Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Formulation of a $k-\omega$ based DDES model KARTHIK RUDRA REDDY, PAUL DURBIN, Iowa State University — DES models fall under the category of Hybrid RANS/LES models, and they employ RANS to resolve near-wall boundary layers in the flow domain and LES away from the surface. The idea of DES is applicable to any RANS model, and various versions of the method reflect this. A general DDES formulation was put forth (Spalart et al, 2006) suitable for use with any RANS model, and later adapted for use with the $k-\omega$ SST model (Gritskevich et al, 2012). The current work develops a variant based on the $k-\omega$ model. In this version, length scales enter directly in the subgrid eddy-viscosity, rather than being used in the dissipation term of the k-equation; indeed, one can approach it as replacing length-scale clipping, in standard DDES, with velocity scale clipping. The length scales were modified in order to account for the log-layer mismatch, a well-known issue with DDES. Simulation results from channel flow and flow over a backward-facing step are presented.

Karthik Rudra Reddy
Iowa State University

Date submitted: 29 Jul 2013 Electronic form version 1.4