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Experimental Measurements of a Model Submarine Wake DAMIEN BRETALL, UMD, DEBORAH FUREY, PAISAN ATSAVAPRANEE, NAVSEA Carderock, KIMBERLY CIPOLLA, NAVSEA Newport — High resolution stereo-PIV measurements were made over ten body lengths downstream of a $1/18^{th}$ scale submarine model in the Deep Water Tow Basin at NSWCCD. The submarine model is an unclassified generic submarine shape (ONR Body-1) composed of an axisymmetric body, four stern appendages (control surfaces) and a propeller. This body is 5.8 m long, 0.49 m in diameter. Block gages on the struts measured streamwise force on the body and provided loading details for setting propeller speed. The model was towed through a stationary laser sheet oriented perpendicular to the tow direction to obtain three-dimensional velocity fields. The objective of the study was to quantify the submarine wake and rate of decay of the coherent vortices. These data will be used in conjunction with measurements obtained on a model towed array to validate computational models for array shape and dynamics. Results with and without the propeller will be presented. Approximately 40 instantaneous vector fields were obtained for each location. Mean and fluctuating streamwise and cross-stream velocities and vorticity were computed.

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