Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Parametric Study of Synthetic-Jet-Based Flow Control on a Vertical Tail Model MARIANNE MONASTERO, ANNIKA LINDSTROM, Rensselaer Polytechnic Institute, MICHAEL BEYAR, The Boeing Company, MICHAEL AMITAY, Rensselaer Polytechnic Institute — Separation control over the rudder of the vertical tail of a commercial airplane using synthetic-jet-based flow control can lead to a reduction in tail size, with an associated decrease in drag and increase in fuel savings. A parametric, experimental study was undertaken using an array of finite span synthetic jets to investigate the sensitivity of the enhanced vertical tail side force to jet parameters, such as jet spanwise spacing and jet momentum coefficient. A generic wind tunnel model was designed and fabricated to fundamentally study the effects of the jet parameters at varying rudder deflection and model sideslip angles. Wind tunnel results obtained from pressure measurements and tuft flow visualization in the Rensselaer Polytechnic Subsonic Wind Tunnel show a decrease in separation severity and increase in model performance in comparison to the baseline, non-actuated case. The sensitivity to various parameters will be presented.

Michael Amitay
Rensselaer Polytechnic Institute

Date submitted: 31 Jul 2015 Electronic form version 1.4