Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Control of Trapped Vorticity in an Offset Diffuser[1] TRAVIS J. BURROWS, BOJAN VUKASINOVIC, ARI GLEZER, Georgia Institute of Technology — Vorticity concentrations trapped within in a recessed section in the moldline of an offset diffuser are manipulated using fluidic actuation to alter the flow evolution within the diffuser. Trapped vorticity is engendered by deliberate local flow separation owing to the aggressive moldline curvature. The strength and scale of the trapped vortex and its interaction with the cross flow are controlled by a spanwise array of streamwise, surface-integrated fluidic actuators that are placed just upstream of the recessed moldline. The local and global characteristics of the diffuser flow in the absence and presence of the actuation are investigated at Mach numbers up to $M = 0.7$, using static pressure distributions, hot-wire anemometry, and particle image velocimetry. It is shown that flow distortion as measured by cross sectional variations of the total pressure distribution within the diffuser can be significantly modified by manipulation of the trapped vorticity, and is reduced (by over 50%) with increasing momentum of the actuation jets. The mitigation of flow distortion by trapped vorticity actuation is associated with manipulation of the evolution of streamwise secondary vortices within the diffuser.

[1]Supported by ONR

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Date submitted: 01 Aug 2015 Electronic form version 1.4