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Sounding Rockets Program Office

In Brief...

Five payloads are schedule to launch from Poker Flat in early 2017. See page 4 for more information.

The Sounding Rocket Working Group meeting is schedule for January 10, 2017 at Wallops Flight Facility.

Qualifications testing for the Medium Mobile Launcher (MML), built by NSROC, has been completed. The system is functioning well.

12.080 DR Chrisley - ZOMBIE launched on December 15, 2016.

This mission, also known as Pathfinder Zombie (PZ), is the first flight test of a single-stage guided target vehicle intended to serve a variety of reimbursable mission needs. The scope of work includes the design, development and operation of a new vehicle configuration made up of GFE and Orbital ATK hardware with flight heritage. PZ mission scope encompasses requirements for the Sabre (4-meter) and Boosted Zombie (Terrier Mk 70 boosted 6-meter) vehicles, where appropriate. The Zombie suit of targets is intended to provide low-cost, threat representative targets utilizing surplus resources.

Orbital ATK is following the NSROC processes with commensurate requirement and verification tailoring of Launch Vehicle Division processes.



Zombie at Wallops during integration and testing.

CY 2016 launches in review

36.297 UG France - Colorado High-resolution Echelle Stellar Spectrograph 2 (CHESS-2) launched February 22, 2016.

The CHESS-2 instrument acquired data on sightline to the hot star epsilon Persei for the entire 400 seconds of available observing time with detector high-voltage on. The payload was successfully recovered and all science-critical subsystems were alive and well, and are being refurbished for the next flight of the CHESS payload. Comprehensive success was achieved for 36.297 UG.

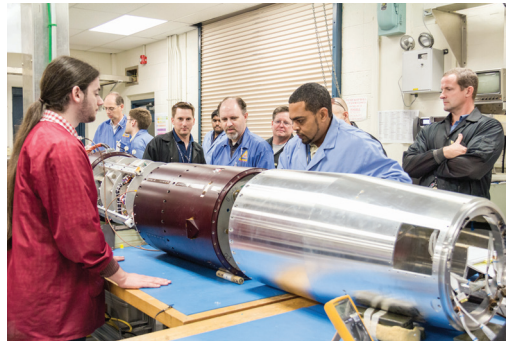


CHESS-2 team at White Sands before launch.

Image Credit: White Sands Missile Range.

46.011 GP Milliner - Multiple User Suborbital Instrument Carrier (MUSIC) launched on March 1, 2016

The purpose of the MUSIC mission was to allow NASA Applied Engineering and Technology Directorate (AETD) personnel to gain experience in developing sounding rocket technology, conduct systems engineering processes and test NASA AETD experiments. This mission resulted in a standard payload carrier with predefined mechanical, telemetry, power and attitude control capabilities to offer to reimbursable customers and other Wallops Flight Facility projects.



MUSIC integration.

41.114 NP DeLeon launched on March 7, 2016.

Three new technologies sponsored by NASA's Space Technology Mission Directorate (STMD) Flight Opportunities Program (FOP) were supported by this mission.



PI Mr. Paul DeLeon with Terrier-Orion on the pad.

The technologies included Montana State University's RadPC, Controlled Dynamics Vibration Isolation Platform (VIP), and NASA Ames Sub-Orbital Aerodynamic Re-Entry Experiments (SOAREX-9). Sounding rockets enable rapid development and testing of new technologies, thereby increasing the Technical Readiness Level (TRL) of instruments intended for future space flight missions.

36.318 US Woods launched on June 1, 2016.



Image Credit: White Sands Missile Range.

EVE on its way study the Sun.

36.318 US Woods was successfully launched at 1 p.m. MDT on June 1, 2016 from the White Sands Missile Range, NM. The payload carried instrumentation to support the calibration of the extreme ultraviolet (EUV) solar instruments aboard the Solar Dynamics Observatory (SDO) satellite. The rocket payload from the University of Colorado (CU) and University of Southern California (USC) includes the EUV Variability Experiment (EVE) that measures the energetic

EUV emissions from the sun. These observations by the rocket EVE and flight SDO EVE are full-disk spectra, or irradiance, over the EUV range from 0.1 nm to 122 nm. Because of the ongoing degradation of the SDO EVE and Atmospheric Imaging Assembly (AIA) instruments since the SDO launch in February 2010, these rocket EVE solar measurements are important for providing an accurate calibration for the SDO satellite instruments. This was the fifth under-flight calibration for the SDO instruments.

