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Rocket report

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Sounding Rockets Program Office

The calendar year ends with four successful launches.

Solar Dynamics Observatory calibration mission launched on October 21, 2013.

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. The EVE program advances understanding of the physics of the solar EUV irradiance variations on time scales from flares to the solar cycle. This progress, which includes providing better predictions, results from simultaneous measurements of the solar EUV irradiance and full Sun images of magnetic fields and brightness at wavelengths emitted from the chromosphere, transition region, and corona, which are obtained by other SDO instruments.



36.290 US Woods launches from White Sands.

Photo by White Sands Missile Range.

For more information, see: http://www.nasa.gov/mission_pages/sounding-rockets/index.html

Happy Holidays!

X-ray Quantum Calorimeter, 36.294 UH McCammon launched on November 4, 2013

The XQC mission investigated the spectrum of the diffuse x-ray emission from the interstellar medium over the energy range from 0.1 to 1.0 keV. Observations in this energy range have shown that the interstellar medium (ISM) in our Galaxy contains large amounts of previously unsuspected hot gas in the 1 million to 3 million degree temperature range. This gas can have profound effects on the structure and evolution of galaxies, and plays a key role in the distribution and life cycle of the elements produced deep in the interiors of stars. Despite its importance, this hot component of the ISM is still poorly understood. This was the third flight of the XQC instrument.

For more information on XQC, please visit: <http://www.nasa.gov/content/yes-there-is-activity-in-the-darkness-of-space/>



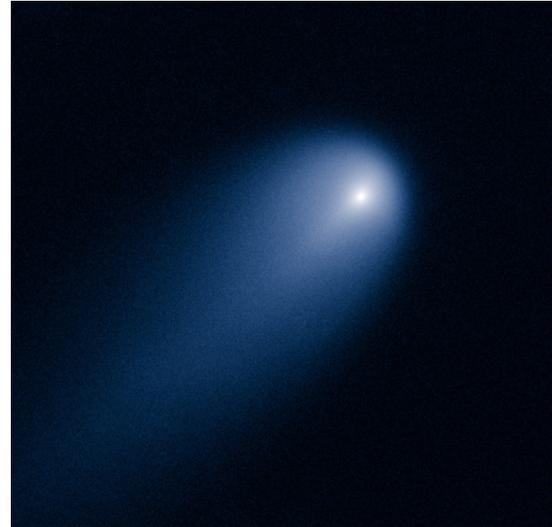
XQC team with payload at White Sands.

Photo by White Sands Missile Range

36.296 UG McCandliss - Far-Ultraviolet Off-Rowland Telescope for Imaging and Spectroscopy (FORTIS) launched to study Comet ISON.

The second flight of FORTIS for calendar year 2013 studied Comet ISON. In a very fast turn around mission the science team reburbished the instrument after the first flight in May 2013 and by November the payload and the team were ready to fly again, this time to study ISON.

The goal of this mission was to acquire imagery and spectra of the sungrazing Oort cloud comet ISON, in the far-UV bandpass between 800 – 1950 Å over a 0.5 degree field-of-view (FOV), during its ingress towards perihelion. Of particular interest is addressing the question of whether Oort cloud comets carry a chemical composition similar to the proto-stellar molecular cloud from which the Solar System formed. Sounding rockets can make unique far-UV observations at solar elongation angles as low as 25 degrees when volatile output is beginning to rapidly increase. In comparison, the Hubble Space Telescope (HST) has a solar elongation limit of 50 degrees.



Comet ISON imaged by the Hubble Space Telescope.

For more information on FORTIS see: <http://www.nasa.gov/content/goddard/six-minute-journey-to-study-comet-ison/>

36.261 UG Clarke - Venus Spectral Rocket (VeSpR) launched on November 26, 2013.

The goals of this project are to obtain a high resolution spectrum of the Hydrogen (H) and Deuterium (D) Lyman-alpha emissions from the atmosphere of Venus, and thereby determine the D/H ratio at the top of Venus' atmosphere, and to obtain an H / Lyman-alpha image of the extended emissions from the Venus corona. Both the present D/H ratio and the extent of the emission from the coronal atmosphere are related to the present day escape of water from the atmosphere of Venus into space. The end goal is to learn of the history of water on Venus. Venus must be observed near elongation, when it appears farthest from the Sun on the sky.



VeSpR on the balancing table at Wallops.

