

# The SOAREX-VI Re-Entry Flight Test Experiment

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The experiment definition and development of the SOAREX VI (Sub-Orbital Aerodynamic Re-entry EXperiment) flight test will be discussed. Scheduled for launch on the ATK X1 sub-orbital flight during July 2008, this flight in the SOAREX series is a mission of opportunity- class payload that will permit one or more re-entry bodies to enter the atmosphere at approximately 4 km/s. The trajectory that is provided presents certain challenges, in that the launch site is the Wallops Flight Facility with a down-range splash point several hundred km north of Antigua (total downrange distance of 2037km/1100NM). These included unique telemetry system choices and means of collecting accurate entry trajectory data due to the distance from any available land range. The principal entry experiment is the SCRAMP (Slotted Compression RAMP) probe, which is uniquely self-stabilizing and permits a simplification of the interface to the upper-stage/payload ejector system. The sensor system will permit measurement of the key aerodynamic parameters, as well as of the shock-shock interaction which occurs on the outer radius of the SCRAMP aft flare (the principal drag and stabilization element). The data from this experiment will be used to improve the understanding of this shock-shock behavior, provide valuable design data for this class of highly stable re-entry probes being proposed for planetary

missions, and finally, streamline a capability of conducting comparatively inexpensive flight experiments at long down-range distances.