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# Rocket report



Sounding Rockets Program Office

## In Brief...



It's time to sign up for WRATS! The Wallops Rocket Academy for Teachers and Students (WRATS) provides **high school educators** with a technical flight experience that will reinforce science, technology, engineering and mathematics (STEM) concepts. WRATS provides an authentic, hands-on rocketry experience based on NASA's sounding rocket engineering and science data collection. WRATS will be held at NASA GSFC Wallops Flight Facility, June 19 – 23, 2017. Teachers interested in attending WRATS should contact Linda Sherman, by email at [Linda.A.Sherman@nasa.gov](mailto:Linda.A.Sherman@nasa.gov).

### Five launches from Poker Flat, Alaska, starts the year.

#### 36.302 UE Bailey - PolarNOx, launched January 27, 2017

First off the pad was 36.302 UE Bailey, launched on January 27, 2017. The purpose of Polar Night Nitric Oxide (Polar NOx) experiment was to measure the concentration of nitric oxide in the mesosphere and lower thermosphere in the nighttime polar region.

The PolarNOx experiment was conducted in the polar region at night in order to measure what

is expected to be peak concentrations of NO. NO is created by the reaction of atomic nitrogen (N) and O<sub>2</sub>. A major source of atomic nitrogen (N) is auroral energetic electrons impacting Nitrogen (N<sub>2</sub>) and splitting the atom into two. The primary destruction mechanism of NO is photo dissociation and in the absence of sunlight, the NO loss mechanism disappears. Under appropriate conditions nitric oxide can be transported to the stratosphere where it will catalytically destroy ozone.

The Principal Investigator was Dr. Scott Bailey from VA Tech.



Image Credit: Wallops Imaging Lab

PolarNOx takes off from Poker Flat Research Range, AK.



# Rocket Report

## 36.303 & 36.304 UE Lynch - ISINGLASS,

Up next, after 36.302, was the first Ionospheric Structuring: In Situ and Ground Based Low Altitude Studies (ISINGLASS) rocket, 36.303 UE Lynch, launched on February 22, 2017.

36.304 UE, the second ISINGLASS rocket, was launched on March 1, 2017. The ISINGLASS investigation studied how auroral energy sources impact ionospheric response gradients and the effects of ionospheric structures on Mesosphere - Ionosphere coupling.

The mission consisted of two identical rockets and was designed to sample multiple locations simultaneously in the auroral ionosphere to take gradient measurements of



Image Credit: Wallops Imaging Lab

36.303 lifts-off from Poker.

plasma parameters. The rockets were flown into two separate events (ie, quiet early evening arc vs dynamic rayed arc); each rocket had a large subpayload, and four small deployable payloads. The four small deployables did not exit the main payload during the first flight, 36.303, but functioned as expected during the second, 36.304. Early indications show that good data was received and further data analysis is ongoing.



Image Credit: Wallops Imaging Lab

Second ISINGLASS rocket, 36.304, lifts-off.

## 36.301 & 36.306 UE Pfaff - Auroral Jets launched on March 1, 2017.

The third mission to launch from Poker Flat in 2017 was the Neutral Jets Associated with Auroral Arcs. This mission also involved two rockets and investigated 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 two rockets were launched 90 seconds apart to two different apogees. Each rocket was instrumented with plasma and neutral gas detectors as well as electric and magnetic field detectors.

The high and low platforms are designed to 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.



Image Credit: Wallops Imaging Lab

Auroral Jets missions launch from Poker.

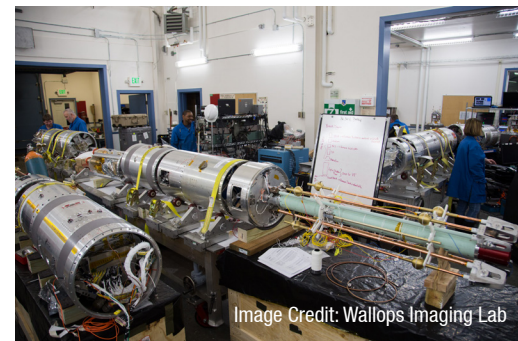


Image Credit: Wallops Imaging Lab

Auroral Jets integration.



