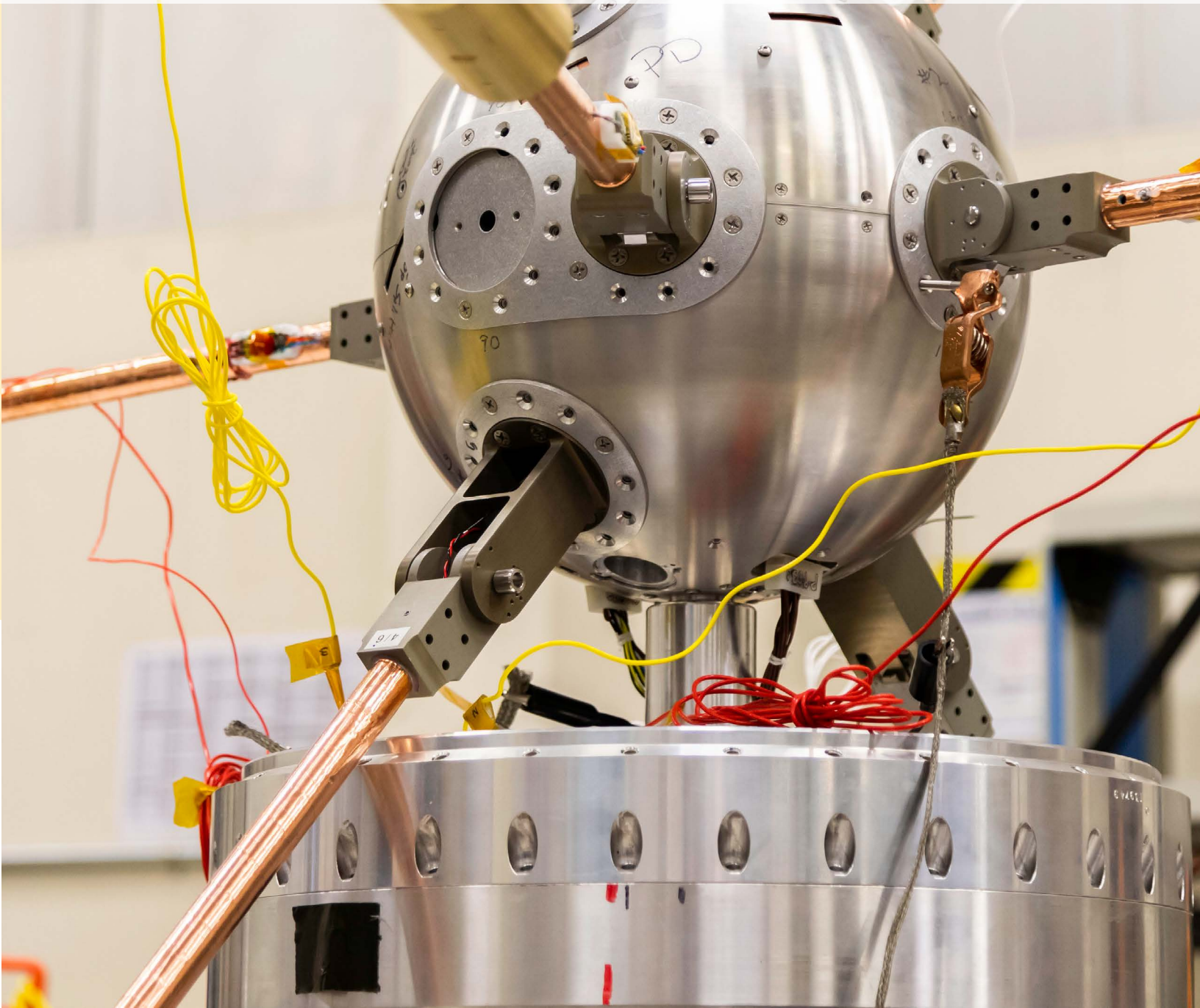
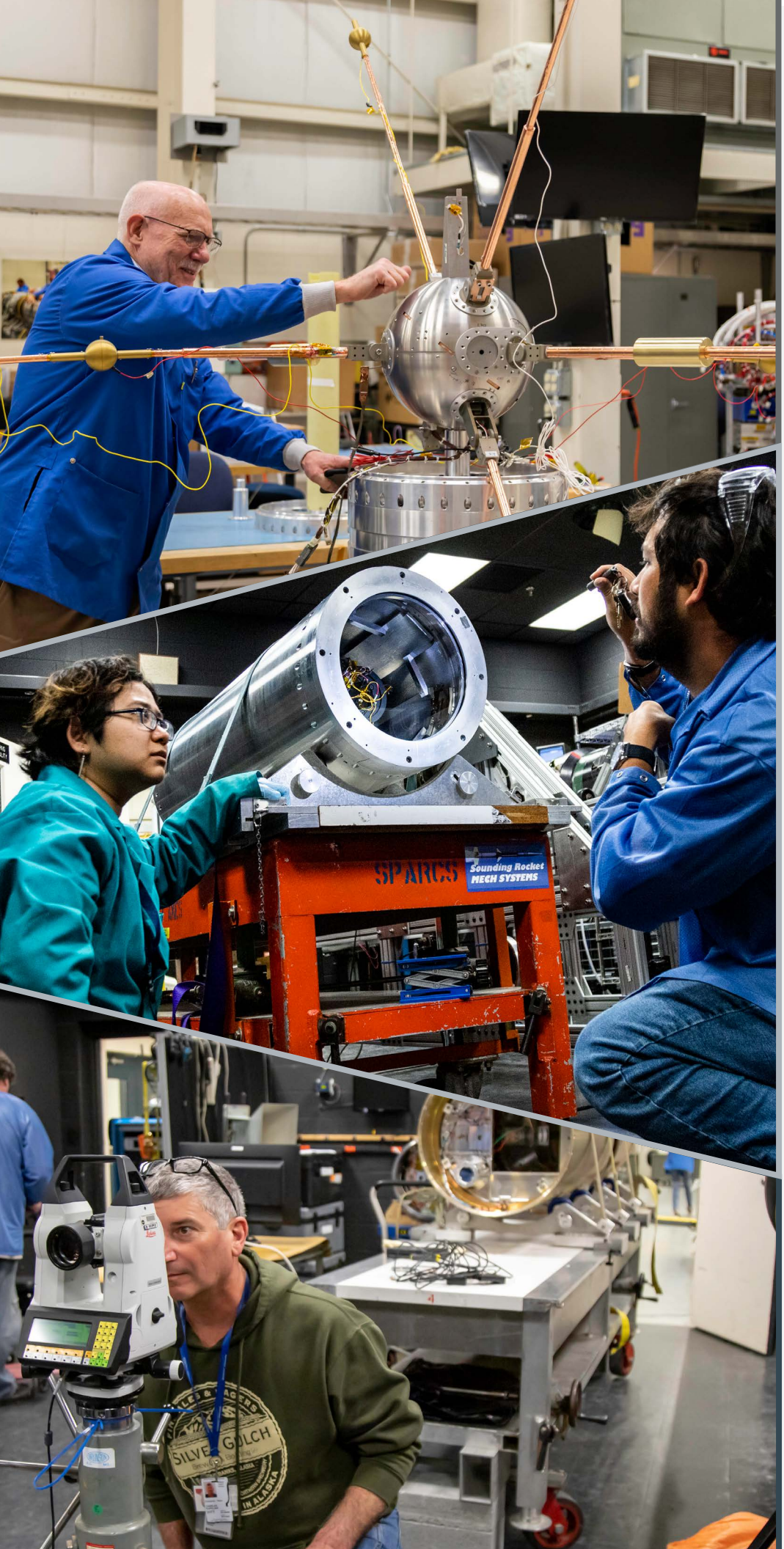
National Aeronautics and Space Administration

