



Power coefficient and annual energy production were increased by 1.26% and 0.47%



Multidisciplinary collaboration made easy at Airworks Engineering

courtesy of 

Airworks, a multidisciplinary company for mechanical engineering, was facing the challenge of **improving efficiency in conversion of wind energy into electrical power** by optimizing the whole assembly of a wind power unit rotor.

CHALLENGE

Experts in **wind power unit**, specialists in **CAD** (Computer Aided Design) and **CFD** (Computational Fluid-Dynamics) professionals from different organizations were involved in a **complex design scenario** and needed to collaborate by **effectively sharing** different

kind of information and resources. Engineers from the **University of Trieste** prepared the parametric CAD model and set up CFD simulations, while **Airworks** took care of aerodynamic performance calculations of the wind rotor blade, and subsequently performed

“Through the entire process, simulation data were effectively managed and shared through ESTECO Enterprise Suite”.

optimization analysis with modeFRONTIER, the multidisciplinary optimization platform.

The need for a **common platform** to share results emerged rapidly, and was successfully tackled with the **ESTECO Enterprise Suite**, the new web-based bundle of **modeFRONTIER** and **SOMO** (ESTECO enterprise collaboration framework). This solution enabled the **seamless execution** of inter-organizational simulation workflows.

SOLUTION

With **Enterprise Suite**, each partner of the simulation workflow was able to contribute to the project providing its own **high level of collaboration**. The CAD expert generated the **geometry of the blades** providing a

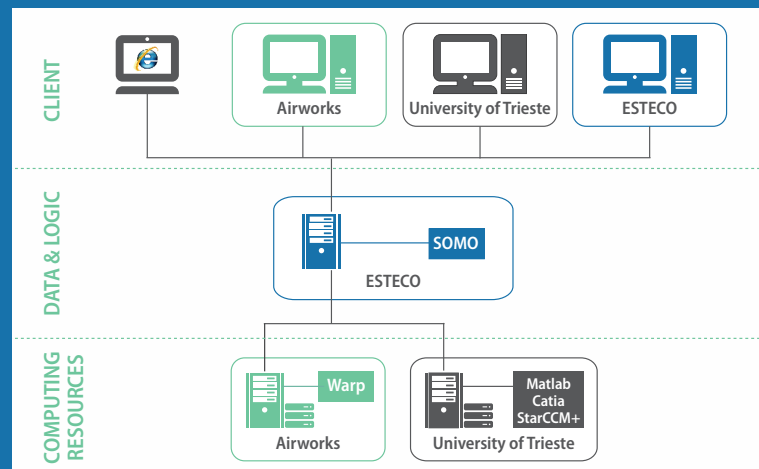


Figure 1. Implemented deployment.

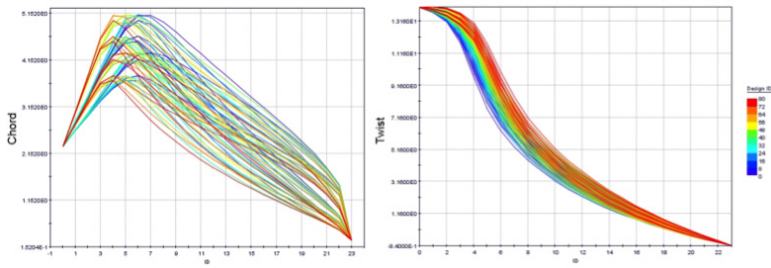


Figure 2. The distribution of chord and twist in the span wise direction, determined by the Bezier function

parametric model and the CAD solution used to update it, while the CFD expert set up the **aerodynamic simulation model**, which used the geometry to evaluate the rotor **aerodynamic performance**. Both simulation workflows were made available to partners in a **shared repository**. Then the wind power unit expert was able to integrate his **performance evaluation software** into an automated multi-disciplinary workflow. Ultimately he used the workflow to **evaluate the power efficiency** of the system and to optimize it in a complete range of environmental conditions.

modeFRONTIER ADVANTAGES

“Through the entire process, simulation data and engineering knowledge were **effective-**

ESTECO Enterprise Suite allowed for a faster process and a considerable resource saving”.

ly managed and shared through **ESTECO Enterprise Suite**, allowing a **faster process** and a considerable **resource saving”**, says **Stefano Picinich**, Airworks Engineering Managing Director. With the

set up of the optimization workflow Airworks professionals were able to explore and evaluate **new parametric geometry**, leading to **innovative designs**, analyzed by the decision maker via the Suite’s post processing tools. The considerable result was of a wind turbine design with an **outstanding power coefficient** and an **annual energy production increase** of respectively **1.26% and 0.47%**.

About ESTECO

ESTECO is a pioneer in **numerical optimization solutions**, specialized in research and development of engineering software for all stages of the simulation-driven design process. Over **250 international** organizations have entrusted the modeFRONTIER **multidisciplinary and multiobjective optimization platform** to accelerate product innovation across a wide spectrum of industrial sectors. The company headquarters is located in AREA Science Park in Trieste, Italy.

About Airworks Engineering

Airworks is an **engineering contractor** for aerospace, defense, wind energy and sophisticated mechanical appliances. Regardless of the project field, the company is committed to deliver **affordable, high quality designs and processes**. Airworks provides solutions ranging from work package up to turn-key design contracts & prototype manufacturing, having a core expertise in wind power plants, space systems, airframes, UAS, composites. www.air-works.eu



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