National Aeronautics and Space Administration

Rocket Report

2019

Sounding Rockets Program Office

What's inside...

In Brief...

The Sounding Rocket Working Group meeting was held at Wallops February 5–6, 2019.

Motors for the Kwajalein launches in June have been shipped and have arrived on site.

Planning for Australia 2020 is continuing. Recent changes reduces the number of launches to three, requiring only one launcher.

SRPO Chief, Giovanni Rosanova, and SRPO Proj–ects Manager, Gordon Marsh supported Poker Flat 50th anniversary open house. The event was well received.

46.018 UO Koehler - RockSat-XN successfully launched on January 13, 2019.

This was an international student mission with participation from the US, Norway and Japan and follows the RockSat-X mission architecture. RockSat-X student experiments are developed with an objective of providing students with an enhanced experience of flying experiments exposed to the space environment. This mission differed from the historical RockSat-X architecture in two major ways: it was launched from Norway, and it incorporated foreign national participation.

RockSat–XN launch from Andoya Space Center, Norway.

The following student experiments were flown on this mision:

UiT = University of Norway – Tromso

This experiment was designed to detect and measure distribution of neutral Mesospheric Smoke Particles (MSP) in the winter Mesosphere. A new probe design, Smoke Particle Impact Detector (SPID), allowed detection of small MSPs.

RockSat-XN continued

UiO - University of Oslo

The UiO experiment was designed to release and establish communication with six sub-payload modules (daughters), and measure small-scale electron density using Langmuir probe systems onboard the daughters. Post-flight data analysis will be conducted to study plasma turbulence and instability.

PARM – University of Tokyo

This experiment was designed to observe the incoming Pulsating Aurora (PsA) electrons in a wide energy range, from a few tens of keV to a few MeV, by onboard particle detectors. Additionally, an onboard optical instrument, which is essential for studying PsA, was used to observe the temporal/spatial variations of PsA.

PSU: Pennsylvania State University

The Penn State experiment was designed to contribute to the understanding of the cause(s) of Polar Mesosphere Winter Echoes (PMWEs). The onboard instrument measurements were compared to ground radar measurements of PMWEs recorded simulatenously with the rocket flight.

CTU –Capital Tech University

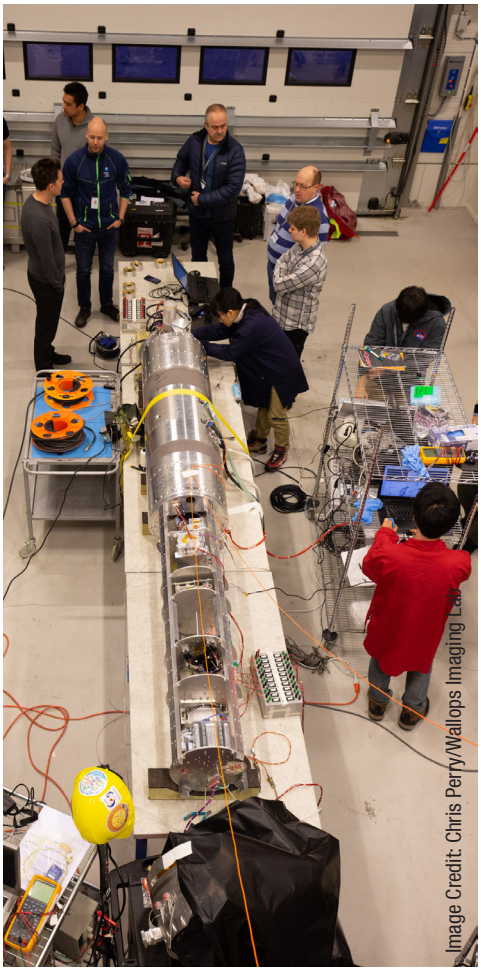
This experiment aimed to identify atmospheric composition through spectral analysis. Additionally, a modified Aerogel thermal insulation was tested.

UNH –University of New Hampshire

The experiment directly observed Nitric Oxide (NO) air afterglow emissions vs. altitude. Also, calculations of NO densities and enhancements vs. typical background values were performed.

