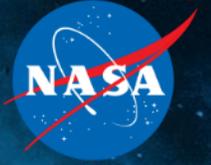


National Aeronautics and
Space Administration



NASA Heliophysics

Space Weather Council Kick Off

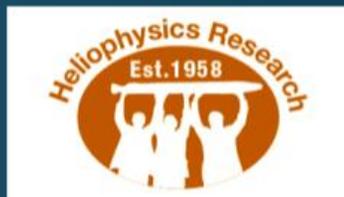
Dr. Nicky Fox
Heliophysics Division Director
March 2, 2022

NASA Heliophysics Objectives

Solve the **fundamental physics** mysteries of heliophysics: Explore and examine the physical processes in the space environment from the Sun to the Earth and throughout the solar system including the interface with the interstellar medium.

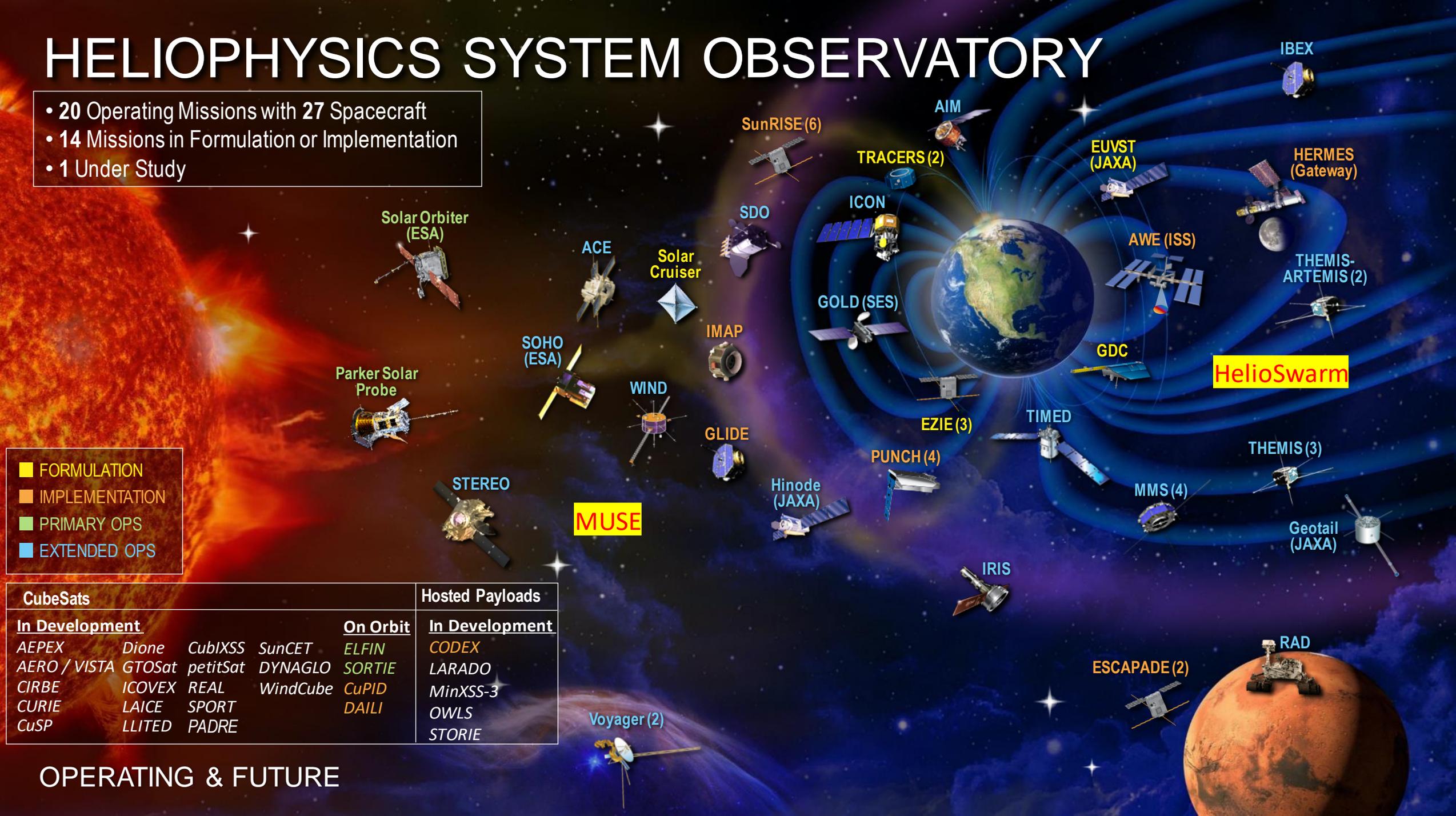
Build the **knowledge to forecast space weather** throughout the heliosphere: Develop the knowledge and capability to detect and predict extreme conditions in space to protect life and society and to safeguard human and robotic explorers beyond Earth.

Understand the **nature of our home in space**: Advance our understanding of the connections that link the sun, the Earth, planetary space environments, and the outer reaches of our solar system.



