NACRA17 real time dynamic simulation

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ABSTRACT

This study presents the development and validation of physical models to simulate the behavior of the NACRA17 Olympic catamaran in a real-time dynamic environment. Simulations are carried out within an in-house system-based dynamic velocity prediction program (DVPP) [1]. Key components include the hydrodynamic and structural response of the appendages for fluid-structure interaction (FSI), the hydrodynamic modeling of the hulls and the aerodynamic modeling of the rig. A significant aspect of the study involved designing control laws to replicate crew movements, enabling active control for flight stability during simulation. Validation was performed through two complementary approaches: measuring the static structural response of the appendages on a jig and assessing the overall performance of the catamaran during sailing trials. These validated models, combined with active control strategies, provide a robust framework for analyzing the catamaran's performance and behavior under realistic conditions, offering valuable insights for athletes training and performance enhancement, with optimization of boat trims and control strategies.

REFERENCES

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