National Aeronautics and Space Administration

Rocket Report

Sounding Rockets Program Office

2013

What's inside...

In Brief...

Plans are underway for the 2013 WRATS High School teacher workshop. The workshop is held at Wallops, June 17–21, 2013. Contact Linda Sherman (Linda.A.Sherman@nasa.gov) for more information.

RockON! registration is open through May 1, 2013. University and College students and faculty interested in participating should register at: **http://spacegrant.colorado.edu/national–programs/rockon–2013–home**

New staff members are welcomed to the Sounding Rockets Program Office. Tina Wessells is the new Resource Analyst and Julie Bloxom is the new Business Manager Specialist. Julie previously supported SRPO as the Resource Analyst.

41.107 NT West technology testflight successfully launched on January 29, 2013

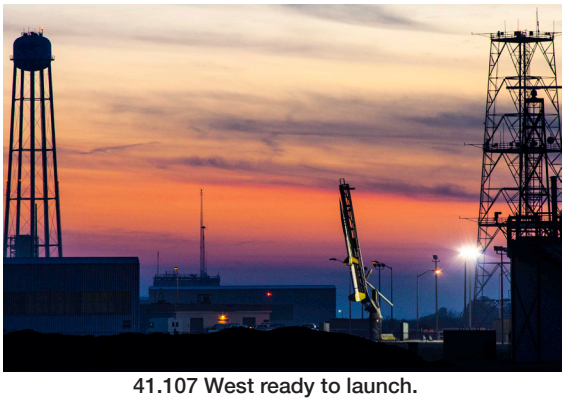

Photo by Berit Bland

41.107 West ready to launch.

The objective for this mission was to test two different methods for creating lithium vapor and to determine which configuration is best for observing various science phenomena in space.

Two canisters in the rocket's payload section contained solid metal lithium rods or chips embedded in a thermite cake. The thermite was ignited and produced heat to vaporize the lithium. The vapor

Continued on page 2.

49.001 GE Rowland – VISualizing Ion Outflow via Neutral atom imaging during a Substorm (VISIONS)

The VISualizing Ion Outflow via Neutral atom imaging during a Substorm (VISIONS) science objective is to understand: How, when, and where, are ions accelerated to escape velocities in the auroral zone below 1,000 km following a substorm onset. In order to achieve this objective, VISIONS utilized a combination of in situ measurements at altitudes up to 1,000 km and remote sensing over a volume of 1,000 km in diameter. VISIONS made the first measurements that can separate

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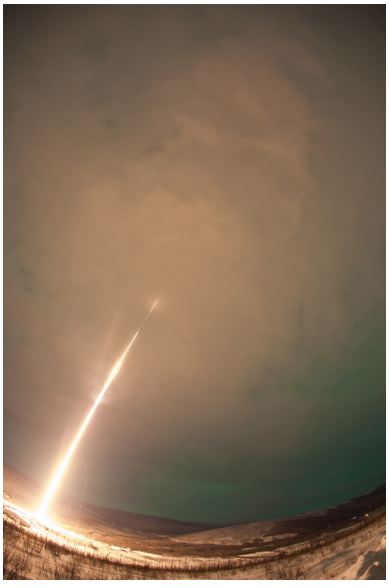


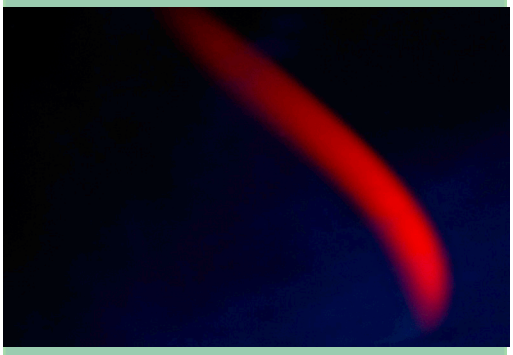
Photo by Wallops Imaging Lab

49.001 lift-off from Poker.

Rocket Report

41.107 cont.

was released in space to be detected and tracked optically. Two missions, scheduled for flight in 2013, will use lithium trails to assist scientists in observing events in space. The first is scheduled for April in the central Pacific Ocean from Kwajalein Atoll in the Marshall Islands and the second will occur in June at Wallops.



Lithium trail deployed from sounding rocket payload 41.107 NT launched on January 29, 2013.

41.104 GT Rosanova successfully launched

The primary purpose of the mission was to verify the ground based command uplink equipment after it was recently moved into a new facility at White Sands.

Technology improvements tested on this mission included: an upgrade to the solar Pointing Attitude Rocket Control System (PSARCS), double the telemetry data rate to 20 Mbit/s; flight test a standard on-board data recording system and develop a low-cost attitude determination sensor package.

