

Abstract Submitted
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Shear Layer Excitation of a High Speed Turbulent Jet KERWIN LOW, BASMAN EL HADIDI, MARK GLAUSER, ZACHARY BERGER, Syracuse University — Simultaneous pressure and acoustic measurements are acquired in the hydrodynamic and acoustic fields of a Mach 0.6 cold jet ($Re = 680,000$). The two axisymmetric sensor arrays in the near-field ($x/D = 3$ and 6) are positioned 10cm from the developing shear layer. The far-field microphones ($x/D = 75$) are positioned at five angular locations from 15° to 90° degrees relative to the jet axis. Presented here are a set of experiments geared towards characterizing the system response of the near field jet shear layer to different modes of forcing. Several open and closed loop control tests were conducted. The open loop control cases included simple sinusoidal forcing (with varying coefficient of momentum and frequency), phased forcing and amplitude modulated forcing. The closed loop cases included feeding back the Fourier filtered signals from 3 diameters and 6 diameters downstream. The correlations between the near field Fourier filtered pressure modes and the far field noise are changed significantly for all control cases; demonstrating the ability to effect control authority in the near field region. An examination of the far field noise spectra, however, demonstrates only minor changes from the control.

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