Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Evaluation of the Predictive Capability of a Reynolds-Averaged Navier-Stokes Model Applied to Reshocked Richtmyer-Meshkov Instability[1] TIBERIUS MORAN-LOPEZ, JAMES P. HOLLOWAY, University of Michigan, OLEG SCHILLING, Lawrence Livermore National Laboratory — Reshocked Richtmyer–Meshkov turbulent mixing of sulfur hexafluoride and air for various Atwood numbers and shock Mach numbers is simulated using a third-order weighted essentially nonoscillatory implementation of a K-ϵ multicomponent Reynolds-averaged Navier–Stokes model. Mixing layer widths from simulations with Mach number $Ma = 1.45$ and Atwood number $At = -0.67$ are compared to the experimental data of Poggi, Thorembey and Rodriguez, and widths from simulations with $Ma = 1.24$, 1.50, and 1.98 with $At = 0.67$ are compared to the experimental data of Vetter and Sturtevant. The sensitivity of the mixing layer widths to variations in the initial conditions and key model coefficients is considered. Budgets of the turbulent transport equations are also considered to further elucidate the mechanisms contributing to turbulent mixing in reshocked Richtmyer–Meshkov instability experiments.

[1]This work was funded by the U. S. DOE NNSA under the Predictive Science Academic Alliances Program by grant DE-FC52-08NA28616 and performed under the auspices of the DOE by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Oleg Schilling
Lawrence Livermore National Laboratory

Date submitted: 03 Aug 2012 Electronic form version 1.4