National Aeronautics and Space Administration

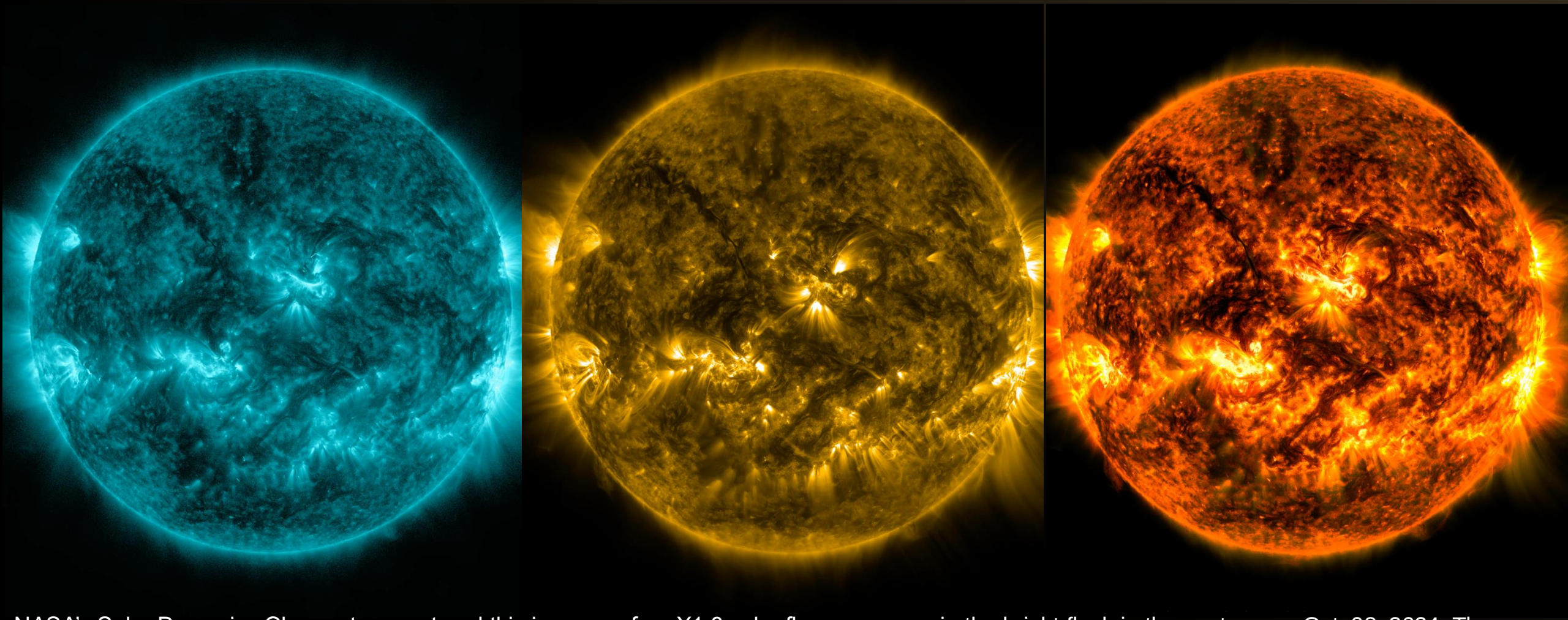
NASA

2024 NASA SCIENCE

Heliophysics Town Hall

Dr. Joseph Westlake
Heliophysics Division Director
October 23, 2024

Welcome! The Heliophysics Town Hall Will Begin Shortly.



NASA's Solar Dynamics Observatory captured this imagery of an X1.8 solar flare – as seen in the bright flash in the center – on Oct. 08, 2024. The footage shows from 9:15 to 10:18 p.m. EDT. Credit: NASA/SDO

Welcome to the Heliophysics Town Hall!

Town Hall Agenda

05 STATE OF THE UNION

10 HELIO RECENT EVENTS

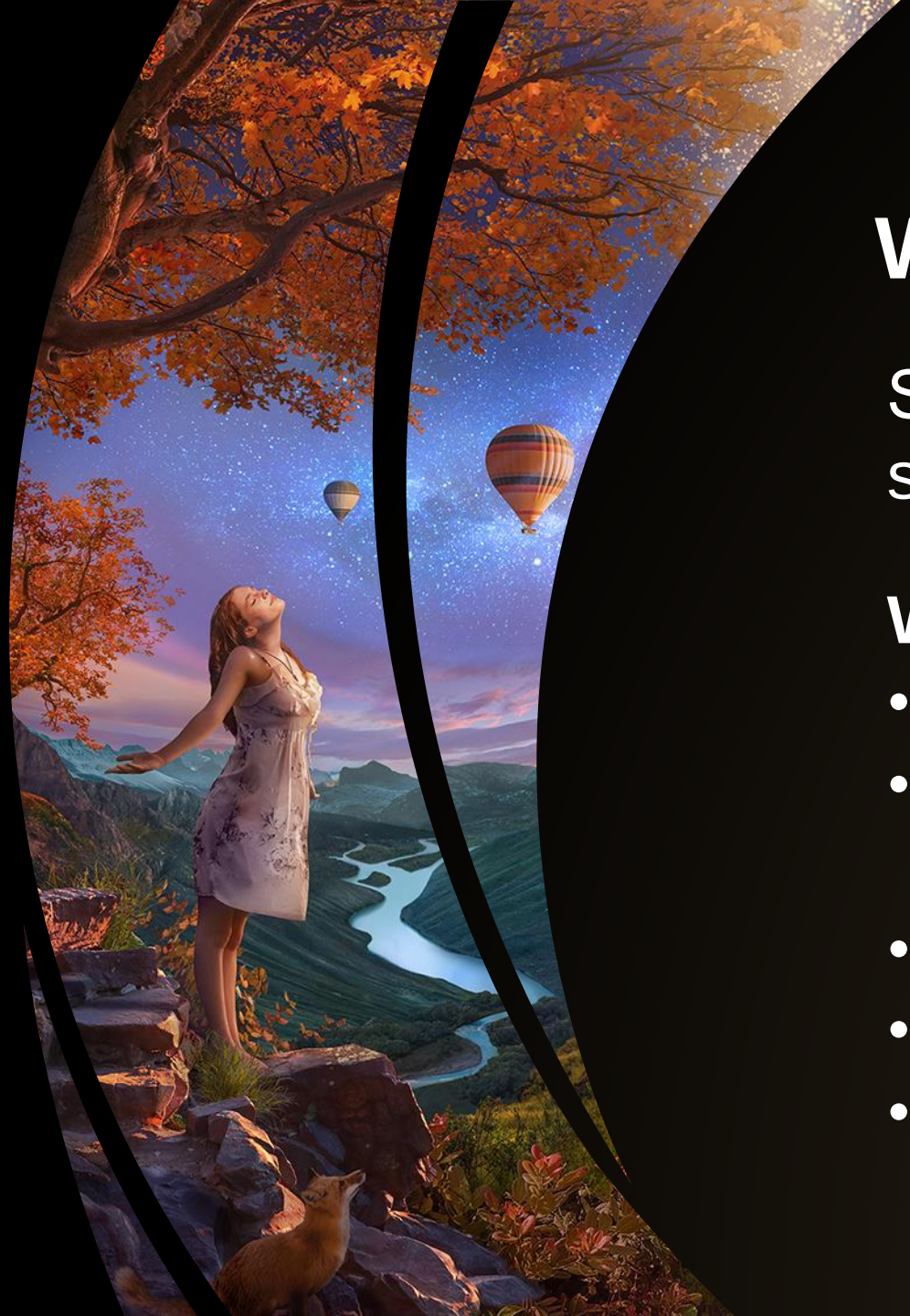
14 MISSION + LAUNCH HIGHLIGHTS

24 HELIOPHYSICS SCIENCE NUGGETS

27 PROGRAM UPDATES

41 QUESTION & ANSWER

State of the Union



Welcomes & Farewells

Since our last Town Hall, we've had some changes!

Welcome to HPD!

- Jared Bell
- Skyler Kleinschmidt
- Alex Fletcher
- Margaux Miller
- Paulette Woods

Farewell

- Matt McClure
- Dan Walsh
- Genene Fisher
- Walter Twetten

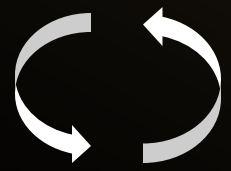
NASA Heliophysics Division Leadership

Dr. Joseph (Joe) Westlake
Division Director

Nicole (Nicki) Rayl
Deputy Division Director (Acting)

Dr. Therese Moretto Jorgensen
Director of Research

Brad Williams
Associate Director for Flight (Acting)



Acting Director/Deputy Roles Rotate

Dr. Asal Naseri
Deputy Associate Director for Flight (Acting)

SCIENCE MISSION DIRECTORATE
HELIOPHYSICS DIVISION

National Aeronautics and Space Administration

JOE WESTLAKE
Division Director

NICKI RAYL
Acting Deputy Division Director

THERESE JORGENSEN
Research Program Director

BRAD WILLIAMS
Acting Associate Director, Flight

ASAL NASERI
Acting Deputy Associate Director, Flight

COMMUNICATION & ENGAGEMENT

HQ Communications
Erin Mahoney[1] – Manager
Carolina Ravinskas[1] – Engagement Lead

GSFC Communications
Sarah Frazier – Manager
Leslie Garrison[1] – Outreach Lead

DIVISION OPERATIONS

Kennedy Novak (XO)[1]
Amy Marshall (EA)[1]
Jess Calles (Flight EA/XO)[1]
Wynette Hoskins (Research EA)[1]

Mission Services Integration
Paulette Woods

Data Systems

Jared Bell[2]
Alvin Robles[1]
Alan Zide

Knowledge Management

Task Monitor
Heather Futrell
Alan Zide

Knowledge Management Strategy
Tara Roberts[1] – Lead
Julia Meisel[1]
Margaux Miller[1]
Roger Sanchez[1]

IT: Heliophysics Advanced Library (HAL)/SharePoint Online (SPO)
Aadel Ragaban[1] - Lead
James Bruniany[1]
Mazin Rasmi[1]
Vyjayanthi Sunkara[1]

Program Executives

David Cheney
Elizabeth Esther
Jamie Favors
Heather Futrell
Skyler Kleinschmidt[2]
Aly Mendoza-Hill
Asal Naseri
Ursula Rick
Brad Williams
Alan Zide

Program Scientists

Jared Bell[2]
Michele Cash
Susanna Finn[3]
Alex Fletcher
Galen Fowler
Reiner Friedel
Lika Guhathakurta
Roshanak Hakimzadeh
Patrick Koehn
Kelly Korreck
Janet Kozyra
Jared Leisner
Elizabeth MacDonald[2]
John McCormack
Dan Moses
Simon Plunkett
Arik Posner
Ennio Sanchez
Sabrina Savage
Esayas Shume[3]
Katya Verner[1]
Amy Winebarger[2]
Lisa Winter-Baek[2]

