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Rocket report

2016

Sounding Rockets Program Office

In Brief...

The Sounding Rocket Working Group (SRWG) meeting was held in Greenbelt on June 7, 2016.

Next Peregrine static fire is scheduled for August 5, 2016 on Wallops Island. This is the second of three planned motor firings.

Rocket Week June 20 – 24 was a great success. Over 200 students and teachers were at Wallops for various rocket projects and viewed the launch of RockOn! on June 24th.

The Launcher Group is at Poker Flat Research Range, AK for launcher maintenance for the upcoming winter campaign. A total of six rockets will be launched from PFRR in early 2017.

Campaign planning for Poker 2017, Kwajalein 2017 and Australia 2018 is under way.

Technical Interchange Meetings are being held with JPL on the potential of using sounding rockets to test new parachutes for future Mars missions.

36.318 UE Woods - EUV Variability Experiment (EVE) successfully launched June 1, 2016

36.318 UE Woods was successfully launched from White Sands Missile Range, NM on June 1, 2016. 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.

This was the fifth underflight calibration for the EUV Variability Experiment (EVE) aboard the NASA Solar Dynamics Observatory (SDO) satellite. Prior calibration missions have been flown on May 3, 2010, March 23, 2011, June 23, 2012, and October 21, 2013. This mission also provides underflight calibrations for solar EUV imagers aboard SDO, SOHO, GOES, Proba2, Hinode, and SEM irradiance instruments aboard SORCE XPS, TIMED SEE, and SOHO.

The Principal Investigator is Dr. Thomas Woods/University of Colorado/LASP



EVE payload during integration at White Sands.

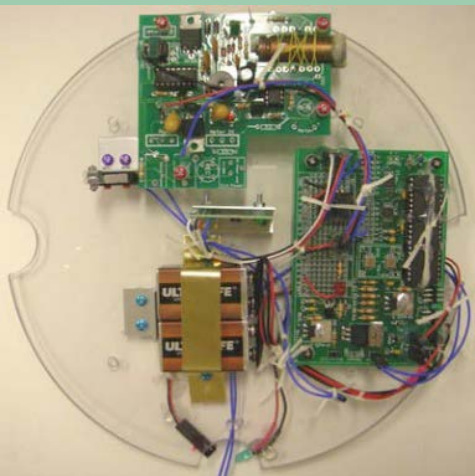
Image Credit: Ted Gazek/NSROC

Rocket Week at Wallops

41.116 UO Koehler - Rock-On! launched June 24, 2016

For the ninth year in a row the Rock-On! student mission was flown successfully from Wallops Island, VA. The launch occurred on Friday, June 24th at 06:06 EDT with over 200 excited students watching their experiments head for space.

Three types of experiments were included in the 2016 RockOn! flight: RockOn Workshop experiments, RockSat-C experiments and Cubes in Space.



RockOn! workshop payload.

RockOn workshop experiments are constructed the week before launch at Wallops Flight Facility. Students arrived on Friday, June 17th and started experiment construction on Saturday. All experiments were ready for integration into the payload by Monday afternoon.

Teams of three students and faculty work together to build, program and test a workshop experiment. The experiments include a microprocessor for data collection and a suite of sensor such as thermistors, pressure transducers, accelerometers, and geiger counters. Additionally a camera is

located on one of the experiment boards. The workshop experience prepares students to participate in more advanced

flight opportunities, such as RockSat-C and RockSat-X. A total of 73 students and faculty attended the RockOn! workshop in 2016.



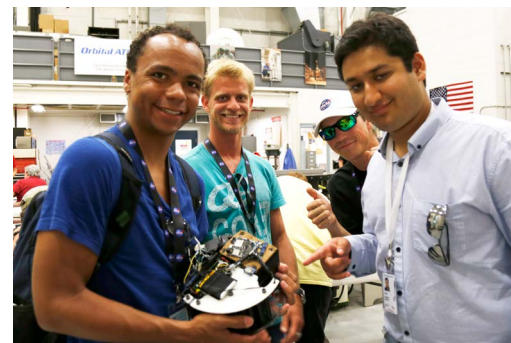
Students working on their RockOn! experiment.



RockSat-C students and faculty with the payload prior to launch.

RockSat-C experiments are more advanced and designed and constructed by the students. This year nine Colleges and

Universities participated in RockSat-C with 93 students attending the launch on Wallops Island.

