

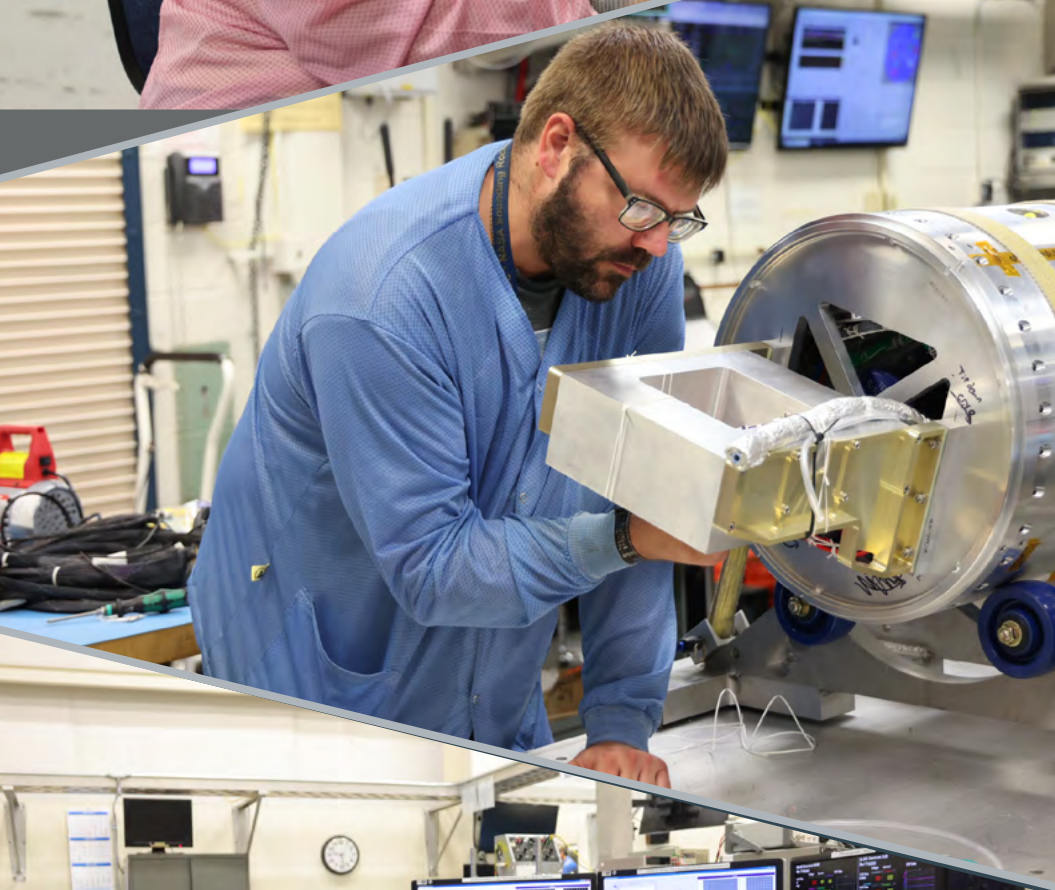
National Aeronautics and Space Administration



Sounding Rockets Program Office Quarterly Newsletter

ROCKET REPORT



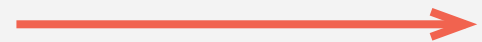


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Cover photo:
TOMEX+ rockets launch from Wallops
Island, VA.
Credit: NASA Photo/Danielle Johnson

