National Aeronautics and Space Administration

Rocket Report

2012

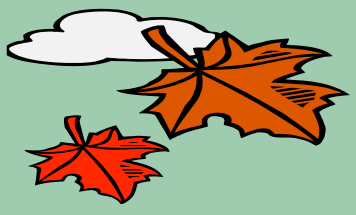
Sounding Rockets Program Office

What's inside...

In Brief...

September 30 is the end of fiscal year 2012. A total of 21 sounding rockets were launched during the fiscal year.

The final 16 Nike motors have been transferred to China Lake for use on a sled track. The Nike has been used as a booster in numerous sounding rocket configurations. The last launch of a Nike boosted vehicle, a Nike Black Brant, occurred September 17, 2004 from Kwajalein (27.146 Gelinas).



Enjoy the fall!

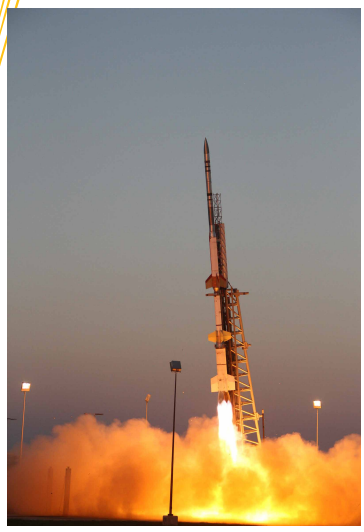


Photo by Wallops Imaging Lab

TATEOR launches from Wallops Island, VA

12.075 GT Brodell – Talos Terrier Oriole (TATEOR) successful test flight, September 22, 2012

12.075 GT Talos–Terrier–Oriole was launched from Wallops Island, VA on September 22, 2012. The primary objective of this mission was to verify performance and dynamic stability of the vehicle stack with a Terrier MK70 second stage and an Oriole third stage. Utilization of the MK70 as a second stage enables multiple new vehicle combinations to enhance program capabilities. This mission also provided a test flight for the 20 Mbit MV encoder, Digital Spin System, and Altitude Prediction, Reporting and Accuracy (APRA) Experiment. Mr. Charles Brodell, NASA Wallops Flight Facil–ity, Sounding Rockets Program Office was the Principal Investigator.

46.004 GO Rosanova – RockSat–X success–fully launched on September 21, 2012

RockSat–X is a follow on mission to RockOn! and involves more complex student experiments. RockSat–X provides more advanced sounding rocket payload support services, including telemetry and deployable instruments. Four uni–versities participated in this mission. This was the second flight of the RockSat–X student opportunity.

University of Colorado flew a payload to record HD video of the flight and all experiments and also demonstrated new

Photo by Berit Bland

RockSat-X launches from Wallops Island, VA

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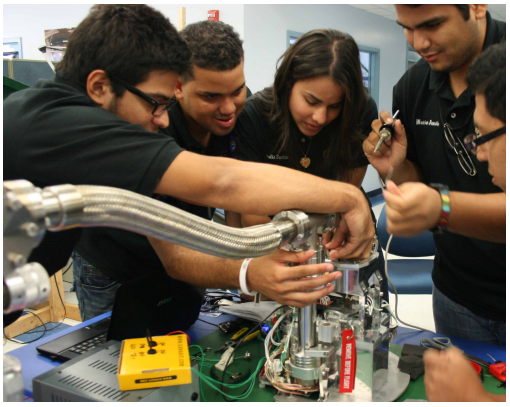
experiment hardware for RockOn, Rock–Sat–C/–X. Seven HD videocameras were included; four downward looking and three looking horizontally.

University of Puerto Rico selected an ex–periment that includes mass spectroscopy to analyze molecular species and their re–spective partial pressures in near space.



University of Puerto Rico students preparing their spectrometer for flight.

University of Colorado Boulder designed and tested a system that deployed the Roll Out De–Orbiting Device (RODEO) that provides a possible means to de–orbit future small satellites.

Students from Baylor (left) and VA Tech (right) de–integrating their experiments post fligth.

Virginia Tech and Baylor University teamed up and designed experiments to measure Nitric Oxide (NO) concentrations at high altitudes (VA Tech) and collect space dust, as well as, mea–sure impact energy using Baylor University's Piezo Dust Detector (PDD) (Baylor).

Two solar missions, SUMI and Hi–C, were flown from White Sands in July.

