National Aeronautics and Space Administration

Rocket Report

4 1 3 2 2010

Sounding Rockets Program Office

What's Inside...

In Brief...

The Sounding Rocket Working Group meeting was held June 10 – 11, 2010. Visit the website at http://rscience.gsfc.nasa.gov/index.html for more information.

NSROC and SRPO participated in the Wallops Open House. NSROC arranged tours through the testing and fabrication areas and SRPO had an exhibit at the "mall". The Open House event attracted 12,000 visitors.

The Colorado Space Grant Consortium has outlined a concept for a University Ride Share educational program.

A briefing on the Extended Duration Sounding Rocket (EDSR) concept was conducted for the Astrophysics and Heliophysics groups at NASA HQ.

Twelve NSROC interns will participate in the Wallops Rocket Academy for Teachers and Students (WRATS) pilot project. Model rockets will be built, analyzed and flown as a test case for future High School projects.

Photos by Visual Information Branch/White Sands Missile Range

36.258 Woods team with vehicle ready to launch.

36.258 UE – Woods calibrates instrument on NASA's new solar observatory.

36.258 UE – Woods completed the first of five underflight calibrations of the Extreme Ultraviolet Variability Experiment (EVE) onboard NASA's latest heliophysics spacecraft, the Solar Dynamics Observatory (SDO).

Launched on February 11, 2010 from Cape Canaveral, FL the primary scientific goal of SDO is to enable us to better understand and predict solar variations that influcene life on Earth and humanity's technological systems. SDO will study how the Sun's magnetic field is generated and structured, and how the stored magnetic energy is converted and released into the heliosphere and geospace in the form of solar wind, energetic particles and variations in the solar irradiance.

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36.270 UG Green launched from White Sands

36.270 UG –Green was launched from White Sands Missile Range, NM on May 21, 2010.

The purpose of this mission is to sample the interface at the local cavity wall and determine whether the gas at the interface is flowing into the cavity or away from it.

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Photos by Visual Information Branch/White Sands Missile Range

36.270 UG launch team with vehicle ready to launch.

36.258 UE - Woods cont.

SDO has three main instruments: the Helioseismic and Magnetic Imager (HMI) which looks inside the Sun to map the flows of plasma that generate solar magnetic fields, the Atmospheric Imaging Assembly (AIA) which takes pictures of the Sun's atmosphere where the Sun's magnetic fields change shape and release energy, and the Extreme Ultraviolet Variability Experiment (EVE).

The EVE measures the Sun's constantly changing ultraviolet brightness. Rapid changes in the ultraviolet radiation of the Sun can cause temporary outages in radio communications and electrical systems on satellites orbiting the Earth. EVE will take measurements of the Sun's brightness as often as every ten seconds, providing space weather forecasters with warnings of possible outages that can be used to alert mission teams to take preventative measures to protect their electronic systems. By comparing EVE's measure–ments with pictures taken at the same time by AIA, scientists can learn where the change in brightness came from and whether it was a flare, a CME, or some other event. The HMI will then reveal the magnetic and plasma flow activities behind the event.

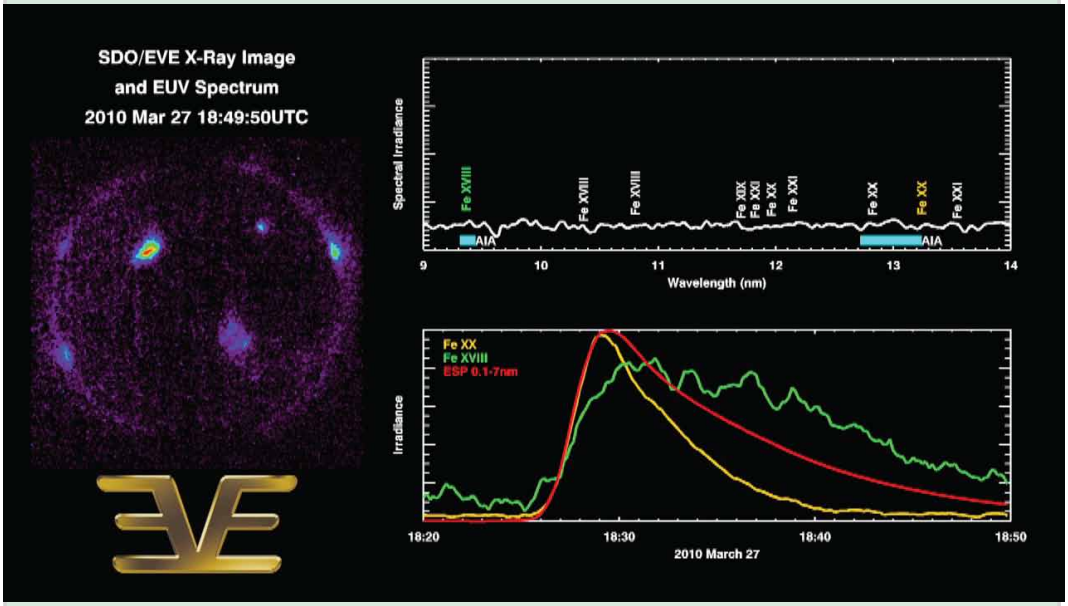
The EVE instrument for SDO is provided by the University of Colorado, LASP and the Principal Investigator is Dr. Tom Woods.