HELIOPHYSICS SYSTEM OBSERVATORY

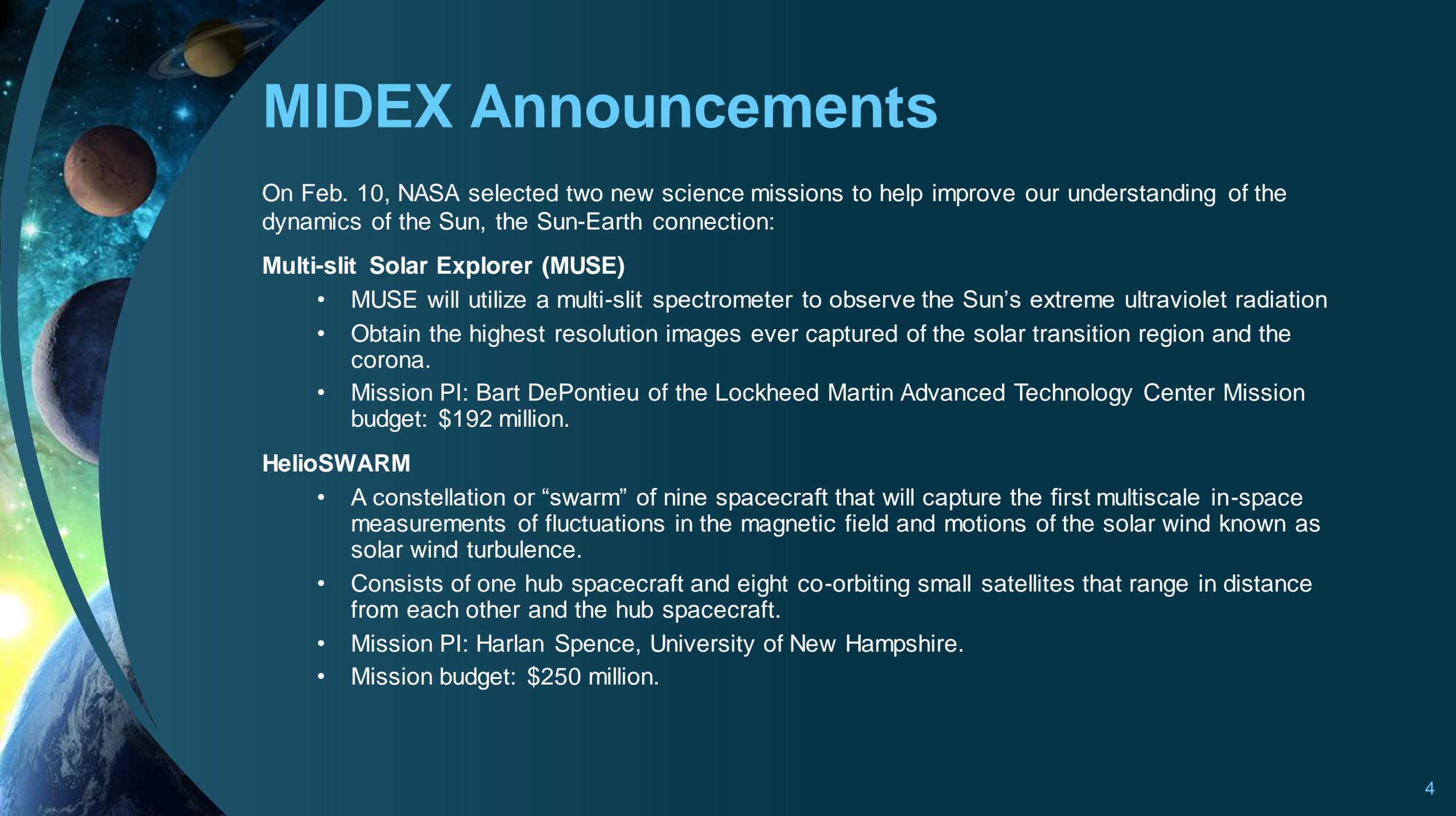
- 20 Operating Missions with 27 Spacecraft
- 14 Missions in Formulation or Implementation
- 1 Under Study



■ FORMULATION
■ IMPLEMENTATION
■ PRIMARY OPS
■ EXTENDED OPS

CubeSats				Hosted Payloads	
In Development				On Orbit	In Development
AEPEX	Dione	CubIXSS	SunCET	ELFIN	CODEX
AERO / VISTA	GTOsat	petitSat	DYNAGLO	SORTIE	LARADO
CIRBE	ICOVEX	REAL	WindCube	CuPID	MinXSS-3
CURIE	LAICE	SPORT		DAILI	OWLS
CuSP	LLITED	PADRE			STORIE

OPERATING & FUTURE

A vibrant space-themed background featuring a blue and green nebula, a bright yellow sun, and several planets including Saturn, Mars, and the Moon. The scene is framed by a dark blue circular arc on the left side.

