Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Flight experiments on laminar flow control in swept-wing boundary layers.[1] WILLIAM SARIC, ANDREW CARPENTER, HELEN REED, Texas A&M University — Data are presented on boundary-layer transition to turbulence in low-disturbance environments. The measurements include infra-red thermography to study roughness related issues of boundary-layer transition in flight. A swept-wing model is mounted on the wing of a Cessna O-2 aircraft where an Euler code is used calculate the aircraft flowfield a nonlinear parabolized stability equations correlate the stability measurements and transition locations. The laminarization scheme of spanwise-periodic distributed roughness elements (DRE) is investigated at chord Reynolds numbers of 8 million. Measurements were made to determine the transition locations for clean configurations and transition locations for enhanced surface roughness that simulates an operational surface finish. For clean configurations, natural laminar flow was achieved over 80% of the surface of a 37° swept-wing model at chord Reynolds numbers of 8.1 million. With a background surface roughness of 1.1 μm rms, transition moved forward to 30% chord. The DRE moved transition to 60% chord.

[1]The work was supported by: AFOSR Grant FA9550-05-0044; AFRL under the AEI program; Northrop-Grumman Corporation.

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Date submitted: 03 Aug 2007 Electronic form version 1.4