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Numerical Flow Analysis of Planing Boats KYLE BRUCKER, THOMAS O'SHEA, DOUGLAS DOMMERMUTH, Naval Hydrodynamics Division, Science Applications International Corporation, THOMAS FU, NSWCCD — The focus of this presentation is to describe the recent effort to validate the computer code Numerical Flow Analysis (NFA) for the prediction of hydrodynamic forces and moments associated with deep-V planing craft. This detailed validation effort was composed of two parts. The first part focuses on assessing NFA's ability to predict pressures on the surface of a 10 degree deadrise wedge during impact with an undisturbed free surface. Detailed comparisons to pressure gauges are presented for two different drop heights, 6 inches and 10 inches. Results show NFA accurately predicted pressures during the slamming event. The second part of the validation study focused on assessing how well NFA was able to accurately model the complex multiphase flow associated with high Froude number flows, specifically the formation of the spray sheet. NFA simulations of a planing hull fixed at various angles of roll (0 degrees, 10 degrees, 20 degrees, and 30 degrees) were compared to experiments from Judge (2012). Comparisons to underwater photographs illustrate NFA's ability to model the formation of the spray sheet and the free surface turbulence associated with planing boat hydrodynamics.

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