MIDEX Announcements

On Feb. 10, NASA selected two new science missions to help improve our understanding of the dynamics of the Sun, the Sun-Earth connection:

Multi-slit Solar Explorer (MUSE)

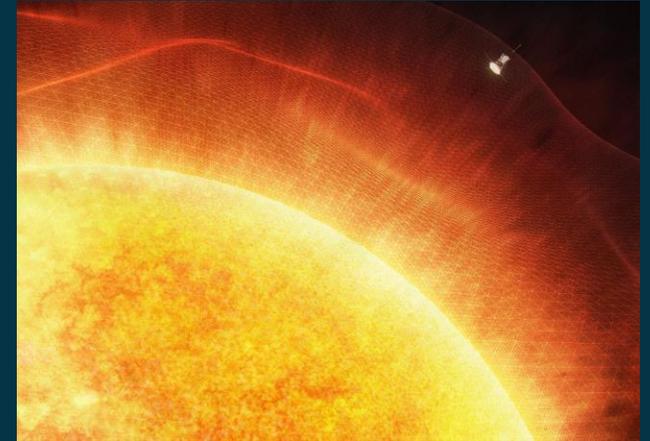
- MUSE will utilize a multi-slit spectrometer to observe the Sun's extreme ultraviolet radiation
- Obtain the highest resolution images ever captured of the solar transition region and the corona.
- Mission PI: Bart DePontieu of the Lockheed Martin Advanced Technology Center Mission budget: \$192 million.

HelioSWARM

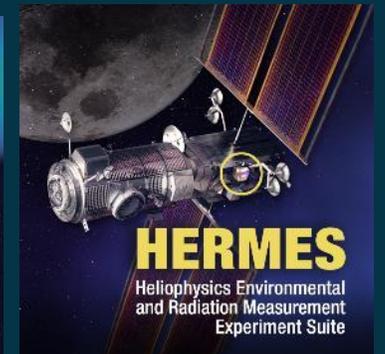
- A constellation or "swarm" of nine spacecraft that will capture the first multiscale in-space measurements of fluctuations in the magnetic field and motions of the solar wind known as solar wind turbulence.
- Consists of one hub spacecraft and eight co-orbiting small satellites that range in distance from each other and the hub spacecraft.
- Mission PI: Harlan Spence, University of New Hampshire.
- Mission budget: \$250 million.

Mission and Division Highlights

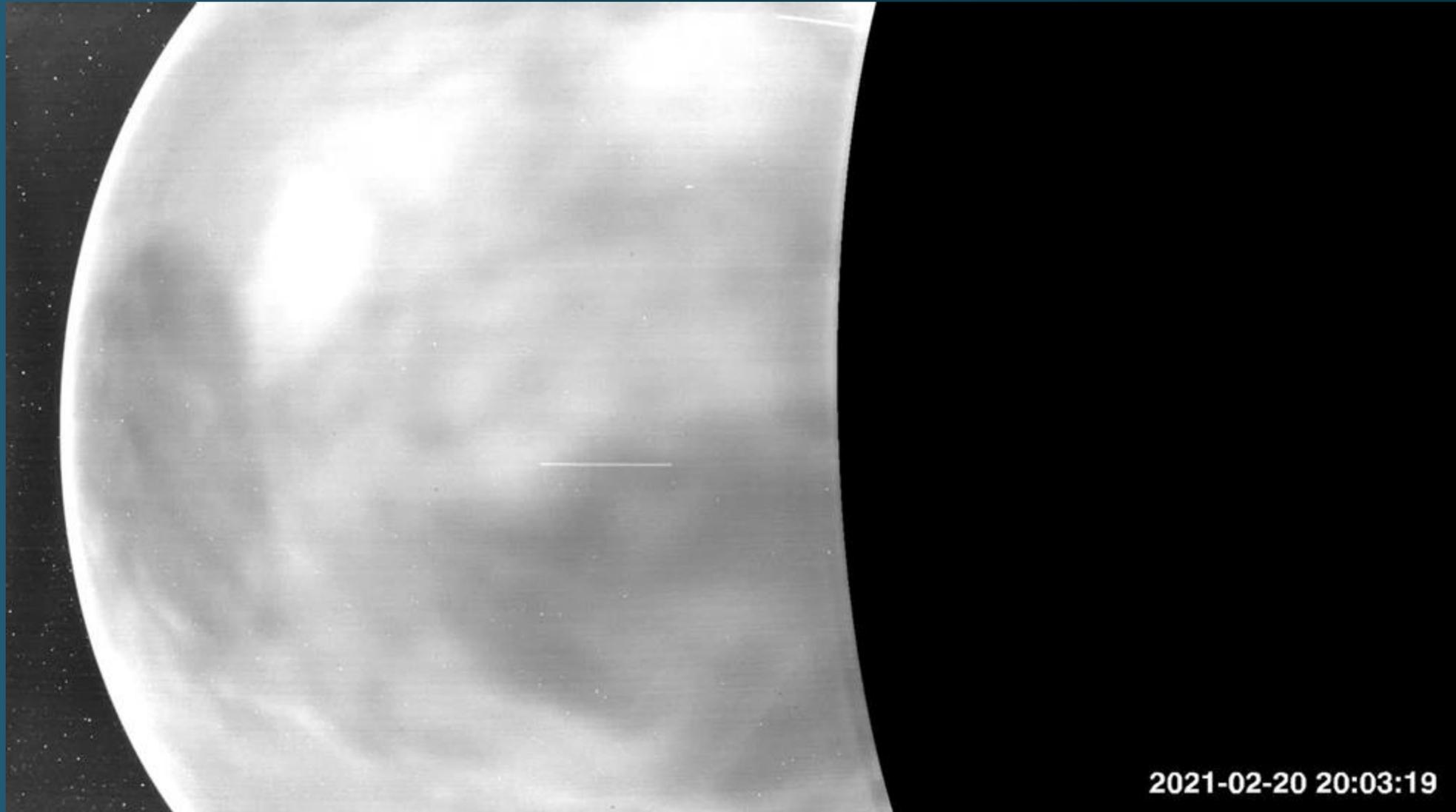
- Parker Solar Probe enters the Solar Atmosphere for the first time, bringing new discoveries
 - Three years after launch, Parker has now flown within the Sun's inner corona, sampling particles and fields still bound to the Sun's atmosphere
- Daily Atmospheric Ionospheric Limb Imager (DAILI) CubeSat successfully launched Dec. 21 on SpaceX CRS-24 from KSC. Deployed from the ISS on Jan. 27
- The Miniature X-Ray Solar Spectrometer 3, or MinXSS-3, successfully launched on the InspireSat-1 small satellite on Feb. 13, 2022. It will spend up to a year in LEO studying X-rays coming from flares on the Sun.
- Congratulations!!
 - **GLIDE** completed KDP C Jan. 13
 - **HERMES** completed KDP C Jan. 27
- Community announcement for the 2022 Small Explorer (SMEX) and Heliophysics Explorers (HEP) Programs was released on Dec. 22