Sounding Rockets Program Office Quarterly Newsletter

Rocket Report

4 1
3 2 2020

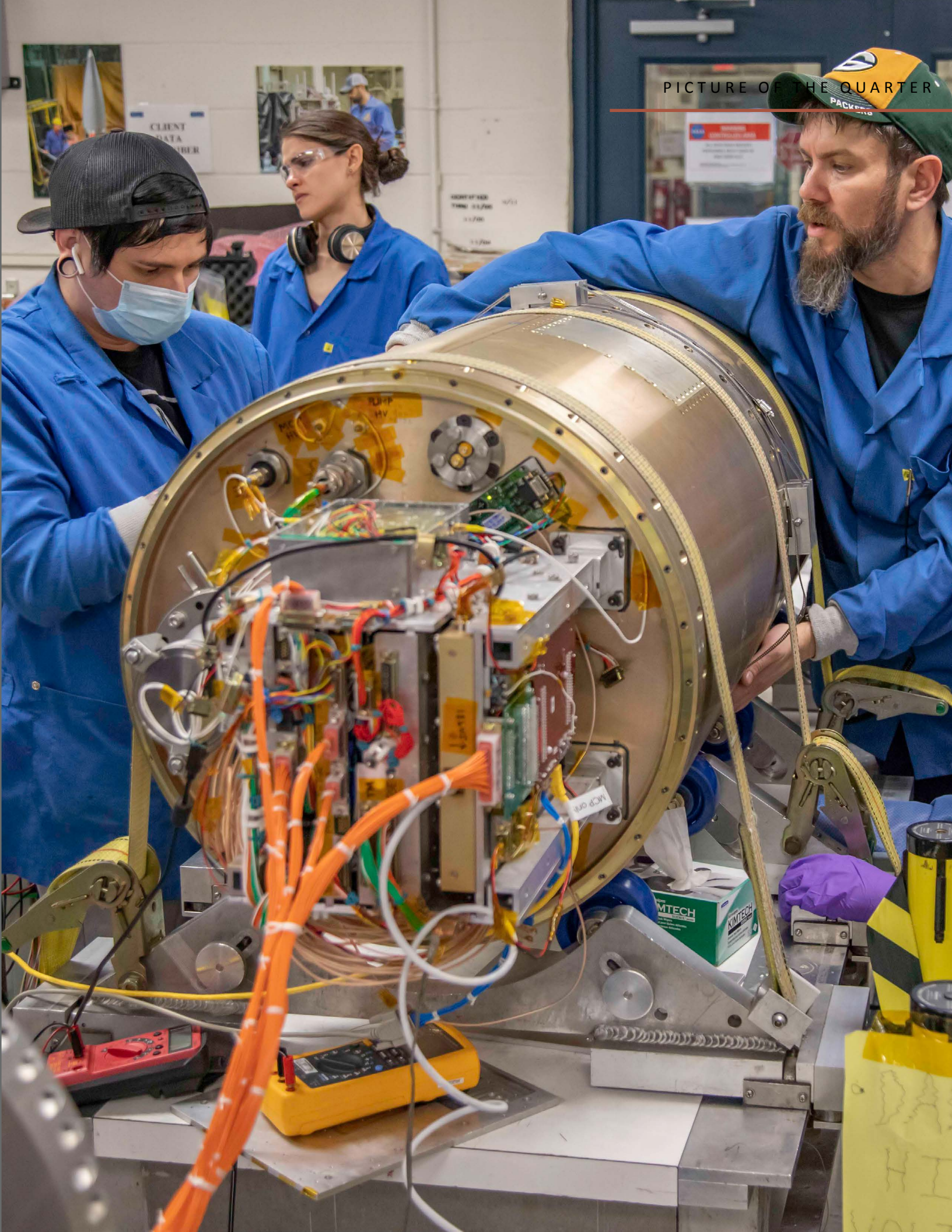




INSIDE

Cover photo:
Goddard Sphere sub–payload.

36.324 US Harris - Spatial Heterodyne Interferometric Emission Line Dynamics Spectrometer (SHIELDS) integration at Wallops in February 2020.


KIMTECH
MCP on

Mission Milestones

During the Covid–19 pandemic the Sounding Rockets Program Office (SRPO) and NASA Sounding Rocket Operations Contract (NSROC) staff have been teleworking in the second quarter of 2020.

Mission preparations, such as mission milestone meetings, have been performed for flights schedule for when on–site activities are resumed. Facility inspections have also been performed on a regular basis.

36.281 UG Zemcov/Rochester Institute of Technology - Cosmic Infrared Background Experiment (CIBER) 2

A Mission Readiness Review for CIBER–2 was held on April 14, 2020.