Programs & Technology

Research & Analysis
Patrick Koehn – Deputy Director
Darcia Brown
Vanessa Salazar[1]

Space Weather
Jamie Favors – Director
Reiner Friedel – Program Scientist
Ursula Rick – Program Executive
Margaux Miller[1]

Technology
Vacant – Chief Technologist
Roshanak Hakimzadeh – Deputy

Presidential Innovation Fellow
Ha-Hoa Hamano

Cross-Cutting

CubeSats
David Cheney
Ennio Sanchez

Resource Management Division (RMD)
David Darbouze
Carol Peterson

Rideshare Office
Aly Mendoza-Hill
David Cheney
Katie Nelson[1]

Sounding Rockets & Range
Sabrina Savage
Dan Moses
Aly Mendoza-Hill

SMD INTERFACES

Office of International & Interagency Affairs
Gib Kirkham – SMD Lead
Betsy Goldemen – HPD Lead

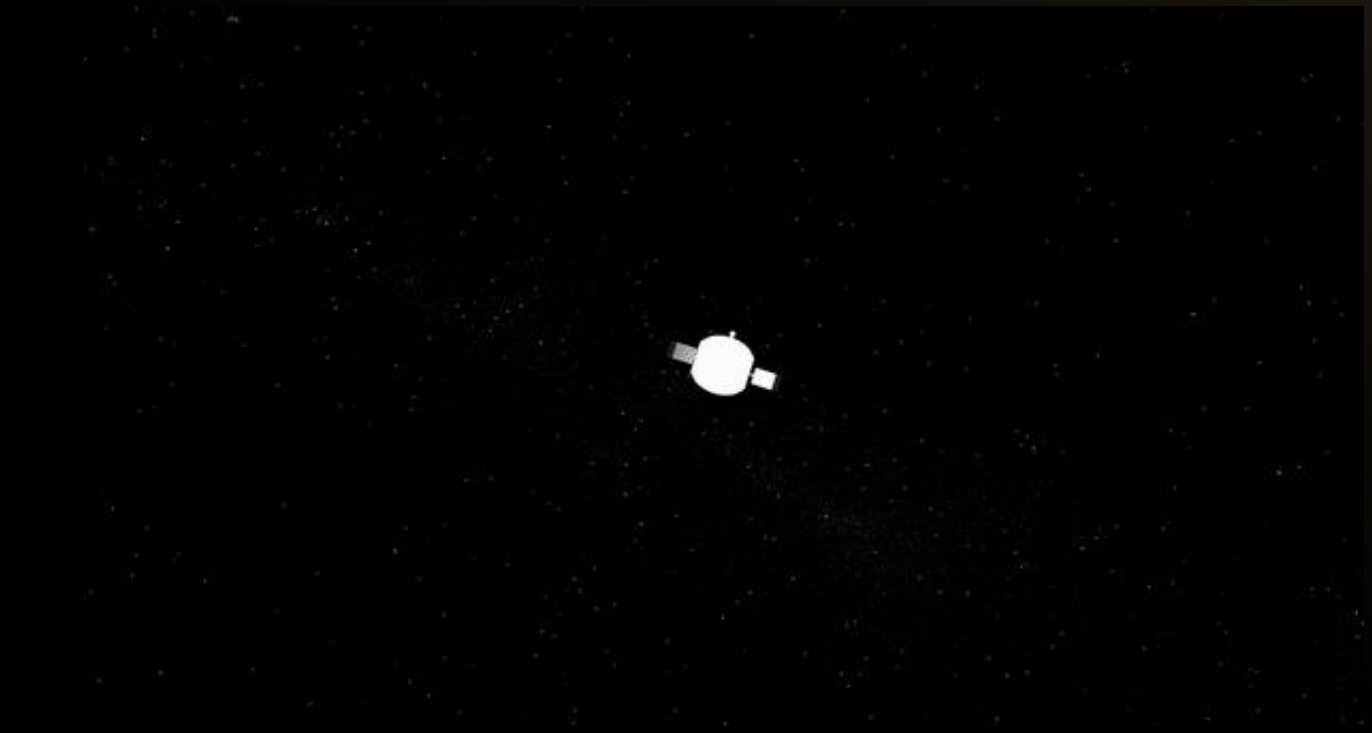
Office of Legislative & Intergovernmental Affairs
Andy Rowe – HPD Lead

Policy
Kayla Rillo
Luc Riesbeck

Key
1: Contractor
2: Detailee
3: IPA
4: Detailed Out

Heliophysics Recent Events

Parker Solar Probe



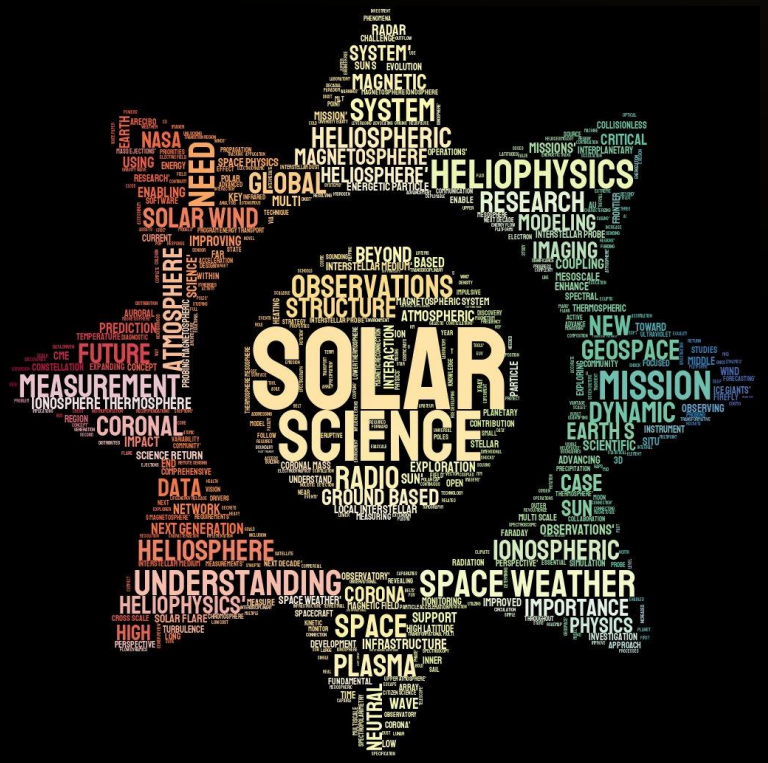
NASA’s Parker Solar Probe completed perihelion #21, which marks its 21st closest approach to the Sun.

On Sept. 30, Parker matched its own distance record by coming about 4.51 million miles (7.26 million kilometers) from the solar surface.

Parker will reach its closest approach on December 24, 2024, which will close out the Heliophysics Big Year!

2024 Decadal Survey is Coming Soon

250 white papers submitted!



Word cloud of the Heliophysics Decadal White Paper titles.
Credit: James Paul Mason

Expected Late CY 2024

*The importance of the Decadal Survey cannot be overstated. This is **the** opportunity to set a vision for the next decade and beyond!*

For current information, visit the NAS website:
https://nas.edu/ssphdecadal

For supporting information delivered to the Decadal Survey, visit:
https://go.nasa.gov/HelioDecadal (Resources → Supplemental Information)

NASA's initial response to the Decadal Survey planned for early 2025

Image credit: National Academies of Science website

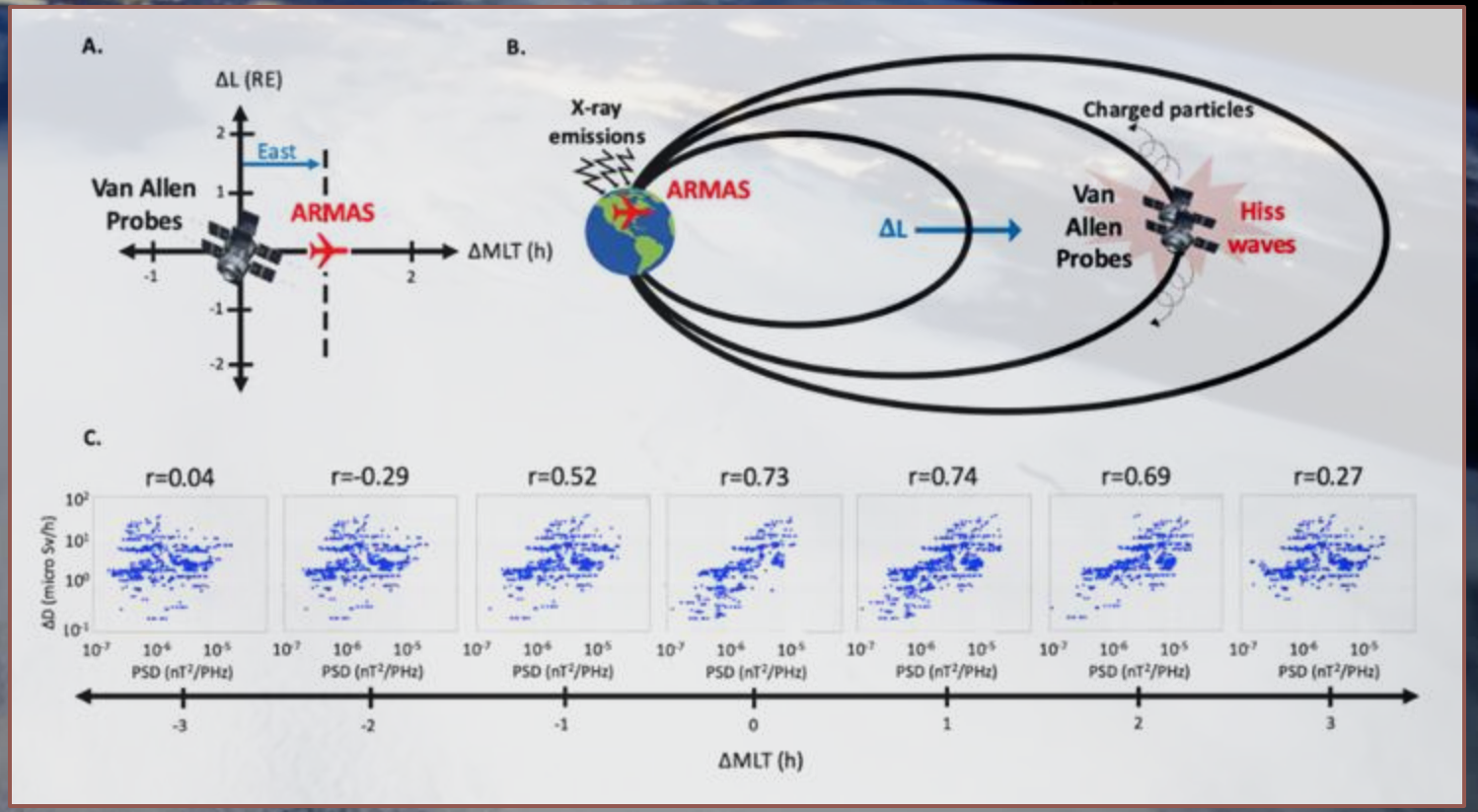
Heliophysics Community Science Nuggets

Electron Precipitation Causes X-Ray Enhancements on Commercial Flights

Electron precipitation driven by *plasmaspheric hiss waves* causes X-ray enhancements on commercial flights.