Image Credit: Wallops Imaging Lab

Heading for the rail.

# Integration & Testing



## Integration activities continue for 29.042 & 36.321 UE Hysell – Waves and Instabilities from a Neutral Dynamo

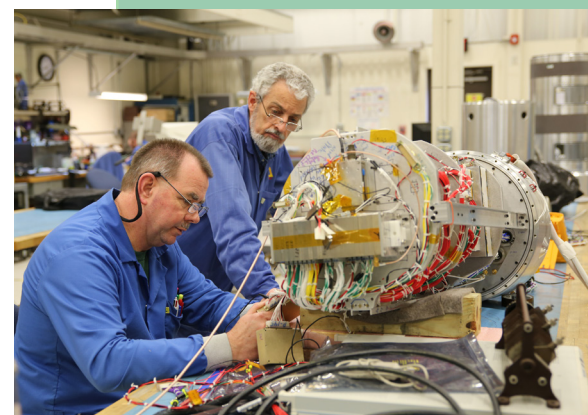
The WINDY mission is scheduled to launch from Kwajalein, Marshall Islands late August 2017. Two rockets, a Terrier-Malemute and a Terrier-Black Brant, are part of this mission to study the stability of the post sunset equatorial F region ionosphere and the factors that predispose it to equatorial spread F, a spectacular phenomenon characterized by broadband plasma turbulence which degrades radio and radar signals at low magnetic latitudes. The goal of the investigation is to lay the foundation for a strategy to forecast this disruptive phenomenon.



Steve Powell, Cornell University and Jorge setting up to test sensors.

## 36.317 GP Hesh – SubTEC-7

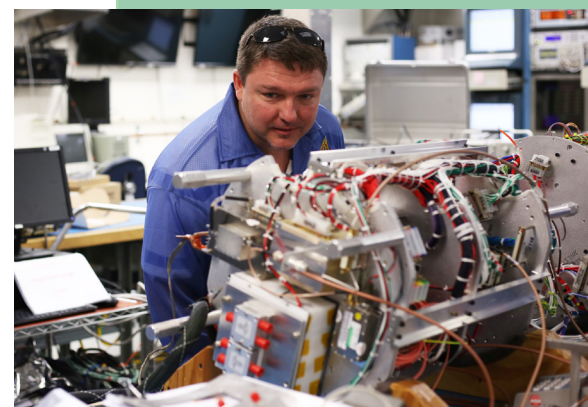
The two primary objectives for the 36.317 Hesh / SubTEC 7 mission are to perform water recovery on a representative Black Brant IX telescope payload as a pathfinder for future Kwajalein water recovery missions to enable telescope observation in the southern hemisphere, and demonstrate the new internally designed and assembled recovery system called the N-FORSe (NSROC Forward Ogive Recovery System). Secondary objectives for the mission are to provide test opportunities for several NASA and NSROC development components and subsystems as well as technology development experiments from reimbursable partners.



Wayne and Charlie working on 36.317.

## 46.015 GT Hall

The purpose of the 46.015 mission is to provide risk mitigation for rocket propelled ejectable chemical ampoule systems that will be employed on future science missions. The mission goals are to demonstrate repeatable success of the ignition trains of both the ampoule rocket motors and the ampoule deflagration.



PI Brian Hall inspecting the payload.



# Rocket report

## Picture Place



Pat testing accelerometers in the centrifuge.



Dave, Jacob, and Dan preparing for NFORSe testing.



New team member Sparky. Despite his slothiness, he's managed to put on an ESD coat.



New machine in the shop. Dana and Steve with HAAS rep.



Zombie testing.



Brandan is a busy intern!