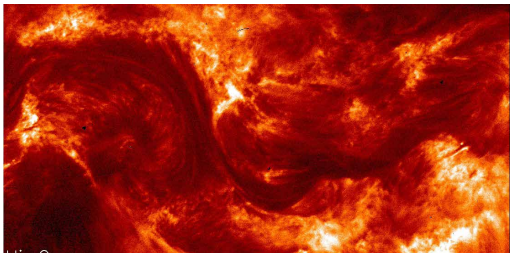
First off the pad on July 5 was the Solar Ul–traviolet Magnetograph Investigation (SUMI). SUMI measured magnetic fields in the chro–mosphere, by observing the ultraviolet (UV) light emitted from two types of atoms on the sun, Magnesium 2 and Carbon 4. Through es–tablished methods of measuring how the light is affected as it travels through the magnetic environment of the solar atmosphere towards Earth, scientists can measure the original strength and direction of the magnetic fields, thus creating a three–dimensional magnetic map of the region.

"With the knowledge we get from a successful SUMI mission, we can go on to build space–based instrumentation that will help us under–stand the processes that form flares and CME's and help us predict space weather," says PI Dr. Jonathan Cirtain.

Launched on July 11, 2012, the High Reso–lution Coronal Imager or Hi–C captured the highest–resolution images ever taken of the sun's million–degree corona.

The telescope focused on a large active region on the sun with some images revealing the dy–namic structure of the solar atmosphere in fine detail. The images were taken in the extreme ultraviolet wavelength.

Hi–C observed features down to roughly 135 miles and observed the sun in one wavelength.



Hi–C image of the solar corona.

The clarity of the images will help scientists better understand the behavior of the solar atmosphere and its impacts on Earth's space environment.

Degradation Free Spectrometer (DFS) was flown from White Sands on July 24.

The DFS sounding rocket mission's ultimate objective was to significantly advance the state of the art in short wavelength observing solar spectrometers to permit more detailed investigation and understanding of the phys–ics, and hence behavior, of our dynamic sun. The present flight carried two newly developed spectrometers which met the observational challenge and were proven flight ready on the present mission.

Visual Information Branch/White Sands

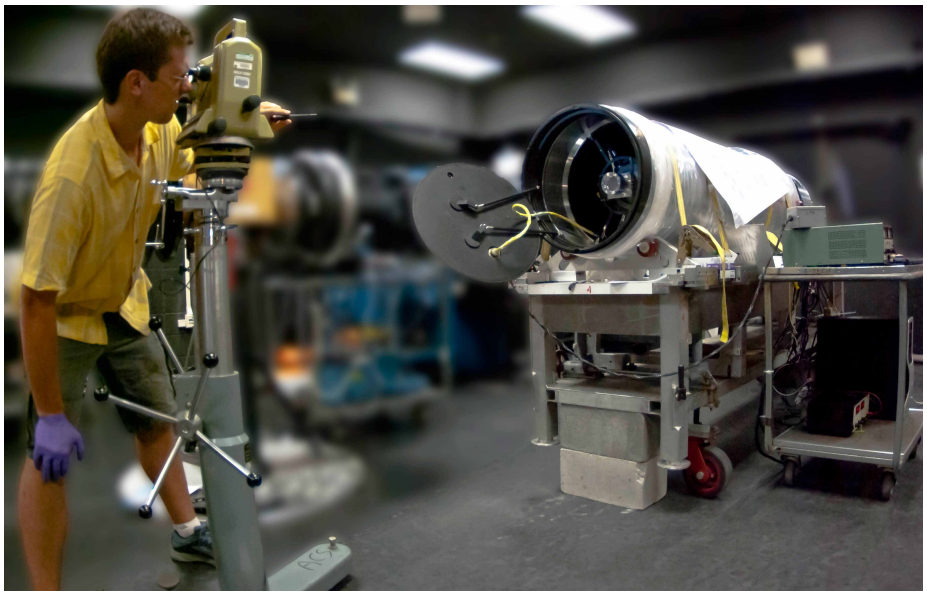
DFS Team with the vehicle.