41.116 UO Koehler launched on June 24, 2016.

The RockOn! workshop was held at NASA Wallops Flight Facility, June 18 - 24, 2016. Seventy-three students and faculty members participated in this year's workshop, which was the ninth since the inception of the program in 2008. RockSat-C experiments are flown in the same payload as the workshop experiments but are more advanced and completely designed and fabricated by the students. Ninety-three students participated in the RockSat-C flight opportunity.



RockSat-C payload team in T&E.

36.314 NS Curtin launched on July 27, 2016.



Image Credit: NASA/MSFC/Emmett Given

Hi-C alignment procedure.

The High-resolution Coronal Imager (Hi-C) mission flew for the second time in 2016. Hi-C is designed to capture the highest resolution images of the sun's million-degree atmosphere, called the corona, in the extreme ultraviolet wavelength. This higher energy wavelength of light is optimal for viewing the hot solar corona. The science goal of the second flight was to identify the connection between the solar chromosphere, transition region, and corona in the hottest and most active regions of the corona. Due to a failed electrical connection, the instrument shutter did not open in flight and science data was not collected.



RockSat-X integration.

46.014 UO Koehler launched on August 17, 2016.

RockSat-X was successfully launched from Wallops Island, VA on August 17, 2016. RockSat-X carried student developed experiments and is the third, and most advanced, student

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flight opportunity. This year, eight Universities and Colleges and over 90 students, participated in RockSat-X. The payload had an ejectable skin and nose cone that fully exposed the experiments to the space environment above the atmosphere. Power and telemetry were provided to each experiment deck. Additionally, this payload included an Attitude Control System (ACS) for alignment of the payload. These amenities allow experimenters to spend more time on experiment design and less on power and data storage systems.

CY 2017 outlook

Nineteen science, technology and education missions, and six reimbursable missions are currently on schedule for 2017.

The year starts with five launches from Poker Flat, AK and ends with a reimbursable launch for JPL. Three solar physics, five astrophysics and seven geospace missions are on scheduled 2017, as well as, two technology and two education missions. Three reimbursable missions for DoD and JPL respectively are also on schedule.

2017 also includes two launches from the Kwajalein Atoll in the Marshall Islands. The Principal Investigator for this mission, Waves and Instabilities from a Neutral Dynamo (WINDY), is Dr. Hysell from Cornell University. The launches are planned for August 2017.

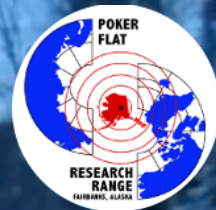


Image Credit: Cliff Murphy

Integration and Testing for Poker missions in 2017 completed

Weather in Fairbanks*

Month	Avg High	Avg. Low	Avg.Precip
Jan	3° F	-11° F	0.6 in
Feb	11° F	-7° F	0.5 in
Mar	25° F	2° F	0.3 in

	Record High	Record Low
Jan	52° F (1/17/09)	-60° F (1/2/69)
Feb	49° F (2/12/80)	-52° F (2/5/99)
Mar	57° F (3/21/91)	-41° F (3/28/71)

The Sounding Rocketeers are heading north, to once again launch science missions under the brilliant lights of the Aurora. Three teams, with a total of five vehicles and payloads, are departing Wallops in early 2017 to brave snow, ice, cold and darkness to fulfill the mission of NASA.

Integration and testing progressed on schedule with all payloads completing vibration, balancing, Moments of Inertia measurements and bend tests. The Natural Jets and the Ionospheric Structuring: In Situ and Ground based Low Altitude Studies (ISINGLASS) payloads also completed magnetic calibration and deployment testing, while the PolarNOx payload went through alignment checks for the telescope. Integration and testing activities were completed in December, all hardware is packed up and shipped out to Poker.

