National Aeronautics and Space Administration

NASA

# 2024 NASA SCIENCE

# Heliophysics Update

**Dr. Joe Westlake**
Heliophysics Division Director
June 21, 2024

# NASA Heliophysics Division Leadership

**Dr. Joseph (Joe) Westlake**
Division Director

**Margaret (Peg) Luce**
Deputy Division Director

**Nicole (Nicki) Rayl**
Associate Director for Flight

**Dr. Therese Moretto Jorgensen**
Director of Research

# Heliophysics Recent Events


Credit: NASA/Keegan Barber

# APRIL 8, 2024: TOTAL SOLAR ECLIPSE


**400+** NASA employees across **14** locations engaging with the public

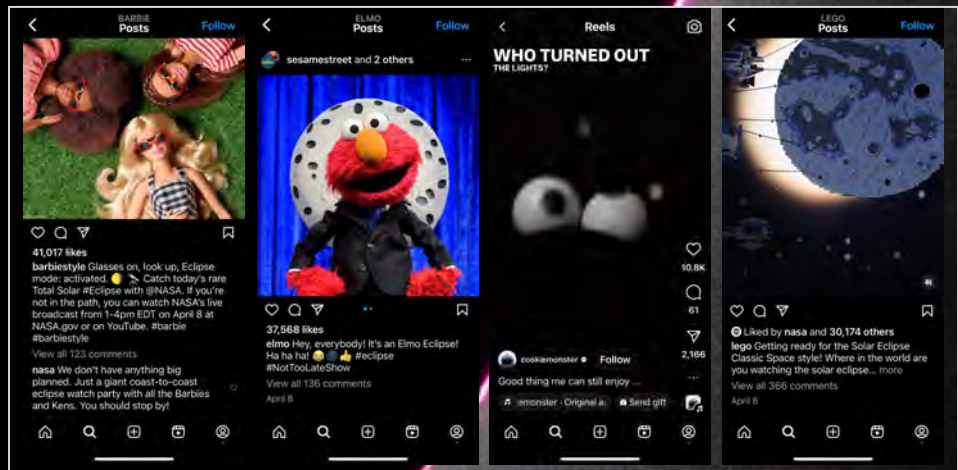

**2M+** glasses distributed

**12,328,645**
NASA Broadcast viewers – English

HD 1080P

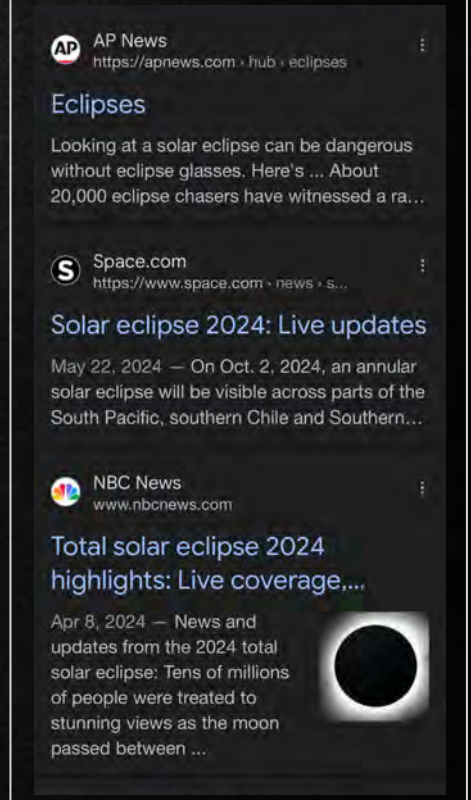
LIVE

