

Abstract Submitted
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Spanwise Structures in a 2-D Synthetic Jet FLORINE CANNELLE,
MICHAEL AMITAY, Rensselaer Polytechnic Institute — A two dimensional isolated zero net mass flux jet, or synthetic jet, was investigated experimentally using Particle Image Velocimetry (PIV) and hot-wire anemometry. The evolution of counter-rotating spanwise coherent structures was explored for different jet orifice aspect ratios. Two synthetic jet configurations were tested, both driven by piezoceramic disks, for actuation frequencies of 300 and 917Hz, with various length- and time-scales, Reynolds numbers and several stroke lengths (between 5 to 50 times the slit width). The velocity and vorticity fields were measured in planes along and across the slit. Analysis of the spanwise extent of the jet demonstrates a unique flow pattern, where the flow near the jet exit plane is initially two-dimensional, while farther downstream the vortex pair lines develop secondary counter-rotating streamwise structures, where the streamwise and spanwise spacing between them vary with stroke length and formation frequency.

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