Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Flow Physics of Synthetic Jet Interactions on a Sweptback Model with a Control Surface MARIANNE MONASTERO, MICHAEL AMITAY, Rensselaer Polytechnic Institute — Active flow control using synthetic jets can be used on aerodynamic surfaces to improve performance and increase fuel efficiency. The flowfield resulting from the interaction of the jets with a separated crossflow with a spanwise component must be understood to determine actuator spacing for aircraft integration. The current and previous work showed adjacent synthetic jets located upstream of a control surface hingeline on a sweptback model interact with each other under certain conditions. Whether these interactions are constructive or destructive is dependent on the spanwise spacing of the jets, the severity of separation over the control surface, and the magnitude of the spanwise flow. Measuring and understanding the detailed flow physics of the flow structures emanating from the synthetic jet orifices and their interactions with adjacent jets of varying spacings is the focus of this work. Wind tunnel experiments were conducted at the Rensselaer Polytechnic Institute Subsonic Wind Tunnel using stereo particle image velocimetry (SPIV) and pressure measurements to study the effect that varying the spanwise spacing has on the overall performance. Initial SPIV data gave insight into defining and understanding the mechanisms behind the beneficial or detrimental jets interactions.

Michael Amitay
Rensselaer Polytechnic Institute

Date submitted: 26 Jul 2016 Electronic form version 1.4