Additionally, the mission provided an educational experience for students at the White Sands Middle School.

Photo by WSMR

Giovanni and Charlie on payload recovery.

VISIONS cont.

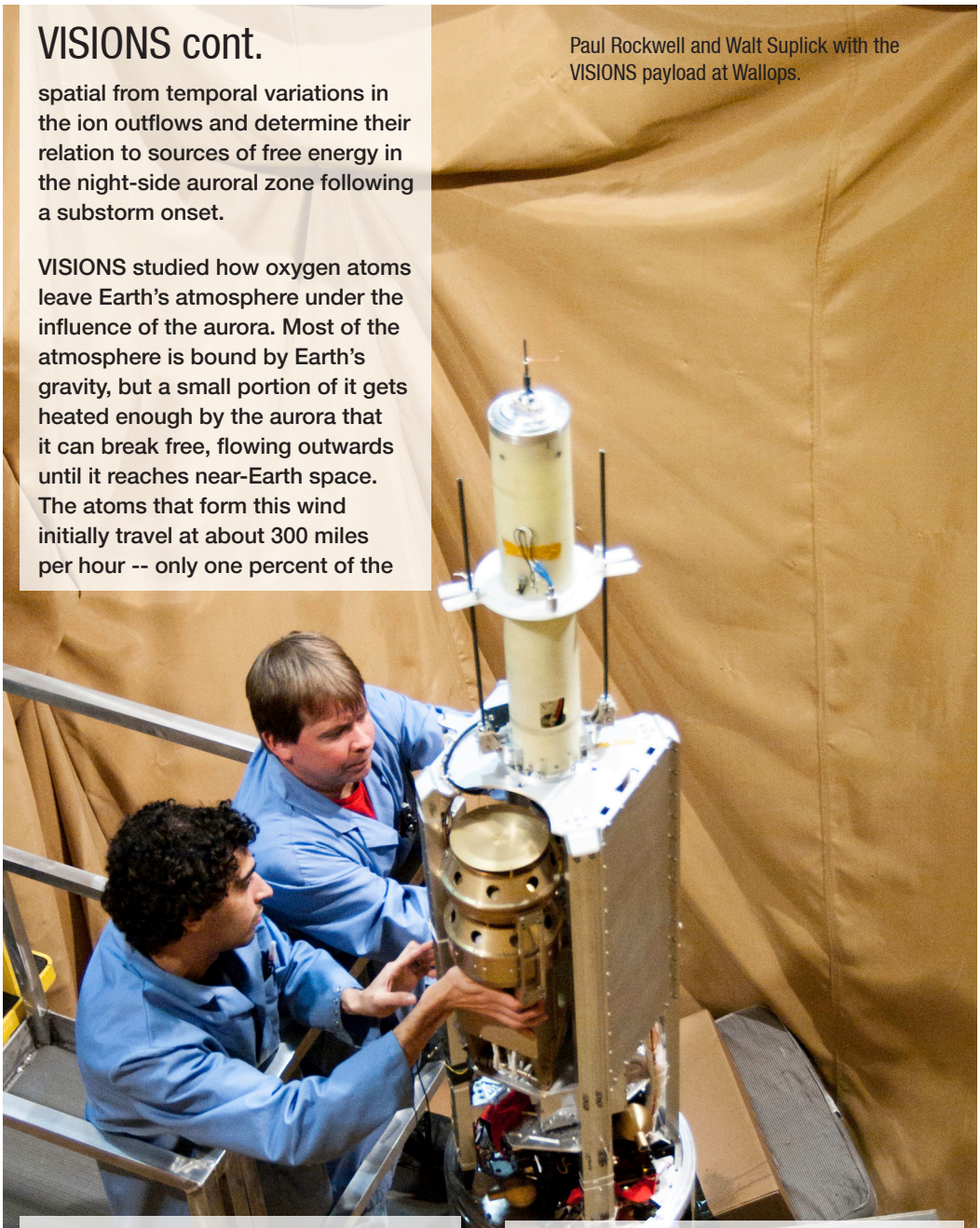
spatial from temporal variations in the ion outflows and determine their relation to sources of free energy in the night-side auroral zone following a substorm onset.

VISIONS studied how oxygen atoms leave Earth's atmosphere under the influence of the aurora. Most of the atmosphere is bound by Earth's gravity, but a small portion of it gets heated enough by the aurora that it can break free, flowing outwards until it reaches near-Earth space. The atoms that form this wind initially travel at about 300 miles per hour -- only one percent of the speed needed to overcome gravity and leave Earth's atmosphere.

