Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

**Boundary-layer instability & transition on a flared cone in a Mach 6 quiet wind tunnel**[1] JERROD HOFFERTH, WILLIAM SARIC, Texas A&M University — Measurements of boundary-layer transition location and instability growth on a sharp-tipped 5°-half-angle flared cone were conducted in a low-disturbance Mach 6 wind tunnel at a freestream unit Reynolds number of $10 \times 10^6$/m. Under quiet flow at these conditions, the boundary layer becomes transitional near the base of the cone, where significant second-mode instability growth is evident. Transition location is determined using an array of embedded thermocouples, and instability development is observed in mean and fluctuating mass flux data using hotwire anemometry. The present work seeks to reproduce and build upon previous experiments which used the same test article and similar diagnostics in the facility's former installation at NASA Langley. Together with comprehensive measurements of the freestream disturbance environment, these baseline cone data characterize the facility's performance relative to that in its previous installation. In addition, the current campaign establishes experimental readiness for future research, which will study the effects of periodic surface roughness and controlled-input disturbances.

[1]AFOSR/NASA National Center for Hypersonic Research in Laminar-Turbulent Transition; Grant FA9550-09-1-0341

Jerrod Hofferth
Texas A&M University

Date submitted: 05 Aug 2011 Electronic form version 1.4