



2018 — 2021

GRAND

CHALLENGE

INITIATIVE

Quick Look



9 MISSIONS
12 ROCKETS



NASA GSFC/WFF • Andoya Space Center • University of Oslo • JAXA • ISAS • Dartmouth College • University of Iowa • University of Alaska Fairbanks • Clemson University • University of Colorado

THE GRAND CHALLENGE INITIATIVE - CUSP

2018

LAUNCHED: December 8, 2018

TRICE-2

MISSION: Twin Rockets to Investigate Cusp Electrodynamic-2

LAUNCH VEHICLES: Black Brant XII • 2 Rockets

LAUNCH SITE: Andøya, Norway

PRINCIPAL INVESTIGATOR: Craig Kletzing, University of Iowa, USA



LAUNCHED: December 7, 2018

VISIONS-2

MISSION: Visualizing Ion Outflow via Neutral atom Sensing-2

LAUNCH VEHICLES: Black Brant X • 2 Rockets

LAUNCH SITE: Ny-Ålesund, Svalbard

PRINCIPAL INVESTIGATOR: Doug Rowland, NASA Goddard Space Flight Center, USA



2019

LAUNCHED: January 4, 2019

CAPER-2

MISSION: Cusp Alfvén and Plasma Electrodynamic Rocket-2

LAUNCH VEHICLE: Black Brant XII

LAUNCH SITE: Andøya, Norway

PRINCIPAL INVESTIGATOR: James LaBelle, Dartmouth College, USA



LAUNCHED: January 13, 2019

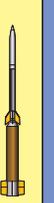
G-CHASER

MISSION: University Student Experiments

LAUNCH VEHICLE: Terrier-Improved Malemute

LAUNCH SITE: Andøya, Norway

PRINCIPAL INVESTIGATOR: Chris Koehler, Colorado Space Grant Consortium



LAUNCHED: April 5, 2019

AZURE

MISSION: Auroral Zone Upwelling Rocket Experiment

LAUNCH VEHICLES: Black Brant XI • 2 Rockets

LAUNCH SITE: Andøya, Norway

PRINCIPAL INVESTIGATOR: Miguel Larsen, Clemson University, USA



LAUNCHED: December 10, 2019

CHI

MISSION: Cusp Heating Investigation

LAUNCH VEHICLE: Black Brant IX

LAUNCH SITE: Ny-Ålesund, Svalbard

PRINCIPAL INVESTIGATOR: Miguel Larsen, Clemson University, USA



SOUNDING ROCKET FAST FACTS

- Known as sounding rockets for the nautical term "to sound," meaning to measure, these rockets reach a region between 30 and 800 miles above Earth's surface.
- The lower end of this region is otherwise inaccessible, as it's above the maximum altitude for scientific balloons and below the minimum for satellites.
- The flight is a simple parabolic trajectory and flight time is less than 20 minutes—providing just 5 to 10 solid minutes of scientific observations from space.

LAUNCHED: November 26, 2019

ICI-5

MISSION: 3D in situ Observations of Ionospheric Irregularities in the Cusp

LAUNCH VEHICLE: VS-30 - Improved Orion

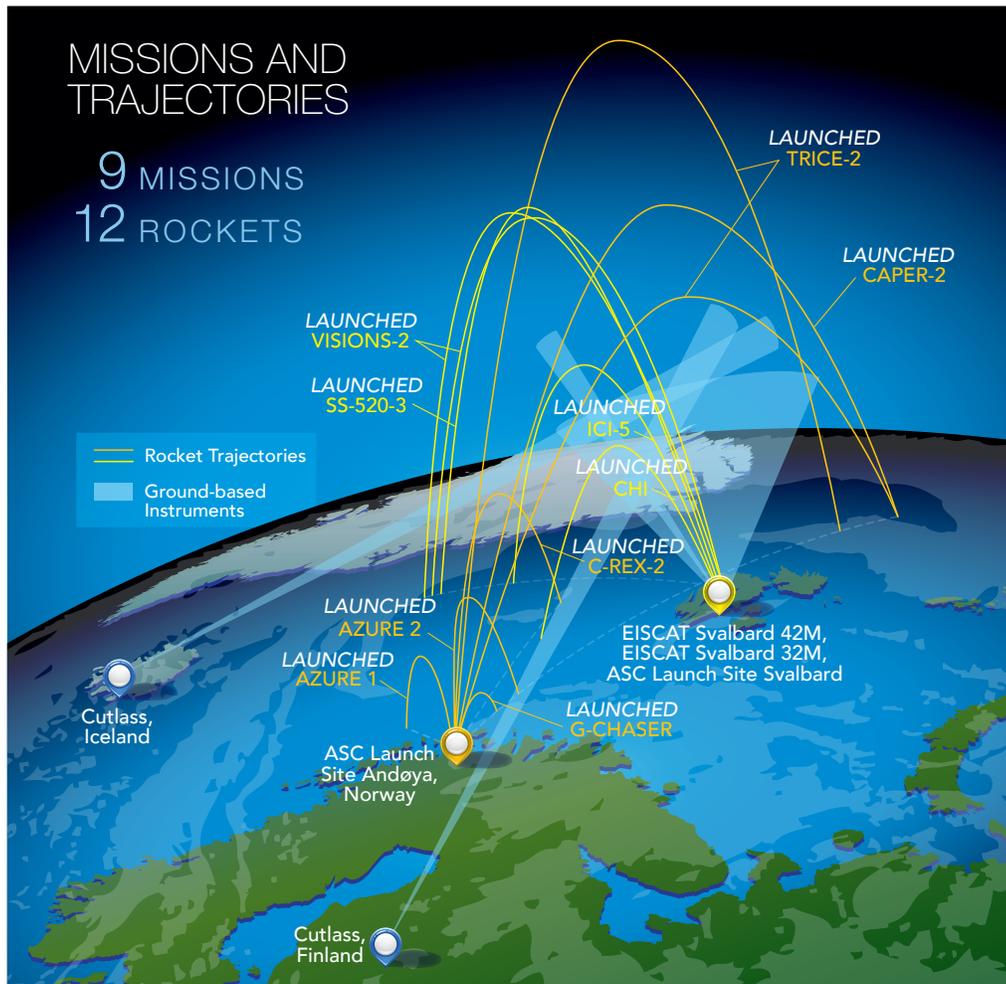
LAUNCH SITE: Ny-Ålesund, Svalbard

PRINCIPAL INVESTIGATOR: Joran Moen, University of Oslo, Norway



MISSIONS AND TRAJECTORIES

9 MISSIONS
12 ROCKETS



2021

LAUNCHED: November 4, 2021

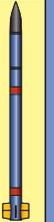
SS-520-3

MISSION: Ion Outflow in the Cusp

LAUNCH VEHICLE: SS-520-3

LAUNCH SITE: Ny-Ålesund, Svalbard

PRINCIPAL INVESTIGATOR: Yoshifumi Saito, Japan Aerospace Exploration Agency



LAUNCHED: December 1, 2021

C-REX-2

MISSION: Cusp-Region Experiment

LAUNCH VEHICLE: Black Brant XII

LAUNCH SITE: Andøya, Norway

PRINCIPAL INVESTIGATOR: Mark Conde, University of Alaska Fairbanks, USA

