Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

**Turbulent flow computations for high speed shock dominated flows with a one-equation turbulence model** JOHN EKATERINARIS, Prof. Embry-Riddle Aeronautical University — High order accurate discontinuous Galerkin (DG) discretization of the compressible three dimensional Nervier-Stokes equations for hybrid-type meshes is carried out. A general finite element discretization framework is used for all types elements and all computations of the DG method are performed in the regular computational domain for the standard cubic element. Total variation bounded limiters are applied for the standard cubic elements of the computational domain to obtain resolution of three dimensional moving shocks. Three dimensional inviscid flow results for weak and strong shocks over two dimensional configurations showed excellent agreement with other numerical solutions and the experiment. The DG high resolution method is applied for the computation of a moving shock exiting from a cylindrical shock tube and subsequently reflecting from a wall at a distance from the shock tube exit. The Spalart-Almaras one-equation turbulence model is used to obtain turbulent flow solutions for shock dominated flows and near wall turbulence of high speed flow after the exit of the shock. Good agreement with the experiment is found.

John Ekaterinaris
Prof. Embry-Riddle Aeronautical University

Date submitted: 01 Aug 2012 Electronic form version 1.4