The key instrument is Goddard's MIniaturized Low-energy Energetic Neutral Atom imager (MILENA) which directly observed the oxygen flowing out of the atmosphere. MILENA contains twin imagers that observed the oxygen further along on its journey, after it has stolen an electron from a neutral gas atom in the atmosphere. This allows the oxygen to break free from its magnetic prison and travel a long distance, where it can be detected remotely. By mapping the oxygen, MILENA acts as a type of camera that builds up a picture of the auroral wind using oxygen atoms instead of light.

The other instruments aboard VISIONS, including the Rocket-borne Auroral Imager (RAI), the Fields and Thermal Plasma (FTP) instrument, and the Energetic Electron Analyzer/Energetic Ion Analyzer (EEA/EIA), worked with MILENA to detect where the auroral activity occurs and measure the auroral energy that heats the oxygen. Goddard provided MILENA and the FTP, while the RAI and EEA/EIA instruments are provided by The Aerospace Corporation of El Segundo, Calif.

This was the first operational flight of the new sounding rocket vehicle, the four stage Oriole IV (Talos-Terrier-Oriole-Nihka).



Paul Rockwell and Walt Suplick with the VISIONS payload at Wallops.

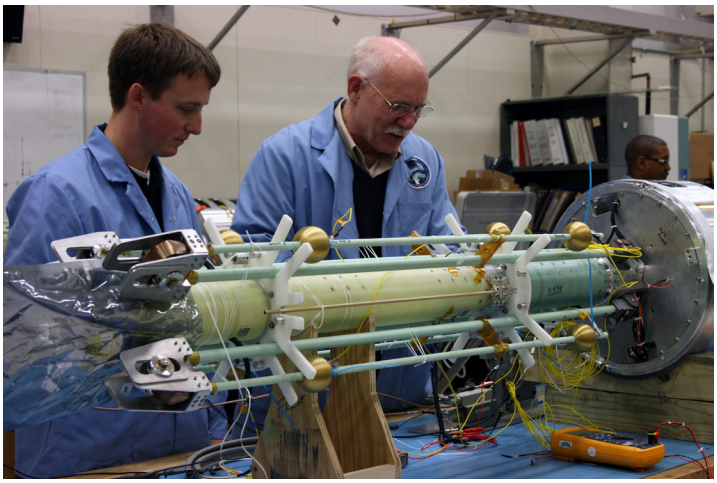
Source for information about VISIONS : Claire De Saravia/GSFC, http://www.nasa.gov/mission_pages/sunearth/news/visions-aurora.html

Integration and Testing

46.001 & 45.005 Kudeki – Equatorial Vortex Experiment (EVEX)

The EVEX mission is scheduled for launch from the Kwajalein Atoll in the Marshall Island in April 2013. The scientific objective of EVEX involves a study of space weather in a layer of Earth's atmosphere referred to as the ionosphere. More specifically, this experiment will study the circulation of ionospheric plasma (ionized gas) just after sunset. The intensity of circulation in the equatorial ionosphere is assumed to be related to post-sunset ionospheric storms that affect satellite communication and navigation systems and signals. The Kwajalein Atoll in the Marshall Islands is ideally suited for testing this theory as it is very close to the magnetic equator where these storms are most intense. The experiment will measure electric fields, plasma velocity, neutral winds and plasma densities during the early stages for these storms. Two sounding rockets, a Terrier-Improved Malemute and an Oriole II (Terrier-Oriole), will be launched for the EVEX mission.

AFRL's Metal Oxide Space Cloud experiment (MOSC) science mission is scheduled for launch from Kwajalein during the same time frame. Two Terrier-Orion sounding rockets will be launched for MOSC.



Max Fowle and Dr. Rob Pfaff at Wallops for pre–flight instrument checks.

Rob, Paulo and Mark preparing an EVEX payload for Magnetic Calibration.

RockON! team tests new workshop payload

The RockOn! student flight opportunity is scheduled for launch on June 20, 2013. This will be the 6th flight of the mission providing University level students with an opportunity to build and fly an experiment to space. RockOn! is managed by the Colorado Space Grant Consortium and applications to participate are available until May 1, 2013 at: http://spacegrant.colorado.edu/national-programs/rockon-2013-home