41.123 AE TOMEX+ vapor trails.
Credit: NASA Photo/Danielle Johnson



PICTURE OF THE QUARTER

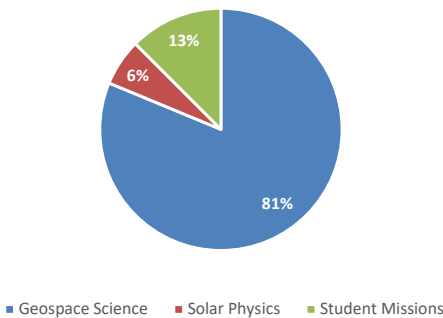


Program News

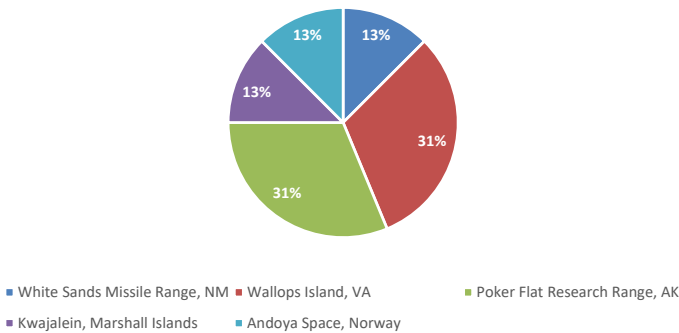
The third quarter of 2025 included four sounding rocket launches. Three rockets were launched for the TOMEX+ mission in August, and one was launched for the student flight mission, RockSat–X, also in August.

September 30, 2025 is the end of the Fiscal Year. The Sounding Rockets Program launched 16 missions, in three disciplines, from five different launch ranges in 2025.

Launches by Discipline FY 2025
Total missions: 16



Launches by Site FY 2025
Total missions: 16



Geospace Science was the focus of the majority of the missions, with launches from all five sites. Remote campaigns were conducted from Kwajalein, Marshall Island, and permanent launch sites in Norway and Alaska.

For FY 26 the current manifest includes 19 launches from 4 different launch sites, with disciplines including Astrophysics, Solar Physics,



Testing parachutes during the August Teacher Workshop.
Credit: NASA Photo/Berit Bland

Geospace Science, Student Flight, and Reimbursable Technology Development.

Two launches from Andøya Space, Norway are coming up in the first quarter of FY 26, with launch windows opening in November 2025.

46.043 WO Koehler NASA Wallops Flight Facility -
RockSat-X - August 12, 2025

Missions Launched

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. Student experiments from 8 University teams shared the 46.043 experiment section. The following experiments were included in the 2025 RockSat-X mission:

The College of the Canyons experiment tested the efficacy of LiDAR scanning in space.

The University of Alabama Huntsville flew the Induced Charging from Atmospheric Re-Entry by a University spacecraft (ICARUS).

The University of Puerto Rico flew a payload equipped with advanced sensors to study the low-latitude atmosphere at an altitude from 0 to 160 km.

University of Hawaii Community Colleges launched a small scale sublimation rocket.

University of Delaware used a Langmuir probe to generate current-voltage (I-V) curves.

University of Virginia demonstrated the feasibility of a low-cost, deployable hypersonic flight experiment.

Virginia Tech's experiment, MiRV, tested RF communications and evaluated the design of a re-entry vehicle.

Northwest Nazarene University's experiment included a space deployable payload.



RockSat-X team with experiment.
Credit: NASA Photo/Berit Bland



RockSat-X sequence testing.
Credit: NASA Photo/Berit Bland



Students on Wallops Island after the launch.
Credit: NASA Photo/Berit Bland

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41.123, 41.124 & 36.314 AE Clemmons/Aerospace Corporation- Turbulent Oxygen Mixing Experiment Plus (TOMEX+) - August 28, 2025 (UT)

Missions Launched

Two Terrier–Improved Orions and one Terrier–Black Brant were launched for the TOMEX+ mission from Wallops Island, VA on August 28, 2025 UT (August 27, 2025 ET).

The 41.123 and 41.124 trimethylaluminum (TMA) release payloads combined with the 36.335 Lidar/Winds instrumentation payload and a ground based imager comprises the TOMEX+. The TOMEX+ mission is based on the 21.126–.127 TOMEX mission flown from White Sands Missile Range, NM in 2000.

