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Flow Control and Dynamical System Development on the Axisymmetric Jet. JEREMY PINIER, MARK GLAUSER, Syracuse University — Synthetic jet actuators are used to manipulate the developing shear layer of a high-speed jet and ultimately reduce the perceived far-field sound. In developing closed-loop flow control strategies, a dynamical model of the flow's sound producing region is needed and the effect of the actuation on the flow field measured. In this aim, Dual-Time Stereoscopic PIV (DT-SPIV) measurements in the cross-flow plane are made at downstream positions from 6 to 10 jet diameters, where sound production was shown to be most intense. DT-SPIV consists of taking two Stereo PIV measurements at the same location lagged by a small time, which enables access to the acceleration field. This is necessary in the development of low-order dynamical systems based on experimental data. The effect of the synthetic jet actuation on the flow is measured and incorporated explicitly in the dynamical model for further implementation of advanced flow control. Simultaneously, the far-field sound is measured using an array of 6 microphones to assess the efficiency of the actuators and quantify the correlation between the sound producing region's dynamics and the far-field sound.

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