**4,603,238**
NASA Broadcast viewers – Spanish




**Tens of Thousands**
Of engagements with Barbie, Cookie Monster, Elmo, Snoopy, LEGO and more

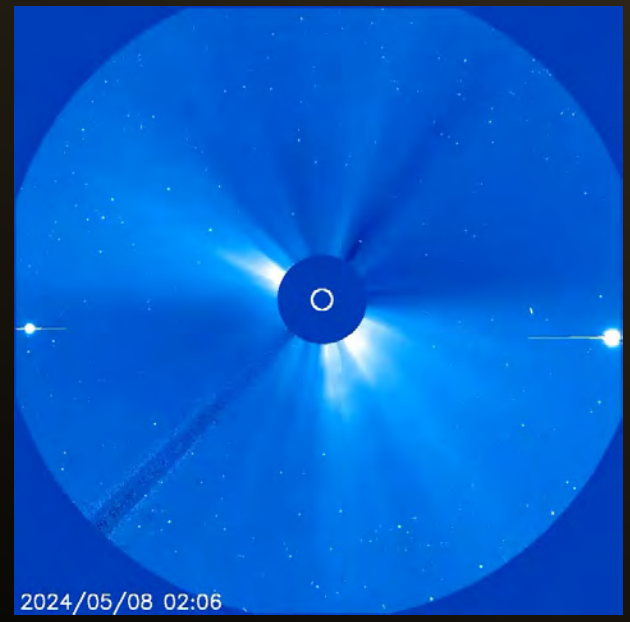
**17,535**
News stories with an estimated publicity value of **$54.5 million**



# Geomagnetic Solar Storm

NASA's Solar Dynamics Observatory (SDO) captured this image of an X5.8 solar flare peaking at 9:23 p.m. EDT on May 10, 2024. The image shows a subset of extreme ultraviolet light that highlights the extremely hot material in flares.
Credit: NASA SDO

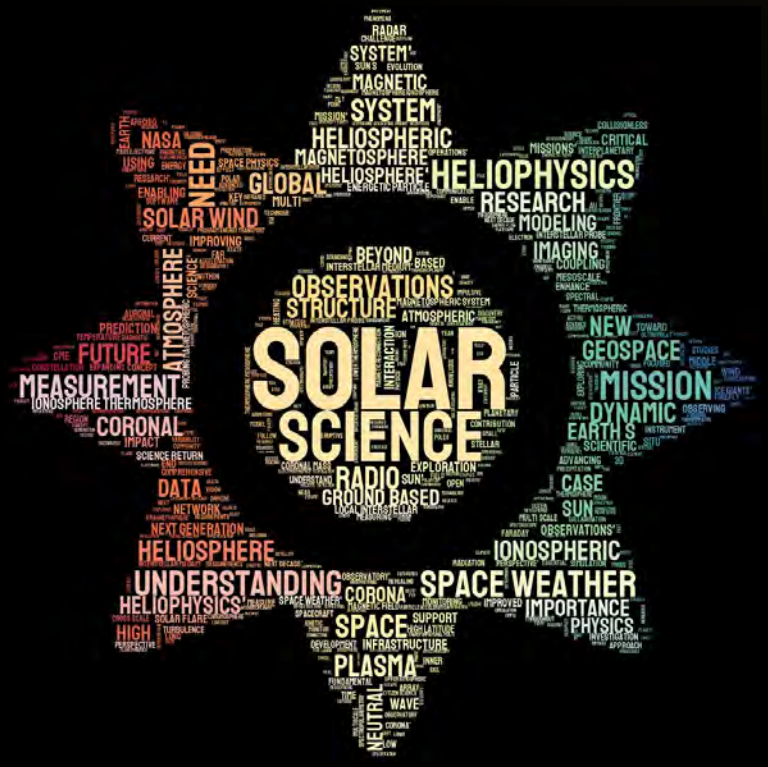
A coronal aurora appeared over southwestern British Columbia on May 10, 2024.
Credit: NASA/Mara Johnson-Groh




A series of CME's are launched from the Sun on May 8th, as captured by SOHO's LASCO instrument
Credit: NASA SOHO