Integration and Testing

36.268 UG McCandliss – Far–Ultraviolet Off–Rowland Telescope for Imaging and Spectroscopy (FORTIS)

The primary purpose of this mission is to be the first in a program to investigate Lyman alpha escape from nearby star-forming galaxies and to quantify its relationship to the local gas-to-dust ratio using multi-object farultraviolet (FUV) spectroscopy. FUV observations will be conducted using the FORTIS; a multi-object spectro/telescope with a Micro Shutter Array (MSA) designed to observe extended bright HII regions of low red-shift star-forming galaxies. It is envisioned this mission will serve as a pathfinder for future orbital spacecraft.

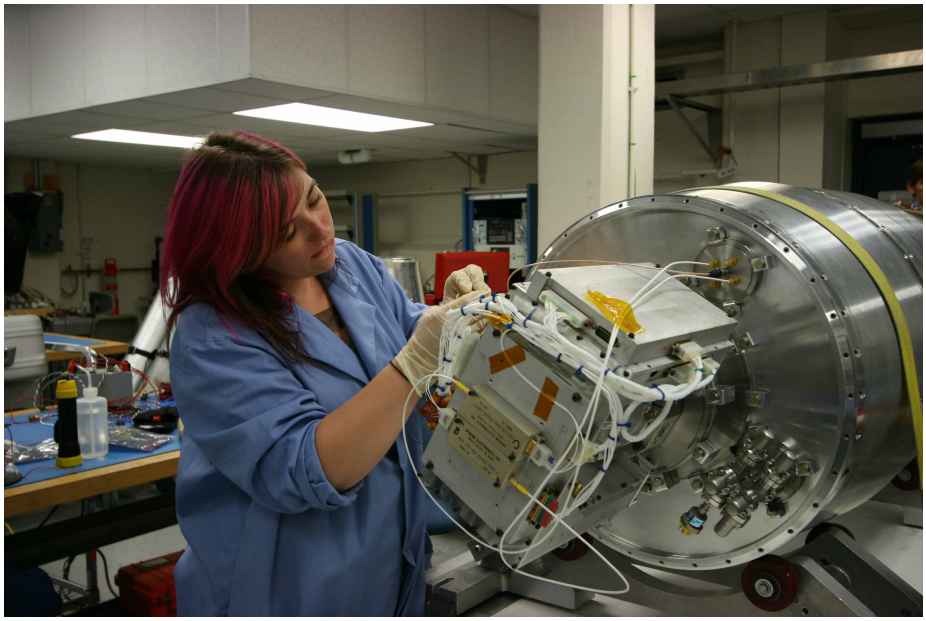
FORTIS team at Wallops.



Brian Fleming of Johns Hopkins University aligning FORTIS.

36.260 UG Cook – IMAGER

The primary goal of this project is to image the unique galaxy M101 in four medium ultraviolet bands to probe the dependence of the UV dust extinction features on formation and processing mechanisms. The galaxy M101 provides a unique laboratory due to its strong metallicity gradient and many HII regions. Determining how dust varies as a function of metallicity and nearby massive star formation is important to understanding galaxy evolution as dust mediates our view of galaxies from the ultraviolet to the infrared.

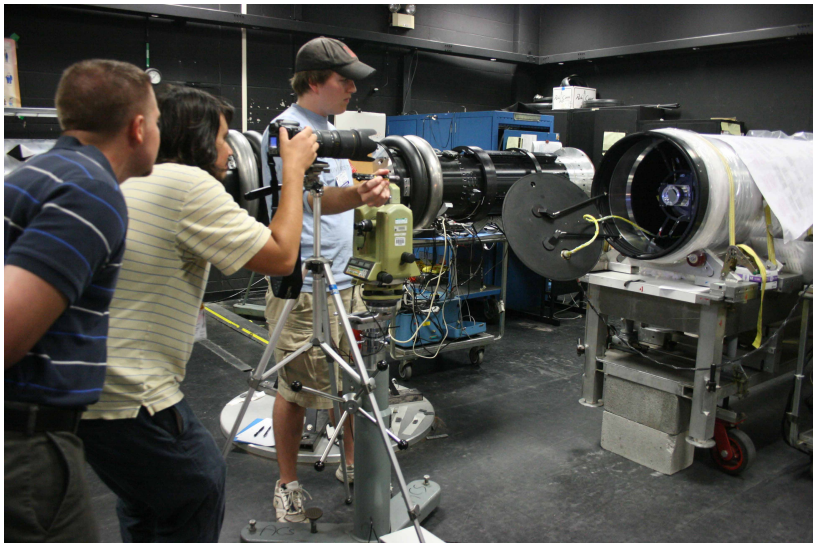


Meredith Danowski of Boston University working on IMAGER.

