

Abstract Submitted  
for the DFD05 Meeting of  
The American Physical Society

**LES of Propeller Crashback**<sup>1</sup> MARTIN VYSOHLID, KRISHNAN MAHESH, University of Minnesota — Crashback is an operation where the direction of rotation of a propeller is suddenly reversed. Crashback is characterized by massive flow separation and unsteady propeller loads. LES of the flow around a marine propeller is performed. The simulations are performed in a rotating frame of reference on unstructured grids using the algorithm developed by Mahesh et al. (2004, J. Comput. Phys. 197). Good agreement is obtained with experiment for the thrust and torque coefficients. The flow-field shows the presence of an unsteady ring vortex. A model problem is studied, where the propeller is approximated by a disk with prescribed axial and swirl velocity. The model problem results show ring vortex and thrust fluctuation similar to the real propeller. The results of the model problem will be used to explain the fluctuating loads observed during crashback.

<sup>1</sup>Supported by ONR

Martin Vysohlid  
University of Minnesota

Date submitted: 09 Aug 2005

Electronic form version 1.4