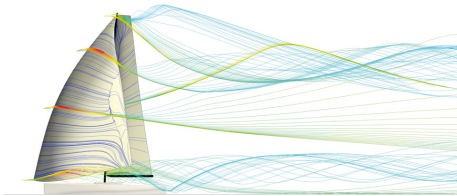


Fortissimo Experiment Partners:

- **Cape Horn Engineering** (End User)
- **PLUS Solutions** (Application Expert)
- **CINECA** (HPC Provider)

More Information:

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Through the AeroSimPortal platform, Cape Horn is able to reduce the cost of its design and consultancy services by around 50%, while keeping the same profit margins. This will allow it to charge extremely competitive prices to its customers, increasing its market share. Beyond the consultancy service, Cape Horn will deploy AeroSimPortal through a scalable pay-per-use platform. Subject to testing, AeroSimPortal is expected to be available on the Fortissimo Marketplace in early 2019.

PLUS and CINECA will benefit from expertise gained through the experiment. They will be able to target customers in the maritime engineering sector and will be able to better compete for their business thanks to this experience.

BENEFITS

Cape Horn have seen the following benefits from their participation in the experiment:

- Additional revenues from consulting estimated at about €300,000 over the next three years
- Additional income from the introduction of a SaaS platform, estimated at approx. €200,000 over the next three years
- Significant time reduction for sail designers, since they can concentrate on design issues and not on fluid dynamics

THE FORTISSIMO PROJECT

Fortissimo is a collaborative project that enables European SMEs to be more competitive globally through the use of simulation services running on a High Performance Computing cloud infrastructure. The project is coordinated by the University of Edinburgh and involves more than 100 partners including Manufacturing Companies, Application Developers, Domain Experts, IT Solution Providers and HPC Cloud Service Providers from 14 countries. These partners are engaged in over 90 experiments (case studies) where business relevant simulations of industrial processes are implemented and evaluated. The project is funded by the European Commission within the 7th Framework Programme and Horizon 2020 and is part of the I4MS Initiative.

I4MS Fortissimo is part of I4MS ICT Innovation for Manufacturing SMEs: www.i4ms.eu



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