Connection observed between space weather from satellites to radiation exposure onboard flights

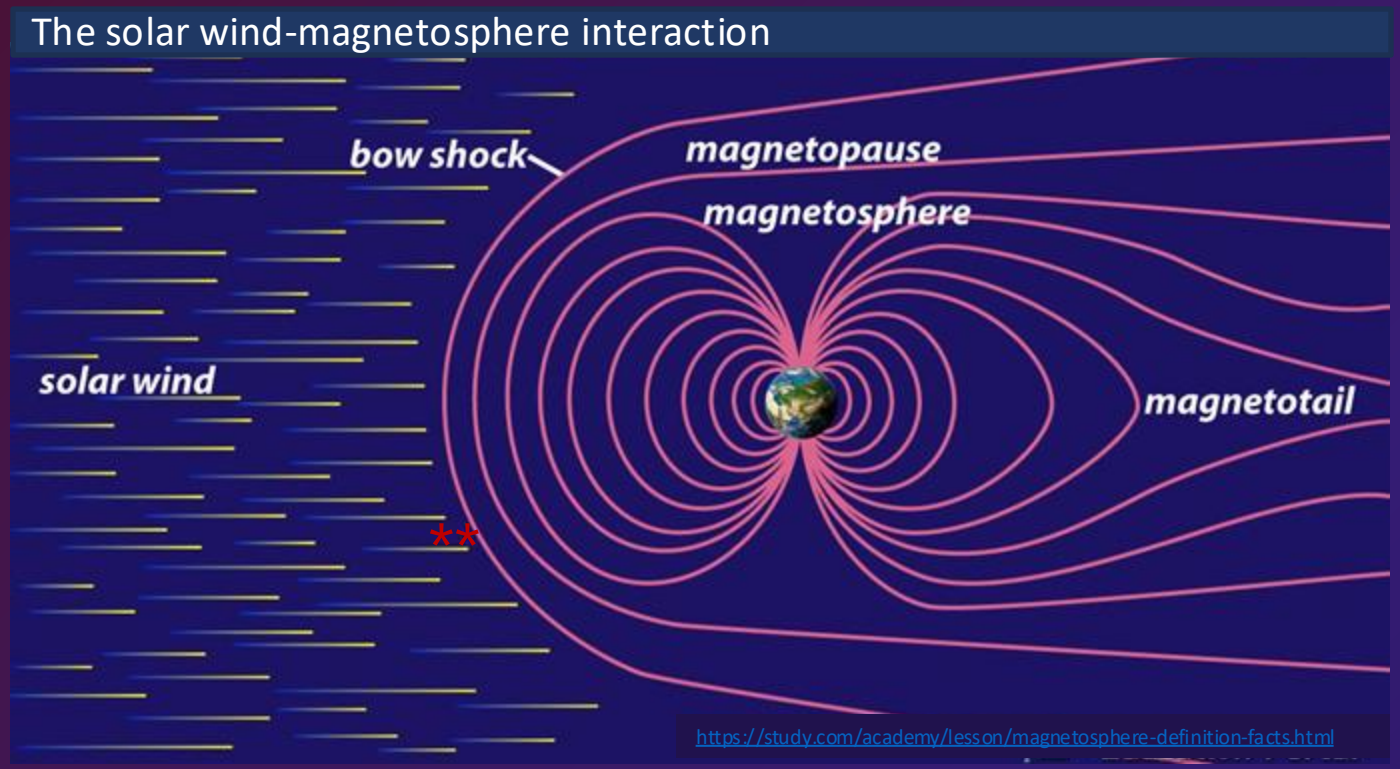
This helps in further protecting airline passengers and crew from excessive radiation during geomagnetic storms.



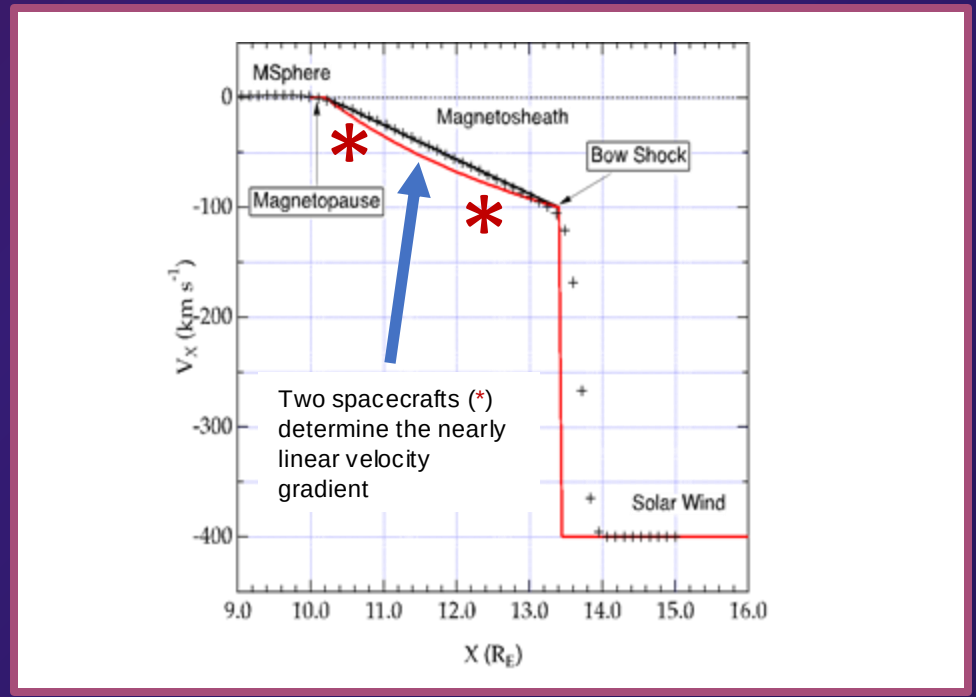
Plasmaspheric hiss waves are emissions of energy that scatter electrons into the atmosphere. They are like the space equivalent of static noise when tuning to a radio station.

PI: Bortnik, J. ROSES 2021

Multi-satellite Tracking of Bow Shock and Magnetopause Locations



Shocks occur when supersonic streams of charged particles (e.g. solar wind) encounter obstacles like the boundaries of the magnetosphere. The Earth's shock bends into a "bow" shape. The location and motion of both the bow shock and magnetopause provide crucial information on how the solar wind interacts with our magnetosphere.

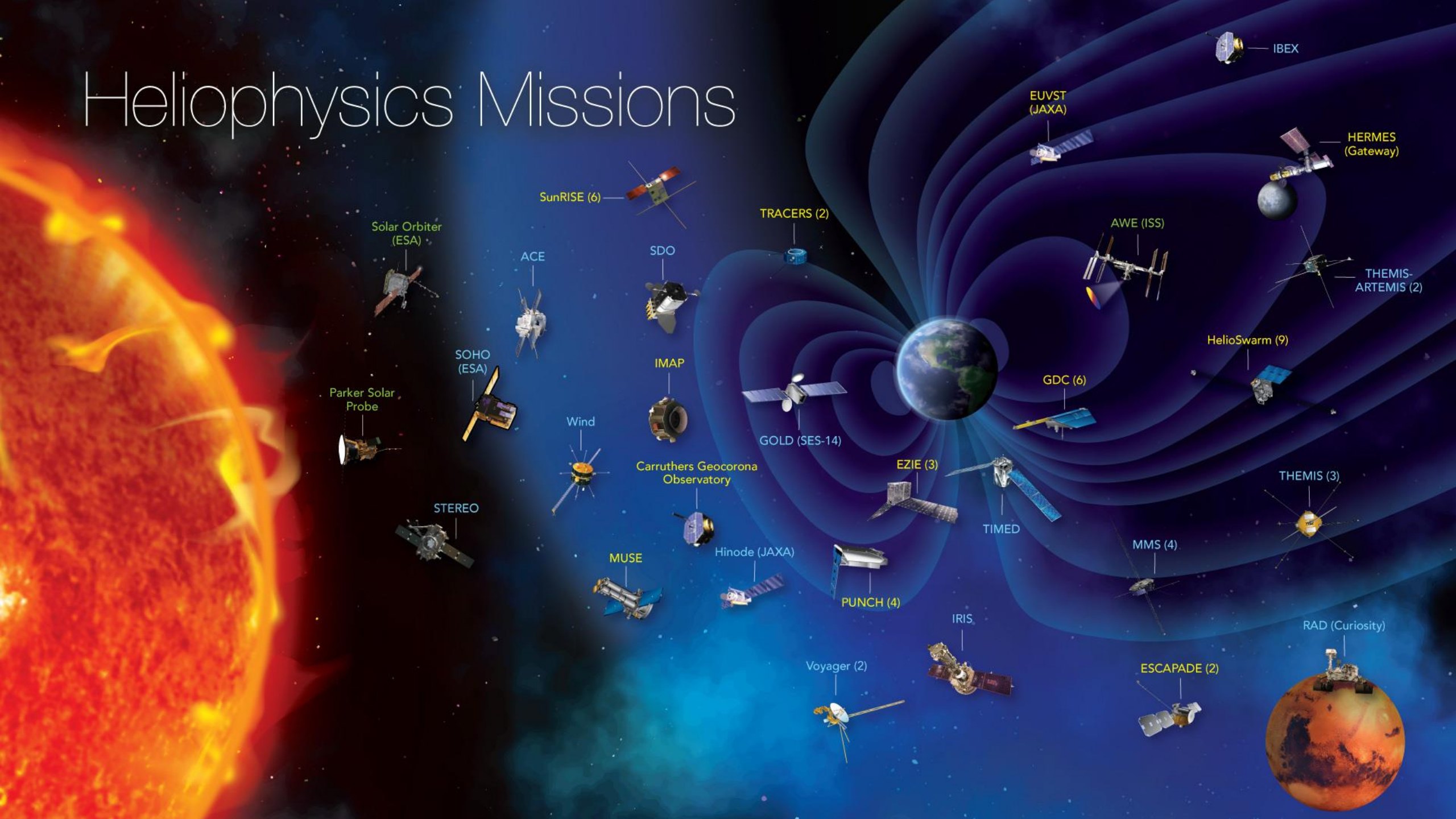


- Multipoint THEMIS observations show that changes in the speed and direction of plasma can be used to track the magnetopause and bow shock locations remotely.
- Researchers can now continuously track magnetopause motion to distinguish between the two leading models for the solar wind-magnetosphere interaction: steady or bursty reconnection on the dayside magnetopause.
- This will guide the development of accurate first principle space weather forecast models.