# Rocket Report

## Launch Schedule April – June, 2017

MISSION	DISCIPLINE	EXPERIMENTER	ORGANIZATION	PROJECT	RANGE	DATE
36.317 GP	SPECIAL PROJECTS	HESH	NASA-GSFC-WFF	SUBTEC 7	WI	05/02/17
36.309 US	SOLAR & HELIOSPHERIC	HASSLER	SWRI	RAISE	WS	05/09/17
46.015 GT	TEST & SUPPORT	HALL	NASA-WFF		WI	05/23/17
41.121 UO	STUDENT OUTREACH	KOEHLER	UNIV. OF COLORADO	ROCKON - RockSAT-C	WI	06/22/17
36.323 UG	UV/OPTICAL ASTROPHYSICS	FRANCE	UNIV. OF COLORADO	CHESS	WS	06/26/17

## 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!

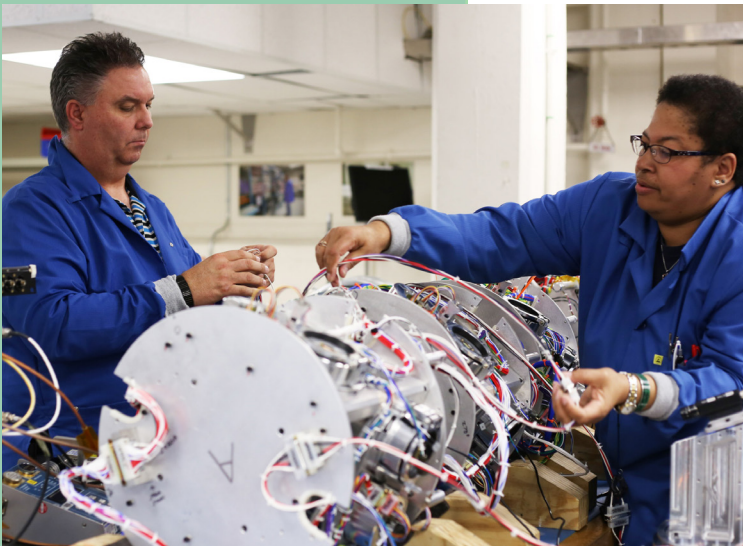
Contact:  
 Chuck Brodell  
 Phone: #1827  
 Email: Charles.L.Brodell@nasa.gov

or

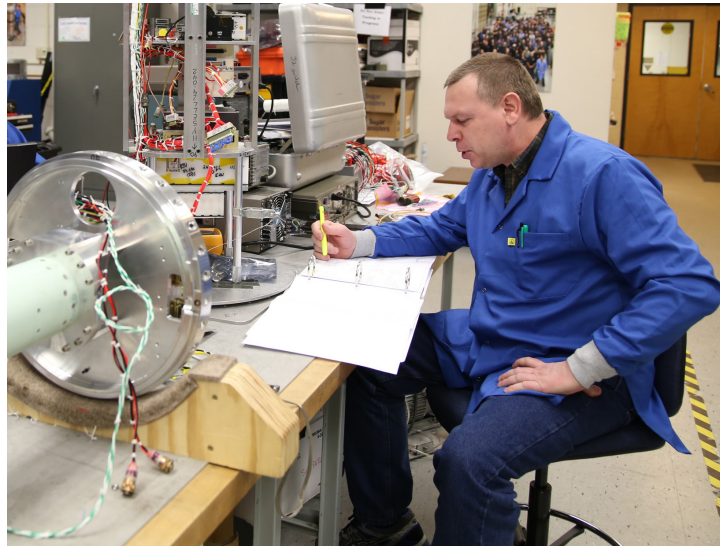
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WS - White Sands  
 WI - Wallops Island  
 NOR - Norway  
 FB - Fairbanks

*Welcome back Chris Bradley and John Gsell!*



Chris working with Bernita on Hall.



John working on Hysell.