

Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

3-D Interactions of Synthetic Jets and Cross-Flows - Experiments¹ JOSHUA WOOD, MICHAEL

AMITAY, Rensselaer Polytechnic Institute — The interaction of synthetic jets with a cross-flow over a finite wing was studied experimentally at a low Reynolds number and low angles of attack using PIV. The focus of the work was to explore the details of the flow structures near the synthetic jets. The interaction of the synthetic jets with the flow resulted in an array of counter-rotating vortical structures. The pair of counter-rotating vortices formed at the jet orifice was found to be two-dimensional just downstream of the jet orifice; however, as it advected downstream, it developed three-dimensionalities. The effect of the momentum coefficient (or blowing ratio) on the 3-D interaction was also explored; at low momentum coefficient only a slight interaction between the vortices was observed; however, as the momentum coefficient increases, the vortices interacted with each other, causing them to lift off the surface. Furthermore, the spanwise extent of the coherent structures was reduced as they advected downstream.

¹Supported by AFOSR grant number FA9550-08-1-0233, monitored by Dr. John Schmisser.

Michael Amitay
Rensselaer Polytechnic Institute

Date submitted: 06 Aug 2009

Electronic form version 1.4