

Abstract Submitted
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Control of Supersonic Flow Over an Open Cavity with a Leading-Edge Spanwise Tab Array¹ LAWRENCE UKEILEY, SURABHI SINGH, University of Florida, LOUIS CATTAFESTA, YANG ZHANG, Florida State University, KUNIHICO TAIRA, University of California Los Angeles — Flow over an open cavity presents a dynamically rich flow dominated by broadband and tonal resonant effects. In the current study, passive control via a spanwise array of tabs along the cavity leading edge is performed on an open cavity of $L/D = 6$ at Mach 1.4. The spanwise wavelength of the fences is one cavity depth while the height was determined to match the penetration extent of spanwise-arranged leading edge slots of the same wavelength utilized in [1] in the same flow facility. Significant fluctuating surface pressure reductions of up to 45 % of P_{rms} are observed along the cavity floor and rear wall. Particle Image Velocimetry (PIV) is conducted to compare the velocity fields of the baseline flow with the controlled case. Two-component PIV measurements in streamwise aligned (x-y) planes revealed that fences produce lifting of the shear layer along with modifications of the recirculation characteristics. Stereoscopic PIV at cross-stream aligned (y-z) planes reveal the presence of counter-rotating vortices causing increased mixing of the flow. These observations are consistent with findings using leading edge blowing control in [1]. [1] Lusk et al., *Exp Fluids* (2012) 53:187-199

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