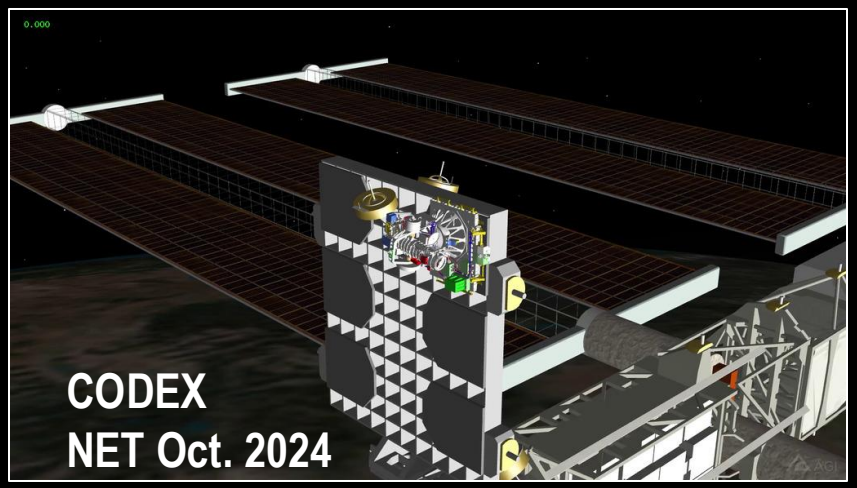
PI: Sibeck, D. ROSES 2022

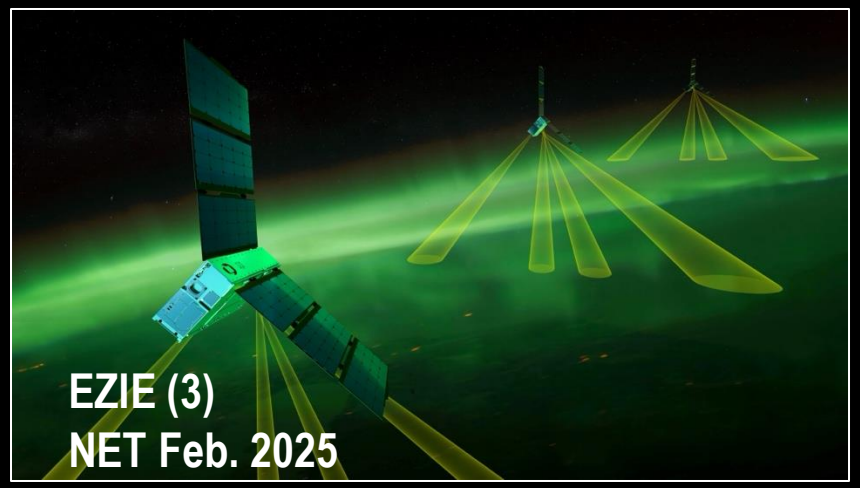
Mission + Launch Highlights

Heliophysics Missions



Upcoming Heliophysics Mission Launches



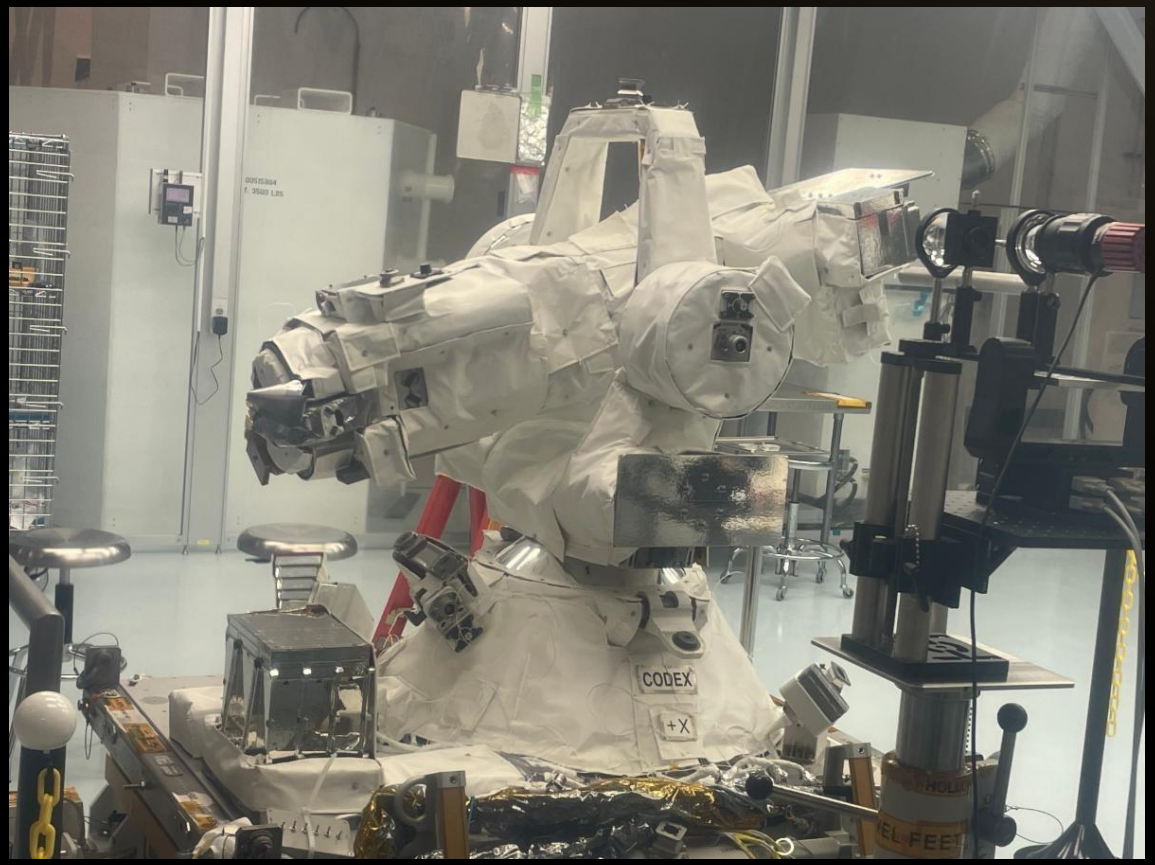


Happy (belated) 47th Birthday to Voyager!

Artist’s Concept of Voyager 2

Artist's Concept of Wind

CODEX



COronal Diagnostic Experiment (CODEX) is a collaboration between NASA, the Korea Astronomy and Space Science Institute, and Italian National Institute for Astrophysics that will fly aboard the International Space Station.

This modern coronograph will use multiple filters to obtain simultaneous measurements of electron density, temperature, and velocity of the solar wind for the ***first time*** within a single instrument.

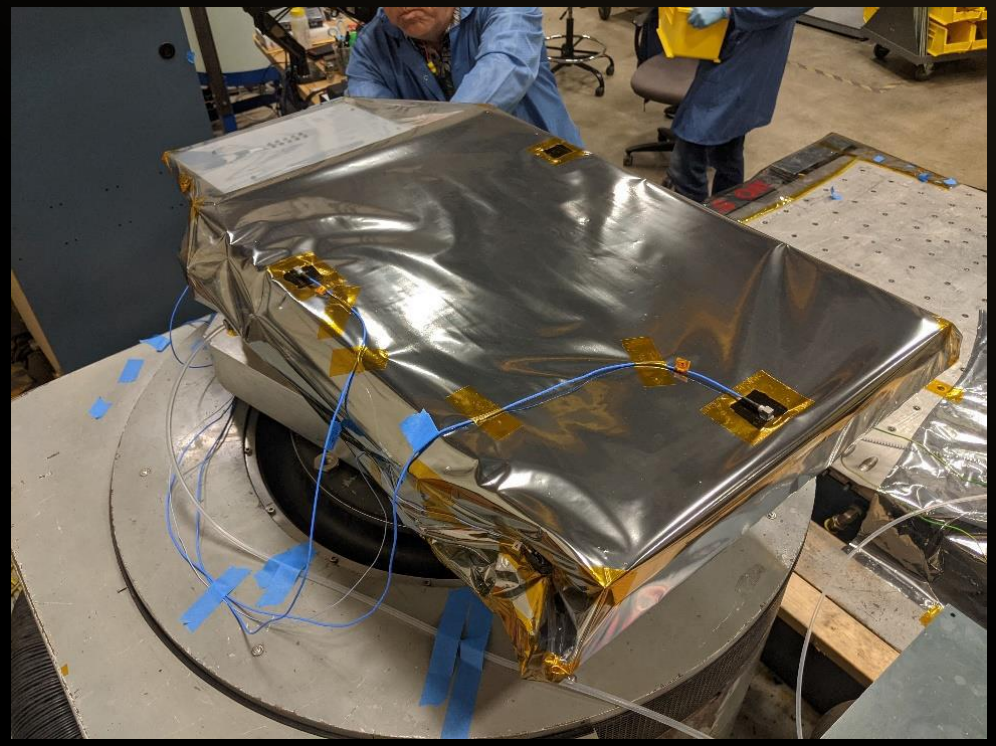
CODEX is scheduled to fly aboard SpaceX Falcon 9 CRS-31 from Kennedy Space Center in late 2024.

EZIE

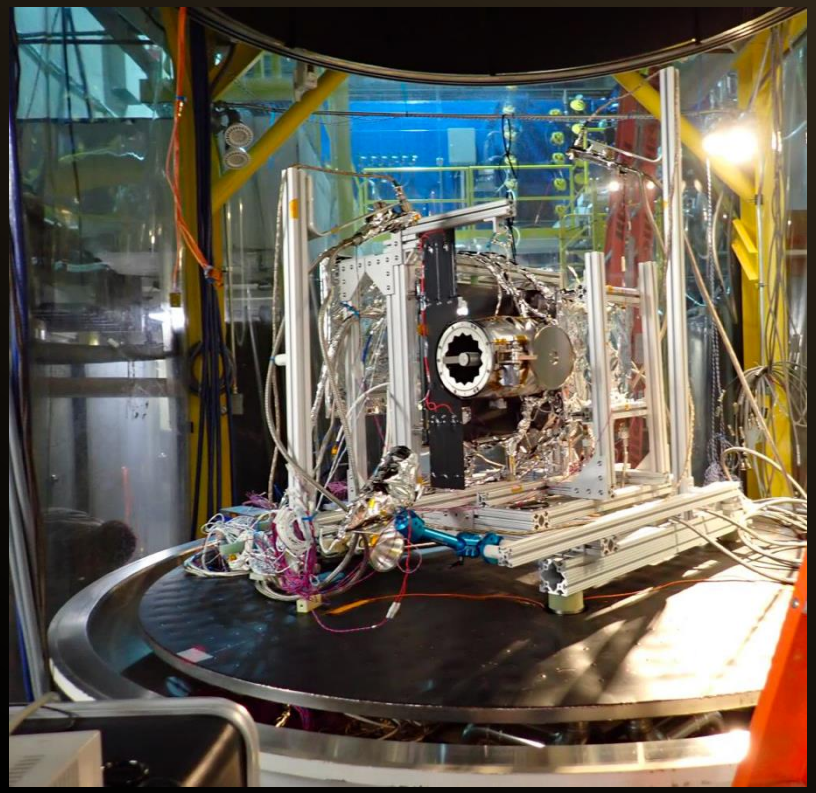
Blue Canyon Technologies (BCT) technicians Davy Hong and Dave Biancalana attach a solar array to the bus of the Electrojet Zeeman Imaging Explorer (EZIE) CubeSat. *Brooks Freehill, Blue Canyon Technologies*

