



# THE PUNCH MISSION FIRST LIGHT

**SPACE WEATHER LIKE YOU'VE  
NEVER SEEN IT BEFORE!**



*Craig DeForest (PUNCH PI, Southwest Research Institute)  
AAS Press Briefing: 10-Jun-2025, Anchorage AK*



# NASA'S PUNCH EXPLORER: A SCIENCE MISSION WITH SPACE WEATHER APPLICATIONS

## GOALS:

- **Track space weather:** Sun to Earth in 3D
- **Measure the solar wind:** globally in near-real time

**DATA:** polarized visible-light images, very wide field

## MISSION DESIGN:

- four smallsats act as one "virtual imager"
- 650km sun-synchronous polar orbit
- Spacecraft are spread out around the planet

## STATUS:

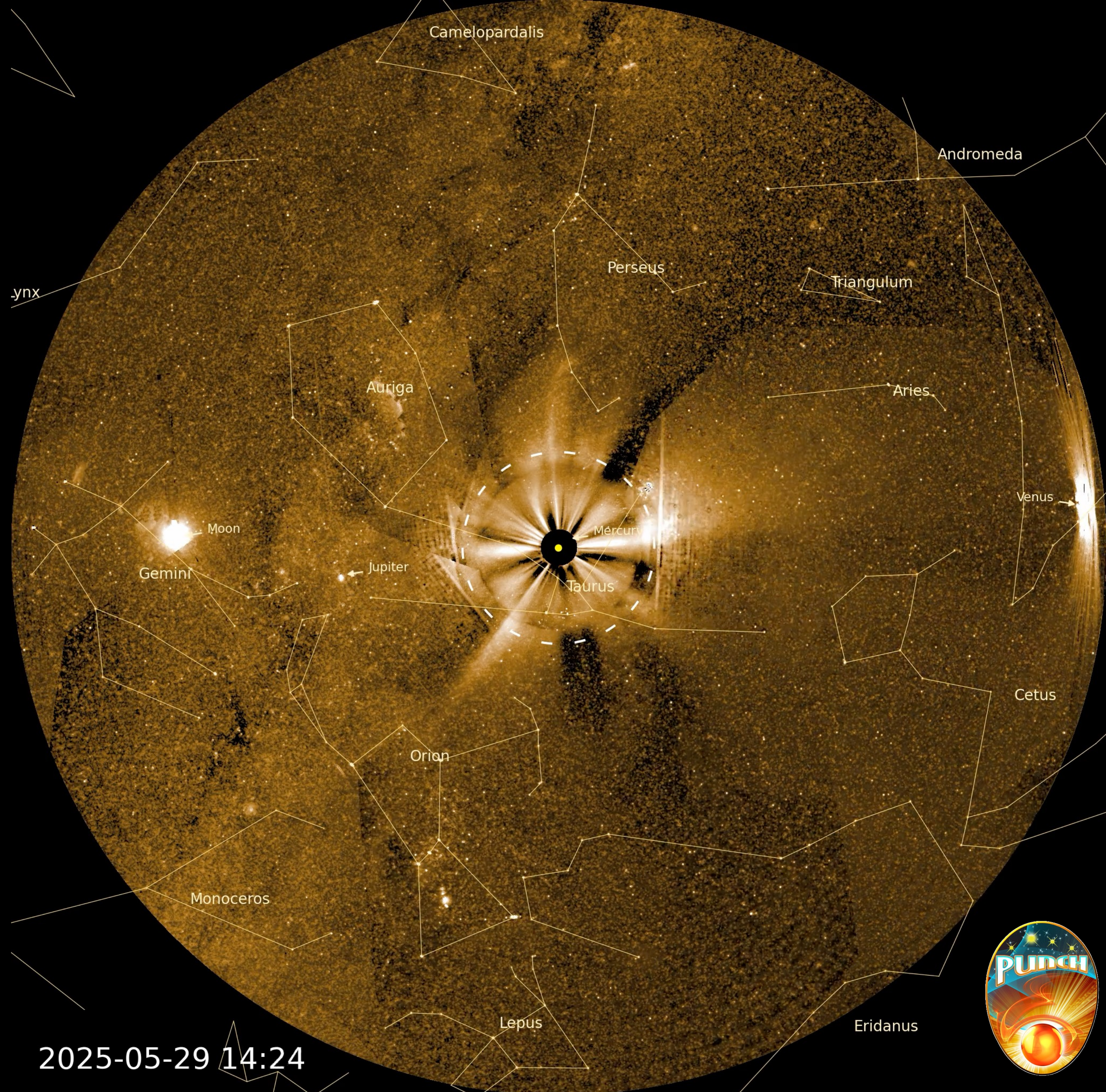
- Launched March 11, 2025 from VSFB
- Finishing commissioning
- Calibration still in progress