# 2024 Decadal Survey is Coming Soon

**250 white papers submitted!**




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

**Expected Summer 2024**

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

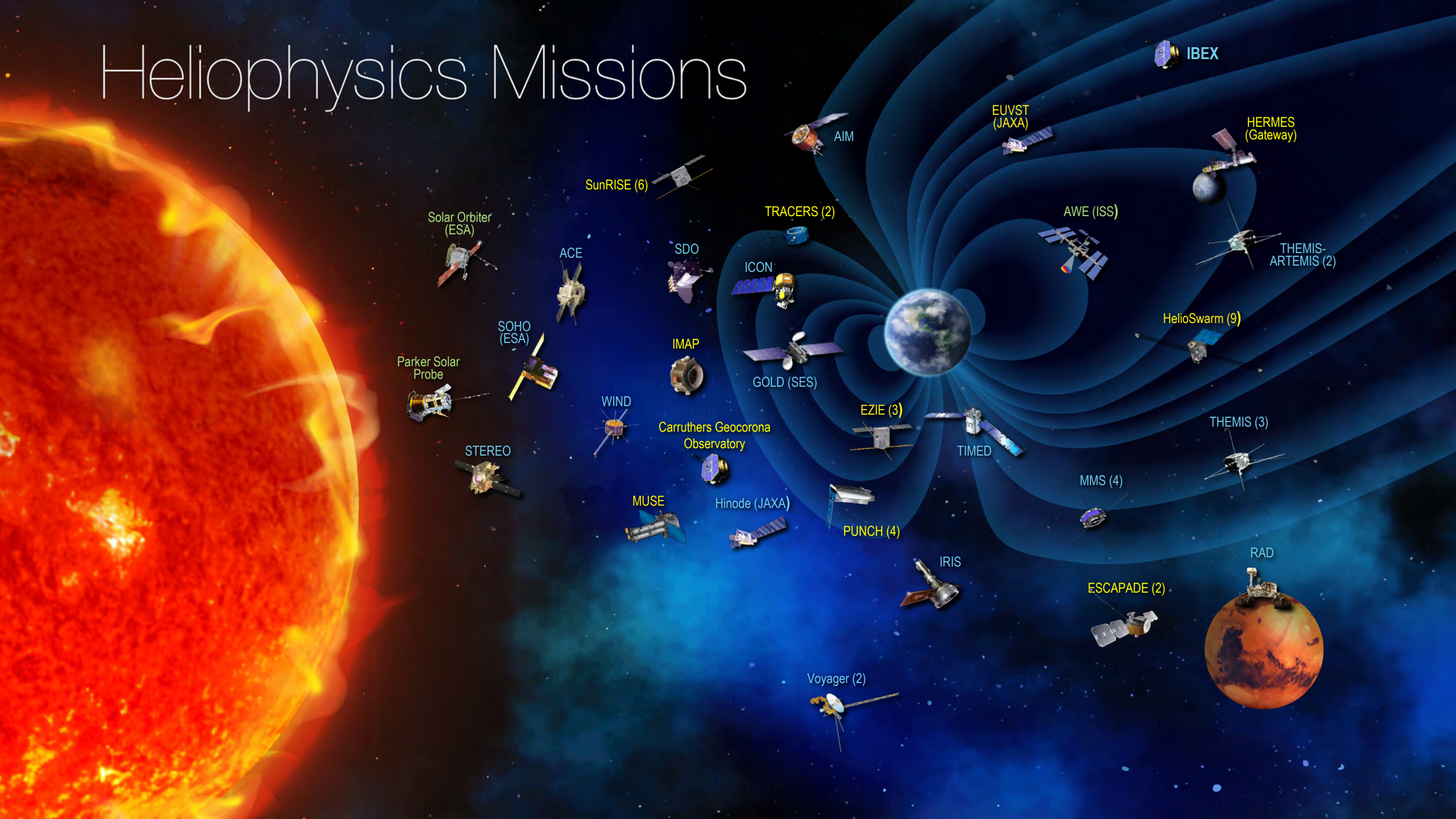
The Decadal Survey is charged to "generate consensus recommendations to **advance and expand the frontiers of solar and space physics** in the current decade and **lay the groundwork for continued advances in future decades**." [Decadal Survey, Statement of Task]

For more information, visit the NASEM website: https://nas.edu/ssphdecadal

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

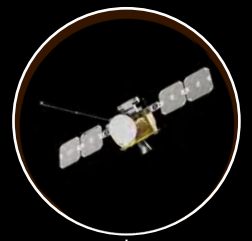
Image credit: National Academies of Science website