Parker Solar Probe

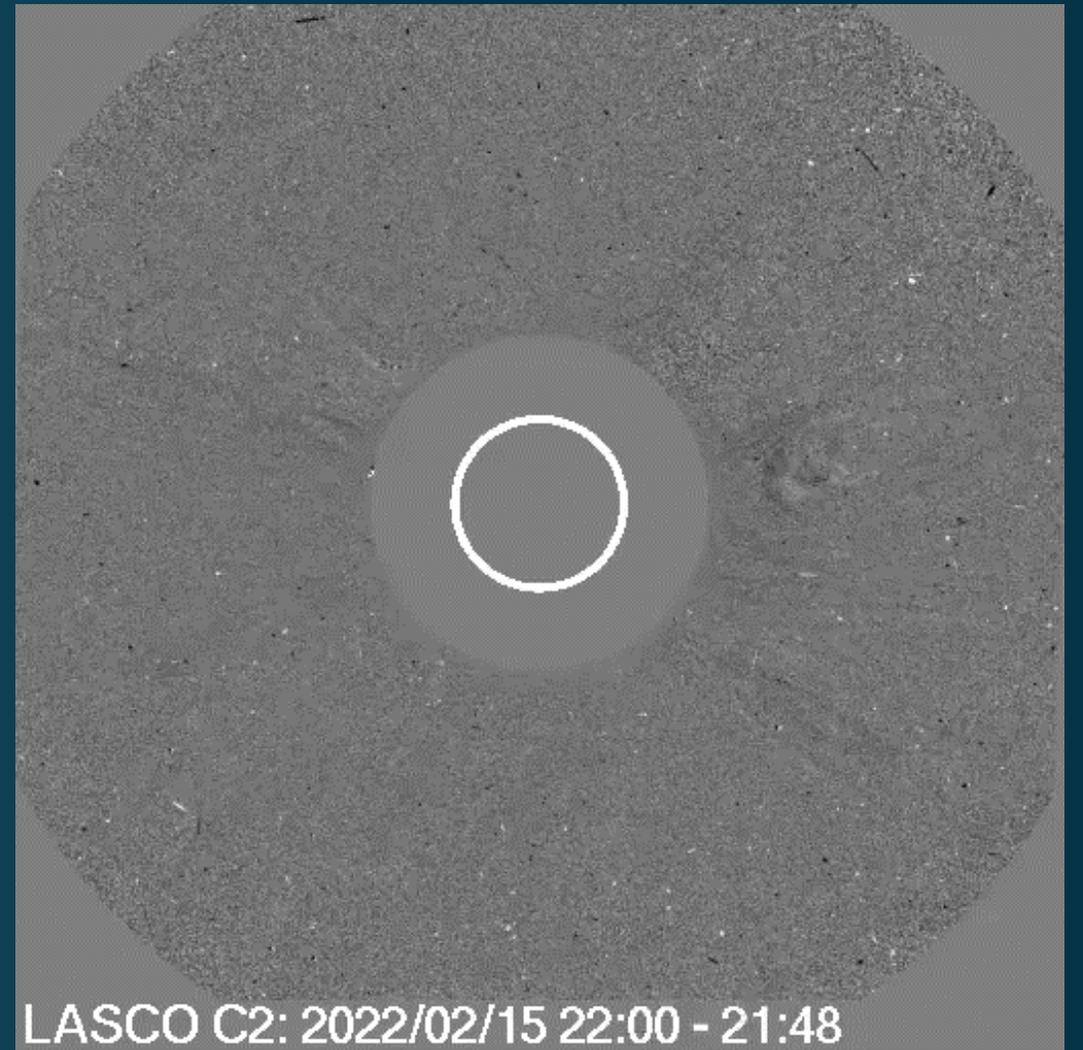
