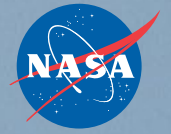


National Aeronautics and Space Administration



# ROCKET REPORT

Sounding Rockets Program Office Quarterly Newsletter

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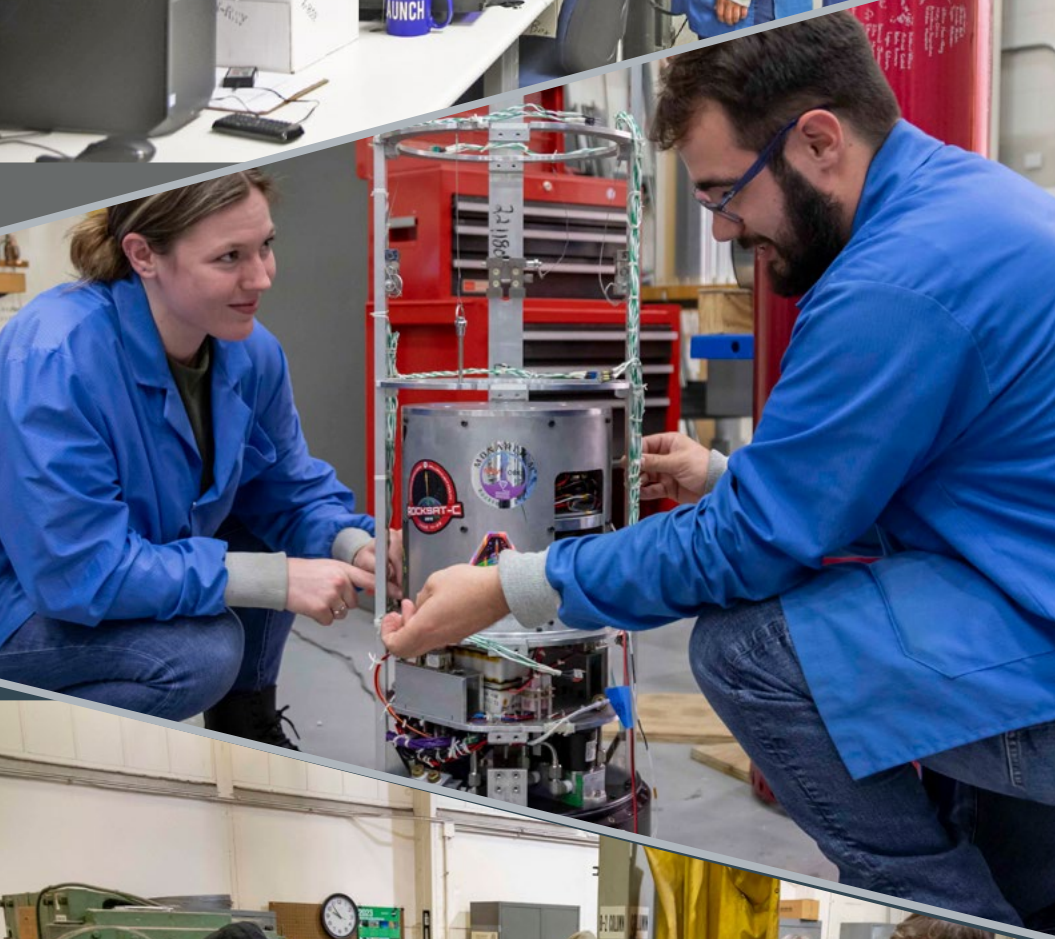




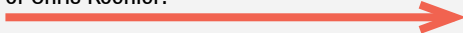
## INSIDE

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Cover photo:  
46.032 WT SubTEC-9 launches from  
Wallops Island, VA. Credit: NASA Wallops  
Imaging Lab.



RockOn and RockSat-C teams with  
payload on vibration table. Photo courtesy  
of Chris Koehler.









## Program News

Three missions, two from White Sands Missile Range (WSMR), NM and one from Wallops Island, VA, were flown this quarter, and included three disciplines; Solar Physics, Astrophysics, and Technology demonstration.

