

Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Effects of flow control over a 3D turret – Part II RYAN WALLACE, MARLYN ANDINO, RYAN SCHMIT, CHRIS CAMPHOUSE, JAMES MYATT, MARK GLAUSER, Syracuse University — Building upon the 3D turret work done at Syracuse University an extended study was conducted in the Air Force Research Laboratory's Subsonic Aerodynamic Research Laboratory (SARL) wind tunnel at Wright-Patterson Air Force Base. The SARL experiments were performed at higher Reynolds and Mach numbers and therefore present a more complex, more challenging flow. Synthetic jets mounted upstream of the aperture were used to generate multiple actuation cases in order to provide a rich ensemble for plant model development based on the split POD method of Camphouse (2007). PIV velocity data was acquired along with simultaneous surface pressure data at various planes across the turret with and without open-loop control. In addition, a simple proportional closed-loop control was performed using the bandpass filtered first POD mode coefficient of the surface pressure as the feedback signal. The amplitude of the feedback signal was calibrated using the open-loop results which were the most effective in reducing the separation zone of the turret.

Ryan Wallace
Syracuse University

Date submitted: 06 Aug 2007

Electronic form version 1.4