Members of the Electrojet Zeeman Imaging Explorer (EZIE) team representing NASA, the Johns Hopkins Applied Physics Laboratory (APL) in Laurel, Maryland, Blue Canyon Technologies (BCT) in Boulder, Colorado, and Maverick Space Systems in San Luis Obispo, California, pose with the EZIE SV-B Space Vehicle after completing vibration testing. *Lauren Ransom, Blue Canyon Technologies*

PUNCH

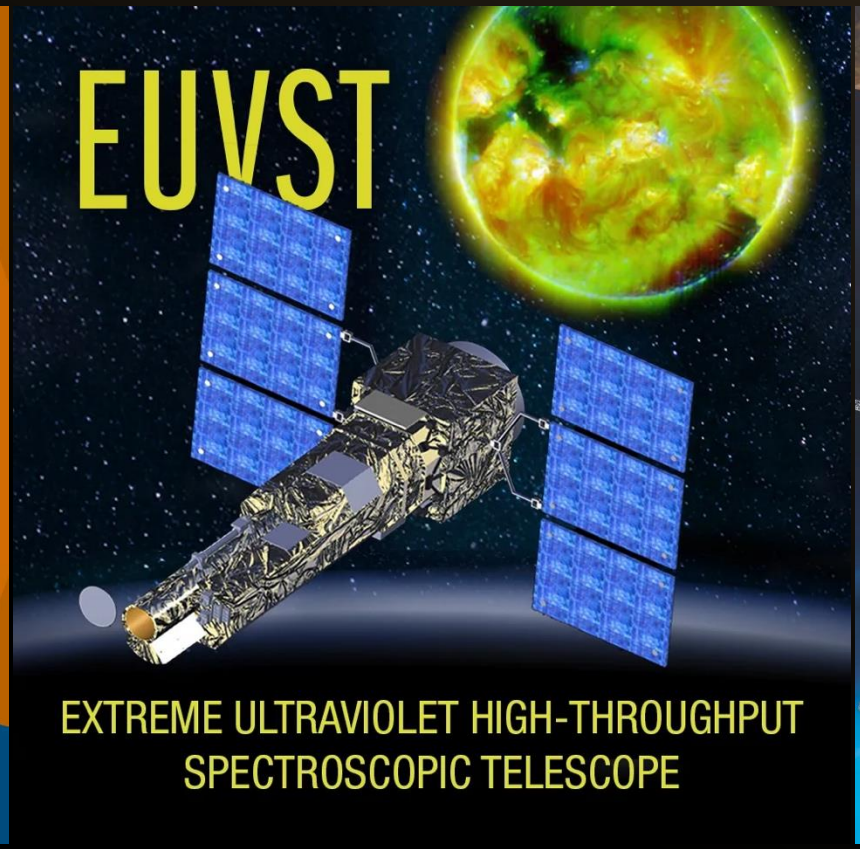


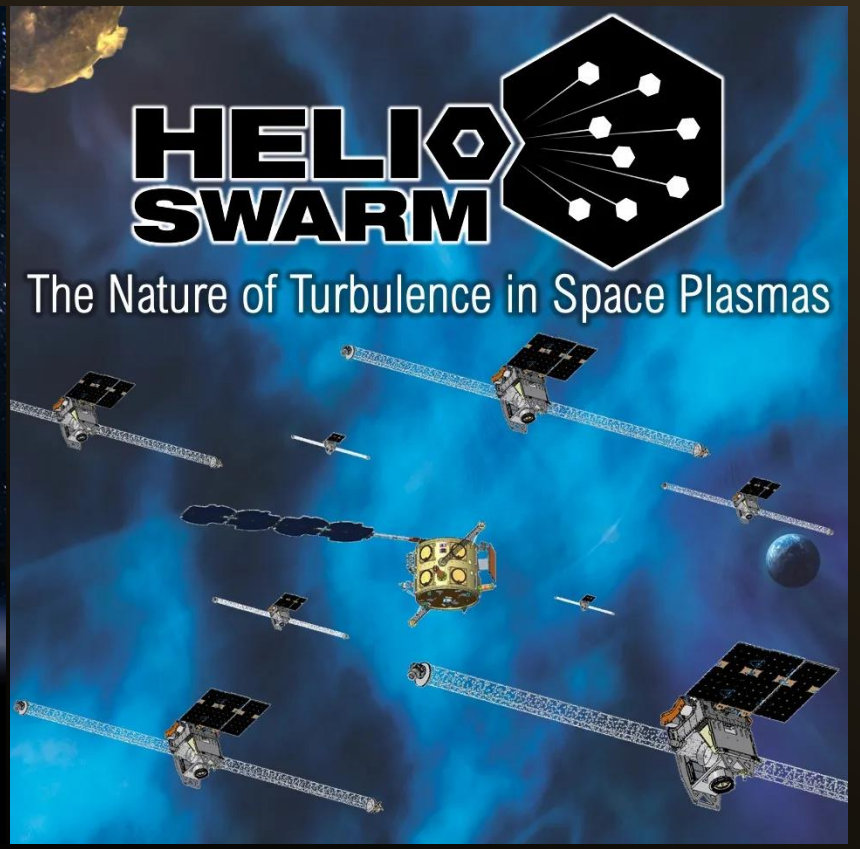
PUNCH Wide Field Imager undergoes vibration testing



PUNCH Near Field Imager undergoes thermal vacuum testing

Missions in Development

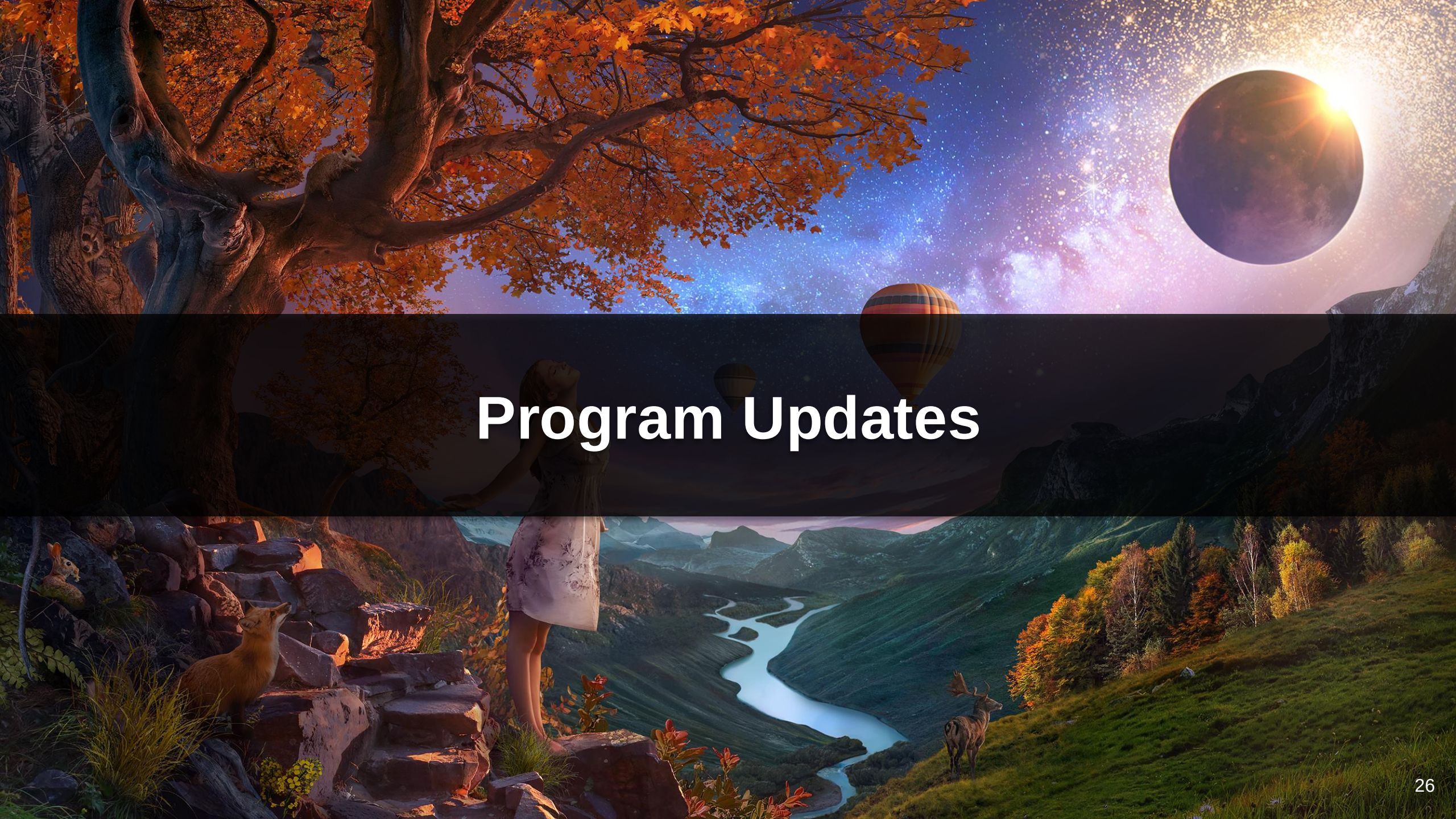




NASA's Sounding Rockets Program

- Current motor inventory is healthy
- FY24
  - 17 missions launched (4 missions moved to FY25)
  - 2 campaign deployments to Poker Flat (4 total launches)
  - Two eclipse campaigns = 6 total launches from White Sands and Wallops
  - Solar flare campaign from Poker Flat Research Range
  - First use of upgraded SPARCS (solar pointing system) with MaGIXS launch at White Sands (successful)
  - 2 student outreach launches from Wallops
- FY25
  - 18 missions total on manifest
  - Four campaign deployments (Norway, Poker-x2, Kwajalein)
  - May begin Peru site improvements
- FY26
  - Currently 12 missions total (updates expected)
  - Three campaign deployments (Norway, Poker, Kwajalein)

CAPTION: Recovery of the second flight of the Marshall Grazing Incidence X-ray Spectrometer (MaGIXS) at the White Sands Missile Range (PI: Amy Winebarger, MSFC). The payload is a technology development science demonstration that successfully captured soft X-ray spectra of resolved features within solar active regions. Pictured are instrument team members, sounding rocket engineers, and military range personnel.



