Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Flow Structure along the 1303 UCAV MEHMET A. KOSOGLU, DONALD ROCKWELL, Lehigh University — The 1303 Unmanned Combat Air Vehicle is representative of a variety of UCAVs with blended wing-body configurations. Flow structure along a scale model of this configuration was investigated using dye visualization and particle image velocimetry for variations of Reynolds number and angle-of-attack. Both of these parameters substantially influence onset and structure of the leading-edge vortex (LEV) and a separation bubble/stall region along the tip. The onset of formation of the LEV initially occurs at a location well downstream of the apex and moves upstream for increasing values of either Reynolds number or angle-of-attack. In cases where a separation bubble or stall region exists, quantitative information on its structure was obtained via PIV imaging on a plane nearly parallel to the surface of the wing. By acquiring images on planes at successively larger elevations from the surface, it was possible to gain insight into the space-time features of the three-dimensional and highly time-dependent structure of the bubble or stall region. Time-averaged images indicate that maximum velocity defect decreases in magnitude and moves downstream with increasing elevation from the surface.

Mehmet A. Kosoglu
Lehigh University

Date submitted: 03 Aug 2007 Electronic form version 1.4