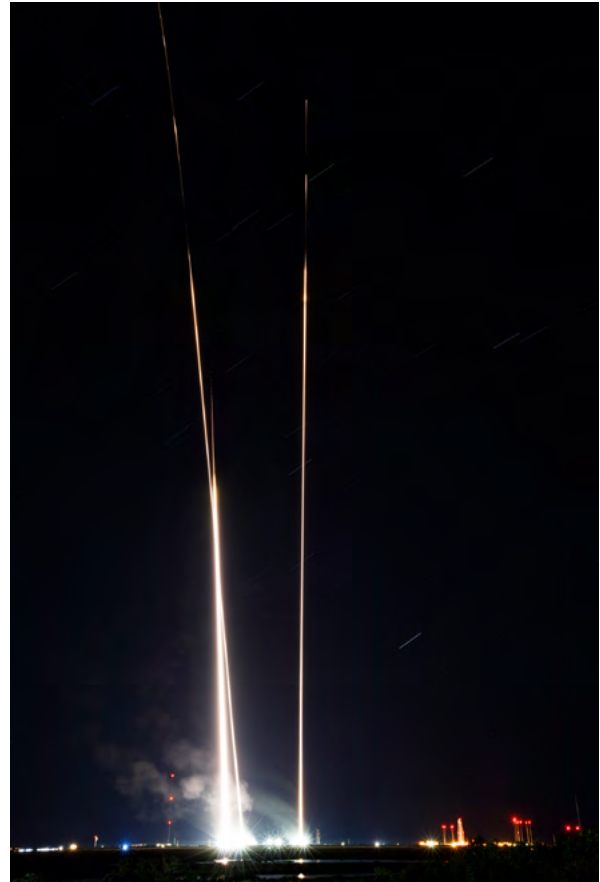
Core scientific question examined by TOMEX+:

How are turbulence and the mixing of atomic oxygen related to each other and to underlying instabilities?

This question is addressed through the three scientific objectives for TOMEX+:

- Determine how the vertical profile of the atomic oxygen mixing ratio varies as the atmosphere changes from regions of large layered turbulence at or below the mesopause to decreasing and possibly vanishing turbulence around the turbopause.
- Determine the horizontal variations in the atomic oxygen density that can be related to variations in turbulent fluctuations.
- Characterize the 3D turbulence spectrum, its spatial variability and relationship to larger scale features of the flow, especially those relatable to instabilities.

Scientific data from the mission is being analyzed. Early flight results indicate that the 41.124 Terrier–Orion payload did not disperse TMA vapor as expected.



Three TOMEX+ vehicles launch (long exposure photo).
Credit: NASA Photo/Kyle Hoppes



TMA Vapor trails.
Credit: NASA Photo/Danielle Johnson

Wallops Rocketry Academy for Teachers and Students (WRATS)



Eighteen High School teachers from ten states and Washington D.C. participated in the WRATS workshop August 11 – 15, 2025. The workshop was held the same week with the RockSat-X flight and the teachers attend the launch on Wallops Island – a highlight of the week.

During the workshop participants learn about model rocketry and how models relate to sounding rockets. Three models were constructed and flown during the week. The first experiment demonstrates mass vs. altitude by varying the “payload” mass carried by a small rocket. Parachutes are designed and constructed for the second small rocket to demonstrate and evaluate shape and size parameters and their trade-offs in rocket recovery. Advancing to the final rocket for the week, both mass and parachute experiments are incorporate and an altimeter is added record peak altitude.

Additional components of the workshop include tours of Wallops Flight Facility, presentations by Subject Matter Experts on parachutes and internship opportunities.

The WRATS workshop is a collaboration between the Wallops Education Office, Sounding Rockets Program Office (SRPO), and the NASA Sounding Rockets Operations Contract (NSROC).

Some of the feedback received from the teachers:

“Can’t wait to share with my students!”

“Reinforces math and science concepts and skills.”

“Great connections to geometry, design, and data analysis.”



WRATS group photo after the final launch.



Rocket construction.



Center of Gravity measurement.

