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Characterization of synthetic jet actuators used for jet noise reduction by flow control ALEXIS ZELENYAK, ZACHARY BERGER, MATTHEW BERRY, PATRICK SHEA, MARK GLAUSER, Syracuse University — The issue of jet noise introduces various opportunities for advancements in flow control and fluid dynamics. One such method for jet noise reduction involves the use of synthetic jet actuators as shear layer excitation on the flow produced by a fully compressible, turbulent jet. A set of eight zero-net-mass flux actuators are organized around the periphery of the jet in an actuation glove fitting on the nozzle. As some noise reduction has been achieved through the use of this actuation system, further characterization of the system is necessary to fully quantify its capabilities and understand its effect on the flow physics in the shear layer. The synthetic jet actuators are driven by several different frequencies based on the Helmholtz resonance of the cavities, with measurements taken at several locations along the actuator orifice. Velocity profiles are then constructed from the measured response using hot wire anemometry. Such experimental results provide vital insight into the flow field created by the synthetic jet actuator system, allowing for more effective modification to the actuation glove.

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