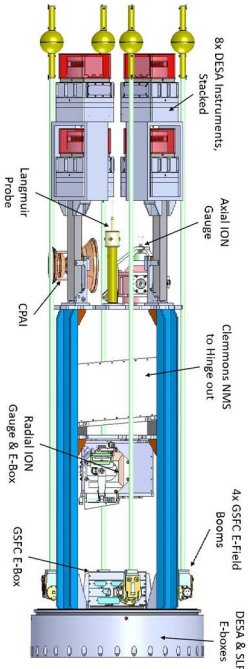
CIBER–2 aims to measure spatial fluctuations in the near–infrared background light. CIBER–2 scientifically follows on the detection of fluctuations with the predecessor CIBER –1 sounding rocket experiment and will use measurement techniques developed and successfully demonstrated by CIBER–1. The high–sensitivity and multiband imaging measurements of CIBER–2 will elucidate the history of Intra–halo light (IHL) production and carry out a deep search for extragalactic background fluctuations associated with the epoch of reionization (EOR).

47.001 GE Endurance (Collinson)/NASA Goddard Space Flight Center - Endurance

A Requirements Definition Meeting for Endurance was held on April 16, 2020.

The purpose of the Endurance experiment is to make the first measurement of the magnitude and structure of the electric field generated by Earth's Ionosphere. Endurance will directly measure a particular component of Earth's electrical field called the ambipolar electrical field that is generated by Earth's ionosphere, the layer of Earth's atmosphere that contains a high concentration of ions and free electrons.

Endurance will be first mission to fly on a Oriole III–A (Terrier–Oriole–Nihka) vehicle.



Endurance payload detail

Oriole III–A vehicle
Credit: NSROC ME

36.359 & 36.364 UE Bounds/University of Iowa - Aurora Current and Electrodynamics Structures (ACES) 2

A Requirements Definition Meeting for this mission was held on April 29, 2020.

The purpose of the ACES–2 mission is to determine the distribution of the ionospheric currents and the associated energy dissipation in a stable arc as well as to determine the role of the Alfven resonator in governing the structuring of current closure. The first ACES mission flew successfully from Poker Flat Research Range, AK, on January 29, 2009.

Two rockets, both Black Brant IXs, will be launched as part of this mission. The launches will be separated by approximately 2–minutes. The first rocket, high–flyer, will fly to approximately 330 km, and the second to between 130 and 170 km.

36.368 UG Green/University of Colorado - Dual-channel Extreme Ultraviolet Continuum Spectrograph (DEUCE)

A Desing Review for this mission was held on May 5, 2020. This is a re–fly of 36.311 and 36.331, flown from White Sands Missile Range (WSMR) on October 30, 2017 and December 18, 2018 respectively.

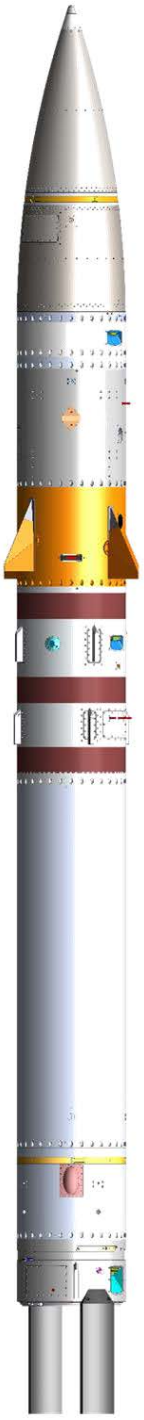
DEUCE, an astrophysics mission, will observe β Canis Major, a local, bright, hot star that has very little intervening absorbing material in the interstellar medium. The other star that meets these criteria is ε Canis Major, which was observed with the 36.331 mission. The fundamental objective of DEUCE is to understand how bright these types of stars are in the 700 – 900 Å regime.

36.365 GB Nuth/NASA Goddard Space Fligth Center - Determining Unknown yet Significant Traits (DUST) 2

The DUST–2 Design Review was held on June 4, 2020. The first DUST mission flew from White Sands Missile Range (WSMR) on October 7, 2019.

The purpose of the DUST–2 experiment is to measure important variables in the end–to–end process of grain formation in circumstellar outflows around Asymptotic Giant Branch (AGB) stars and model the physical and chemical properties of the dust. The scientific goal is to determine the most important physical properties controlling dust production and measure the infrared spectrum of the analog dust grains during formation and agglomeration in the laboratory and in microgravity.

The DUST–2 instrumentation will include four double wavelength interferometers and two in–situ IR spectrometers to measure free–flying dust.



