



What's inside...

- 2 Features
- 3 Integration and Testing
- 4 Other news
- 5 Picture Place
- 6 Schedule & Miscellanea

Rocket report

4 1
3 2 2015

Sounding Rockets Program Office

In Brief...

The Sounding Rocket Working Group (SRWG) meeting was held in June at Goddard Greenbelt. For more on the SRWG, see <http://rscience.gsfc.nasa.gov/>

The NSROC launcher group is at Poker Flat Research Range, AK performing launcher maintenance for the upcoming winter campaign.

A successful deployment test of the newly designed clamshell payload skin has been completed. The clamshell design will allow internal sections of the payload to be exposed to the space environment.

The planned Australia campaign is currently scheduled for 2017.

SRPO and NSROC representatives attended the ESA/PAC meeting in Norway.

46.008 UO Koehler - RockSat-X was successfully launched from Wallops Island on April 18, 2015.



RockSat-X lift-off from Wallops Island, April 18, 2015.

RockSat-X is an advanced student flight opportunity and the third step in a three tier student mission lineup. This was the fourth flight of the RockSat-X payload.

RockSat-X participants have completed two types of student experiments, RockOn and RockSat-C, prior to flying in this more advanced mission.

The rocket carried experiments developed by undergraduate students from the University of Colorado in Boulder, Northwest Nazarene University in Nampa, Idaho, the University of Puerto Rico, the University of Nebraska in Lincoln and Virginia Tech in Blacksburg.

The participating universities in this RockSat-X flight and their experiment descriptions follow.

University of Colorado Boulder (CUB):

The objective of this mission is to generate a sample of an immiscible alloy composed

RockSat-X continued

of 80% aluminum and 20% indium by mass to investigate the effect of solidification in microgravity on the microstructure. The powdered aluminum indium mixture will be melted via induction heating and the sample created in microgravity will be compared to ground samples after the flight.

Northwest Nazarene University (NNU):

The mission objective is to release several 3D printed airfoil shapes into space to test for flight stability in low atmospheric conditions. In addition, flexible sensors are mounted to the airfoil structures and acceleration and temperature data is transmitted via RF communications from the airfoil to the main experiment structure. This data will help determine ideal structures and sensor capabilities for data reconnaissance of an extraterrestrial body.

University of Puerto Rico (UPR):

The payload will include an impact detection system with the use of a Piezo Electric Sensor and an aerogel to collect micrometeorites. The system deploys the sterilized collect system into the space environment during the flight, which is later retracted and sealed before re-entry. The system contains organic polymer collectors that will gather amino acids, proteins and DNA to potentially prove the presence of life at 43 to 99 miles above Earth. The micro-particles will be analyzed via next generation genomics.

University of Nebraska Lincoln (UNL):

The mission objective is to analyze the difference between crystal growth in

microgravity and normal gravity on Earth. This will be accomplished by crystallizing super saturated samples of sodium acetate trihydrate (SAT) while the experiment is in the microgravity environment.

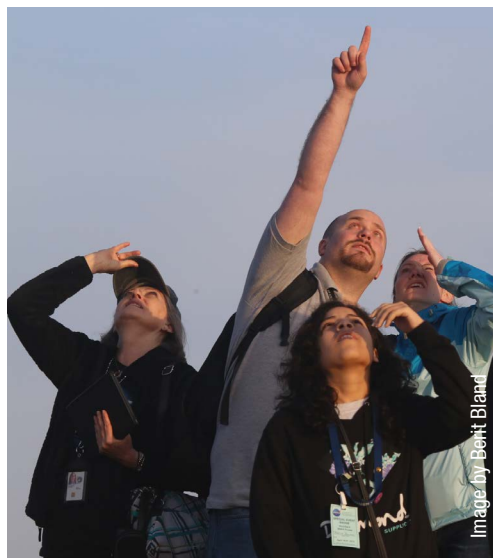
Virginia Tech (VT):

The experiment aims to test two mechanisms. The first is the deployment of the VT Space Pressure Sensor Aperture Cover Release Mechanism, which utilizes a thermal cutting device that releases an intricate latch system for use in future projects. Second, an Optical Nitric Oxide Sensor will be used to determine NO concentration at high altitudes. Additionally, the experiment houses a system of cameras for recording panoramic video which will be used to create a virtual reality simulation of the flight.

Video Payload (XHED):

The University of Colorado Boulder video payload is designed to capture HD video of the experiments during flight operations. This is done using eight HD video cameras, four of which are deployed to obtain a better view of the experiment section before being retracted for re-entry.

