

Abstract Submitted
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50 kHz PIV Investigation of Swept Compression Ramp Shock / Boundary Layer Interactions¹ LEON VANSTONE, Univ of Texas, Austin, MUSTAFA NAIL MUSTA, Necmettin Erbakan University, SERDAR SECKIN, NOEL CLEMENS, Univ of Texas, Austin, HIGH SPEED WIND TUNNEL LAB TEAM — The shock/boundary-layer interaction (SBLI) of a swept (30°) compression ramp (22.5°) in a Mach 2 flow is examined using 5 Hz and 50 kHz PIV in both streamwise-transverse and streamwise-spanwise planes. The mean u-velocity component exhibits conical symmetry in accord with previous studies, but the weaker velocity components (v , w) do not. We argue that moderately-swept interactions possess an extended inception region where the separated flow takes additional distance to reach its asymptotic state. The high-speed PIV is band-pass filtered to investigate driving mechanisms of unsteadiness of the separated flow. We looked at three distinct frequency bands: low (0-1 kHz), mid (1-10 kHz), and high (10-50 kHz). Unlike unswept interactions, the majority (80%) of the unsteadiness of this swept-ramp SBLI is then compared to a similar unswept compression ramp to show differences between 2D and 3D interactions.

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