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Swept Impinging Oblique Shock/Boundary-Layer Interactions[1]
JESSE LITTLE, JAMES THREADGILL, ILONA STAB, ADAM DOEHRMANN, University of Arizona — Oblique shock waves impinging on boundary layers are common flow features associated with high-speed flows around complex body geometries and through internal channel flows. The increasingly three-dimensional surface geometries of modern vehicles has led to a prevalence of complex shock/boundary-layer interactions. Sweep has been observed to vary the interaction structure, unsteadinesses, and similarity scalings. Sharp-fins and highly-swept ramps have been noted to induce a quasi-conical development of the interaction, in contrast to a quasi-cylindrical scaling observed in low-sweep interactions. However, swept impinging oblique shock cases have largely been overlooked, with evidence of only cylindrical similarities observed in hypersonic conditions. Flow deflection beyond the maximum turning angle has been proposed as the mechanism for conical interaction development but such behavior has not been established for the present configuration. This study examines the effect of sweep on the interaction induced by a 12.5° generator in Mach 2.3 flow using oil-flow, Schlieren and PIV. Results document the development of similarity scalings at various angles of sweep, and highlight the difficulty in replicating a quasi-infinite span conditions in a moderately sized wind tun

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