# Heliophysics Missions



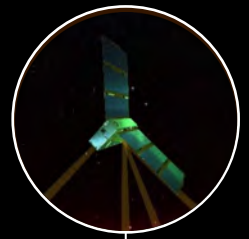
# Helio Mission Launch Timeline

**ESCAPADE**



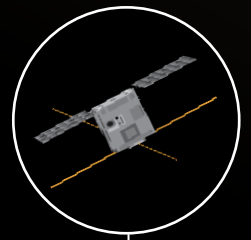
~October **2024**

**EZIE**



~October **2024**

**SunRISE**



~March **2025**

**TRACERS**

~April **2025**

**PUNCH**

~April **2025**

**IMAP**

~May **2025**

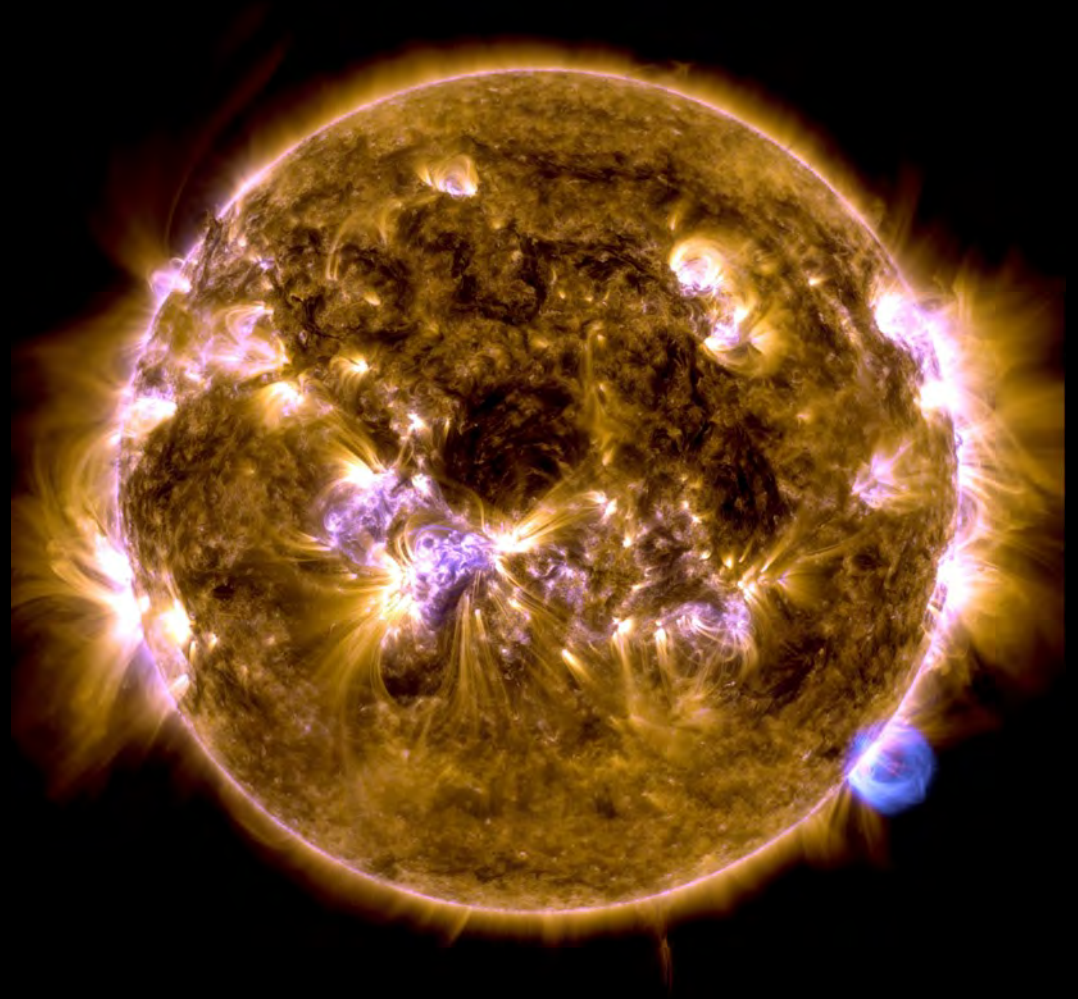
**Carruthers Geocorona Observatory**

~May **2025**

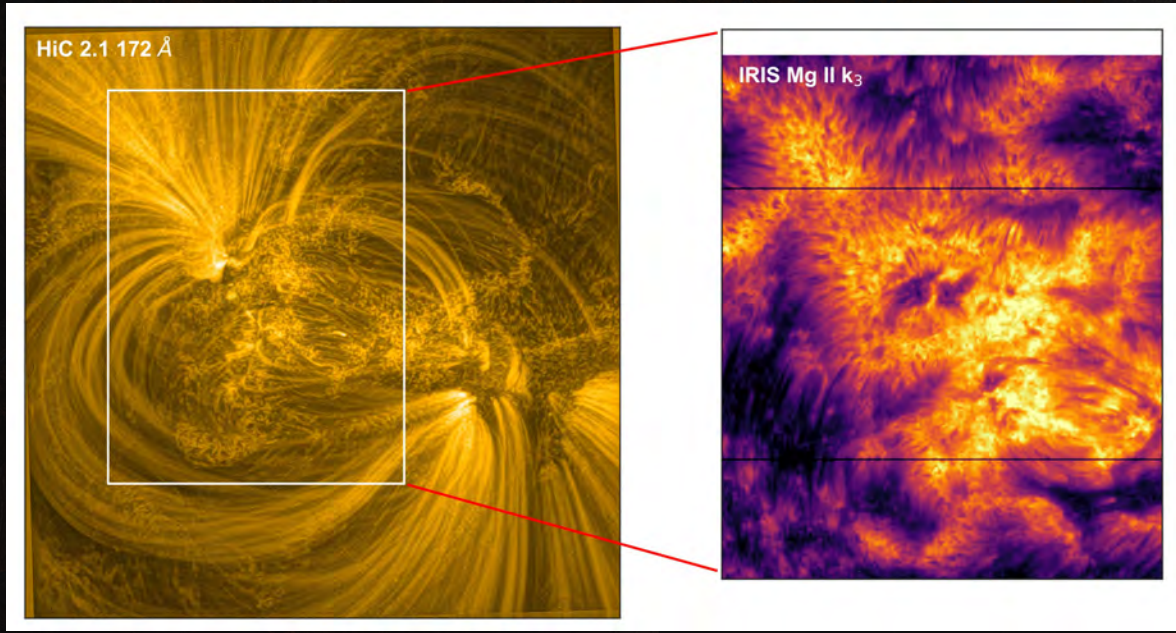
# Science Storytelling

- Share your science!
- We want to advocate for compelling "science nuggets" from the Heliophysics community
- Pull science results and captivating images from reports that can be easily shared

