

Abstract Submitted
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Visualization of airflow in the wake of a ship superstructure¹ C.J. BROWNELL, W.P. STILLMAN, J.H. GOLDEN, S.A. SIMPSON, L. LUZNIK, D.S. MIKLOSOVIC, G. WHITE, J.S. BURKS, M.R. SNYDER, U.S. Naval Academy — Helicopter landings on naval surface ships, such as cruisers and destroyers, must take place in the presence of an air wake created by flow over the ship superstructure. Wake turbulence over the flight deck makes piloted landings dangerous and difficult, and poses significant problems for the use of unmanned rotorcraft. To address this problem, a comprehensive set of experimental and simulation data are being collected via concurrent field tests, wind tunnel measurements, and CFD simulations. These data will facilitate an understanding of the wake turbulence produced under a variety of weather conditions, and will allow assessment of the fidelity of lower order flowfield estimates. A U.S. Navy Auxiliary Patrol (YP) Craft is used as a representative ship platform. The YP is over 100 ft long, has a similar shape to a modern destroyer, and has been modified to include a flight deck and hangar-like superstructure. Presented here are preliminary CFD results along with results from a large-scale flow visualization experiment. Qualitative information gleaned from the flow visualization is being used in the experimental design of upcoming quantitative air velocity measurements.

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