DUST payload model.
Credit: Henry Burth/NSROC ME

46.032 WT Hesh/NASA Wallops Flight Facility-SubTEC-9

A Mission Initiation Conference for the SubTEC–9 mission was held on June 8, 2020.

Sub–TEC is a carrier platform for technology experiments provided by SRPO, NSROC and other entities.
The primary objectives for SubTEC–9 are:

- Test high data rate C–band telemetry link (~40 Mbps) to test out both flight and ground components
- Test the Deploying and Retracting Tubular (DaRT) boom system with 360º cameras
- Test the Engineering and Technology Directorate (ETD) Wallops Integrated Star Tracker (WaIST) in a relevant flight environment
- Provide a test flight opportunity for several NSROC and NASA ETD development
- Provide opportunity for external piggyback experiments

52.009 AE Reeves/Los Alamos National Laboratory - Beam-Plasma Interaction Experiment (Beam-PIE)

A Requirements Definition Meeting for the Beam–PIE mission was held on June 15, 2020.

The two primary objectives for Beam–PIE are to demonstrate and increase the technology readiness level of the new electron accelerator technology for space applications and to study wave generation from pulsed electron beams and quantify the generation efficiency of whistler waves relative to extraordinary–mode type waves. If waves of sufficient amplitude can be generated, a secondary science objective will be the investigation of wave–particle interaction physics and the changes to the local particle populations, possibly induced by the beam–generated waves.

41.130 UO Koehler/Colorado Space Grant-RockOn

A Design Review for the RockOn mission was held on April 2, 2020.

The RockOn payload includes both student experiments created during a week long workshop at Wallops, and the more advanced RockSat–C experiments. Since 2008, the first RockOn mission, over 700 students from 42 states and DC and Puerto Rico have participated in this opportunity.

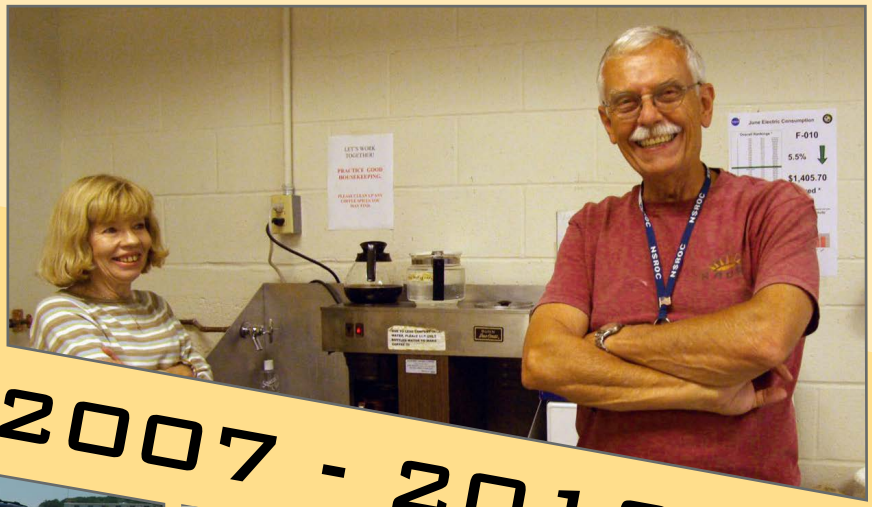
RockOn workshop team in 2019.

46.030 UO Koehler/Colorado Space Grant-RockSat-X

A Design Review for the RockSat–X mission was held on April 20, 2020.

RockSat–X is the most advanced University student flight opportunity. Students design and construct their own experiments. The payload is designed to provide exposure to the space environment and includes support systems such as telemtery and attitude control. Eight student teams will fly experiments on this, the 10th flight of RockSat–X.

rockSat–X teams on Wallops Island in 2019 after a successful launch.



PICTURES 2007 - 2012

From the Archives: Guará Campaign 1994

In 1994 the Guará sounding rocket campaign was conducted from the Alcântara launch site in Brazil. Thirteen sounding rockets and 20 meteorological rockets were launched between August and October of that year.