The prototype EVE instrument was originally flown on a sounding rocket, 36.233 in 2006.

Information from the SDO website:
http://sdo.gsfc.nasa.gov/
Colorado EVE website:
http://lasp.colorado.edu/eve/index.htm
and the GSFC NEWS Tech Transfer, Vol 7, No.3 Winter 2009

Photos by Visual Information Branch/White Sands Missile Range

36.258 launches from White Sands Missile Range, NM



The solar X–ray image from EVE is shown in the left panel. An X–ray image only shows the active regions on the sun. The top right panel shows a small part of the solar EUV spectrum. The bottom right panel shows the time series of just three emissions.Credit: Laboratory for Atmospheric and Space Physics / University of Colorado in Boulder, LASP/CU. See more: http://sdo.gsfc.nasa.gov/gallery/firstlight.php

36.270 UG - Green cont.

The Diffuse Interstellar Cloud Experiment (DICE) is designed to record high resolution (R ~ 60,000) spectra of the O VI doublet (1032 Å, 1038 Å). The selected targets, δ Sco and π Sco, separated by only ~ 10 arsecs, lie on opposite sides of a nearby hot/cold gas interface. The Local Inter Stellar Medium (LISM) provides an excellent laboratory for studying interstellar gas dynamics and the distribution of energy and matter throughout the Galaxy. Understanding the role of O VI in our own neighborhood will aid in analyzing the ISM of galaxies through the universe.

Photos by Visual Information Branch/White Sands Missile Range

Recovery of 36.270 UG Green

International cooperation

A team from the Japanese space agency, JAXA, visited Wallops to discuss the U.S./Japan collaboration that is part of the Daytime Dynamo Experiment. Four rockets, two single stage Black Brants and two Terrier–Orions will be launched as part of this experiment. The Japanese space agency will provide lithium release canisters that will be flown as part of the experiment to measure the daytime neutral wind profile. The Principal Inves–tigator is Dr. Rob Pfaff/NASA Goddard Space Flight Center with co–investigators from The Aerospace Corporation, Clemson University, University of Colorado Boulder and Applied Physics Lab.

Photo by Dr. Miguel Larsen/Clemson University.

Meeting with JAXA scientists at Wallops.

Integration and Testing

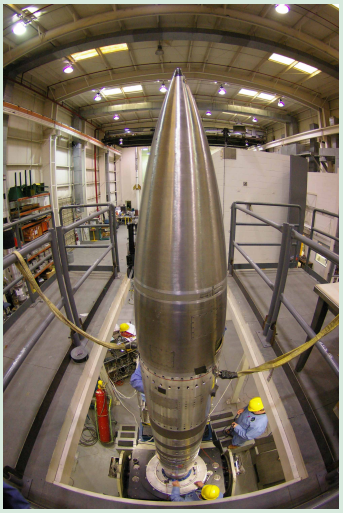
Heyne 41.087 NT – Terrain Relative Navigation and Em–ployee Development (TRaiNED) testing completed.

41.087 NT Team with payload in the background.

Justin Babcock (left) and Bernita Justis with the payload in the deployment bay.

Camera testing.

GPS checks.



Payload on vibration table.