Picture Place

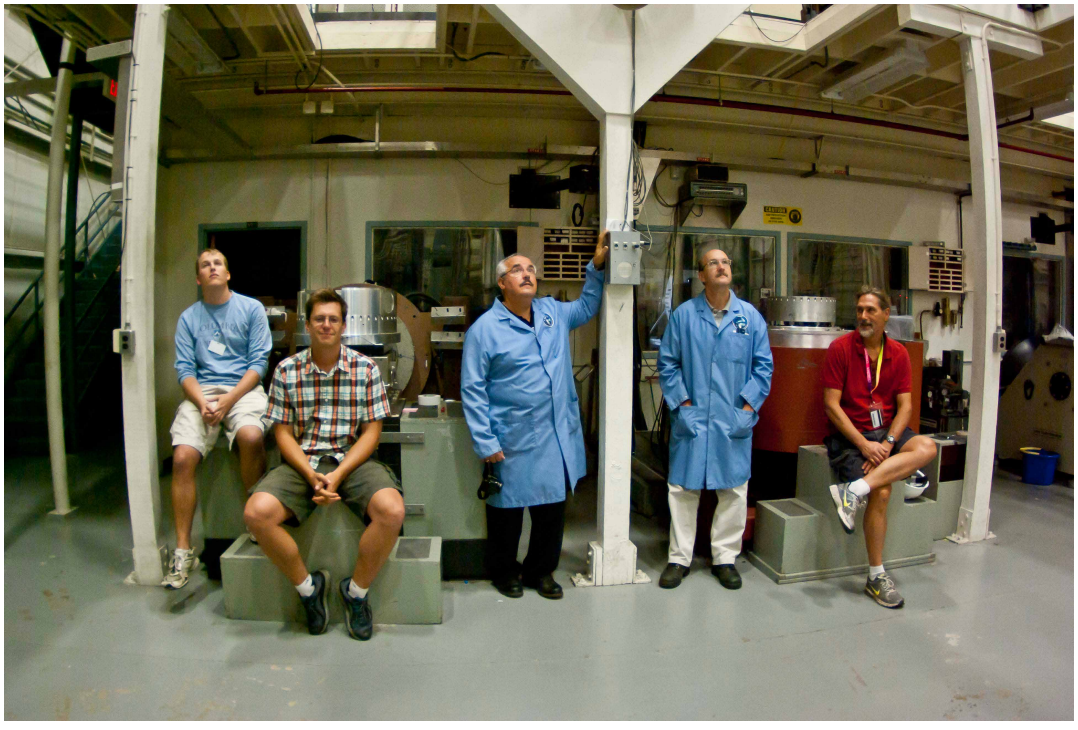
Photo by Wallops Imaging Lab

TATEOR team



Aligning FORTIS microshutter array

RockSat–X integration



FORTIS team members

36.260 UG IMAGER in T&E

Photo by Bristol

Joe Schafer, NSROC II Program Manager, addressing attendees at Bristol's 50th Anniversary.

NSROC attended Bristol Aerospace's 50th Anniversary Celebration, held at their Winnipeg facility on 5 July 2012. NSROC Program Manager Joe Schafer (pictured) was one of several guest speakers. On behalf of NASA and Orbital Sciences, Joe acknowledged the Black Brant longevity was due to its flexibility, robustness, reliability and low cost. In attendance at the celebration were the local Winnipeg workforce, retirees, civic leaders and the media. One retiree recounted their very first Black Brant launch in 1962, which was followed by the second and third launches, which all failed due to pitch-roll coupling, before it was a phenomenon that was widely understood.

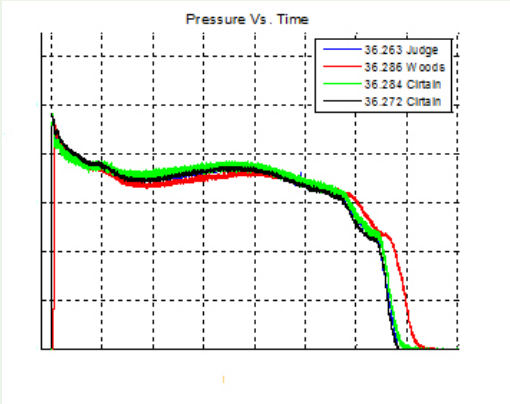
NASA has flown 484 Brants (as of 5 July 2012) in 6 distinct rocket configurations, from the single stage Brant to the four stage Black Brant 12. About half of these have been the two stage Terrier-Black Brant.The Brant has been instrumental in many science discoveries and affirmation of scientific theories.