# PUNCH TRACKS SPACE WEATHER ACROSS THE SOLAR SYSTEM

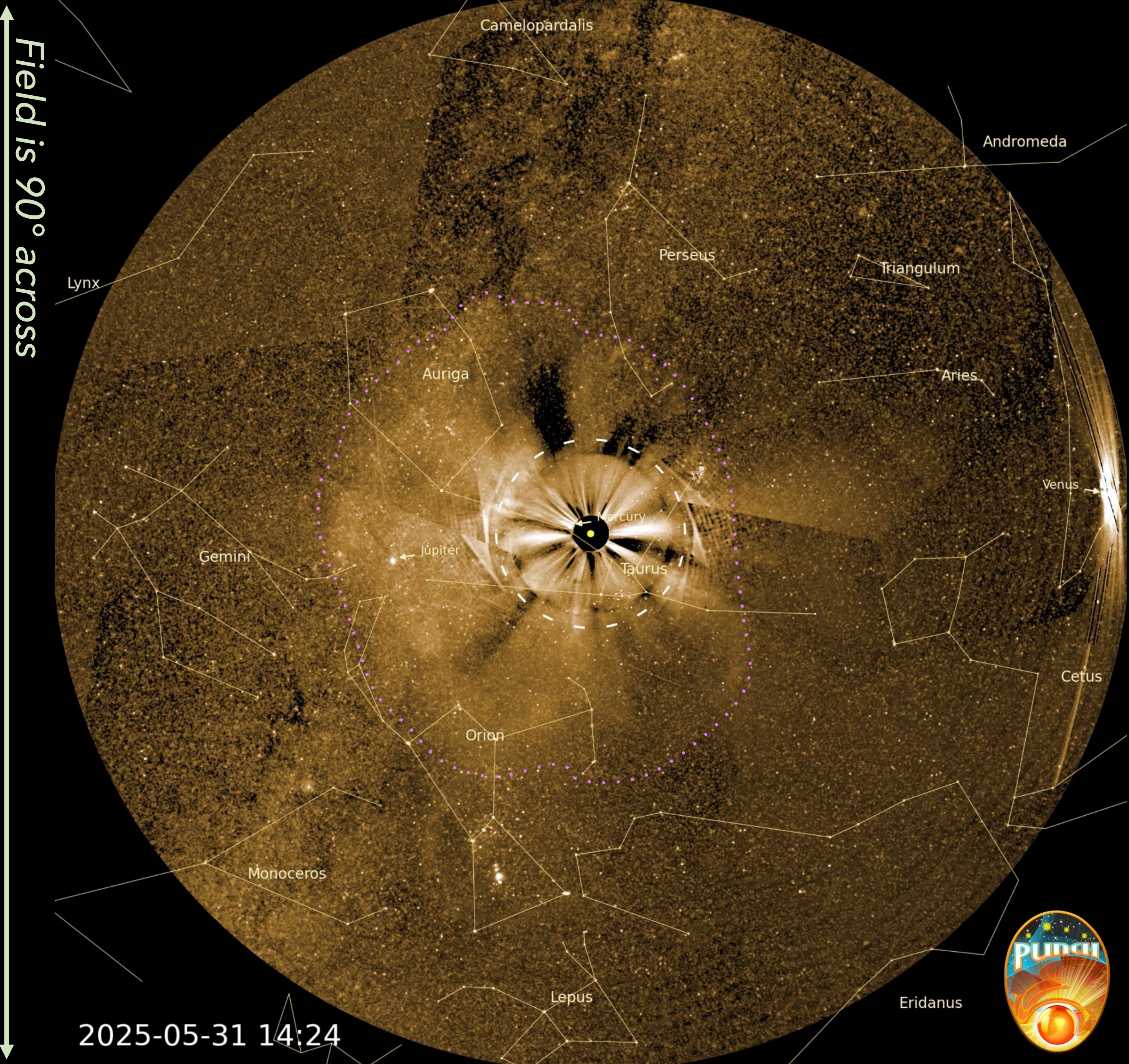
- You've never seen space weather this way before.
- 31-May-2025: a large space weather storm (CME) bursts from the Sun and approaches Earth at 4 million mph!
- 2-June-2025: another CME leaves the Sun northbound at 1.5 million mph.
- Yellow dot (at center) shows Sun to scale.
- White circle shows FOV of prior instrument (LASCO) that is still used for space weather forecasting.
- *PUNCH is taking data continuously right now, and will continue to do so throughout its 2-year mission.*
- *These are preliminary data, before full calibration and starfield removal (scheduled for this summer).*

