Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Noise Sources in Baseline and Controlled High Reynolds Number and High Speed Jets[1] J. KASTNER, J.-H. KIM, M. SAMIMY, Gas Dynamics and Turbulence Laboratory, The Ohio State University — The importance of dynamic processes involving large coherent structures in entrainment, mixing, and noise generation in free jets and shear layers is well established. Active control of dynamics of these structures is an effective and desirable way of manipulating such processes in these flows. Localized Arc Filament Plasma Actuators (LAFPA) developed at the Gas Dynamics and Turbulence Laboratory (GDTL) have high bandwidth and amplitude and are uniquely suited for such a task. Eight actuators were distributed around the exit of a 2.54 cm axisymmetric nozzle and operated over a wide range of frequencies to cover the jet column and the initial shear layer instabilities. Two jets were examined, a Mach 0.9 jet (Re # of 7.6 x 10^5) and a Mach 1.3 ideally expanded jet (Re # of 1.1 x 10^6). The jets were forced with azimuthal modes 0, 1, ±1 & ±2. A three-dimensional microphone array with 8 microphones located in the jet's far field was used to investigate noise sources. The array could locate the source of high amplitude noise events in space and time and also provide metrics including SPL and correlations. Detailed results of this work will be presented and discussed.

[1]Supported by NASA Glenn Research Center and OCAPP

Mo Samimy
The Ohio State University

Date submitted: 09 Aug 2005 Electronic form version 1.4