Image by Berit Bland

Integration and Testing

36.287 UE Samara - Ground-to-rocket Electrodynamics-Electrons Correlative Experiment (GREECE)

The GREECE mission will investigate the electrodynamics associated with the most dynamic, fluid-like auroral structures that occur at substorm onset using a sounding rocket. In addition to the rocket, the science closure will depend on heavy use of supporting ground-based optical auroral imaging at downrange sites, under the payload trajectory. The primary objective of this mission is to measure the precipitating electrons with high temporal resolution (1 ms) using two separate detectors focusing on low to mid energies (50 eV to 30 KeV) and high energies (5 keV to 160 keV). The in situ electric and magnetic fields will be measured with high time resolution, at both DC and high frequency. An ion detector will also be flown as a technology demonstration.

Driving Science Questions are:

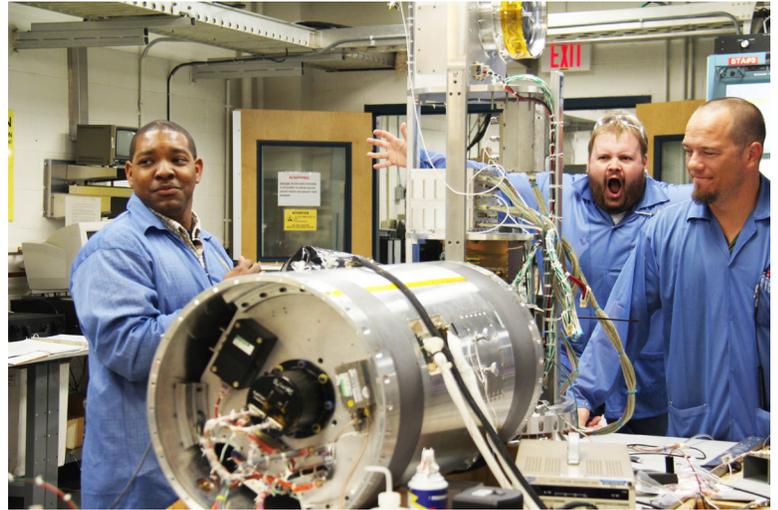
- 1) Do large amplitude (≥ 500 mV/m) convergent electric field structures exist at low altitudes (< 500 km altitude) in the ionosphere? If so, what are their amplitudes and are they responsible for driving the rapid (≥ 10 km/s) fluid-like shear motions of auroral structures?
- 2) What are the precipitating electron spectra responsible for auroral curls and do they show evidence of either parallel potential drop or Alfvén wave acceleration?
- 3) How accurately can we predict the energy of the electrons causing auroral curls based on emission line ratios observed on the ground with high spatial (≤ 150 m) and temporal (≥ 30 Hz) resolution?

This project sets out to image the auroral structures from downrange sites with multiple narrowfield and all-sky imagers. Different wavelength filters will be used in each imager in order to derive the precipitating electron energy from the emission line ratios. The aurora will be imaged simultaneously with the conjugate high resolution in situ rocket measurements of the actual precipitating electrons and electric fields.



36.287 UE GREECE integration pictures.

Picture Place



Frank and Christian working on GREECE – Justin...



Coordinated – Belinda, Cliff, Brian and Justin with VeSpR.



Dave and Rob with procedures.



Terri working on the GREECE payload.



Tom preparing VeSpR for Testing and Evaluation.

Schedule 2014

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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January

36.287 UE

SAMARA/SWRI

FB

24-Jan

April

46.007 GP

ROSANOVA/NASA-WFF

WI

1-Apr

36.288 DS

VOURLIDAS/NRL

WS

15-Apr

36.253 US

HASSLER/SWRI

WS

15-Apr

36.235 US

HARRIS/UNIV. OF CALIFORNIA, DAVIS

WS

26-Apr

May

36.285 UG

FRANCE/UNIV. OF COLORADO

WS

15-May

June

36.245 UH

FIGUEROA/MIT

WS

2-Jun

36.282 US

KANKELBORG/MONTANA STATE UNIV.

WS

6-Jun

41.110 UO

KOEHLER/UNIV. OF COLORADO

WI

19-Jun

July

36.289 US

JUDGE/DIDKOVSKY/USC

WS

8-Jul

August

46.008 UO

KOEHLER/UNIV. OF COLORADO

WI

12-Aug

October

36.293 UG

CHAKRABARTI/U. OF MASS. -LOWELL

WS

1-Oct

36.292 UH

MCENTAFFER/UNIVERSITY OF IOWA

WS

11-Oct

12.077 GT

BRODELL/NASA-WFF

WI

23-Oct

November

12.079 GT

HESH/NASA-WFF

WI

6-Nov

52.001 UE

CONDE/U. OF ALASKA/FAIRBANKS

NOR

17-Nov

49.003 UE

LABELLE/DARTMOUTH COLLEGE

NOR

17-Nov

December

36.295 US

KRUCKER/UNIV OF CA @ BERKELEY

WS

1-Dec

12.078 GT

BRODELL/NASA-WFF

WS

8-Dec