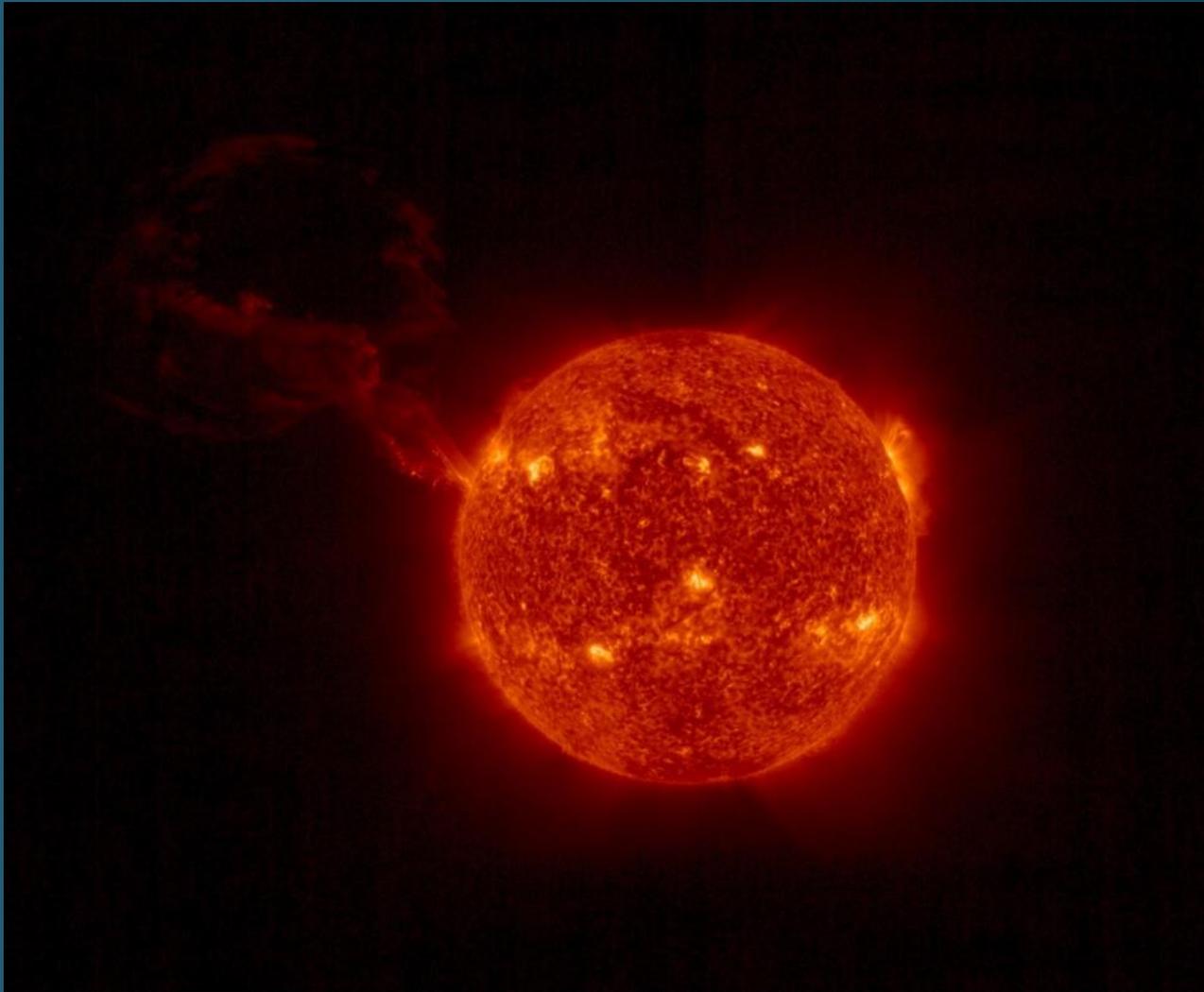