The Sounding Rockets Program Office, in partnership with the Education Office, supported the RockOn/RockSat–C student flight opportunity. The mission was scheduled to launch on June 22, 2023 but was delayed due to inclement weather and rough sea state. The mission is now scheduled for August 15, 2023 and will be launched in conjunction with RockSat–X.

June saw the return of the Wallops Rocketry Academy for Teachers and Students (WRATS) High School educator workshop. 19 educators from 12 states attended. Read more on page 10.

Three payloads will be launched from WSMR during the Annular Solar Eclipse on October 14, 2023. Called Apophis, after the cosmic world serpent from ancient Egyptian cosmology, the payloads will measure any irregularities in the mid–latitude ionosphere caused by the eclipse. The Principal Investigator is Dr. Barjatya/Embry–Riddle University. More information about the eclipse: <https://solarsystem.nasa.gov/eclipses/2023/oct-14-annular/overview/>

The Sounding Rockets Working Group meeting will be held July 12–13, 2023 at Greenbelt.

Two long–time NSROC employees, Clay Mersham and Janet Rickmond, have retired during this quarter. We wish them the very best in their future endeavors.



Happy WRAT testing model rocket parachute.  
Credit: Berit Bland/NSROC.

36.383 UG ZEMCOV/RIT - Cosmic Infrared Background  
ExpeRiment (CIBER) 2 - launched April 16, 2023

CIBER-2 is a near-infrared rocket-borne instrument designed to conduct comprehensive multi-band measurements of extragalactic background light (EBL) anisotropy on arcsecond to degree angular scales.

CIBER-2 builds on the successful measurements and proven methodology of the predecessor CIBER-1 instrument.

No science was collected due to termination of flight shortly after launch.

## Missions Flown



CIBER-2 team at WSMR.  
Credit: Ryan Harty/WSMR



CIBER-2 ready for launch at White Sands Missile Range, NM.  
Credit: Julia Rae Gallegos/WSMR.



Countdown for CIBER-2.  
Credit: Julia Rae Gallegos/WSMR.

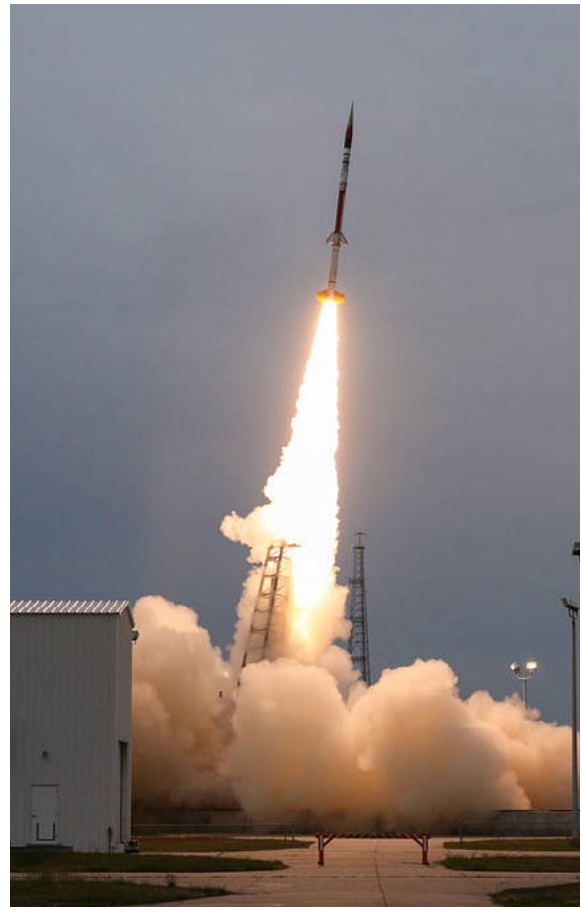
46.032 WT HESH/YACOBUCI/NASA GSFC Wallops Flight Facility- Sub-TEC 9 - launched April 25, 2023

## Missions Flown

SubTEC-9 was the ninth technology development flight and included both in-house experiments and one GSFC partnered piggy-back experiment. The primary objective of this mission was to test a new high data rate (~40 Mbps) C-band telemetry system. Additional experiments included a new star tracker as well as Ethernet cameras, a new battery system, and several other technologies.