Program Updates

Research & Analysis Update

RECENT ROSES-23 SELECTIONS

HSR 2023 (notified 10.20.23)	HGIO 2023 (notified 1.08.24)	HFOS 2023 (notified 1.25.24)	HTIDES 2023 (notified 1.25.24)	LWS 2023 (notified 5.01.24)
• 161 proposals received • 24 selected • 14% selection rate	• 82 proposals received • 19 selected • 23% selection rate	• 6 proposals received • 1 selected • 17% selection rate	• 24 proposals received • 11 selected • 46% selection rate	• 62 proposals received • 16 selected • 26% selection rate

ROSES-2023 solicitation provided the greatest scope ever offered for NASA Heliophysics

- New Technology Program and Space Weather Program
- Growing number of Cross-Divisional programs

Maintaining a robust R&A program through solicitation of 25 ROSES-24 elements

NASA DRIVE Science Centers

In response to the 2013 Heliophysics Decadal Survey, NASA established three DRIVE (Diversify, Realize, Integrate, Venture, Educate) Science Centers to create breakthrough science in heliophysics by integrating models from different domains and approaches.

COFFIES: Consequences of Fields and Flows in the Interior and Exterior of the Sun

CGS: Center for Geospace Storms

SHIELD: Solar wind with Hydrogen Ion charge Exchange and Large-Scale Dynamics

H-CSI 2023 Selections

- Anderson, Marin/Jet Propulsion Laboratory - Monitoring Solar Activity During Solar Cycle 25 with the GAVRT Solar Patrol Science and Education Program
- Camporeale, Enrico/University Of Colorado, Boulder - Machine Learning Competition For Solar Wind Prediction In Preparation Of Solar Maximum
- Cullens, Chihoko/University Of Colorado, Boulder - Dynamic Footprint In Mid-Latitude Mesospheric Clouds
- Kosar, Burcu/Catholic University Of America - Investigation Of Green Afterglow Observed Above Sprite And Gigantic Jet Tops Based On Spritacular Project Database
- Perry, Gareth/New Jersey Institute Of Technology - A Hamsci Investigation Of The Bottomside Ionosphere During The 2023 Annular And 2024 Total Solar Eclipses
- Rawafi, Nour/Johns Hopkins University - What Is The Total Energy Input To The Heliosphere From Solar Jets?

CSSFP 2023 Helio Selections

- Cecilia Mac Cormack - Large Scale Structures Originating from the Sun (LASSOS) multi-point catalog: A citizen project connecting operations to research.
- Wenli Mo - Enabling Magnetopause Observations With Informal Researchers (EMPOWR)
- Joshua Semeter - High-resolution Ionospheric Imaging using Dual-Frequency Smartphones
- Oliver Gerland - Comet Identification and Image Annotation Modernization for the Sungrazer Citizen Science Project

Heliophysics ROSES Citizen Science Funding Opportunities

F.9 Citizen Science Seed Funding Program (CSSFP)

Optional NOI past due (10/1/2024), Proposals due 11/19/2024

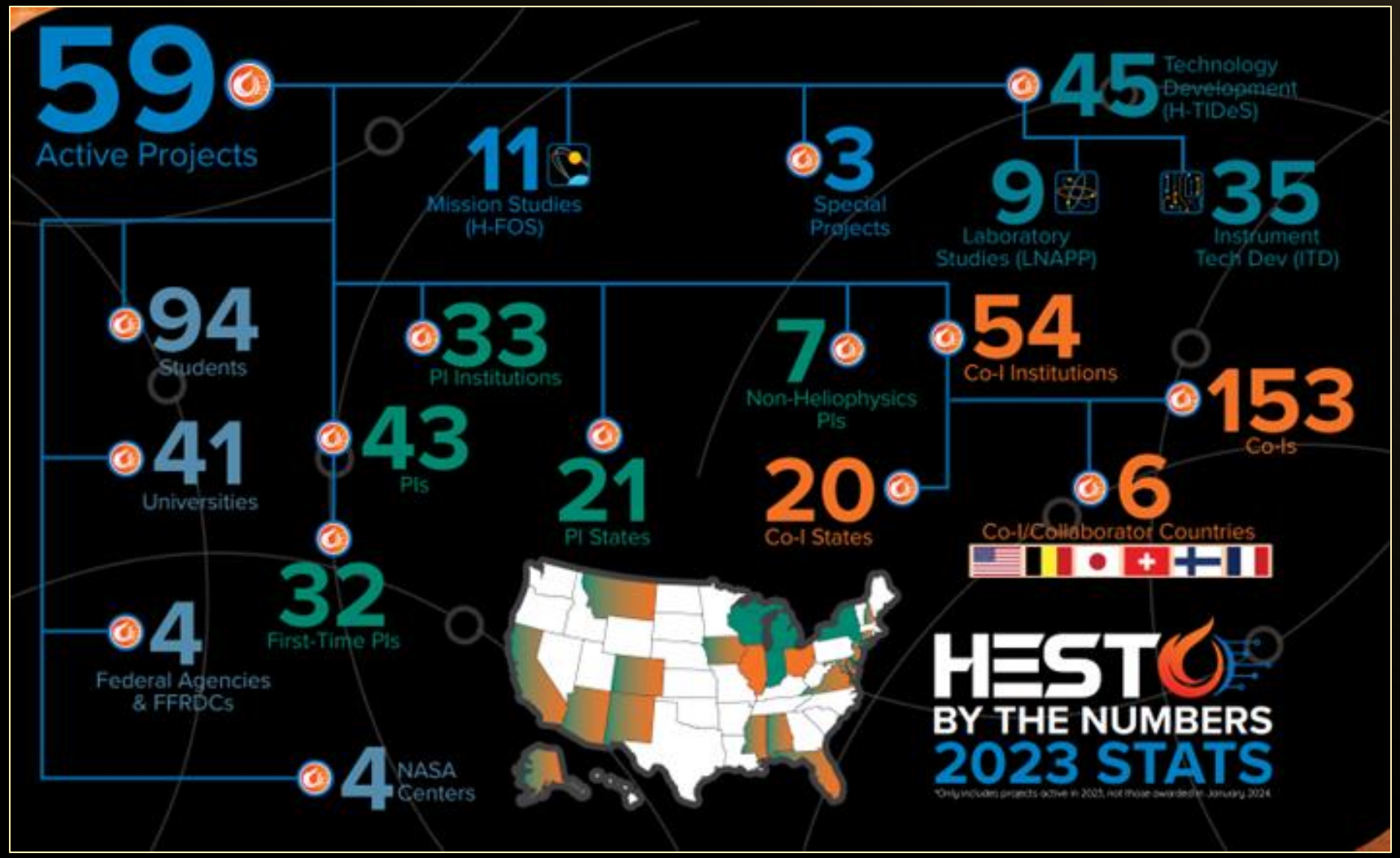
- Cross-Divisional ROSES Program, offered annually
- Award duration up to one year only
- Aims to incubate citizen science projects as they are being conceived or during critical transitions, or when the project changes scientific direction. CSSFP awards require relatively short proposals to encourage new proposers; the S/T/M section has a limit of 6 pages.
- Roughly $80k per award, with ~$700k available for Heliophysics

B.21 Heliophysics Citizen Science Investigations (H-CSI)

Step 1 due 11/14/2024, Step 2 due 1/17/2025

- Began in ROSES 2022; has been offered annually (Inclusion Plan Pilot starting in ROSES 2023)
- Solicits medium-scale citizen science investigations, mature enough to produce science results and achieve proposed project goals within a maximum 3-year period of performance. Investigations previously funded through CSSFP or a similar program are welcome to submit proposals, though previous seed funding is not a requirement.
- Expected annual funding ~$150-200K per investigation, with ~$700k available in FY25

Heliophysics Strategic Technology Office (HESTO)



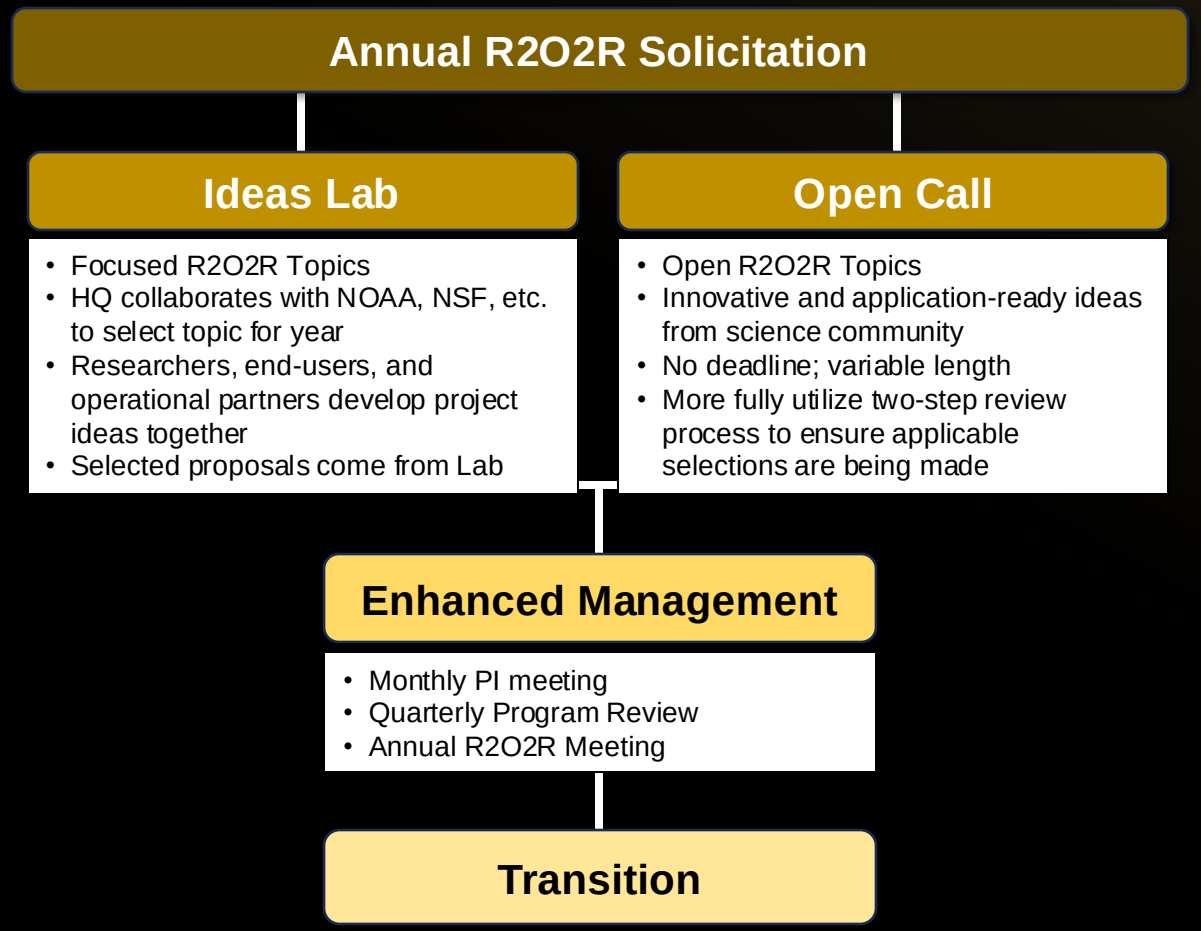
HESTO manages NASA's Heliophysics Technology Program (HTP), including facilitating technology investments, nurturing project maturation, and promoting technology infusion towards science community progress.

