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Fine Tuning of a Fast Catamaran Design to new Operating Conditions utilizing CFD & Optimization



A 39m catamaran operating near the critical hump speed of 18 knots has been optimized through parametric variation. Design objectives included the quality of the flow on the propeller plane and the required power.

The catamaran, which was originally designed for a much higher speed of 32 knots, already showed a relatively good performance for the new design speed. Applying STAR-CCM+ in combination with the parametric design and optimization platform FRIENDSHIP-Framework allowed a very economic adjustment, keeping the hull form mostly unchanged. The enhanced flow on the propeller plane was targeted, and the aft hull geometry was changed only locally. In order to improve the wave pattern, a foil forward of the propeller, close to the free surface, was utilized.

The computations were performed in full scale condition on a Linux cluster with a total of 730 CPU-cores. A fully viscous solver with SST K-Omega Detached Eddy Model was used.

The presentation will cast light on the integration process of the geometric variation and the flow simulation in an automated optimization loop and the results of the exercise will underline the economy of the approach.

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