Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

DDES of shock wave/ turbulent boundary layer interaction PATRICIA CORONADO, MARCEL ILIE, University of Central Florida — The detached-eddy simulation (DES) model, which is a hybrid RANS and LES method, aims to solve the intensive CPU requirement of LES. Thus, near the solid surface within a wall boundary layer, the unsteady RANS model is realized, while away from the wall surface, the model automatically converts to LES. The delayed-detached-eddy simulation (DDES) was proposed by Spalart in 2006 to improve the DES model previously developed. The transition from the RANS model to LES in DES is not grid spacing independent, therefore a blending function is introduced to the recently developed DDES model to make the transition from RANS to LES grid spacing independent. The present research concern the study of the shock/wave turbulent boundary layer interaction using delayed-detached-eddy simulation (DDES) model with a low diffusion E-CUSP (LDE) scheme with fifth-order WENO scheme. The first case studied using DDES is a 3D transonic channel with shock/turbulent boundary layer interaction. The second case studied consists of a 3D transonic inlet-diffuser. Both results are compared with experimental data. The computed results of the transonic channel agree well with experimental data. The results show that DDES simulation provides improved results for the shock wave/turbulent boundary layer interaction compared to those of its predecessor the detached-eddy simulation.

Marcel Ilie
University of Central Florida

Date submitted: 06 Aug 2010 Electronic form version 1.4