**HQ-HelioHighlights@mail.nasa.gov**



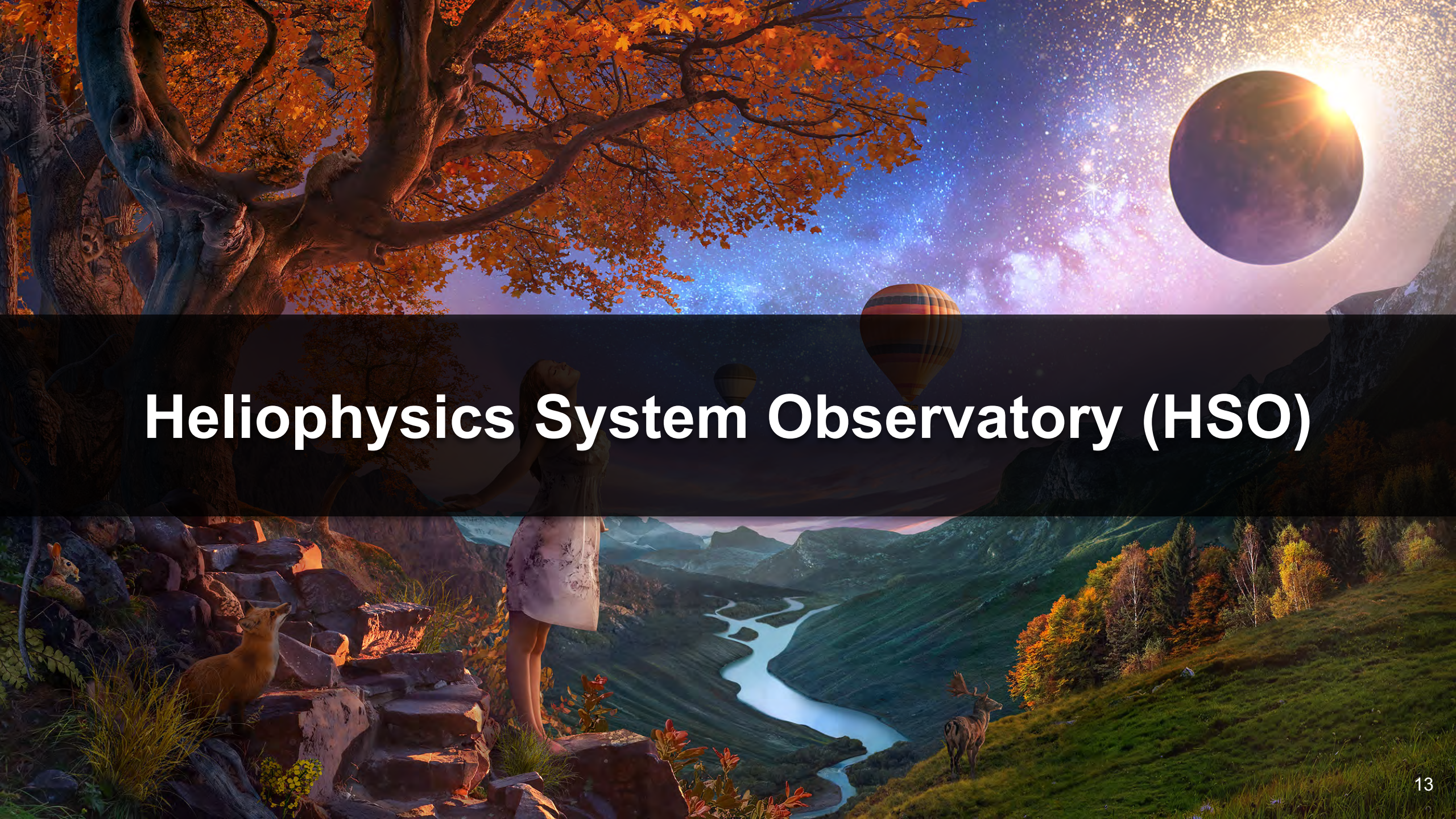
# Science Nugget: Solar Moss




Read the Paper: https://www.nature.com/articles/s41550-024-02241-8

**IRIS and HI-C take a closer look at super heating mechanisms within sunspots**

Scientists have named a small-scale, bright, patchy structure made of plasma in the solar atmosphere “moss.” The moss blossoms around the center of a sunspot group, where magnetic conditions are strong. Observations from IRIS and HI-C combined with complex 3D simulations have now revealed that electrical currents may contribute to heating the moss. Throughout this region there is a mess of magnetic field lines, like invisible spaghetti. This tangle of magnetic spaghetti creates electrical currents that can help heat material to a wide range of temperatures from 10,000 to 1 million degrees Fahrenheit.



# Heliophysics System Observatory (HSO)

# Extended Mission Policy Activities

**2023 Senior Review Findings**

> **Individual extended mission proposals lacked system-level coherence and perpetuated closed communities.**

The following would strengthen the HPD portfolio and engage broader community:

- Develop opportunities for HSO science working groups
- Expand HSO Guest Investigator funding opportunities
- Expand HSO community frameworks to share and leverage the development of code, team science efforts, and coordination with HDRL

**Results** **12 missions proposed, 4 designated project-funded, 6 designated infrastructure, 2 terminated due to technical feasibility**

## Framework Development

- Address terminology and definition concerns
- Establish research funding transition and competition processes for missions phasing out of prime phase
- Outline Senior Review criteria for transitioning missions

## Stakeholder Feedback

- Solicit feedback from internal and advisory stakeholders on:
  - Overall framework
  - Terminology
  - Metrics for evaluation

## Policy Development

- Draft written policy to foster open science, healthy competition, and opportunities for early career scientists
  - Incorporate stakeholder feedback
  - Address concerns raised in HDP feedback form

## Community Feedback

- Share framework at Sept. HPD Town Hall
- Answer questions and accept live feedback
- Identify format/method and timeline for formal feedback submission

## Finalize & Release Policy

- Finalize written policy based on feedback
- Issue policy and guiding direction to operating missions
- Leverage appropriate communication channels to ensure awareness across the community
- Feed into 2026 Senior Review and ROSES