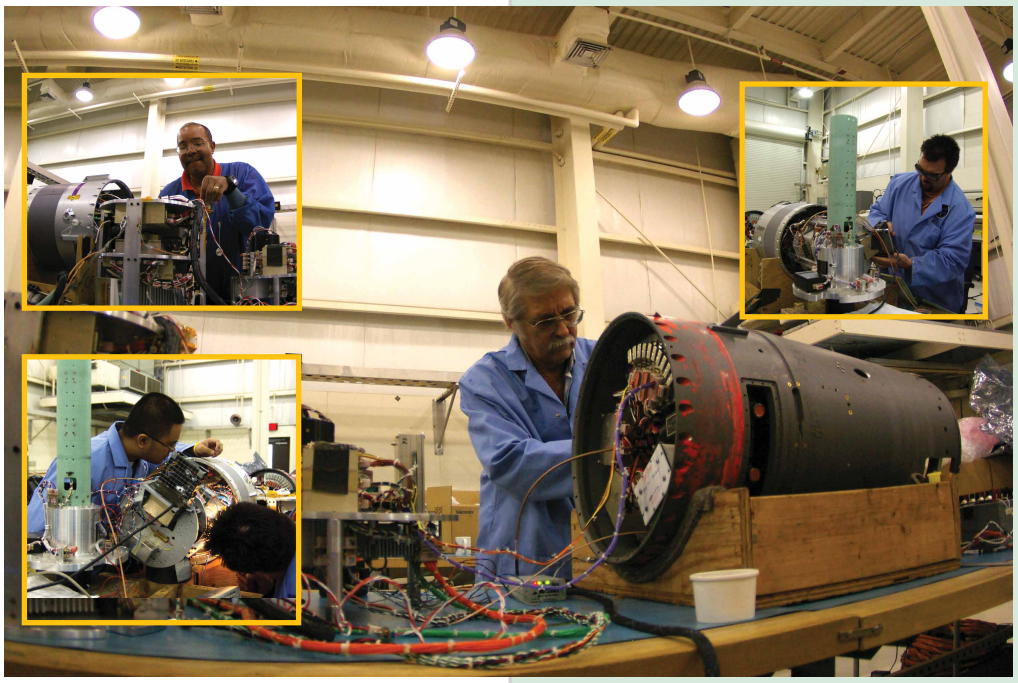
41.082 NP – Bull – Sub–TEC III

The Sub–TEC III includes experiments from NASA, NSROC and the FAA. The Autonomous Flight Safety System (AFSS) is the primary experiment on this Sub–TEC mission. NASA's Kennedy Space Center and Goddard Space Flight Center are collaborating on this non traditional Flight Termination System (FTS). The AFSS uses rules–based decision software and onboard sensors to terminate a flight autono–mously.

In addition to AFSS, Sub–TEC III includes several NSROC experiments and the Automatic Dependent Surveillance–Broadcast experiment from the FAA.

Currently the Sub–TEC III mission is scheduled for flight from Wallops Island, VA in July 2010.

Integration pictures: Background, Eric Johnson. Bottom left, Eduardo Lagman with Eric Taylor, top left, Greg Waters and top right, Eric Taylor.



RockOn! Third Annual student flight opportu–nity.

In June the Colorado and Virginia Space Grant Consortia, supported by the NASA Sounding Rockets Program Office, the NASA Sounding Rocket Operations Contract (NSROC) and the NASA Space Grant Office at NASA Headquarters, arranged the third successful RockOn! mission.

University students and faculty from around the country arrived at Wallops on Saturday, June 19th to participate in a weeklong space flight workshop. During the workshop participants learn how to build, test, integrate and fly an experiment on a NASA sound–ing rocket.

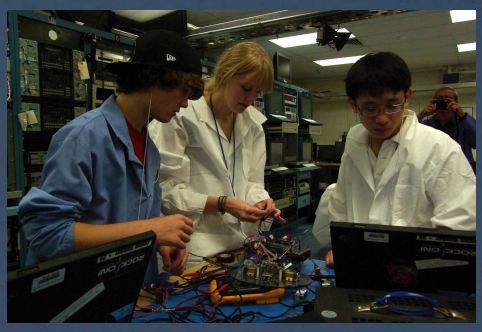
Working in teams of three or four, each group receives an experiment kit consisting of an AVR micropro–cessor, various sensors, mounting hardware and programming software. From this box of hardware, by mid–week, emerged a complete space–flight experiment with datalogging capability.

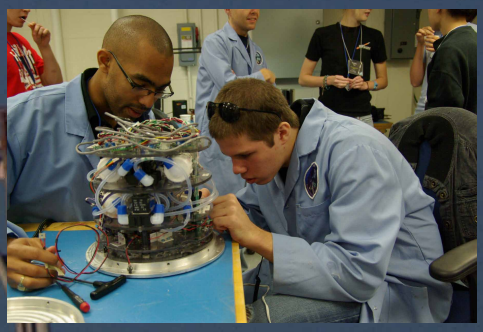
Chris Koehler, Director of the Colo–rado Space Grant Consortium, is the instructor for the RockOn! workshop. He is assisted by several students from the University of Colorado. These students have been intimately involved in creating the experiment package and the software routines that enable collection of data during the flight.

