

REQUEST FOR PROPOSAL: Sounding Rocket Mission to Flight Test a Scramjet Engine at Mach 5.

I. OPPORTUNITY DESCRIPTION

Virginia Tech was fortunate to participate in a NASA Wallops Island Sounding Rocket Outreach Student Launch Program. The program involved the design, manufacture, test, integration, and launch of a sounding rocket payload on an Improved Orion sounding rocket from the Wallops Island Flight Facility (WFF). Students were involved in every aspect of the mission from start to finish.

This mission, Hy-V, is a project under the Virginia Space Grant Consortium and is primarily being conducted by students. NASA has provided a Terrier-Improved Orion sounding rocket for this mission, with a tentative launch date of July 2009.

II. PROJECT OBJECTIVE

The objective of the project for the 2006-2007 senior design team is to produce a complete system design and prototype model of the payload. The team will need to interface with the Mechanical Engineering design team working on the scramjet and with others groups working on the project. The initial team of AE students should recruit sophomores, juniors, and seniors from AE and other curricula to supplement the team in the Spring semester and hence provide continuity in subsequent years of the project.

III. DATA REQUIREMENTS

The final proposal shall include the following:

- a) Identification of the major features of all elements of the payload
- b) Mission planning and trajectory analysis
- c) Structural analysis and design, including mass properties, stress analysis, vehicle interface, deployment mechanisms
- d) Power system requirements and design, including load, batteries, voltage converters, and any other required power equipment
- e) Heat flow analysis and thermal management system design
- f) Communications link requirements, frequencies, antennas, receivers, transmitters
- g) Command and data handling system, including processor selection, command and telemetry requirements, data storage
- h) All interfaces to the sounding rocket and associated subsystems
- i) Cost estimate of production, deployment, and operations
- j) A detailed schedule of activities for development and deployment of the system
- k) A plan for analysis of the science data
- l) End-of-life disposal procedures