Planned Flight of the Inflatable Reentry Vehicle Experiment 3 (IRVE-3)

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The Inflatable Reentry Vehicle Experiment 3 (IRVE-3) is planned for launch from NASA Wallops Flight Facility in the spring of 2012. IRVE-3 is a follow-on mission to the IRVE-II flight of 2009, which successfully demonstrated exo-atmospheric inflation, reentry survivability, and flight performance of a Hypersonic Inflatable Aerodynamic Decelerator (HIAD). IRVE-3 is intended to demonstrate the performance of a HIAD with a flight-relevant TPS exposed to a peak reentry heat rate above 15 W/cm2, and to demonstrate the effect of an offset center of gravity on HIAD flight performance.

This paper discusses the IRVE-3 mission scenario, reentry vehicle design, expected flight environment, predicted vehicle response, and the various sensors that will allow quantification of the flight environment and vehicle performance. The design and expected performance of the inflatable aeroshell, inflation system, and CG offset mechanism will be discussed in detail, along with plans for future development flights and eventual mission use.