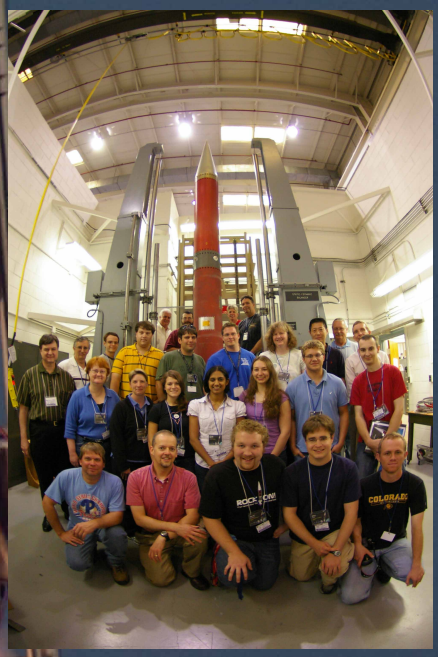
The payload also contains seven RockSat–C canisters, which house custom built self–contained experiment provided by selected universities. Each experiment was selected for a flight opportunity as part of a competitive selection process. RockSat–C experiments are provided by University of North–ern Colorado, Colorado State University College of Engineering, Temple Univ. of Louisiana at Lafayette, University of Colorado at Boulder, University of Minne–sota, West Virginia University, University of Puerto Rico, University of Wyoming, Virginia Tech, and College of Menominee Nation.

On launch day the teams head out to Wallops Island early in the morning. The launch window opens at 6 a.m. and the count–down started a few hours before that. As the count nears zero, the crowd's excitement rises and the last ten seconds are almost heart stopping. The viewers aid in the count and on T – 0, the Terrier booster ignites with a roar. A short burning booster, the Terrier burns out after about five seconds, and the Orion sustainer takes over after a short coast phase. At an altitude of about 110 km the payload separates from the Orion and coasts to reach an apogee of 117 km. On the downleg a parachute is deployed to soften the impact of the payload. The payload is sealed and remains floating in the water until it is picked up by the recovey boat.

Once the payload is back at Wallops Flight Facility the the experiments are returned to the students and post–flight checks and data analysis can begin.







Picture Place...

① John Gsell inspecting the Heyne payload.

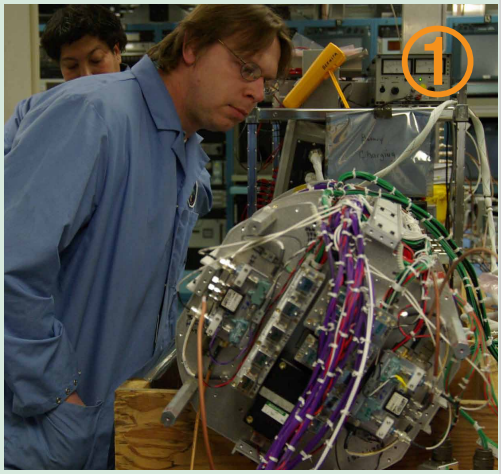
② 41.087 Heyne on the vibration table.

③ Bruce Scott (No.1 –left) and Pat Bradley (No.2 – right)

④ Bill Doughty preparing for Heyne GPS testing.

⑤ Heyne team posing for group photo.

⑥ Teamwork; Ronnie Ridley and Charlie Cathell.



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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Upcoming Launches

June
36.265 UG BOCK/CAL TECH UNIVERSITY WS
36.213 NS DAVIS/MSFC WS
41.087 NT HEYNE/JPL WS
41.088 UO KOEHLER/UNIV. OF COLORADO WI

August
36.219 US HASSLER/SWRI WS
12.073 GT HALL/NASA WFF
36.261 UG CLARK/BOSTON UNIVERSITY WS

September
36.269 GS RABIN/NASA-GSFC WS
36.264 UH MCCAMMON/UNIV. OF WISCONSIN WS
36.225 UG CHAKRABARTI/BOSTON UNIVERSITY WS

TBD
12.069 GT HICKMAN/NASA-WFF WI
12.070 GT HICKMAN/NASA-WFF WI
12.071 GT HICKMAN/NASA-WFF WI
12.072 GT HICKMAN/NASA-WFF WI

Note! White Sands (WS) launch dates are subject to adjustment depending on hardware availability.

From the Archives...

Elton Williams (left), Eric John–son (center) and Jack Bredin (right) some years ago. Photo provided by Eric Johnson.