UPR –University of Puerto Rico

The experiment consisted of the collection and analysis of organic compounds located inside the aurora borealis trail.

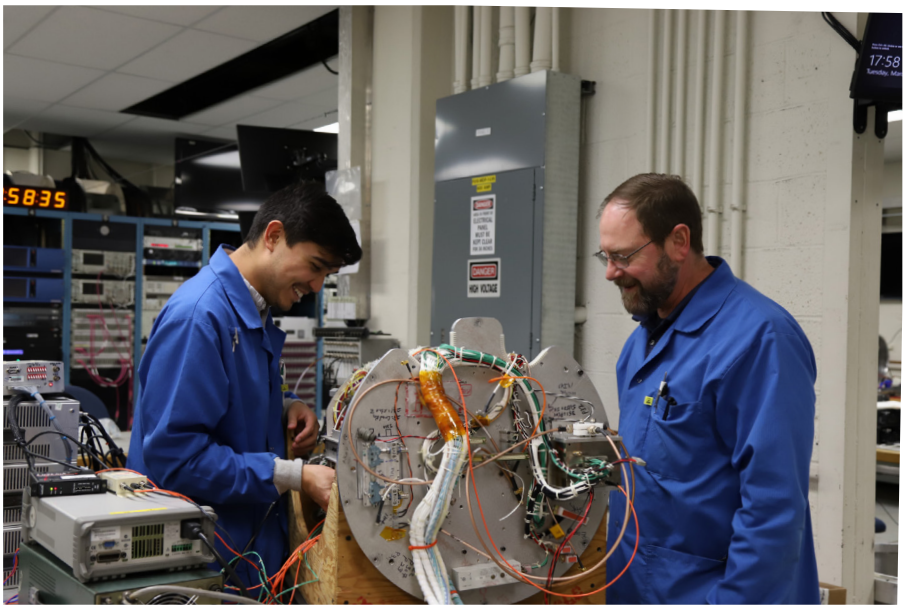


RockSat–XN integration in Norway.

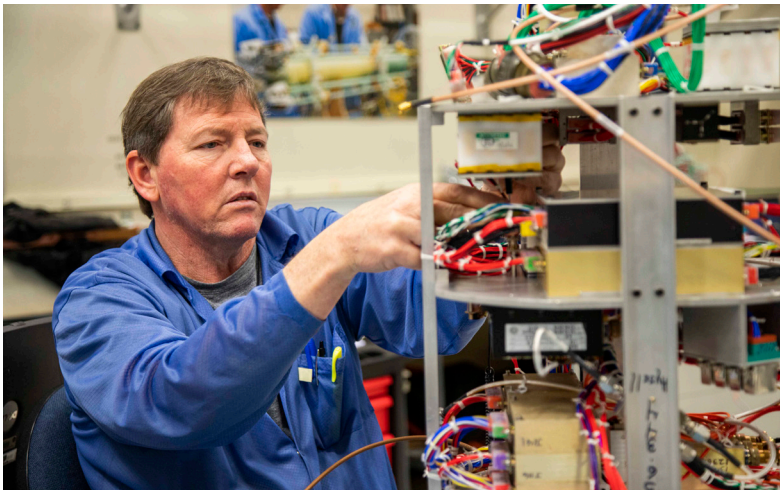
RockSat–XN students at Andoya Space Center in Norway.

Rocket Report

Picture Place



Alex and Andrew with FORTIS in the ground station.



Larry working on Too WINDY.