Parker Solar Probe Captures Images of Venus



As Parker Solar Probe flew by Venus on its fourth flyby, its WISPR instrument captured these images, strung into a video, showing the nightside surface of the planet. *Credits: NASA/APL/NRL*

Massive Solar Prominence on Feb. 5



Late on Feb. 15th Solar Orbiter captured a massive solar prominence with its EUI instrument, pictured left. The prominence is estimated to be around 6 solar radii in size and will directly impact Parker Solar Probe. Data from PSP will be downlinked following its next solar encounter. SOHO's LASCO instrument captured the video at right

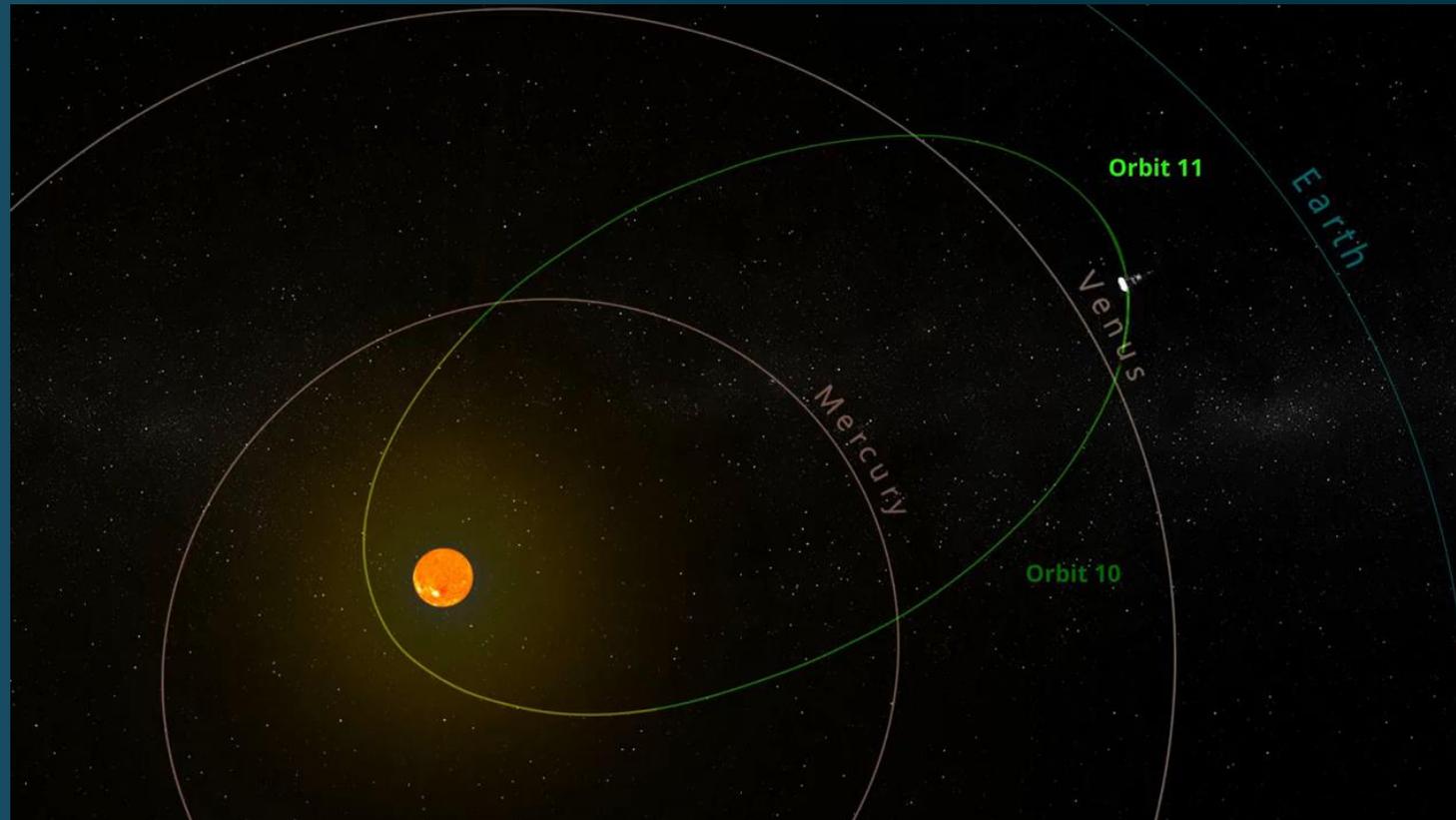


NASA WAS FINALLY ABLE TO COMPLETE THE MISSION BY GOING AT NIGHT.



Future Highlights

- On Feb. 25, Parker Solar Probe reached perihelion #11, with its closest approach to the Sun reaching 5.3 million miles.
 - Parker Solar Probe passed the Sun's Earth-facing side. Many opportunities for Earth-bound missions and other spacecraft to give us multiple viewpoints of solar events



A vibrant space-themed background featuring a curved blue arc on the left side. The background is filled with various celestial bodies: a yellow planet with rings (Saturn) at the top, a reddish planet (Mars) in the middle, and a grey planet (Moon) below it. The bottom left corner shows the blue and white horizon of Earth. The overall color palette is dominated by blues, greens, and yellows, with a starry field in the background.

