Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Transitory Control of Large Scales in a Plane Shear Layer P. GERARDIN, B. VUKASINOVIC, A. GLEZER, Georgia Institute of Technology — Large-scale motions are induced in a separating, single-stream shear layer by transitory modulation of high-frequency fluidic actuation where the frequency of the carrier waveform is nominally an order of magnitude higher than the natural frequencies of the baseline flow. While the induced vortical structures scale with the cross stream width of the shear layer, they do not result from *direct* manipulation of natural instability modes and their evolution is fundamentally different than that of the naturally-evolved coherent structures because it is associated with the transient onset of the actuation and consequently the momentary disruption of the vorticity flux within the upstream boundary layer. It is shown that a sequence of large vortical structures can be induced in the shear layer over a broad range of frequencies *independently* of the natural amplification of the baseline flow. Mixing can be enhanced by simultaneous control of large-scale entrainment and the small-scale motions that are effected by the high-frequency actuation.

Ari Glezer
Georgia Institute of Technology

Date submitted: 09 Aug 2005 Electronic form version 1.4