

Abstract Submitted
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A dynamic test platform for evaluating control algorithms for a supercavitating vehicle.¹ ARNAR HJARTARSON, WILLIAM HAMBLETON, GARY BALAS, ROGER ARNDT, University of Minnesota — The use of supercavitation to enable marine vehicles to travel at extraordinary speeds is a topic of considerable interest. The control of these vehicles pose new issues not faced with fully wetted vehicles due to a complex interaction between the vehicle and the cavity that it rides in. Existing models make many assumptions that may not be valid for a highly maneuverable vehicle. To this end, several experimental test platforms have been developed to enable test and validation of control algorithms and hydrodynamic models. Previous efforts have revealed the destabilization of marginal super cavities, especially when a cavity is being maintained with ventilation. Our latest water tunnel test platform is a body of revolution with an actuated cavitator on the model forebody, actuated fins which protrude through the cavity surface, and actuated pitch and translation of the model body, all supported by a six-axis balance. Model validation tests and preliminary data regarding the dynamics of the interaction of the cavity with the model will be presented.

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