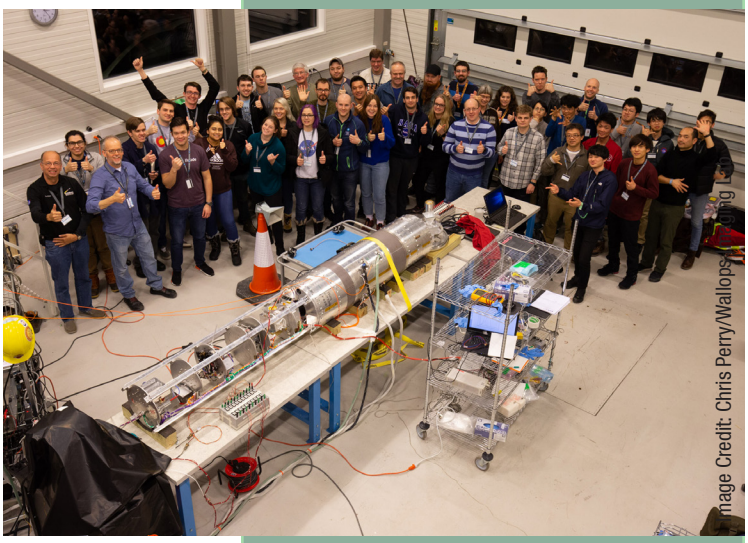
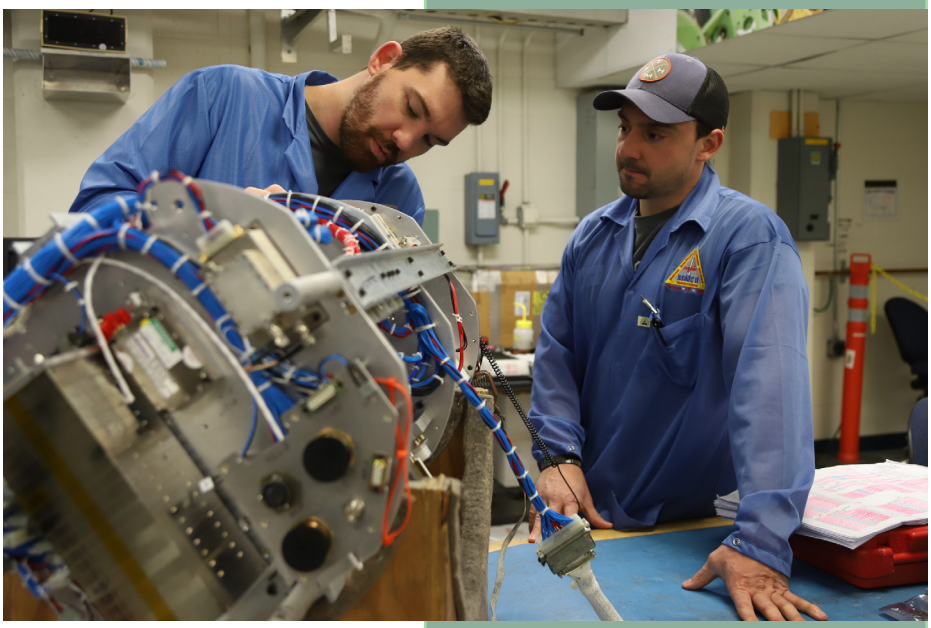


Image Credit: Chris Perry/Wallops

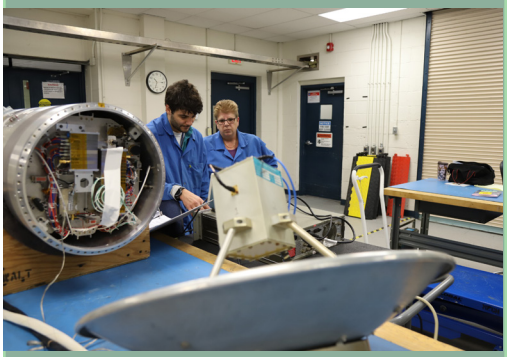
RockSat–XN students with payload.

Gary and Rob with Too WINDY.



Kyle and Brooks working on SISTINE.