# GDC & DYNAMIC

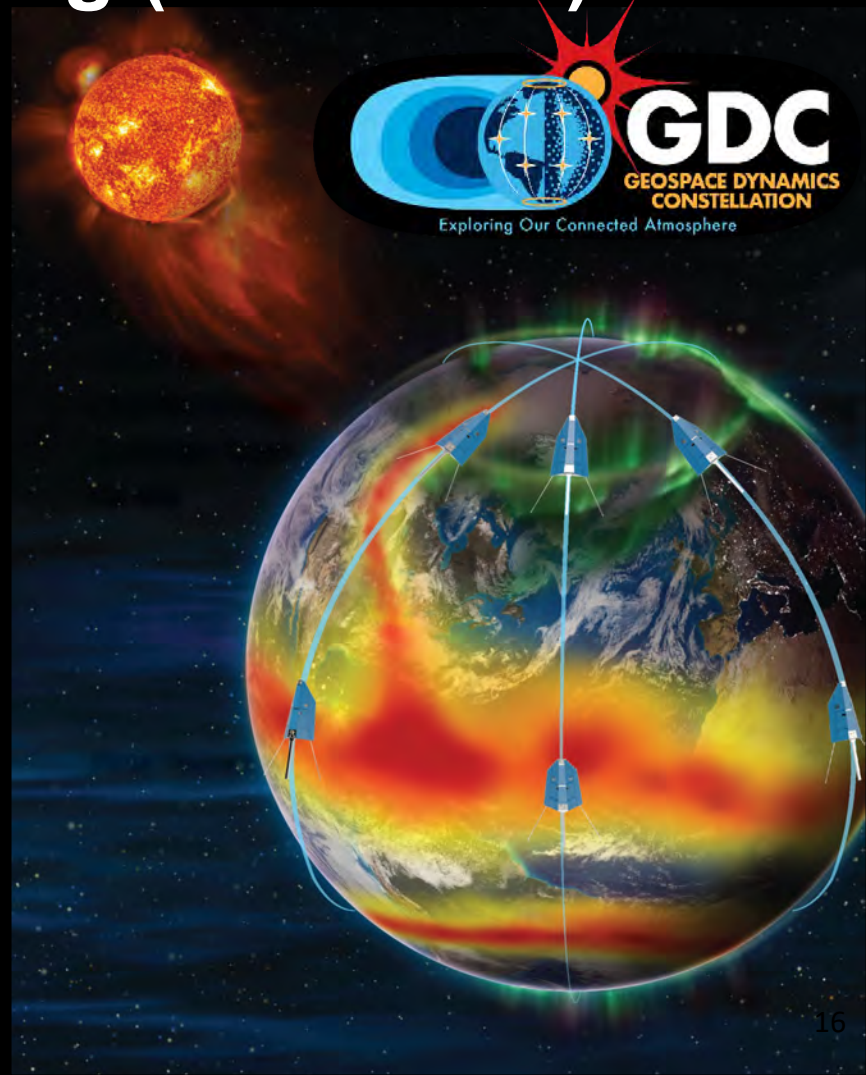
# Geospace Dynamics Constellation (GDC) and Dynamical Neutral Atmosphere-Ionosphere Coupling (DYNAMIC)

GDC and DYNAMIC provide a whole-system study of upper atmospheric dynamics by combining their scientific and technical capabilities

- **Science**
  - GDC: Understand the upper atmosphere's internal processes and dynamics, and response to energy inputs from Earth's space environment (*energy from above*)
  - DYNAMIC: Understand the effect of lower atmosphere variability on the processes and dynamics of the upper atmosphere (*energy from below*)
- **Architecture**
  - GDC: Provides in situ measurements above 300 km
  - DYNAMIC: Provides remote sensing of vertical profiles below 300 km altitude, leverages GDC measurements

