



# EXCELLENCE IN SAILING AND DESIGN

## ALTAIR HPC SOLUTIONS BOOST LUNA ROSSA PRADA PIRELLI'S DEVELOPMENT PROCESS

### Background Information/About the Customer

From August to October 2024, Barcelona will host the 37th edition of the America's Cup (37AC) – the oldest and most prestigious sailing competition in the world. Standing for rivalry, excellence, and innovation, the America's Cup demands a lot from its participants: a strict set of rules for the boat design, and a very limited amount of time to develop and optimize them.

These demands make the America's Cup an incredibly fast-paced, competitive environment. One of the competitors in the 37AC is the Italian team Luna Rossa Prada Pirelli, who is looking to challenge for the most coveted trophy in sailing, the "Auld Mug".

### Their Challenge

In the highly competitive context of the America's Cup, the Luna Rossa Prada Pirelli Team must be able to conceive and test new design solutions as quickly as possible. While the team can look back on its designs and experience from past America's Cups, each new edition brings unique rules that require innovative technology and solutions. In addition to special competition rules such as design constraints for the AC75 foiling boat class, the development timeline is forcing teams to break new ground in their design and testing processes. The ability to perform fast, accurate simulations is crucial to optimizing boat performance, which gives teams the best possible chance of bringing home the trophy.

For the 37AC, Luna Rossa Prada Pirelli needed powerful computing solutions to help them push their boundaries and accelerate their development cycles. To meet these requirements, the Team chose to partner with Altair.

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## Our Solution

As time was a crucial factor in the development of their 37AC boat, in addition to Altair's structural simulation software the Team chose the Altair® HPCWorks™ high-performance computing (HPC) and cloud platform. Altair HPCWorks helped them transform their approach to design and simulation and ensured the maximization of their time and effort.

The tools, solutions, and applications within the Altair HPCWorks platform helped Luna Rossa Prada Pirelli to accelerate innovation by simplifying their resource and workflow management, allowing them to orchestrate, visualize, optimize, and analyze their most demanding workloads.

More specifically, Altair HPCWorks enabled the Team to replicate complex physical tests in a virtual environment, allowing them to accurately perform large-scale non-linear calculations. Moreover, the Team was able to advance the design process by running multiple simulations in parallel. The parallelization of operations and the compression of high-resolution models significantly reduced development and design timelines. The use of Altair's HPC solutions also allowed the engineers to create a "virtual identity card" for each design candidate. This workflow allowed them to quickly evaluate different solutions and select the best ones based on their virtual performance.

HPC simulations delivered a vast amount of information that designers used to create reduced order models to be inserted into the boat's global simulator. This provided a comprehensive view of the entire boat's performance while boosting organization-wide collaboration. These HPC capabilities also facilitated the detailed analysis of complex high-resolution models, significantly accelerating access to crucial information in the design process's preliminary stages. Finally, the Altair® Access™ desktop application made it possible to automate both the submission of a large volume of calculations and the download/integration of results with customized post-processing routines.

## Results

The adoption of Altair HPCWorks allowed the Luna Rossa Prada Pirelli Team to significantly accelerate their 37AC development process, enabling them to conduct more virtual tests in the given time.

- **Reduction of development times:** with HPC, large jobs can be split up into smaller jobs that run faster and can be re-combined. This speeds compute and simulation times, allowing the team to test and optimize solutions faster and more efficiently.
- **Performance improvement:** the ability to perform complex simulations faster than ever enabled the team to run even more simulations, meaning they could explore additional design variants – a crucial competitive advantage.
- **Optimized collaboration:** the integration of Altair tools improved collaboration between designers and analysts, making the design process smoother and more coordinated.

With Altair HPCWorks the Luna Rossa Prada Pirelli team is ready to face the America's Cup with confidence. "Thanks to the collaboration with Altair and their HPC technology, we have enhanced our design process. Simulations and optimization have allowed us to reduce development times and improve efficiency, making our team stronger and more prepared for the America's Cup," said Andrea Canciani, Structural Engineering, Luna Rossa Prada Pirelli.



We are in the final phase of preparation and are excited about the progress made thanks to Altair's HPC. We are ready for the challenge and grateful for the support received.

Alessandro Franceschetti,  
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Engineering, Luna Rossa  
Prada Pirelli