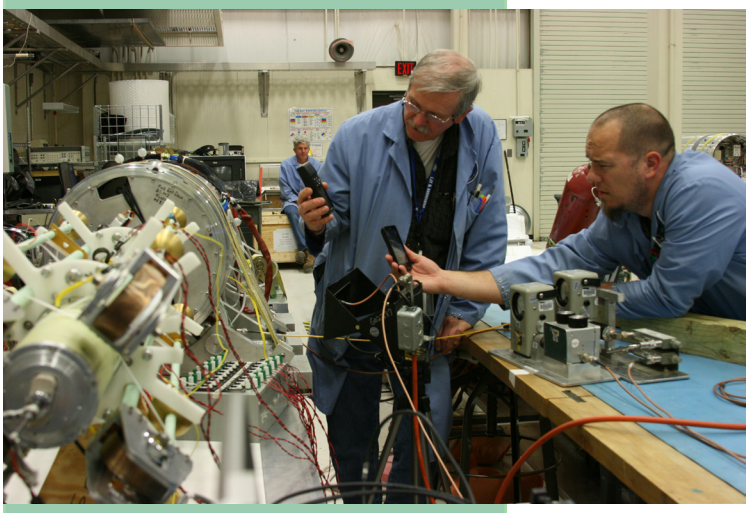
The new Arduino based workshop payload was vibration tested at Wallops in March.

Additional student flight opportunities include RockSat-C (http://spacegrant.colorado.edu/national-programs/rocksatc-home) and RockSat-X (http://spacegrant.colorado.edu/national-programs/rs-x-home).

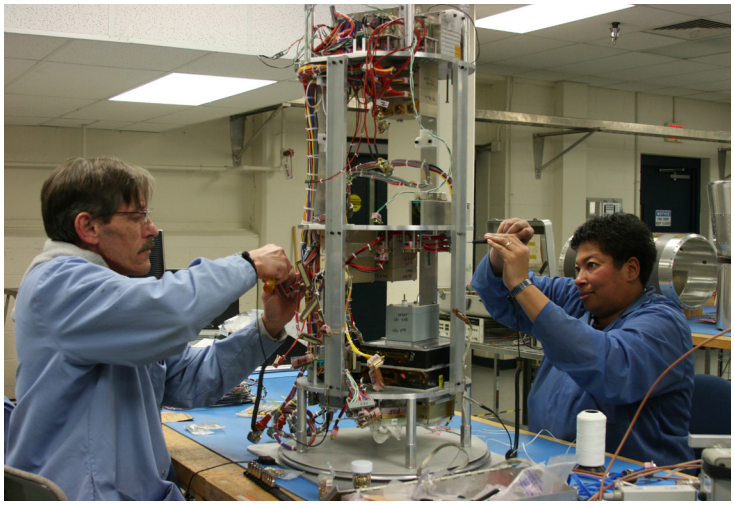
Teamwork!

Picture Place

Mackenzie and Karl preparing for a drop test.

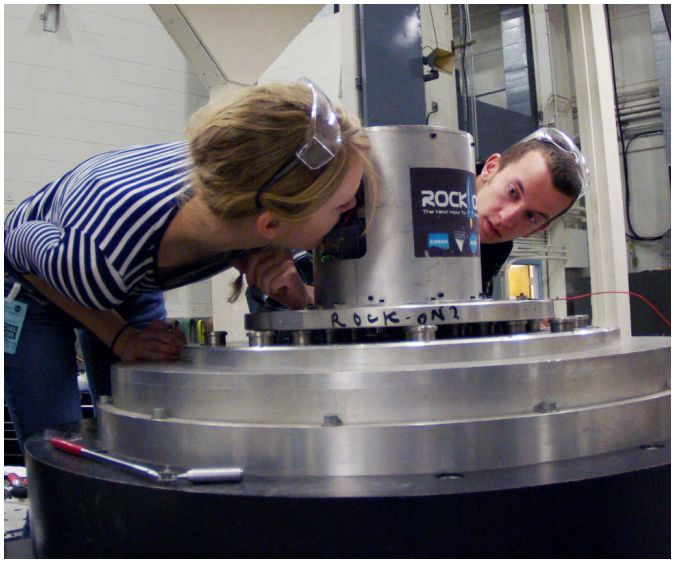


Bill and Christian comparing GPS signals.



Clay and Bernita with the Harris payload.

Tom and Paul vibration testing a new deployment mechanism for the Daytime Dynamo missions.



Post vibe check out of the RockOn! payload.

Rocket Report

Want to contribute?

Working on something interesting, or have an idea for a story? Please let us know, we'd love to put it in print!

