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Flow Structure in Baseline and Controlled Subsonic Cavity Flows* MARCO DEBIASI, JESSE LITTLE, MO SAMIMY, The Ohio State University, GAS DYNAMICS AND TURBULENCE LABORATORY TEAM — The self-excited resonance of flow over an open shallow cavity occurs in several practical applications and understanding its physics plays an important role in the development of efficient techniques for its suppression. To this aim, we use advanced diagnostics to examine the flow over such a cavity recessed in a small continuously operating subsonic wind tunnel. A compression driver actuator is utilized to control the resonance by forcing the cavity shear layer at its receptivity region. Arrays of dynamic pressure transducers are used to measure and correlate the pressure fluctuations in the test section in conjunction with qualitative flow visualizations and 2D PIV images phase-locked to either the forcing frequency or the shedding frequency of shear layer vortices. Both instantaneous and phase-averaged images are obtained in an effort to identify variations between controlled and baseline cases. The results obtained show that the behavior of the coherent structures spanning the cavity matches the empirical predictions given in classical literature. Reduction of the acoustic resonance with control is accompanied by subtle changes in the flow structure and behavior. These detailed results will be presented, discussed and matched against the most recent models of cavity flow. *Supported by AFRL/VA & AFOSR

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