



FFPLUS SUCCESS STORY: BUSINESS EXPERIMENTS

COMPETITIVENESS IN THE DESIGN OF ROWING BOATS USING AI AND HPC

ORGANISATIONS

Filippi Boats is an Italian SME producing Olympic and Paralympic-class rowing boats for elite crews. **81Watts** is an Estonian AI technology expert, specialising in HPC, AI and mathematical modelling. Researchers from **Politecnico di Milano** are the fluid-dynamics experts, supporting design of hull models and performance targets. **NTUA** provides HPC expertise and contributes to the advanced simulation, stochastic optimisation and workflow integration.



THE CHALLENGE

Elite rowing requires marginal gains in hull resistance, stability and efficiency. Similarly, paralympic crews may need individual configurations. Standard hull families and engineering judgement made traditional design too slow and costly to assess hundreds of variants. Filippi needed faster customisation before fabrication with less risk. HPC was essential for high-fidelity CFD simulations and AI training at the scale required.



Technology used: HPC, AI, CFD
Industry Sector: Manufacturing, Sport

THE SOLUTION

The partners created an HPC-enabled workflow that automated mesh generation and OpenFOAM CFD simulations for hull parameters and performance targets. The Deucalion cluster provided up to 64 CPUs and eight NVIDIA A100 GPUs, allowing many designs to run in parallel across more than 700 compute hours. The results trained AI surrogate models for rapid predictions. NTUA combined these with sensitivity analysis and stochastic optimisation to identify crew-specific hull configurations.

THE IMPACT

Filippi can now replace judgement-led design with a validated, simulation-backed process before fabrication. The HPC workflow cuts the design cycle from about 20 days to around three days, an 85% improvement, while reducing trial-and-error, technical risk and the cost of customised racing shells. Engineers can compare crew-specific configurations at scale and respond faster to elite customers, strengthening Filippi's premium offer in Olympic and Paralympic rowing.

The capability supports growth in export markets, including the USA and Asia, with evidence that a selected hull suits the athlete, crew and competition goal. For Paralympic rowers, more individualised assessment increases confidence that stability, efficiency and performance needs are addressed.

81Watts has gained reusable expertise in CFD, HPC workflows and AI surrogate modelling, creating further consultancy and collaboration opportunities. Integrating the workflow into design and fabrication makes advanced optimisation repeatable and commercially scalable.

BENEFITS

- Design cycle reduced from about 20 days to three days, an 85% improvement.
- HPC-enabled CFD assesses many hull variants in parallel before fabrication begins.
- Crew-specific designs improve responsiveness to Olympic and Paralympic customers.
- Simulation-backed optimisation lowers technical risk for premium customised boats.
- Filippi targets USA and Asian growth; 81Watts gains reusable HPC and AI expertise.



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