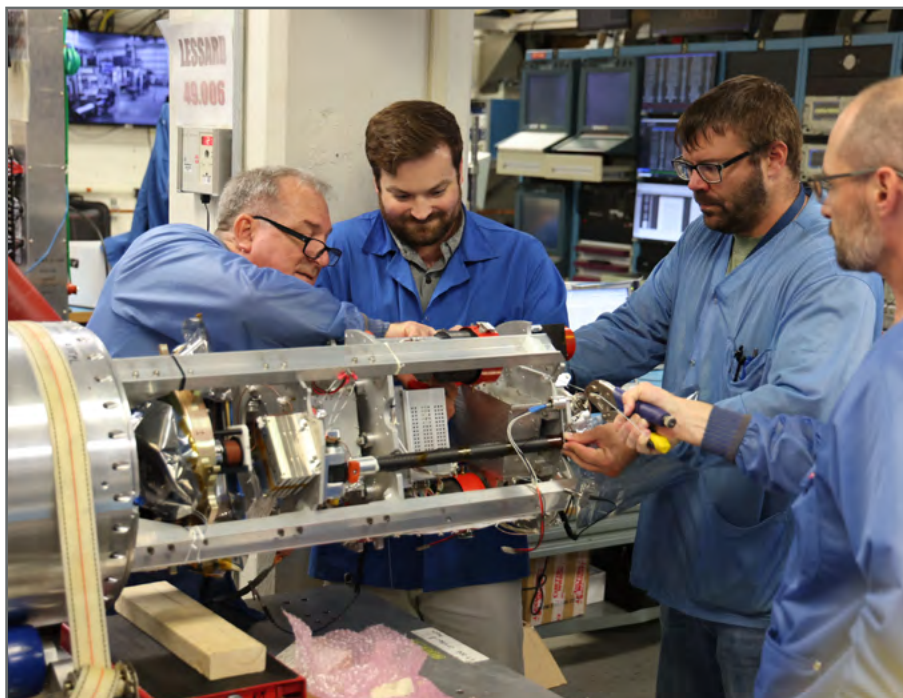


Testing rockets on rails.

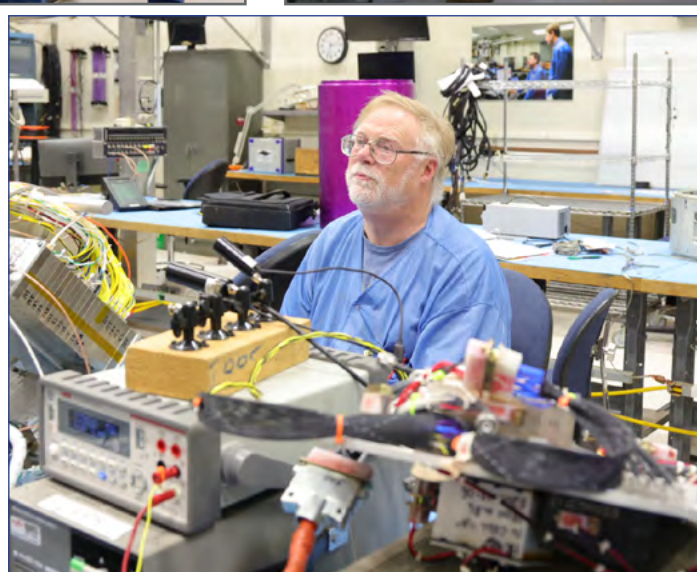
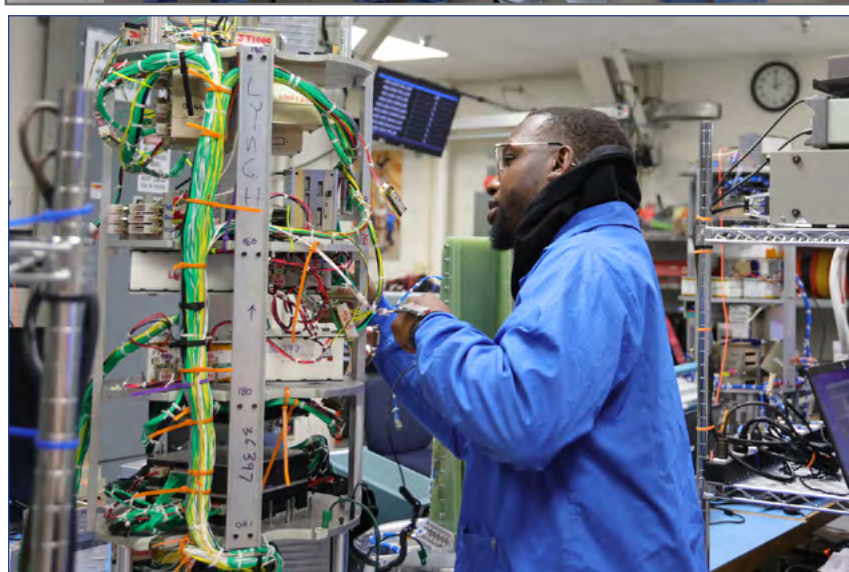
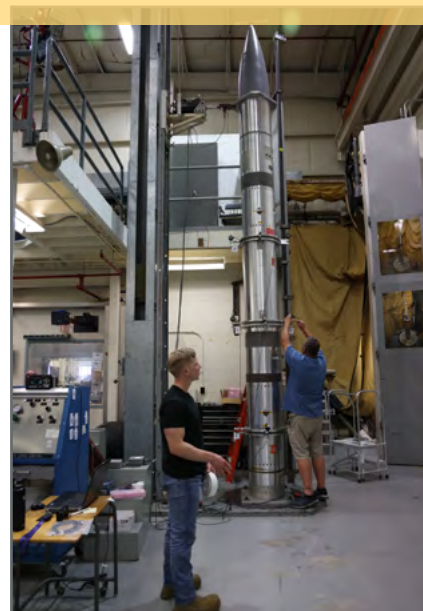