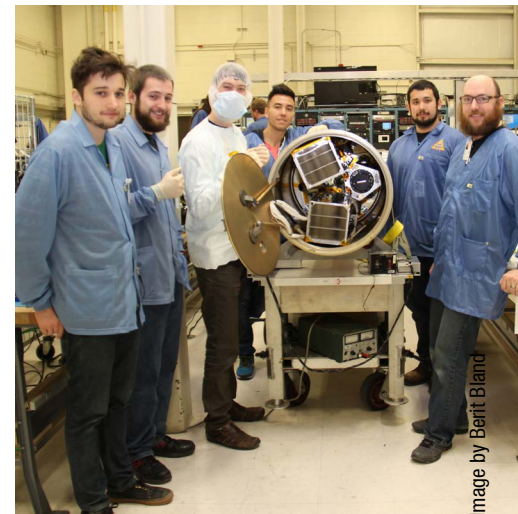
The payload, with the experiments, flew to an altitude of 154.3 km and was recovered off the coast of Virginia.



Dr. Joyce Winterton with VA Space Coast Scholars representatives watch RockSat-X ascend.

36.292 UH McEntaffer - Off-plane Grating Rocket for Extended Source Spectroscopy (OGRESS) launched successfully on May 2, 2015.

The purpose of the Off-plane Grating Rocket for Extended Source Spectroscopy (OGRESS) is to provide high spectral resolving power for large diffuse X-ray sources. The target for this mission was the Cygnus Loop supernova remnant which is one of the brightest and largest soft X-ray emitters in the sky. The payload also contained a critical NASA X-ray technology – off-plane reflection grating arrays. Combined with parallel technology development efforts, this mission provided a flight proving platform for future X-ray missions.



OGRESS team members at Wallops for integration activities.

36.300 UE Woods launched from WSMR, NM on May 21, 2015.

The primary objective for this mission was to provide an underflight calibration for the EUV Variability Experiment (EVE) aboard the NASA Solar Dynamics Observatory (SDO) satellite. The EVE program provides solar EUV irradiance data for NASA's Living with the Star (LWS) program, including near real-time data products for use in operational atmospheric models that specify the space environment and to assist in forecasting space weather operations.

Education – RockOn/RockSat-C and Wallops Rocketry Academy for Teachers and Students (WRATS)



Another successful student mission, RockOn/RockSat-C was flown from Wallops Island, VA on June 25, 2015. This was the eight flight of RockOn experiments and the seventh for RockSat-C.

A record number of RockOn participants from around the country built their experiments during the one week workshop held at NASA GSFC Wallops Flight Facility.

The RockOn/RockSat-C programs are a cooperative effort between the [Colorado](#) and [Virginia Space Grant](#) Consortia and NASA. The programs are designed for College level students and faculty.

The RockOn participants arrive at Wallops on Saturday before the launch and build experiments from kits provided by the Colorado Space Grant Consortium. The kits include sensors, such as accelerometers, thermistors, and geiger counters, which are integrated with a datalogger to collect data during the flight.

RockSat-C experiments are the second level of student experiments, more advanced than the kit based RockOn experiments and are completely designed by student teams sharing space in payload canisters. Twelve teams built RockSat-C experiments for this flight.

In addition to the RockOn and RockSat-C experiments this year's mission included 80 [Cubes in Space](#) experiments. Cubes in Space facilitates experiments built by students ages 11 - 14.

The Terrier-Improved Orion rocket carrying the RockOn/RockSat-C experiments flew to an altitude of 115 km and was recovered off the coast of Virginia.



RockSat-C teams posing with their payload on the vibration table at Wallops Flight Facility. After the vibration testing was completed, the students checked out their experiments to make sure they had survived the testing.

Wallops Rocketry Academy for Teachers and Students (WRATS)

The [WRATS](#) workshop is intended for High School STEM teachers and familiarizes the participants with the physics of rocketry through interactive lectures and hands-on activities.

During the five day workshop teachers construct a model rocket and a payload and conduct a flight test of their system collecting data on pressure, acceleration and temperature during the flight.

Additional activities include tours of Wallops Flight Facility and viewing of the RockOn sounding rocket launch on Wallops Island. More about WRATS: <http://sites.wff.nasa.gov/code810/educators.html>



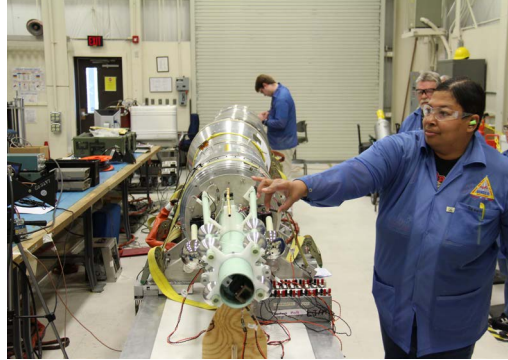
Integration and Testing

39.012 DR Bernhardt Charged Aerosol Release Experiment (CARE) II

The CARE II mission will examine the effect of artificially-created, charged particulate layers on the scatter of UHF, L-Band and S-Band radars. CARE II will study the exhaust plume physics including Magnetohydrodynamic (MHD) waves and electric fields. The optical signature will be measured from scattered sunlight and ion-molecule-electron reactions. The CARE II mission will launch from Norway in September 2015



Payload sequence test.



