



University of Southampton

Faculty of Engineering and Physical Sciences

Developing an International Moth Testing Platform in a DVPP-Driven Real-Time Simulator

Thesis submitted in partial fulfilment of the requirements for the degree of
Master of Science in Maritime Engineering Science:
Yacht and High-performance Craft

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Abstract

The design of high-performance sailing boats has been constantly evolving. Modifications previously based on experience are now assessed using 3D modelling, computational fluid dynamics (CFD) and velocity prediction programs (VPP), using a large number of iterations, subsequent operational simulations and requiring large computational power, more accessible every year.

The development of new hydro-foiling technology applied to sailing boats during the recent years has brought new challenges with it, and the use of a VPP alone is no longer sufficient to physically describe the dynamic nature of foiling boats. This compelled the development of a time-domain VPP for dynamic analysis towards a better performance (DVPP) and the use of a sailing simulator based on that DVPP as a critical tool for training and design improvements in America's Cup (AC) teams and in high-performance foiling boats.

D3 Applied Technologies, a company based in Galicia (Spain) was born around these advances. Gonzalo Redondo, physicist, naval architect and founder of D3, was the co-advisor of this *Master of Science* thesis. Here I describe the procedure followed to implement a International Moth model inside a sailing simulator. Additionally I use the software to predict the performance of this single-handed foiling dinghy and compare different configurations in order to achieve future race-performance gains.

An additional paragraph about the analysis and the results obtained.

The simulator delivers reliable insights for the Moth and shows strong potential as a platform for future performance and control studies.

Keywords: High-performance sailing, International Moth, Hydrofoils, VPP, Sailing Simulator, Performance Analysis.