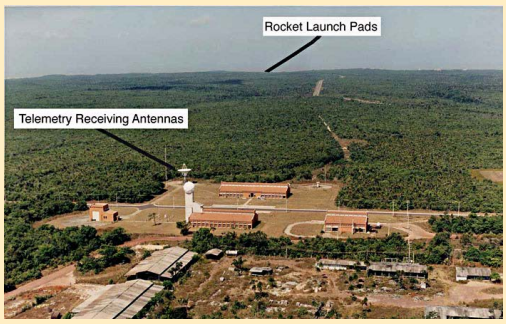
Alcântara is located near the magnetic equator and provides access to scientifically interesting ionospheric phenomena, such as equatorial spread F (EFS). In addition the ESF studies, the sounding rocket missions focused on the daytime equatorial electrojet, sunset electrodynamics, and middle atmosphere–thermosphere coupling at the equator.

Four Nike–Orion rockets were launched during the first launch window in August 1994. These launched were accompanied by the met rockets. The purpose of this portion of the Guará campaign, called Mesosphere and Lower Thermosphere Equatorial Dynamics (MALTED), was to investigate the interaction between large scale planetary waves, medium scale gravity wave structure, and small–scale turbulence in the equatorial zone.

Four single stage Black Brant rockets were launched to study the daytime equatorial electrojet during a variety of geophysical conditions. The electrojet payloads included instrumentation to measure the DC and wave electric fields, currents, plasma density, and instabilities associated with the electrojet.

The Very–High Altitude Spread–F Experiment was launched on a three stage Black Brant X. The experiment probed ionospheric turbulence associated with equatorial spread F. The rocket reached an apogee of 957 km and detected spread F irregularities up to 822 km, considerably higher than in previous such experiments.

Four Nike–Tomahawks were launched to support the Sunset Electrodynamics experiment included a series of chemi–luminescent trimethyl aluminum (TMA) trails, as well as barium and strontium, released from the payloads at dusk. The chemical releases were used to measure the wind profiles from 90–180 km and the electric fields at apogee.



Thanks to Dr. Jim Labelle for posting the images on the web!

SCHEDULE

COVID-19 has affected our operational status and all near-term launch dates are TBD.

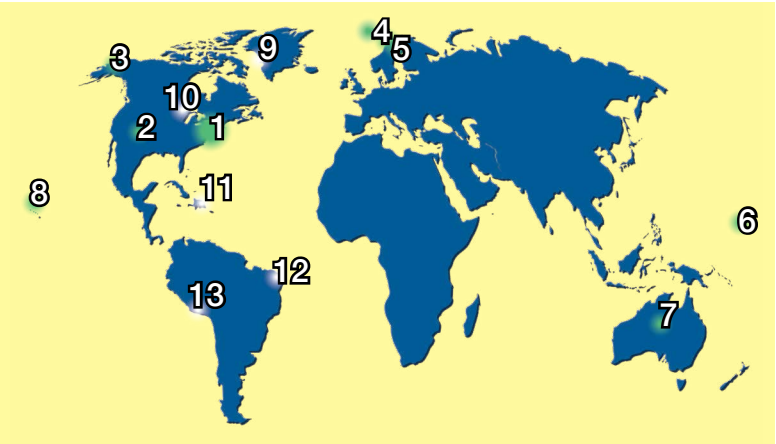
MISSION	DISCIPLINE	EXPERIMENTER	ORGANIZATION	PROJECT	RANGE	DATE
36.322 GS	SOLAR & HELIOSPHERIC	DAW	NASA/GSFC	EUNIS	WS	TBD
36.365 GB	LAB ASTRO	NUTH	NASA/GSFC	DUST–2	WS	TBD

MISCELLANEA

For students

Answers to last issue's word search.

FIND YOUR WAY TO A ROCKET RANGE.



Place the correct number from the map in the list of launch sites.

Active launch sites:
___ - Norway: two launch sites, Andøya Space Center and Svalbard
___ - Australia: several launch sites
___ - Poker Flat Research Range, Fairbanks, Alaska
___ - Wallops Flight Facility, Virginia - Home of Sounding Rockets
___ - Kwajalein Atoll, Marshall Islands
___ - Barking Sands, Hawaii
___ - White Sands Missile Range, New Mexico
___ - Esrange, Kiruna, Sweden

Inactive launch sites:
___ - Alcântara, Brazil
___ - Greenland (Søndre Strømfjord, Thule)
___ - Camp Tortuguero, Puerto Rico
___ - Punta Lobos, Peru
___ - Fort Churchill, Canada