Checking the magnetometer.



Stowing booms on the CARE payload after successful deployment testing.

36.313 NP Milliner

Two experiments from Space Technology Mission Directorate (STMD) Flight Opportunity program are supported by this mission. PI Marc Murbach from Ames Research Center is providing the Exo-brake experiment. The Exo-brake experiment is a passive means of de-orbiting an object. Marc Gibson from Glenn Research Center is providing the Radial Core Heat Spreader (RCHS) experiment. The Radial Core Heat Spreader is a method of thermal energy conversion, for use with space power. The Milliner mission will launch from Wallops Island in July 2015.



Milliner payload outside F-10 for GPS testing.



The Ames science team, with PI Marc Murbach center, at Wallops for integration.

All images by Berit Bland



Bill running the ground station for pre-vibe sequence test for the CARE II payload.



Tom multi tasking.



Irvin removing the Cubes in Space experiment after flight.



Nate installing the NSROC Optical Technology System (NOTS) v. 1.0.



Zeb is giving a tour to the WRATS teachers.

All images by Berit Bland

Rocket Report

Picture Place

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!

Contact:
 Chuck Brodell
 Phone: #1827
 Email: Charles.L.Brodell@nasa.gov

or

Berit Bland
 Phone: #2246
 Email: Berit.H.Bland@nasa.gov

Launch Schedule

| MISSION | DISCIPLINE | EXPERIMENTER | ORGANIZATION | PROJECT | RANGEDATE | TIME |
|------------------|-----------------------------|--------------|-----------------------------|-----------|------------|-------|
| <i>July</i> | | | | | | |
| 36.313 NP | SPECIAL PROJECTS | MILLINER | NASA-WFF | | WI 7-Jul | DAY |
| <i>August</i> | | | | | | |
| 46.012 UO | STUDENT OUTREACH | KOEHLER | UNIV. OF COLORADO | ROCKSAT-X | WI 11-Aug | DAY |
| 36.282 US | SOLAR & HELIOSPHERIC | KANKELBORG | MONTANA STATE UNIV. | MOSES #2 | WS 25 -Aug | DAY |
| <i>September</i> | | | | | | |
| 36.291 US | SOLAR & HELIOSPHERIC | WINEBARGER | U.OF ALABAMA/ HUNTSVILLE | CLASP | WS 3-Sep | DAY |
| 39.012 DR | DOD | BERNHARDT | NRL | CARE II | NOR 7-Sep | NIGHT |
| 46.011 GP | SPECIAL PROJECTS | MILLINER | NASA-WFF | MUSIC | WI 11-Sep | DAY |
| 36.310 GT | TEST & SUPPORT | HESH | GSFC-WFF | | WI 16-Sep | DAY |
| 12.083 CR | DOD/NESC | GILBERT | NESC | SPRINT | WS 17-Sep | DAY |
| <i>October</i> | | | | | | |
| 36.312 UG | UV/OPTICAL ASTROPHYSICS | MCCANDLISS | JOHNS HOPKINS UNIVERSITY | FORTIS | WS 10-Oct | DAY |
| 36.293 UG | UV/OPTICAL ASTROPHYSICS | CHAKRABARTI | UNIV OF MASS - LOWELL | PICTURE | WS 22-Oct | DAY |
| 36.307 DS | SOLAR & HELIOSPHERIC | MOSES | NAVAL RESEARCH LAB | HERSCHEL | WS 31-Oct | DAY |
| <i>November</i> | | | | | | |
| 52.002 UE | GEOSPACE SCIENCE | LESSARD | UNIV. OF NEW HAMPSHIRE | RENU 2 | NOR 10-Nov | NIGHT |
| 49.003 UE | GEOSPACE SCIENCE | LABELLE | DARTMOUTH COLLEGE | CAPER | NOR 10-Nov | NIGHT |
| 36.297 UG | UV/OPTICAL ASTROPHYSICS | FRANCE | UNIVERSITY OF COLORADO | CHESS-2 | WS 17-Nov | DAY |
| <i>December</i> | | | | | | |
| 36.305 UH | HIGH ENERGY ASTROPHYSICS | GALEAZZI | UNIVERSITY OF MIAMI | DXL-2 | WS 4-Dec | DAY |

WS - White Sands
 WI - Wallops Island
 NOR - Norway

Lars Ljunge from RUAG is presented with at Black Brant IX model by Phil Eberspacher and Joe Schafer at the ESA/PAC meeting held in Norway in June.

The model, which included the S19 system, was made in the machine shop by a team consisting of Bob Jillard, Mike Bradshaw, Harold Farrington, and Dana Crouch.

Lars is retiring after many years of service which includes supporting S19 operations for sounding rockets. He will now travel for leisure.

