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Coupled Structural Behavior-Flow Characteristics of a Synthetic Jet M. STRASSBURG, K. MOHSENI, University of Colorado — Synthetic jet actuators are zero net mass flux jets, which consist of a cavity with an oscillating wall opposite an orifice through which fluid is ingested and expelled in a periodic fashion. In this study, a piezoelectric bender and an aluminum cavity are employed in order to characterize thrust generation in synthetic jets. Simultaneous measurements of the jet velocity and diaphragm movements are carried out. These measurements are taken using hot wire anemometry and laser nano-sensing, respectively. Many actuators with various cavity and orifice dimensions are fabricated and tested. Data presented contains oscillating frequencies ranging from 500 to 2000 Hz, and a range of different voltages, which allows for different expelled fluid volumes. For different orifice diameters, the exit fluid volume is correlated to center stream velocity. Thrust generation at various formation numbers is investigated. It is found that the rate of thrust enhancement is decreased after a formation number around 3.

Kamran Mohseni
University of Colorado

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