Recent Accomplishments:

- Held the 2nd 2024 Heliophysics Technology Symposium in September 2024 at the NASA Wallops Flight Facility
- Launched the Heliophysics Technology website (hesto.smce.nasa.gov)
- Released the first annual Heliophysics Technology report

Space Weather Updates

NASA Space Weather Program
R2O2R Program Element – New Approach



New approach **continues to meet NASA's responsibilities** as defined in PROSWIFT Act, National Space Weather Strategy & Action Plan, etc.

New approach **addresses issues & actions** identified by NASA, NOAA, NSF, DoD, and the science community. **Truly interagency approach**.

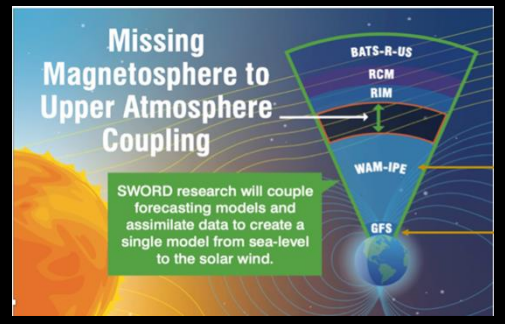
New **approach leverages successful pilot efforts and lessons learned** from similar programmatic activities (i.e., UK SWIMMR and NASA Applied Sciences)

NASA Lead: Dr. Lisa Winter-Baek, Program Scientist (on detail from NSF)
NASA Deputy Lead: Dr. Esayas Shume, Program Scientist

Space Weather Centers of Excellence

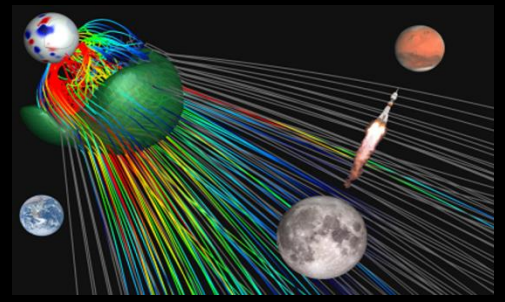
Space Weather Research and Technology Applications (SPARTA) Center of Excellence

- PI: Keith Groves, Boston College



Space Weather Operational Readiness Development (SWORD) Center

- PI: Thomas Berger, University of Colorado, Boulder



CLEAR: Center for All-Clear SEP Forecast

- PI: Lulu Zhao, University of Michigan, Ann Arbor

Joint Selection w/ Department of Commerce:

Center of Excellence for Advanced Forecasting of Drag for Enhanced, Sustainable, and Conscientious Space Operations

- PI: Piyush Mehta, West Virginia University, Morgantown

Moon to Mars Space Weather Analysis Office

The Moon to Mars (M2M) Space Weather Analysis Office was established to support NASA's Space Radiation Analysis Group (SRAG) with human space exploration activities by providing novel capabilities to characterize the space radiation environment.

M2M also supports NASA robotic missions with space weather assessments and anomaly analysis support.

Current M2M Space Weather Activities

Ongoing:
Real-time analysis of space weather activity, 7 days a week; 8am-4pm ET

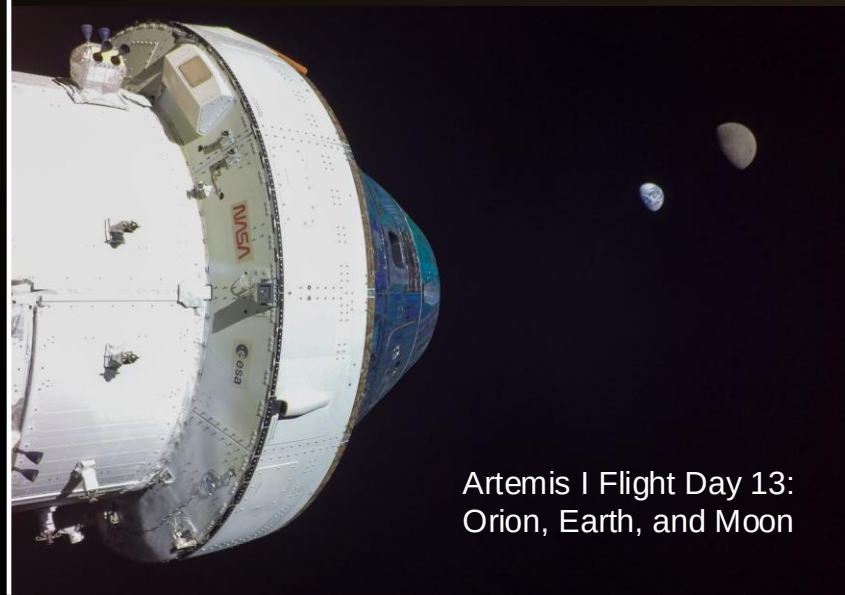
Anomalies:
Analysis requested by mission

Artemis:
Real-time analysis 24/7

Artemis I

The M2M Space Weather Analysis Office supported the mission 24/7 during the 25.5 days of flight and worked closely with NASA SRAG and NOAA SWPC.

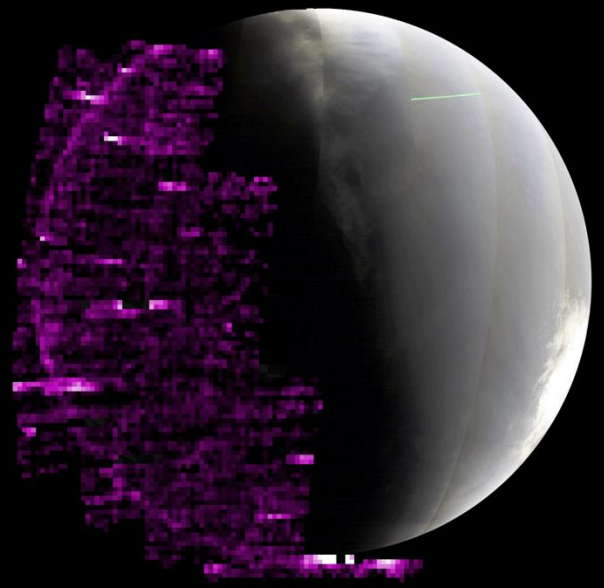
NOAA SWPC hosted a post-Artemis evaluation meeting between NASA SRAG, NASA M2M and NOAA SWPC.



Artemis I Flight Day 13: Orion, Earth, and Moon

Mars Observations During May 2024 Superstorm

Charged particles hitting the camera sensor on the NASA Curiosity Mars rover in May 2024.



Aurora on Mars detected by the NASA MAVEN orbiter in May 2024.

Get Involved & Stay Informed!

Stay in touch and help us find new ways to highlight your work and keep you in the loop!

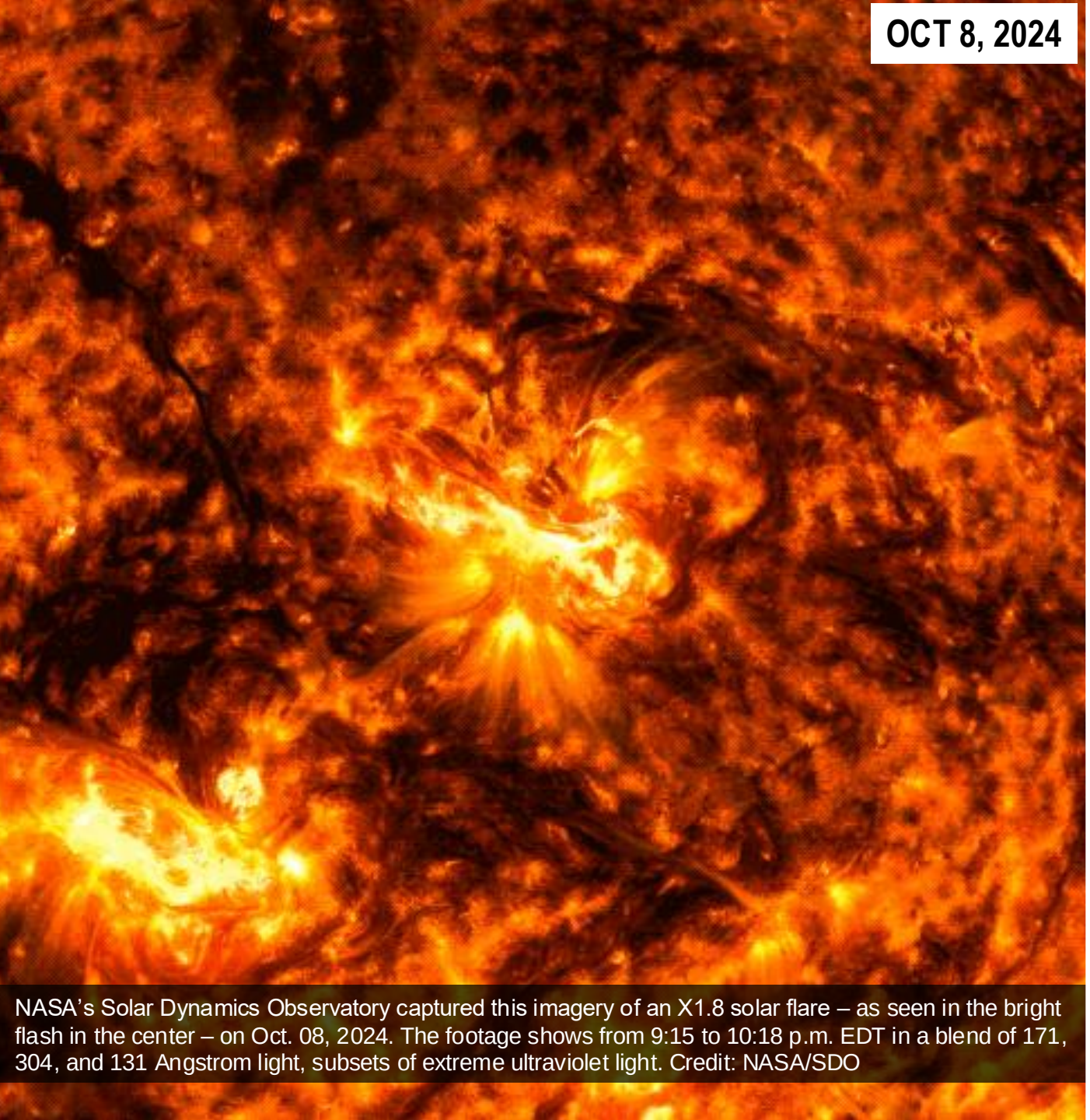
+ Submit science highlights to us here: **https://go.nasa.gov/4gDha1S**

