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Utah State University and NASA Launch Probes into Northern Lights | College of Engineering

01/28/2015

(From Archive) Originally posted January 28, 2015 – In the cold, nighttime skies over Alaska, a NASA Oriole IV suborbital sounding rocket blasted off from the Poker Flat Research Range today at 3:41 a.m. (MST) carrying six research payloads built by the Utah State University's Space Dynamics Laboratory into the Aurora Borealis as part of NASA's Auroral Spatial Structures Probe mission.

Preliminary data from the probes during flight to the ground station indicate that they performed as designed.

"The successful launch of the Auroral Spatial Structures Probe will enable scientists and satellite operators to better understand the energy processes during auroral activity in the thermosphere and its effects on satellites as they orbit Earth," said Professor Charles Swenson, director for the Center for Space Engineering at Utah State and the principal investigator for the ASSP mission. "Solar winds produce electric currents in the upper atmosphere where auroral activity occurs, and those currents produce heat that can expand the thermosphere which increases the drag on satellites significantly."

Swenson said that previous rocket missions have also measured the energy flow in the Aurora Borealis, but those measurements have only been taken at the points where a single launch vehicle passes over the aurora. The unique capability of the ASSP mission is that it launched one large central instrument, as well six small probes that were ejected from the main instrument in midflight creating a formation of probes over the aurora.

"Each of the smaller probes weighs about seven lbs. and has six inch diameters," said Tim Neilsen, SDL's program manager for ASSP. "They are ejected from the rocket in different directions at high velocity, essentially acting as space buoys, to create a network of measurements that will allow us to see the structure of the aurora over a much wider area than was possible before. Working with USU faculty and students on ASSP has continued a long relationship SDL has with NASA in service of the science community."

Because ASSP measures both the spatial and temporal variation of energy in the upper atmosphere, scientists at Utah State University, and elsewhere, will be able to understand when and where the Earth's thermosphere will heat and expand due to the Joule heating process. Satellite planners and operators will then be able to better plan and forecast the state of the thermosphere as they relate to satellite trajectories. This becomes increasingly valuable information during solar storms when large amounts of electromagnetic energy interact with Earth's upper atmosphere.

The College of Engineering at Utah State University is one of the premier engineering research and academic institutions in the western U.S. The College of Engineering houses many top experts who are innovating new advances in space instrumentation, water quality and bio-energy research. The college is comprised of more than 2,200 undergraduate students, 400 graduate students, award-winning faculty including 90 tenured or tenure track professors, nine research faculty, seven lecturers, and 75 staff members. The college has seven programs across six academic departments certified through the Accreditation Board of Engineering and Technology: Biological Engineering, Civil and Environmental Engineering, Computer Science, Electrical and Computer Engineering, Engineering Education and Mechanical and Aerospace Engineering. For more information about Utah State's College of Engineering, visit: www.engineering.usu.edu

A unit of the Utah State University Research Foundation, the Space Dynamics Laboratory is one of 14 University Affiliated Research Centers in the nation. Charged with applying basic research to the technology challenges presented in the military and science arenas, SDL has developed revolutionary solutions that are changing the way the world collects and uses data. SDL's core competencies are electro-optical sensor systems, calibration, thermal management, reconnaissance systems, and small satellite technologies. Headquartered in North Logan, Utah, SDL has operations in

Albuquerque, N.M.; Bedford, Mass.; Washington, D.C.; Los Angeles; Huntsville, Ala.; and Houston. For more information about the Space Dynamics Laboratory, visit: www.sdl.usu.edu/

Photo caption: A NASA Oriole IV suborbital sounding rocket blasts off from the Poker Flat Research Range, Alaska Wednesday at 3:41 a.m. (MST) carrying six research payloads built by the Utah State University's Space Dynamics Laboratory into the Aurora Borealis as part of NASA's Auroral Spatial Structures Probe mission. (Photo credit: NASA)

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