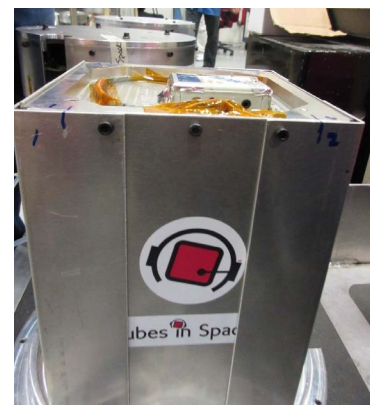


Happy RockSat-C students with experiment after the flight.



Success!

Cubes-in-Space is a program for students age 11 to 18. One inch cubes with student designed experiments are flown in the nosecone of the rocket. Students and teachers submit a proposal for an experiment to the Cubes-in-Space program. The proposals are reviewed and 80 teams are selected for flight on the rocket.



Click for more information on:

[RockOn!](#)

[RockSat-C](#)

[Cubes-in-Space](#)

The Wallops Rocket Week includes the Wallops Rocketry Academy for Teachers and Students (WRATS) workshop. The workshop is hosted by the Sounding Rockets Program Office and NSROC with support from the Wallops Education Office. 2016 was the 5th year of the workshop with 20 teachers selected from over 80 applicants. Teachers came from as far away as New York state and as near as Accomack County, VA. All participating educators teach STEM topics at the High School Level.

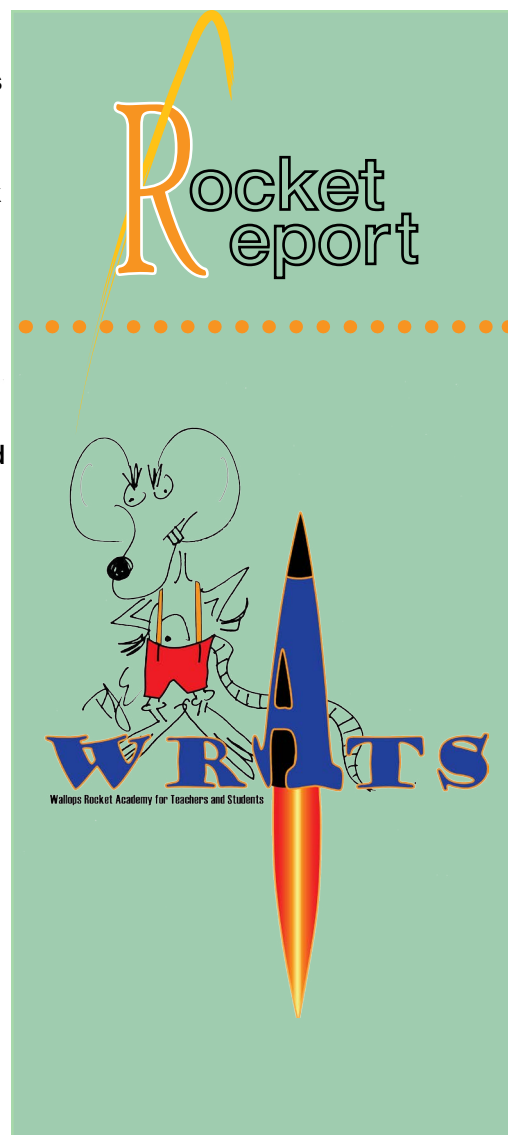
WRATS offers a unique, in-depth, learning experience where teachers not only get hands-on practice building rockets but are exposed to rocket physics through interactive lectures conducted by Office Chief Phil Eberspaker. Topics such as aerodynamics, propulsion, recovery system design and trajectory simulations are covered in detailed presentations and then put into practice with rocket and payload construction activities.

WRATS starts with overviews of the sounding rockets program and model rocketry, followed by construction of an E-powered model rocket. Tours of sounding rocket Testing and Evaluation facilities and a visit with the RockOn workshop students are also included. By the end of the first day all teachers have a flyable model rocket.

On the second day teachers build an electronic payload to measure acceleration, temperature and pressure during flight. The payload is based on the Arduino micro-processor and inexpensive sensors. Recovery system design and construction are also completed.

Once all the construction activities are completed the models are launched and recovered at Wallops Flight Facility. Flight data is then plotted and analyzed.

The week ended with the launch of the RockOn! mission from Wallops Island.



Interactive presentations and demonstrations.



Payload construction.



Model rocket construction.