List of experiments::

- Wallops Integrated Star Tracker (WalST)
- High Rate C-Band Telemetry (~40 Mbps)
- Haigh-Farr GPS/S-band Combo Antenna
- Space Eye 320 Ethernet Cameras
- Gigabit Ethernet Switch w/ Time Stamping
- NSROC Ethernet Sensor Suite
- Wallops Solid State Peripheral Control Relay Board (SPECTR)
- Next-Gen Battery (lithium ion)
- Command Uplink D/A Board Redesign
- TERN-FLY
- COTS Gyro
- Constant Current Buck Box (C2B2)
- Autonomous Rocket Tracker (ART)
- Printed Hybrid Electronics (PHE) Demo



46.032 WT Sub-TEC 9 launch from Wallops Island, VA-  
Credit: NASA Photo/Kyle Hoppes



Sub-TEC 9 integration at Wallops.  
Credit: Berit Bland/NSROC.



C-band telemetry testing in ground station.  
Credit: Berit Bland/NSROC.



## Missions Flown

### 36.389 US WOODS/University of Colorado - SDO EVE Underflight Calibration Experiment - launched May 3, 2023

The primary objective for this mission is 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.

This mission also provides underflight calibrations for irradiance instruments onboard several NASA spacecraft, as well as, underflight calibrations for solar EUV imagers onboard SDO, Solar TERrestrial RELations Observatory (STEREO), Geostationary Operational Environmental Satellite (GOES), and Hinode.

More information on the EVE sounding rocket program: <https://lasp.colorado.edu/missions/eve-rocket-program/>

#### Payload flight history:

- 36.233, launched 10/28/2006 – Limited Success
- 36.240, launched 4/14/2008 – Success
- 36.258, launched 5/3/2010 – Success
- 36.275, launched 3/23/2011 – Success
- 36.286, launched 06/23/2012 – Success
- 36.290, launched 10/21/2013 – Success
- 36.300, launched 5/21/2015 – Failure
- 36.318, launched 6/1/2016 – Success
- 36.336, launched 6/18/2018 – Success
- 36.353, launched 9/9/2021 – Success



EVE team with vehicle at WSMR.  
Credit: Ryan Harty/WSMR.



EVE launch from WSMR.  
Credit: WSMR.



## PICTURE PLACE - MACHINE SHOP TOUR





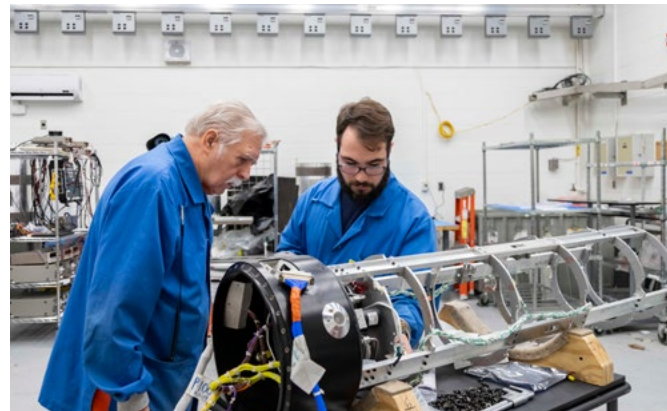
# Integration and Testing

## 41.132 UO Koehler/University of Colorado - RockOn

Integration and testing for the RockOn student mission was completed. RockOn is the first, of three, student flight opportunities. Students apply to attend a one week workshop at NASA GSFC Wallops Flight Facility. During the workshop students build, test and integrate their experiments. Students and faculty work in teams of three to complete the experiments.

The RockOn payload also includes more advanced student built experiments called RockSat-C, the second flight opportunity. Cubes-in-Space, a K-12 flight opportunity, is also part of the payload. The Cubes-in-Space experiments fly in the nosecone of the payload.

Due to inclement weather and rough sea state (the payload requires recovery) during the June launch window, the RockOn launch has been postponed to August 15, 2023.