Launch!

All photos credit: NASA Photo/Berit Bland



PICTURE PLACE



Integration and Testing

49.006 UE Lessard/University of New Hampshire - Rocket Experiment for Neutral Upwelling (RENU) 3

When the solar wind interacts with the Earth's magnetosphere, both energy and matter can be transferred across the magnetopause boundary. This transfer gives rise to numerous phenomena, including ion outflow and neutral upwelling in the polar cusps. These processes are caused by a transfer of energy to the ionospheric plasma and neutral gas through various mechanisms. The heated plasma or gas expands, increasing the density of the atmosphere at high altitudes by as much as a factor of two, and injecting ionospheric plasma into and even outside of the magnetosphere.

The Rocket Experiment for Neutral Upwelling (RENU) 3 sounding rocket will study the electrodynamic properties of the cusp during a neutral upwelling event.

The objectives for RENU 3 are:

- What are the properties of high-altitude thermospheric winds (versus altitude) associated with a cusp-related neutral upwelling event?
- What are the ionosphere-thermosphere system input parameters that drive the upwelling event?
- Which aspects of the observations match modeling results and which do not?
- What are the relative fluxes of upflowing N^+2 and O^+ during the event?

This flight is similar to the 52.002 UE RENU 2 mission that was launched from Andøya in December of 2015. RENU 3 will transit the cusp region during a neutral upwelling event, equipped with a suite of instruments that will build on previous observations of this phenomena from RENU 2.

The launch window opens on November 13, 2025 at Andøya Space, Norway.



RENU 3 integration at Wallops.
Credit: NASA Photo/Berit Bland

SCHEDULE FOR NEXT QUARTER

MISSION	DISCIPLINE	EXPERIMENTER	ORGANIZATION	PROJECT	RANGE	DATE
46.040 WO	STUDENT OUTREACH	KOEHLER/BLIX	NASA WFF/Andoya Space	GHOST	NOR	11/13/25
49.006 UE	GEOPACE SCIENCE	LESSARD	UNIV OF NEW HAMPSHIRE	RENU-3	NOR	11/13/25

NOR – Andøya Space, Norway

MISCELLANEA



TOMEX+ rails being elevated.
Credit: NASA Photo/Danielle Johnson