Image Credit: Geoff Bland/Code 610

Integration and Testing

36.301 & 36.306 GE PFAFF – Neutral Jets in Auroral Arcs

The main objective of this investigation is to understand the height-dependent coupling processes that create localized neutral “jets” in the upper atmosphere associated with the aurora, their driving conditions, and their associated heating and neutral structuring.

The auroral neutral jets experiment consists of two rockets launched simultaneously with different apogees -- 350 km and 175 km. Each rocket will be instrumented with plasma and neutral gas detectors as well as electric and magnetic field detectors. The high and low platforms will determine the jet characteristics simultaneously at different altitudes and show how the driving electric field and particle input vary within the 150 to 300 km range. In conjunction with independent wind measurements from TMA trails to 160 km, wind data will be gathered with in situ measurements to extend the jet profile to 350 km. Simultaneous measurements by the imaging Fabry-Perot system will enable a launch in the presence of a well-defined auroral neutral jet. This mission is scheduled launch in February 2017.



Payload structures with 3D printed models for fit checking prior to final integration supported by SRPO embedded engineering.



Randy working on payload electrical systems.



Tim and Terry testing the Attitude Control System.

36.317 GP HESH – Technology development mission – Water recovery system test

The primary objective for this mission is demonstrating the NSROC Forward Ogive Recovery System (NFORSe) and water recovery of a representative BBIX telescope payload. New water recovery designs include a modified shutter door with the prototype “water wedge” intended to protect the door mechanism and maintain sealed joint integrity providing the required bounciness enabling recovery. The secondary objective is to provide a flight opportunity for 23 SRPO/NSROC development components and piggy-back technology development experiments from reimbursable customers.



Water recovery system ready for drop.

Testing of the water recovery system was conducted at the Chincoteague Bay Field Station (CBFS) boat dock on May 26, 2016. The payload, without instruments other than what was required to measure parameters applicable to the recovery system, was suspended from a crane and dropped into the water. The test simulated, as closely as possible, the environment during an actual mission. A successful test indicated that the system worked as designed with no water entering the payload.



Rob and Shane with the payload and vacuum pump.

Rocket report

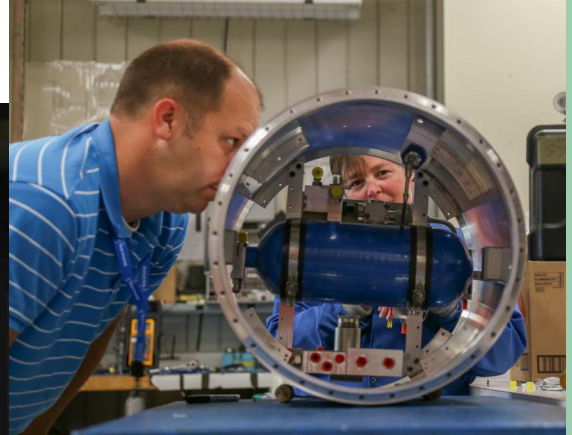
Picture Place



Irvin and Bill working on RockOn and RockSat-C.



Valerie!



Still can't find it!



Shane practicing for 36.317 Hesh.



Nate and Terry teaching interns about rotation and alignment.

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 CY 2016

MISSION	DISCIPLINE	EXPERIMENTER	ORGANIZATION	PROJECT	RANGE	DATE	TIME
36.314 NS	SOLAR & HELIOSPHERIC	CIRTAIR	NASA/MSFC	HIC	WS	JUL-19	DAY
46.014 UO	STUDENT OUTREACH	KOEHLER	UNIVERSITY OF COLORADO	RockSAT-X	WI	AUG-16	DAY
36.309 US	SOLAR & HELIOSPHERIC	HASSLER	SWRI	RAISE	WS	OCT-12	DAY
36.245 UH	HIGH ENERGY ASTROPHYSICS	FIGUEROA	MIT	MICRO-X	WS	DEC-1	NIGHT
36.281 UG	UV/OPTICAL ASTROPHYSICS	BOCK	CAL TECH	CIBER-2	WS	DEC-1	NIGHT
36.317 GP	SPECIAL PROJECTS	HESH	NASA-GSFC-WFF	SUBTEC 7	WI	DEC-13	DAY

WS - White Sands
WI - Wallops Island
NOR - Norway
FB - Fairbanks

From the archives – 36.150 NP Murbach, launched September 18, 1998



Left side, front to back: Chuck Brodell, Mark Murbach, Tony Baldwin, Ed White, Right side front to back: Carl Snow, Will Holmer, Harold Cherrix