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Manipulation of a transitional jet using a single perpendicular synthetic jet DAVID TAMBURELLO, MICHAEL AMITAY, Rensselaer Polytechnic Institute — The effects of the upstream location of a single synthetic jet actuator (i.e., within the main jet nozzle oriented perpendicular to the main jet) on an axisymmetric free jet (Re = 6600) was investigated experimentally using PIV. The synthetic jet was driven at a frequency of 1000Hz (Strouhal number of 0.16) and it's momentum coefficient was varied from 0.005 to 0.16. When the synthetic jet is located near the main jet exit, the flow is both vectored away from the synthetic jet and drawn toward it. These are attributed to both augmentation of the main jet coherent structures and to direct impact of the synthetic jet onto the main jet. Conversely, when the synthetic jet is located farther upstream (i.e. deeper into the nozzle), the main jet is drawn back toward the synthetic jet, which may be caused by a virtual modification of the nozzle shape. These results were compared to those for a steady control jet under the same conditions.

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