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Investigation of the Richtmyer-Meshkov Instability Using a New Higher Resolution, Lower Dissipation Hybrid Central-Difference WENO-Z Method[1] WAI SUN DON, Brown University, OLEG SCHILLING, Lawrence Livermore National Laboratory — A recently developed high-order hybrid central-difference WENO-Z method for the Euler equations is extended to the two- fluid compressible fluid equations. This new method is applied to simulate the two- and three-dimensional Richtmyer-Meshkov instability using a model of the Mach 1.3 air(acetone)/SF_6 Jacobs-Krivets shock tube experiment. Fields, as well as quantities representative of the large- and small-scales of the flow, are compared to the corresponding fields and quantities obtained using the pure WENO method and the same grid resolution. The comparisons show that the new method provides better resolution properties and lower implicit numerical dissipation compared to the original WENO method. In particular, it is shown that the multi-resolution strategy used to select either the WENO or central differencing scheme yields better quality numerical solutions in the relatively smooth post-shock flow region than the pure WENO method.

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