

Abstract Submitted  
for the DFD05 Meeting of  
The American Physical Society

**Late-wake Vortices of Maneuvering Bodies in Stratified Fluids<sup>1</sup>**

RICHARD MORRISON, SERGEY VOROPAYEV, HARINDRA FERNANDO, Arizona State University — Laboratory experiments were conducted in a large flow facility to investigate the formation and evolution of large vortices that form in stratified late wakes of maneuvering and self-propelled bodies. The maneuvers included acceleration, deceleration and turning, whence a significant momentum is imparted to the fluid. Previous small-scale experiments conducted at  $Re = 1000$  [Phys. Fluids, 1999, 11(6), 1682] showed that the late-wake vortices of maneuvering bodies are much bigger and different in dynamics and morphology from that of the steadily moving bodies. The present experiments delved into such differences at much higher Reynolds numbers ( $Re = 50,000$ ). New findings include: the effect of internal wave radiation on momentum balance in the wake, surface signatures of stratified wakes, and transverse-propagating dipoles that form during the motion of bodies in curved paths. State of the art flow diagnostic techniques were employed for flow measurements, and the flow phenomena and measurements were explained using simple dynamic arguments and phenomenological models.

<sup>1</sup>This study was supported by ONR (N00014-03-1-0452).

Richard Morrison

Date submitted: 09 Aug 2005

Electronic form version 1.4