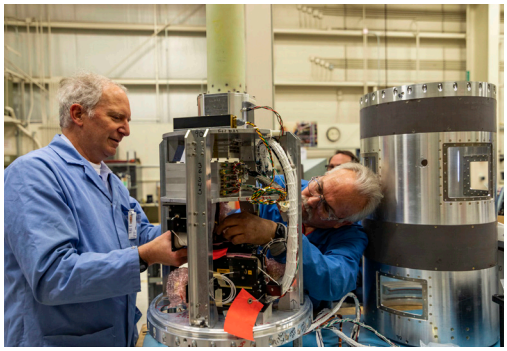
Rocket Report



Integration & Testing

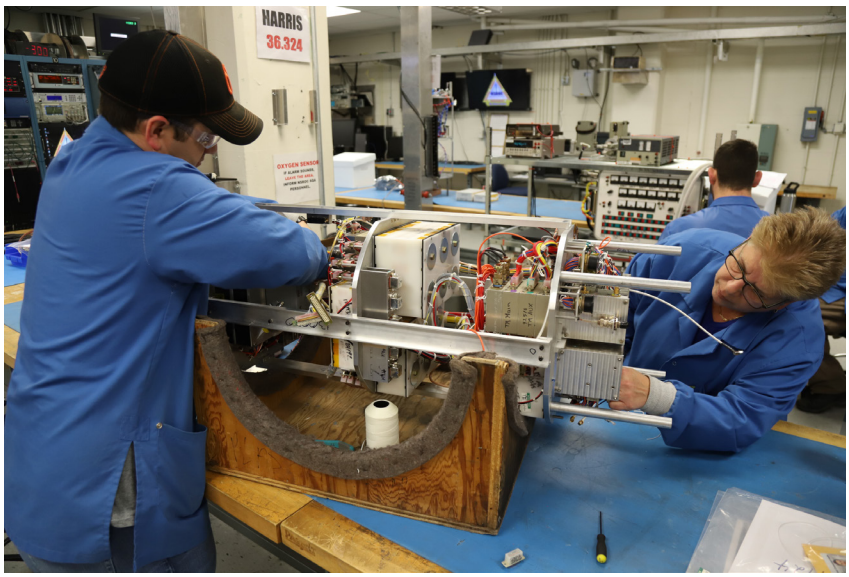
36.344 & 36.345 UE Hysell – Waves and Instabilities from a Neutral Dynamo (Too WINDY)

Too WINDY will investigate the stability of the post sunset equatorial F region ionosphere and the factors that predispose it to equatorial spread F (ESF), a 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 the disruptive phenomenon. The focus of the investigation will be on the influence of horizontal thermospheric winds. Two rockets, carrying one instrumented payload and one tracer payload respectively, will be launched nearly simultaneously into a ESF event from Roi Namur, Kwajalein Atoll, Marshall Islands. The launches are scheduled for June 2019.



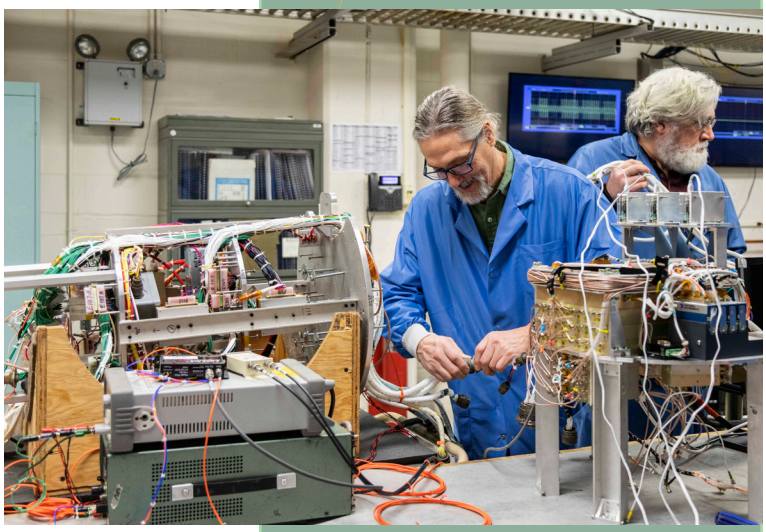
36.324 US Harris – Spatial Heterodyne Interferometric Emission Line Dynamics Spectrometer (SHIELDS)

The purpose of this mission is obtain a spatial map of scattered solar ultraviolet (UV) emission from interplanetary hydrogen (IPH) that has crossed, and been modified by, the ion pile-up along the outer edge of the heliosphere. The map will be constructed along multiple lines of sight over a 30° diameter region of the sky located near the location corresponding to the relative velocity vector between the Sun and the local interstellar medium (LISM). SHIELDS is scheduled to launch from White Sands Missile Range, NM in the spring of 2020.



