

Abstract Submitted
for the 4CF06 Meeting of
The American Physical Society

Flush Air Data Sensing System for Trans-Atmospheric Vehicles

JOEL ELLSWORTH, Utah State University — With the emergence of multiple companies attempting to tap the space tourism market, as well as NASA's return to the moon initiative, an inexpensive but reliable means of determining wind relative vehicle attitude is becoming a necessity. The traditional means of obtaining air data (altitude, Mach number, angles of attack and sideslip) using fixed pitot probes and directional flow vanes is not viable for collecting data on high supersonic and hypersonic vehicles, due to the high temperatures and dynamic pressures. The solution is to use a matrix of flush mounted pressure ports on the vehicle nose or on an outboard wing leading edge. Since the ports will be located behind a detached shock wave at supersonic velocities, the temperatures will remain substantially lower. A Flush Air Data Sensing (FADS) system can also be used for subsonic conditions, although it must be calibrated for the effects of the vehicle geometry. The physics of air behavior and the mathematics of the solution algorithm will be presented. Several relevant examples of planned vehicles will be presented.

Joel Ellsworth
Utah State University

Date submitted: 08 Sep 2006

Electronic form version 1.4