**DYNAMIC AO**

- AO released May 2023
- Selections in June 2024



# Research & Analysis Update

## RECENT ROSES-23 SELECTIONS

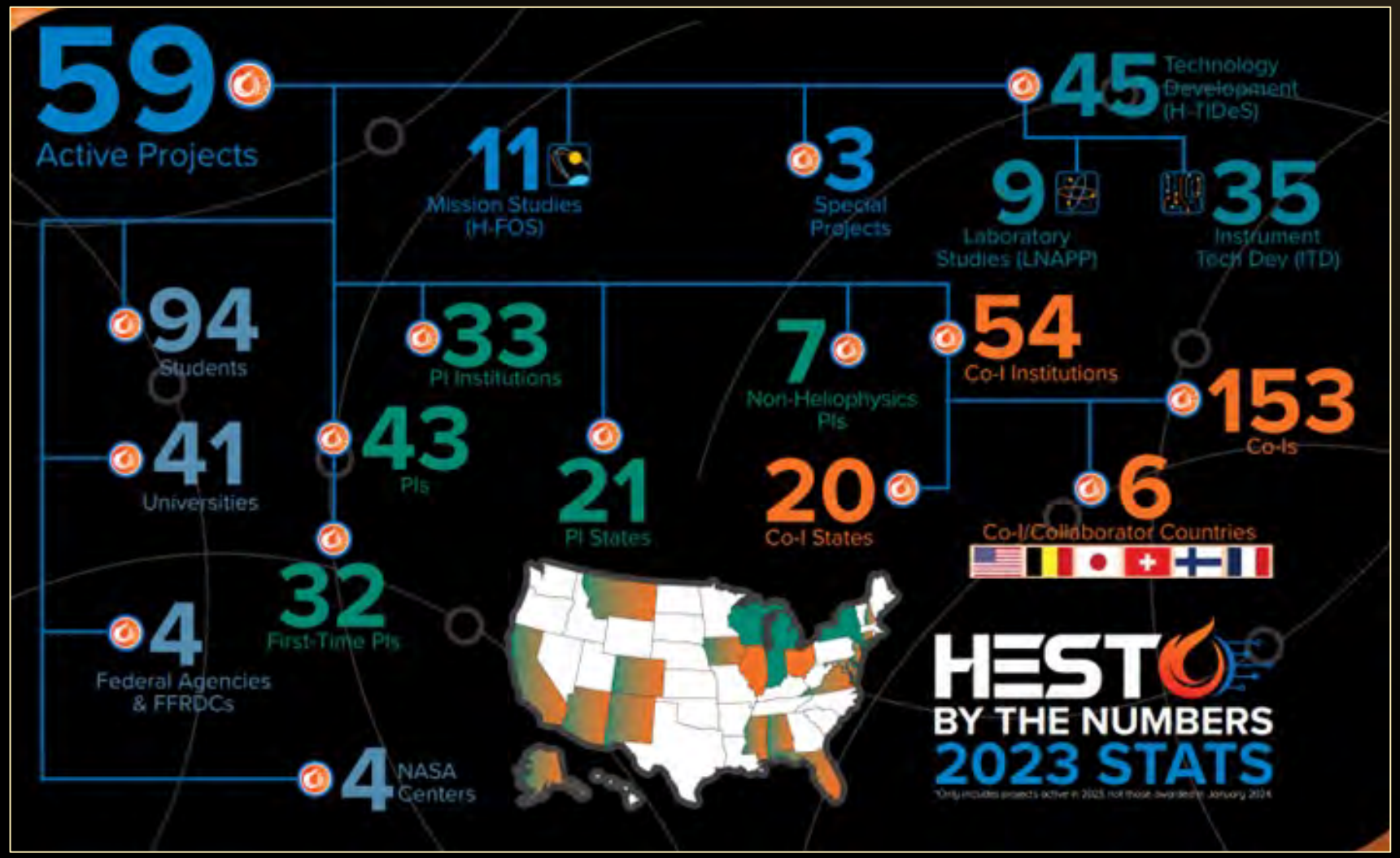
| HSR 2023 (notified 10.20.23) | HGIO 2023 (notified 1.08.24) | HFOS 2023 (notified 1.25.24) | HTIDES 2023 (notified 1.25.24) | LWS 2023 (notified 5.01.24) |
|---|---|---|---|---|
| • 161 proposals received<br>• 24 selected<br>• 14% selection rate | • 82 proposals received<br>• 19 selected<br>• 23% selection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

# Heliophysics Strategic Technology Office (HESTO)




HESTO helps manage the Heliophysics technology program, which works closely with the Sounding Rocket Program and Balloon program.

**Recent Accomplishments:**

- Launched the Heliophysics Technology website (hesto.smce.nasa.gov)
- Released the first annual Heliophysics Technology report

**Looking Ahead:**

- The 2024 Heliophysics Technology Symposium will be held on September 18-19, 2024 at the Wallops Flight Facility

# IT'S A GREAT TIME TO BE A HELIOPHYSICIST

www.nasa.gov

# 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:
**HQ-HelioHighlights@mail.nasa.gov**

NASA.gov/sunearth

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blogs.nasa.gov/sunspot

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