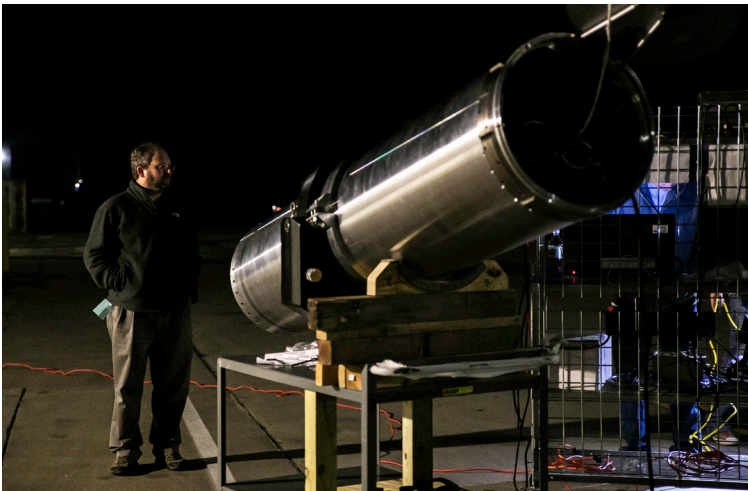
First up to launch is 36.302 UE Bailey - PolarNOx. PolarNOx is designed to measure the concentration of nitric oxide in the mesosphere and lower thermosphere in the nighttime polar region. Auroral particles are thought to produce NOx in the polar night at altitudes above 100 km, but prior to the launch of the PolarNOx mission no observations have been made of night time NO at these altitudes. Additionally, the NO can under appropriate conditions be transported to the stratosphere where it will catalytically destroy ozone. Spectrographic measurements, at wavelengths near 215 nm, of the concentration of NO will be made using a UV astronomy payload to observe a well known and characterized star, Algenib (Gamma Pegasi). The launch window for the PolarNOx mission opens on January 19, 2017.

* Source: The Weather Channel

The launch window for the the next four rockets, two for the Neutral Jets in Auroral Arcs mission and two for the Ionospheric Structuring: In Situ and Groundbased Low Altitude StudieS (ISINGLASS) mission, opens February 13, 2017. The Principal Investigators are Dr. Robert Pfaff from NASA Goddard Space Flight Center and Dr. Kristina Lynch from Dartmouth College respectively.

The main objective of the Neutral Jets in Auroral Arcs 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 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.

ISINGLASS is an experiment designed to gather multipoint data spread locally across an auroral arc. ISINGLASS is also a scientific and technical precursor to a proposed Ionospheric CubeSwarm. It provides the specific detailed case-study examples from which an orbital mission can grow. The in situ measurements of plasma parameters at multiple locations will be stitched together using ground based measurements and data assimilation to produce a localized map of plasma parameters and gradients. There will be two identical flights, into two separate events; each flight releases a large subpayload, and 4 small deployables.



Dr. Bailey with the PolarNOx telescope at Wallops conducting night time testing.



Auroral Jets payload in the Magnetic Calibration Facility at Wallops.



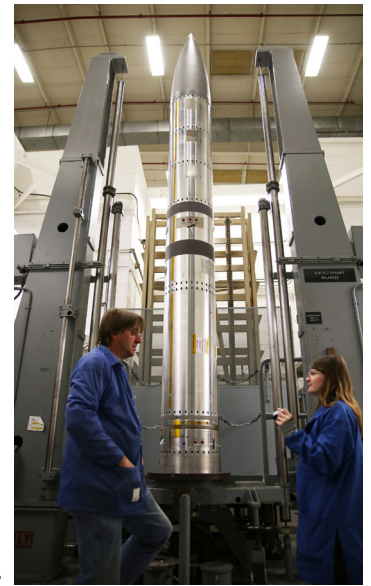
ISINGLASS payload being prepared for sub-payload deployment testing.

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Picture Place



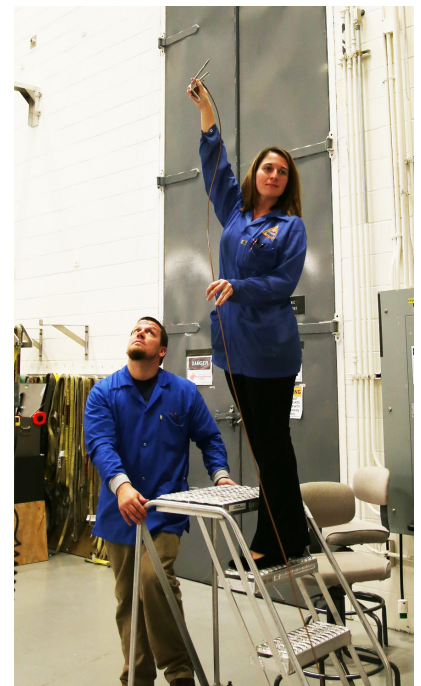
Taking the PolarNOx telescope out for a spin.



Rob and Megan setting up for balance testing.



Randy sighting payload bending.



Brittany and Marc checking GPS reception.



Andrew Muesler working the ground station.



Steve Powell, Cornell University, talks to Wallops retirees.

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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Happy Holidays!

*From your friends
in the SRPO!*