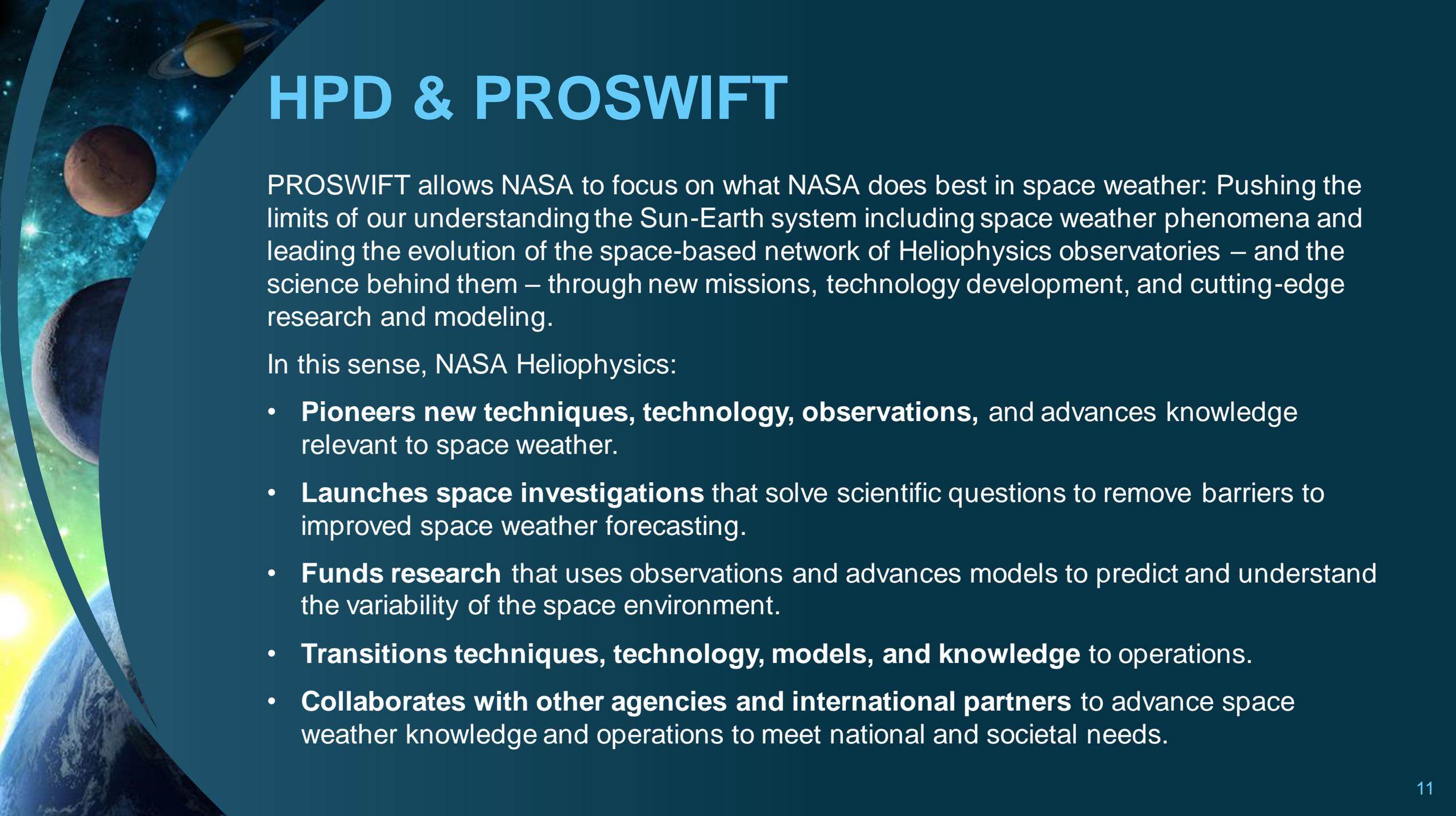
NASA Space Weather Strategy

Vision

- Advance the science of space weather to empower a technological society safely thriving on Earth and expanding into space.

Mission

- Establish a preeminent space weather capability that supports robotic and human space exploration and meets national, international, and societal needs by advancing measurement and analysis techniques, and by expanding knowledge and understanding for transitioning into improved operational space weather forecasts and nowcasts.

A space-themed background featuring a curved view of Earth at the bottom left, with various celestial bodies including Saturn, Mars, and the Moon against a starry blue and green cosmic backdrop.

HPD & PROSWIFT

PROSWIFT allows NASA to focus on what NASA does best in space weather: Pushing the limits of our understanding the Sun-Earth system including space weather phenomena and leading the evolution of the space-based network of Heliophysics observatories – and the science behind them – through new missions, technology development, and cutting-edge research and modeling.

In this sense, NASA Heliophysics:

- **Pioneers new techniques, technology, observations,** and advances knowledge relevant to space weather.
- **Launches space investigations** that solve scientific questions to remove barriers to improved space weather forecasting.
- **Funds research** that uses observations and advances models to predict and understand the variability of the space environment.
- **Transitions techniques, technology, models, and knowledge** to operations.
- **Collaborates with other agencies and international partners** to advance space weather knowledge and operations to meet national and societal needs.

Heliophysics Big Year



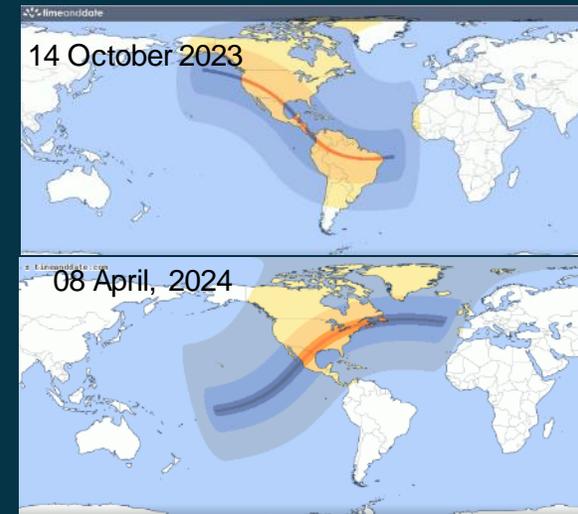
Ties together three major Heliophysics events in 2023-2025 (2 solar eclipses, solar maximum) to maximize participation in a coordinated incentivized citizen science campaign.