36.352 UG McCandliss – Far–ultraviolet Off Rowland–circle Telescope for Imaging and Spectroscopy (FORTIS)

This mission will provide Far-UV spectra of blue stragglers in globular cluster M10 with the FORTIS instrument. FORTIS is a multi-object spectro/telescope equipped with a next-generation microshutter array (NGMSA) capable of imaging individual stars within NGMSA slitlets while simultaneously obtaining their far-UV spectra.



Blue stragglers are stars that are bluer, more massive, and more luminous than the main sequence turnoff (the point where a star leaves the main sequence after the exhaustion of its main fuel) in a given stellar population. Star formation theories assume that all stars in a cluster form at roughly the same time, therefore these blue stragglers require alternative formation mechanisms. They are thought to form via collisions and interactions of binary stars, therefore high stellar density environments such as globular clusters provide rich sources of blue stragglers. Using far-UV light allows FORTIS to easily distinguish the blue stragglers from the large population of old red stars in the cluster. These spectra and images will enable further exploration of blue straggler formation mechanisms in globular clusters.

FORTIS is scheduled for launch from White Sands Missile Range, NM in June 2019. This will be the fourth flight of FORTIS.

46.020 GT Hesh – Sub–TEC 8

Swarm Communication is a development effort to design a system that telemeters data from multiple deploying sub-payloads to the main payload. The design effort encompasses a sub-payload transmitting antenna, a sub-payload command and control board with embedded encoder, a main payload receive software defined radio, and a main payload receive antenna system with filter and low noise amplifier.

The Sub-TEC 8 payload will deploy four sub-payloads – two using high velocity springs and two using COTS rocket motors. The data from the sub-payloads will be telemetered to the main payload via S-band frequencies at speeds of up to 1 Mbps and separation distances up to 20 km.

A test was conducted on the antennas to confirm functionality during a sub-payload rocket motor firing. The image shows a sub-payload mounted to the test fixture and the rocket motor firing (plume going up). Antennas are mounted on the sides of the aft plate of the sub-payload.

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 April – June 2019

MISSION	DISCIPLINE	EXPERIMENTER	INSTITUTION	PROJECT	RANGE	DATE
51.001 UE	GEOSPACE SCIENCES	LARSEN	CLEMSON UNIV	AZURE	NOR	LAUNCH BY 04/10/2019
51.002 UE	GEOSPACE SCIENCES	LARSEN	CLEMSON UNIV	AZURE	NOR	LAUNCH BY 04/10/2019
36.332 NS	SOLAR & HELIOSPHERIC	MCKENZIE	NASA MSFC	CLASP 2	WS	04/11/19
36.344 UE	GEOSPACE SCIENCES	HYSELL	CORNELL UNIVERSITY	TooWINDY	KWAJ	06/09/19
36.345 UE	GEOSPACE SCIENCES	HYSELL	CORNELL UNIVERSITY	TooWINDY	KWAJ	06/09/19
41.126 UO	STUDENT OUTREACH	KOEHLER	COLORADO SPACE GRANT	RockOn	WI	06/20/19
36.352 UG	UV/OPTICAL ASTROPHYSICS	MCCANDLISS	JOHNS HOPKINS	FORTIS	WS	06/30/19
36.281 UG	UV/OPTICAL ASTROPHYSICS	BOCK	CAL TECH	CIBER-2	WS	06/30/19

WS - White Sands
WI -Wallops Island
NOR - Andoya, Norway
FB - Fairbanks
Kwaj - Kwajalein, Marshall Islands
SVAL - Svalbard, Norway

Poker Flat Research Range – 50th Anniversary Open House

Image Credit: Chris Perry/Wallops Imaging Lab