Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Simulations of Wakes and Parachute Environments for Supersonic Flight Test Design. SUMAN MUPPIDI, NASA Ames Research Center (AMA Inc), CLARA OFARRELL, Jet Propulsion Laboratory, California Institute of Technology, JOHN VAN NORMAN, NASA Langley Research Center (AMA Inc), IAN CLARK, Jet Propulsion Laboratory, California Institute of Technology — NASA's ASPIRE (Advanced Supersonic Parachute Inflation Research and Experiments) project is a risk-reduction activity for a future mission, Mars2020. ASPIRE will investigate the supersonic deployment, inflation and aerodynamics of a full-scale disk-gap-band (DGB) parachute in the wake of a slender body at high altitudes over Earth. The leading slender body has about 1/6-th the diameter of the entry capsule that will use this parachute for descent at Mars. ASPIRE flight test design (targeting, safety and recovery) requires models for deployment, inflation and aerodynamic performance of the parachute. However, there is limited flight and experimental data for supersonic DGBs behind slender bodies. This presentation describes the use of CFD in supplementing the available data to construct a parachute aerodynamics model for ASPIRE. Simulations are used to understand the effects of the leading body on the wake, and on the canopy loads, results of which will be presented. The first flight test is scheduled for September 2017. Comparisons of preliminary test data against the pre-test parachute model will be presented.

Suman Muppidi
NASA Ames Research Center (AMA Inc)

Date submitted: 01 Aug 2017 Electronic form version 1.4