Bristol prepared a model of a Black Brant motor, which they donated to the Manitoba Museum.

Black Brant formulation change

Earlier this year, the Black Brant propellant formulation migrated to US provided Ammonium Perchlorate. The first four flights of this new formulation have resulted in more consistent motor pressure and significantly less erosion observed in the recovered graphite throats

Comparison of recovered graphite throats. The throat on the left was flown with the new propellant formulation and shows less erosion than the throat on the right.



Want to contribute?

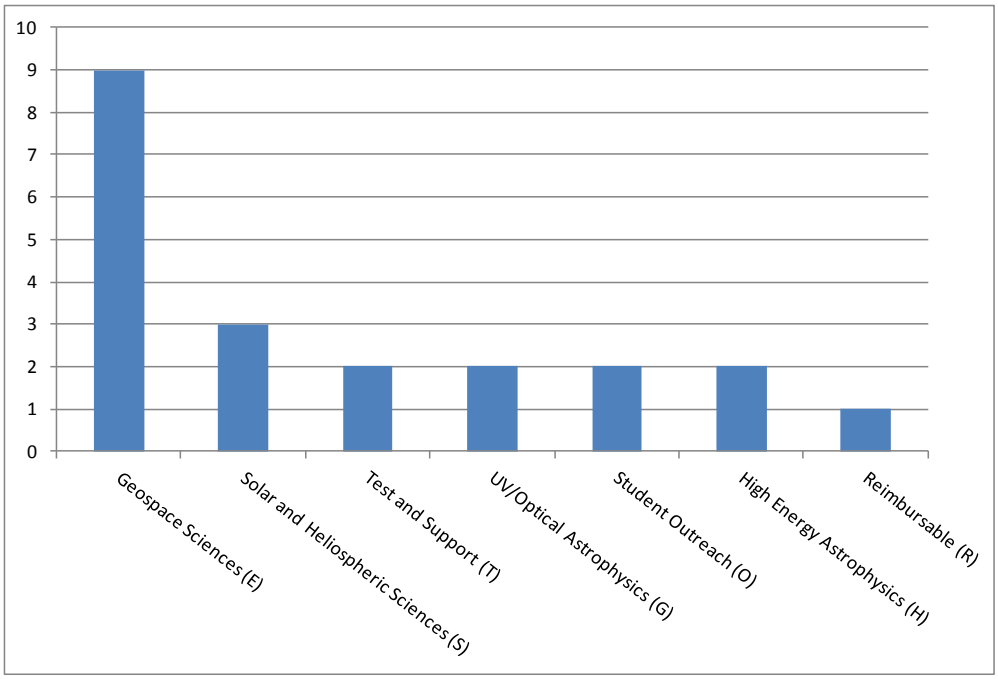
Working on something interesting, or have an idea for a story? Please let us know, we'd love to put it in print!

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

or

Berit Bland
Phone: #2246
Email: Berit.H.Bland@nasa.gov

Launches FY 2012



A total of 21 launches were conducted in FY 2012.

Congratulations Dave Stiles!

How long is 20–minutes? If you're Dave Stiles, it's long enough to save a launch!

At 1:00 pm local time on June 23rd at White Sands Missile Range in New Mexico, the 36.286 Woods team is preparing to launch the third EVE underflight calibration mission. Timing is critical for this mission; in order to match the orbit of the Solar Dynamics Ob–servatory (SDO) the rocket has to launch at 1:30 pm. With 20–minutes to spare before the countdown has to be picked up from a T–10 minute hold, the team discovers that the vacuum snorkle automatic release is not going to work. PI Dr. Tom Woods, MM Dave Jennings and MT Dave Stiles ponder solutions, concluding that using the cherry picker, that just happens to be parked nearby, and manually pulling the vacuum snorkle is the only option to get the rocket airborne in time. So with 20–minutes to spare, Dave rises to challenge and rides to the pad, disconnects the snorkle and saves the day. The countdown is picked up at 1:20:15 pm! 36.286 launches successfully!

Dave Stiles receives award by Commanding Officer at White Sands Missile Range.