

Juan Yacht Design teams up with PRACE SHAPE to make faster sailboats.

Juan Yacht Design, a Spanish SME specialised in the design of cruising yachts and racing boats especially for America's Cup and the Volvo Ocean Race, received an allocation via the PRACE SME HPC Adoption Programme for Europe (SHAPE) as part of the 15th cut-off of PRACE Preparatory Access. This will allow them to implement LES (Large Eddy Simulations) models to simulate flow around sails to replace the RANS (Reynolds Averaged Navier Stokes) models that are standard in the industry.

The use of RANS turbulence models – a pioneering adoption of Computational Fluids Dynamics (CFD) – has enabled Juan Yacht Design to put aside the need for towing tank experimental tests, a key competitive advantage in a cut-throat industry.

One of the main findings of the project is a concrete evaluation of the advantage of using LES over RANS: the latter not accurately capturing the two vortices created at the top and bottom of the Genoa sail, a problem that LES adequately resolves.

“With the support of the technical experts at the Barcelona Supercomputing Centre and the use of their in-house multi-physics simulation code, Alya, we were able to scale out our models up to 1024 cores of the MareNostrum machine and run the simulations there more efficiently than would ever be possible on our own machine,” says Mr. Juan Kouyoumdjian, CEO of Juan Yacht Design. “The experience gained in this project will put us ahead of our competitors, having now a tool to simulate the aero around the sails in great detail and services our customers better with the results.”

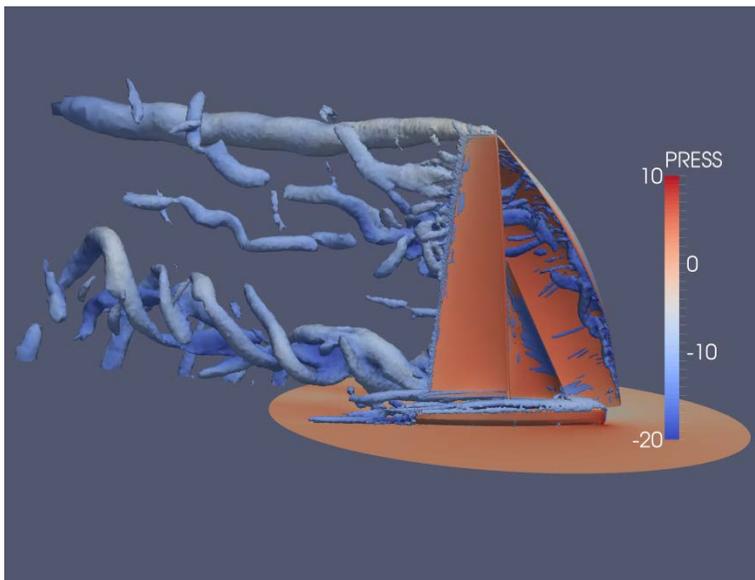


Image 1: Qvorticity isosurfaces coloured by velocity modulus – boat hull and sails coloured by pressure



PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

Project details

Title: Testing LES turbulence models in race boat sail
Leader: Mr Gonzalo Kouyoumdjian of Juan Yacht Design, Spain
Collaborators: Dr Matias Avila, Mr Hadrien Calmet, Dr Herbert Owen Coppola, and Dr Mariano Vazquez of Barcelona Supercomputing Center, Spain
Research field: Engineering and Energy
Resource awarded: 250.000 core hours on Fermi @ CINECA, Italy
100.000 core hours on MareNostrum @ BSC, Spain
250.000 core hours on JUQUEEN @ GCS@FZJ, Germany
250.000 core hours on SuperMUC @GCS@LRZ, Germany

More detailed results of this project, as well as the other 10 first SHAPE projects are available on the PRACE website: <http://www.prace-ri.eu/SHAPE-Prototypes>

About Juan Yacht Design

Established in 1997 by Juan Kouyoumdjian, Juan Yacht Design (JYD) is involved in every aspect of the design of racing and cruising yachts, from conception and analysis through to final construction drawings. Based in Valencia, Spain, JYD is composed of a multicultural team specialized in the design of high performance racing yachts. Its members are at the forefront of yacht design and engineering, from the most sophisticated simulations using 3D, CFD and FEA tools to the production of detailed construction drawings and interaction with building teams. <http://www.juanyacht.com/>

About SHAPE

SHAPE, the SME HPC Adoption Programme in Europe is a pan-European, PRACE-based programme supporting HPC adoption by SMEs. The Programme aims to raise awareness and equip European SMEs with the expertise necessary to take advantage of the innovation possibilities opened up by High Performance Computing (HPC), thus increasing their competitiveness. <http://www.prace-ri.eu/shape>

About PRACE

The Partnership for Advanced Computing in Europe (PRACE) is an international non-profit association with its seat in Brussels. The PRACE Research Infrastructure provides a persistent world-class high performance computing service for scientists and researchers from academia and industry in Europe. The computer systems and their operations accessible through PRACE are provided by 4 PRACE members (BSC representing Spain, CINECA representing Italy, GCS representing Germany and GENCI representing France). The Implementation Phase of PRACE receives funding from the EU's Seventh Framework Programme (FP7/2007-2013) under grant agreements RI-283493 and RI-312763. For more information, see www.prace-ri.eu

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