

Abstract Submitted
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Implicit LES of Flow Over Wall-Mounted Hump SUSHEEL SEKHAR, NAGI MANSOUR, NASA/Ames Res Ctr, SEKHAR/MANSOUR TEAM — Implicit LES of turbulent flow over wall-mounted hump is conducted to understand the physics of separated flows, and to provide data for RANS modeling and development. A modified version of the FDL3DI code¹ that solves the compressible Navier-Stokes equations using high-order compact difference scheme and filter, and the standard recycling/rescaling method for generating a fully developed turbulent boundary layer at the inlet,² is used. A mean velocity profile with $Re_\theta = 1,400$ is imposed at the inlet. Qualitative assessment shows that the separation bubble is comparable in size with experiment. A detailed analysis, including comparisons of mean velocity profiles with experimental data before separation and after reattachment, is made. Quantitative comparisons of Reynolds stress profiles, as well as budgets of Reynolds stresses and turbulent kinetic energy are also presented. Physics of the flow post-reattachment is the focus of this study. Results from this effort will be used to further set up simulations at a higher Reynolds number ($Re_\theta = 3,500$).

¹D.V. Gaitonde & M.R. Visbal, AFRL-VA-WP TR-1998-3060 (1998)

²B. Morgan et al., AIAA J., **49** (3), 582-597 (2011)

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