- NASA is developing a program to use these remarkable events to highlight and motivate solar system science
 - Two Solar Eclipses cross N. America (14 Oct 2023 and 8 April 2024)
 - The rising phase of the Solar Cycle 25 with Solar Maximum predicted to occur in 2025
- Look out for opportunities to be part of our Big Year

<https://science.nasa.gov/heliophysics/programs/citizen-science>



Totality during the solar eclipse in Australia's Tropical North Queensland on November 14, 2012. Getty Images.



The paths of totality for total solar eclipses during the HBY.

What is a “Big Year”? A big year is a birding term for maximizing a birder’s number of species.

Get Involved and Stay Informed!

We are continuing to work hard to grow the Heliophysics community, especially at a time where we find ourselves so separated. Stay in touch and help us find new ways to highlight your work and keep you in the loop!

Check out our “Nicky Notes” email!

- Sign up for it at <https://bit.ly/2R1w8HT>

Stay up to date with what’s happening at Headquarters:

- <https://science.nasa.gov/researchers/virtual-townhall-2020>

Let us know what you’ve been working on:

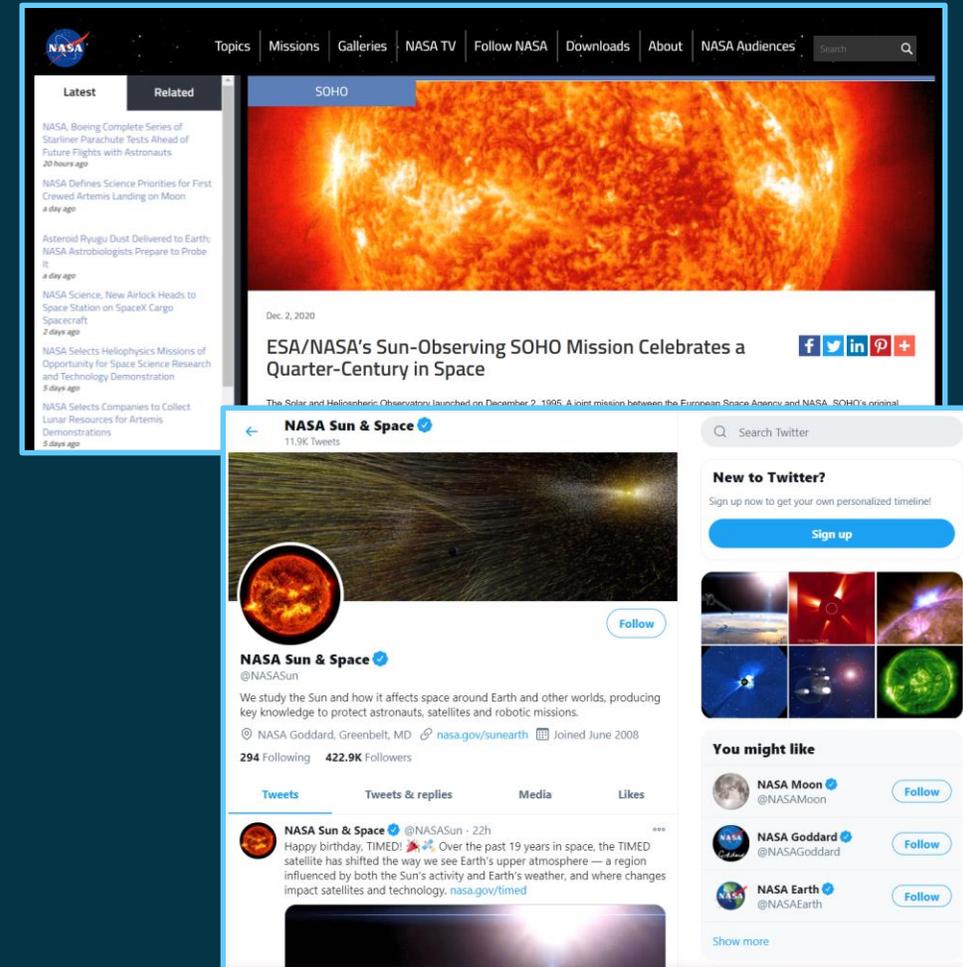
- <https://bit.ly/SubmitHelioScience>

Web and social media:

- NASA.gov/sunearth
- blogs.nasa.gov/sunspot
- [@NASASun](https://twitter.com/NASASun)
- facebook.com/NASASunScience

Volunteer for a panel:

- <https://science.nasa.gov/researchers/volunteer-review-panels>



The image displays two screenshots. The top screenshot shows the NASA website's 'SOHO' page, featuring a large image of the Sun and a news article titled 'ESA/NASA's Sun-Observing SOHO Mission Celebrates a Quarter-Century in Space'. The bottom screenshot shows the Twitter profile for 'NASA Sun & Space' (@NASASun), which includes a bio, location (NASA Goddard, Greenbelt, MD), and a list of suggested accounts to follow, such as NASA Moon, NASA Goddard, and NASA Earth.

The background of the slide is a composite of two cosmic images. The top half features a dark blue and black space filled with numerous small, bright stars and a prominent, glowing blue nebula on the right side. The bottom half shows a similar starry field but with a warm, golden-yellow and greenish glow, suggesting a different spectral filter or a different region of space. The text "#HelioRocks!" is centered in a white, sans-serif font across the middle of the image.

#HelioRocks!