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Launch Schedule

April
36.269 GS RABIN/NASA–GSFC WS
36.271 UG FRANCE/UNIVERSITY OF COLORADO WS
36.235 US HARRIS/UNIV. OF CALIFORNIA, DAVIS WS
46.001 UE KUDEKI/UNIVERSITY OF ILLINOIS KWAJ
45.005 UE KUDEKI/UNIVERSITY OF ILLINOIS KWAJ

May
36.268 UG MCCANDLISS/JHU WS
36.239 DS KORENDYKE/NRL WS

June
40.030 UG BOCK/CAL TECH WI
41.106 UO KOEHLER/UNIV. OF COLORADO WI
21.140 GE PFAFF/NASA–GSFC WI
41.090 GE PFAFF/NASA–GSFC WI

July
46.006 GT ROSANOVA/NASA/GSFC–WFF WI

August
46.005 UO KOEHLER/UNIV. OF COLORADO WI

September
36.253 US HASSLER/SWRI WS
36.288 DS VOURLIDAS/NRL WS
36.245 UH FIGUEROA/MIT WS

October
36.281 UE BOCK/CAL TECH WS
36.290 UE WOODS/UNIV. OF COLORADO WS

November
36.261 UG CLARKE/BOSTON UNIVERSITY WS

December
36.259 GH GENDREAU/NASA–GSFC WS

WS – White Sands
WI –Wallops Island
KWAJ – Kwajalein Atoll, Marshall Island

From the Archives

Steve Powell, Cornell University and Rob Pfaff, Goddard Space Flight Center, prepare E-Region Rocket/ Radar Instability Study (ERRRIS) II instruments for flight, February 1989 at Esrange in Sweden.

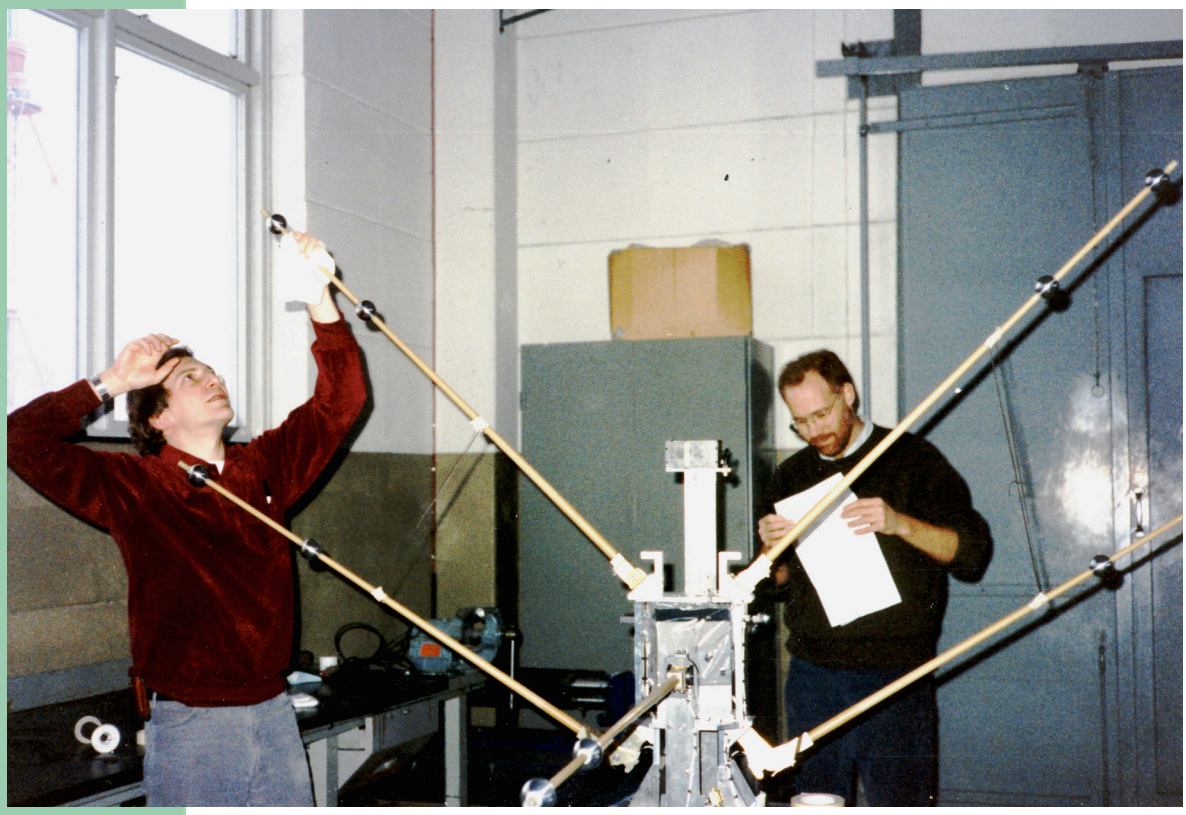

Photo by Geoff Bland