+ 

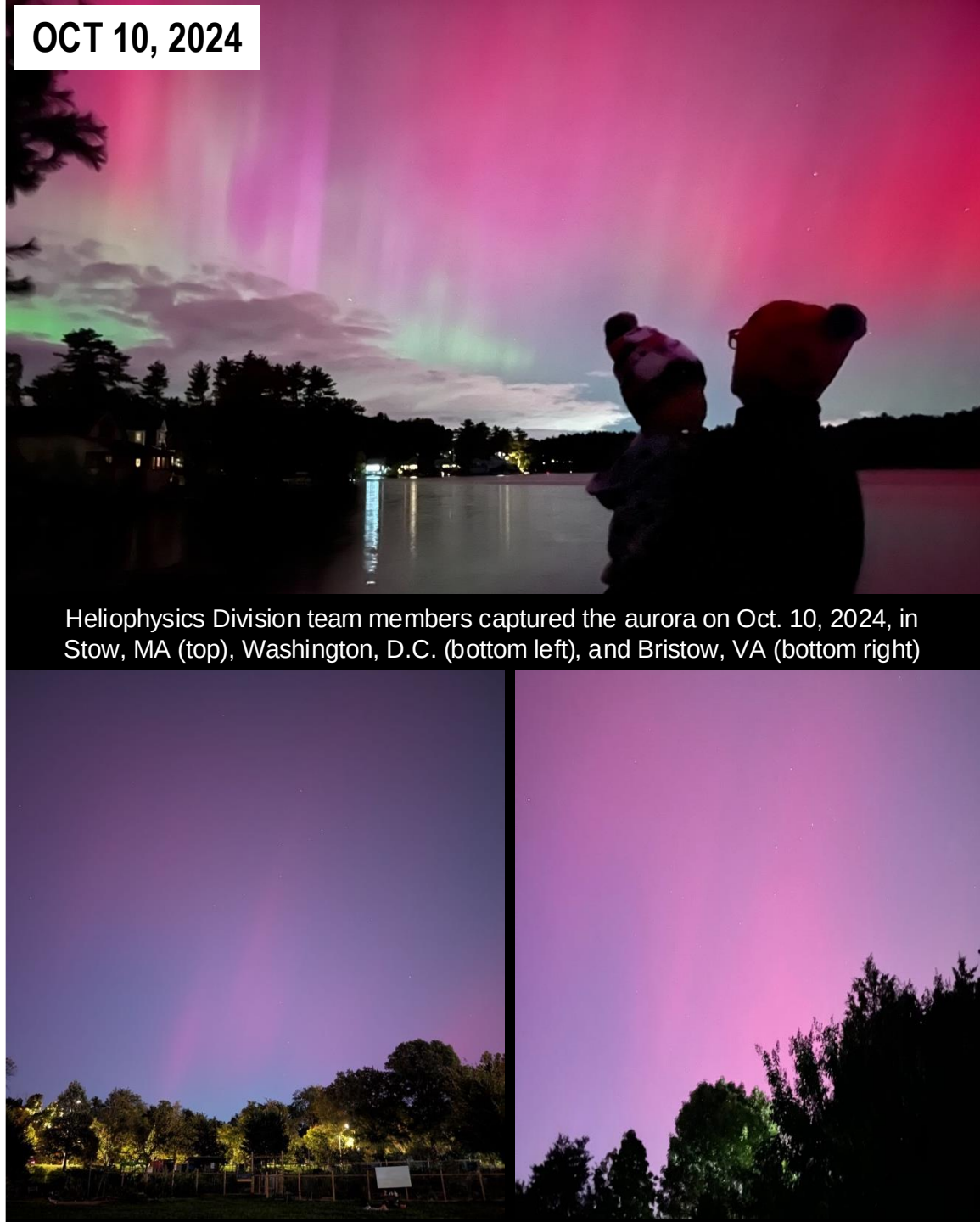
Subscribe to the Heliophysics Newsletter

+ Follow us:

- NASA.gov/sunearth
- blogs.nasa.gov/sunspot
- @NASASunScience
- @NASASun



NASA’s Solar Dynamics Observatory captured this imagery of an X1.8 solar flare – as seen in the bright flash in the center – on Oct. 08, 2024. The footage shows from 9:15 to 10:18 p.m. EDT in a blend of 171, 304, and 131 Angstrom light, subsets of extreme ultraviolet light. Credit: NASA/SDO



Heliophysics Division team members captured the aurora on Oct. 10, 2024, in Stow, MA (top), Washington, D.C. (bottom left), and Bristow, VA (bottom right)

Questions & Answers

Question: 1

Received 284 Upvotes

What is the status of the GDC and DYNAMIC programs considering uncertainties in funding? How is HPD planning to navigate this uncertainty, and when do you anticipate having more clarity regarding the funding situation?

Question: 2

Received 279 Upvotes

Could you clarify the steps and key milestones that will follow the announcement of the Decadal recommendations?

Question: 3

Received 271 Upvotes

What is the status of the Space Weather Pipeline (SWx) suite of instruments and are there any flight opportunities for those instruments?

Question: 4

Received 270 Upvotes

What are some tangible things that the heliophysics community do to help HPD advocate for a larger Presidential Budget Request in FY26 and beyond?

Question: 5

Received 266 Upvotes

Considering the flat budget environment, how does HPD view the role of CubeSats compared to larger satellites in current and future mission priorities? Additionally, do you have any insights on the possible timeline for the next SMEX and MIDEX opportunities?

Question: 6

Received 77 Upvotes

Does NASA consider the extension and/or renewal of successful DRIVE Centers considering the transformative science and cost-efficiency they provide through their already operational and successful establishments?

Question: 7

Received 61 Upvotes

Can you elaborate on the importance of outer heliospheric science to HPD and ways to support such cross-divisional missions conducting heliophysics observations?

Question: 8

Received 29 Upvotes

How does NASA view the value of DYNAMIC as a stand-alone mission?

Question: 9

Received 15 Upvotes

What cadence should the community expect for LWS, STP, SMEX, and MIDEX mission opportunities over the next decade?

Question: 10

Received 14 Upvotes

What is the plan for the next DRIVE Science Center solicitations?

Question: 11

Received 12 Upvotes

How will the findings of the NAC NASA at a Crossroads: Maintaining Workforce, Infrastructure, and Technology Preeminence in the Coming Decades report be addressed by SMD and what short/long term effects will be felt by Helio?

Question: 12

Received 10 Upvotes

Why have the HPAC's repeated requests for information on taxpayer-funded grant funding levels been rejected?

Question: 13

Received 6 Upvotes

Is there any mitigation to the cancellation of the MoO which will affect smaller mission concepts & early-career scientists?

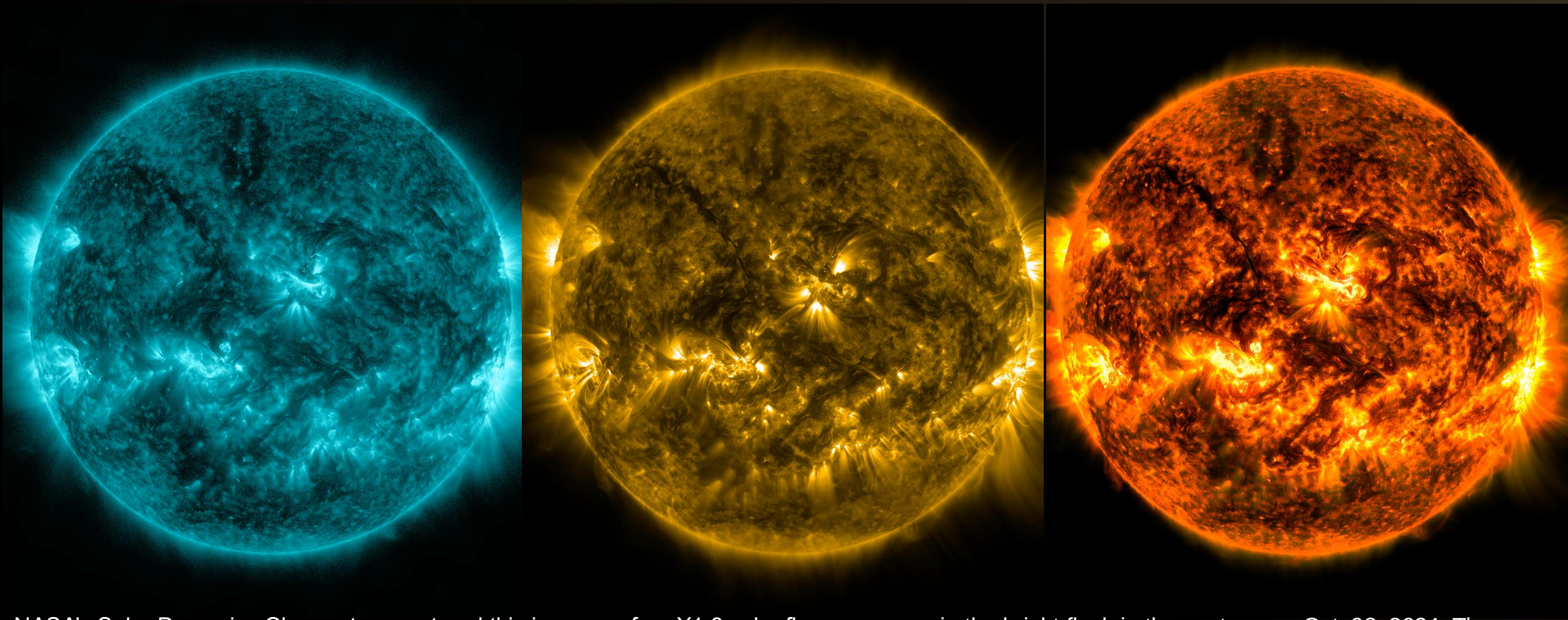
Head Over to the Heliophysics Advisory Committee Meeting!

Head on Over to the Heliophysics Advisory Committee Meeting!

Date	WebEx Link	Meeting #	Password
Wednesday, October 23, 2024	https://nasaevents.webex.com/nasaevents/j.php?MTID=mc9115ec5198e03fc6757901104f5cfb7	2818 795 0282	iAkGQAvp762 (42547287)
Thursday, October 24, 2024	https://nasaevents.webex.com/nasaevents/j.php?MTID=mb8424f487346a8ad5f3eb0b5a9958	2819 521 4155	JGrAjPiW892 (54725749)

- **Next Agenda Topic:**
  - SMD RFI on ROSES Access– 1:00 PM – 1:30 PM
- **For Additional HPAC Materials:**
  - https://science.nasa.gov/researchers/nac/science-advisory-committees/hpac/

Thank You! The Heliophysics Town Hall has Ended.



NASA's Solar Dynamics Observatory captured this imagery of an X1.8 solar flare – as seen in the bright flash in the center – on Oct. 08, 2024. The footage shows from 9:15 to 10:18 p.m. EDT. Credit: NASA/SDO