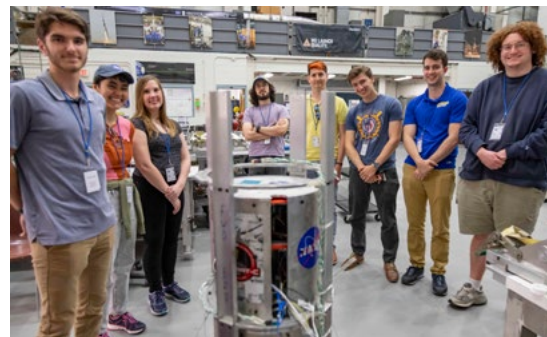
RockOn payload structure assembly and checkout.  
Photo by Berit Bland/NSROC



RocSat-C teams with canister.  
Photo by Berit Bland/NSROC



Cubes-in-Space payload.  
Photo by Berit Bland/NSROC



RockSat-C teams with payload structure and canister.  
Photo by Berit Bland/NSROC



RockSat-X experiment integration in process.  
Photo by Berit Bland/NSROC

## 46.038 UO Koehler/University of Colorado - RockSat-X

RockSat-X student experiments are developed with an objective of providing students with an enhanced experience of flying experiments that are exposed to the space environment. The students gain experience in designing, building, testing, and then flying their experiments on a sub-orbital space flight. It also exposes students to the design and mission lifecycle.

The RockSat-X missions carry student developed experiments and is a follow on mission to RockOn and RockSat-C. RockSat-X experiments are more advanced than RockOn and RockSat-C and include full featured sounding rocket support systems, such as telemetry, attitude control and recovery. RockSat-X experiments are exposed to the space environment enabling measurement of variables outside the payload.

The RockSat-X payload has completed preliminary integration and testing at NASA GSFC Wallops Flight Facility, and is currently scheduled for launch on August 15, 2023.



## Wallops Rocketry Academy for Teachers and Students (WRATS)

### WRATS 2023

In June we welcomed 19 High School educators from around the United States to participate in the WRATS workshop. Twelve states, including MD, VA, OH, TN, NY, IA, WA, SD, DE, NV, KY and FL, were represented.

The workshop started on Monday, June 19th, 2023, and the participants were treated to a presentation by David Sabatino on the significance of the Juneteenth holiday. The presentation was engaging and well received.

This year's workshop included building three different model rockets to investigate the relationship between mass and flight time, parachute design and flight time, and a final rocket that combined the two experiments. The final model rocket included both a payload (raw egg) and an altimeter to measure altitude. Additionally, the teachers, sized, designed and constructed their own parachutes.

During the five day workshop the teachers were familiarized with Wallops Flight Facility through tours of the Range Control Center, F-10 machine shop and Testing & Evaluation Lab, and the Balloon program.

Model rocket launches were originally scheduled through out the week, but due to inclement weather had to be postponed and took place on Friday, the last day of the workshop. 36 rockets, 18 Alpha IIIs and 18 Green Eggs were launched in a 1.5

hour window. Many thanks to Dave Knight/Ground Safety and Eric Littleton/Airfield Manager, for supporting the launches.

Laura writes, "This was probably the best Professional Development (PD) that I have attended in the past 10 years (and I have attendedd a lot of PDs)".



Starting construction of Wizard.



Fin alignment check on Wizard model.



Launcher checks.



Center of Gravity measurement.



Tour of Machine Shop.



Alpha III launch.



WRATS on Wallops Airfield.



## SCHEDULE FOR NEXT QUARTER

MISSION	DISCIPLINE	EXPERIMENTER	ORGANIZATION	PROJECT	RANGE	DATE
41.132 UO	STUDENT OUTREACH	KOEHLER	COLORADO SPACE GRANT	ROCKON	WI	08/15/23
46.038 UO	STUDENT OUTREACH	KOEHLER	COLORADO SPACE GRANT	ROCKSAT-X	WI	08/15/23

WI – Wallops Island, VA

## MISCELLANEA



### NSROC burgers and hotdogs luncheon

NSROC and SRPO staff were treated to a cook-out in April. Burgers and hotdogs were served at the Wallops pavilion.

