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UNH Scientists Launch Rocket Over Alaska To Study Pulsating Aurora

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DURHAM, N.H. -- A 65-foot-tall Black Brant XII sounding rocket carrying a unique, spinning camera built at the University of New Hampshire was launched from Alaska's Poker Flat Research Range in the early morning hours of February 12 and soared 460 miles above Earth to photograph a little-understood phenomenon known as pulsating aurora.

Scientist Marc Lessard of the UNH Institute for the Study of Earth, Oceans, and Space (EOS) and Department of Physics led the experiment. Lessard's Ph.D. student, Sarah Jones, designed the unique camera, which had to "despin" the digital imagery of the aurora taken from a rocket spinning at a rate of 60 revolutions per minute.

Pulsating aurora, unlike the well-known and spectacular aurora borealis or Northern Lights, is a subtle type of aurora that seems to blink on and off in large round patches. Pulsating auroras occur after the curtain-type displays of aurora borealis and are often missed by watchers who think the show is over.

Despite their small size, transient nature, and distance far above the surface of the Earth, Lessard notes that pulsating aurora pack quite an energetic punch. The power behind pulsating auroras is one of the mysteries Lessard and his colleagues would like to solve when they analyze data from the launch. Scientists think pulsating auroras get their power from the Van Allen belts, radiation belts far from Earth, unlike typical aurora displays, which are driven by processes a few hundred miles above the atmosphere.

Lessard's rocket experiment, complex even by rocket-science standards, had a main instrument cluster, known as a payload, and three sub-payloads, which separated early after the rocket cleared the upper atmosphere at an altitude of 143 miles. Two of the sub-payloads had their own rocket motors, propelling them away from the main payload where they obtained spatially separated measurements of the pulsating aurora.

Lessard's team also used the rocket to measure electrical current flow related to pulsating auroras and to produce visual images from within the pulsating aurora.

Since the instrument packages within the rocket radioed down their information about pulsating aurora during the flight, the rocket payloads will not be recovered.

The launch was carried out under the NASA-funded Rocket Observations of Pulsating Aurora (ROPA) program. Working with Lessard and Jones were collaborators from Dartmouth College, Cornell University, and the University of Alaska Fairbanks.

Photos available to download:

<http://www.unh.edu/news/img/ropa2.jpg>

All four stages of the 65-foot-tall Black Brant XII sounding rocket are shown being fired in this

photograph of the successful launch to study pulsating aurora. The foreground snow reflects the glow of the Northern Lights. Photo by Todd Valentic, SRI, Inc.

<http://www.unh.edu/news/img/21a.jpg>

Photo caption: Aurora borealis over Poker Flat Research Range near Fairbanks, Alaska. Showy displays like this commonly occurred as scientists waited weeks for the right conditions needed to launch a rocket to study ephemeral, poorly understood pulsating aurora. Photo by UNH graduate student Hyojin Kim.