Free Flight Ground Testing of ADEPT in Advance of the Sounding Rocket One Flight Experiment. B. P. Smith[1] and S. Dutta[2], [1]NASA Ames Research Center (M/S 229-1, Moffett Field, CA, brandon.p.smith@nasa.gov), [2]NASA Langley Resarch Center (soumyo.dutta@nasa.gov).

Abstract: The Adaptable Deployable Entry and Placement Technology (ADEPT) project will be conducting the first flight test of ADEPT, titled Sounding Rocket One (SR-1), in just two months [1]. The need for this flight test stems from the fact that ADEPT's supersonic dynamic stability has not yet been characterized. The SR-1 flight test will provide critical data describing the flight mechanics of ADEPT in ballistic flight. These data will feed decision making on future ADEPT mission designs. This presentation will describe the SR-1 scientific data products, possible flight test outcomes, and the implications of those outcomes on future ADEPT development. In addition, this presentation will describe free-flight ground testing performed in advance of the flight test. A subsonic flight dynamics test conducted at the Vertical Spin Tunnel located at NASA Langley Research Center provided subsonic flight dynamics data at high and low altitudes for multiple center of mass (CoM) locations. A ballistic range test at the Hypervelocity Free Flight Aerodynamics Facility (HFFAF) located at NASA Ames Research Center provided supersonic flight dynamics data at low supersonic Mach numbers. Execution and outcomes of these tests will be discussed. Finally, a hypothesized trajectory estimate for the SR-1 flight will be presented.

References:

[1] Wercinski et al., "ADEPT Sounding Rocket One (SR-1) Flight Experiment Design Summary," IPPW14 (2017).