Field is 90° across



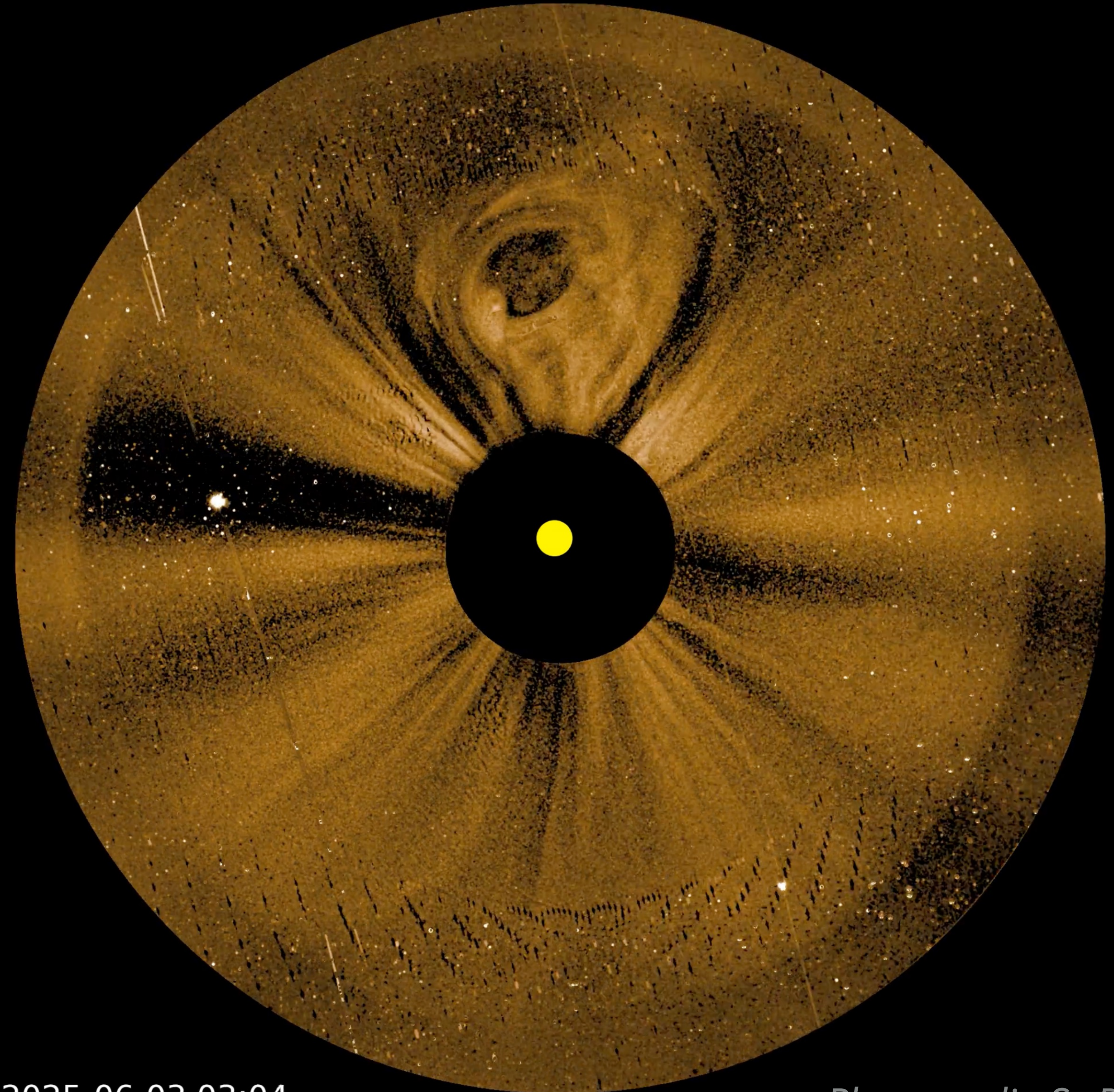
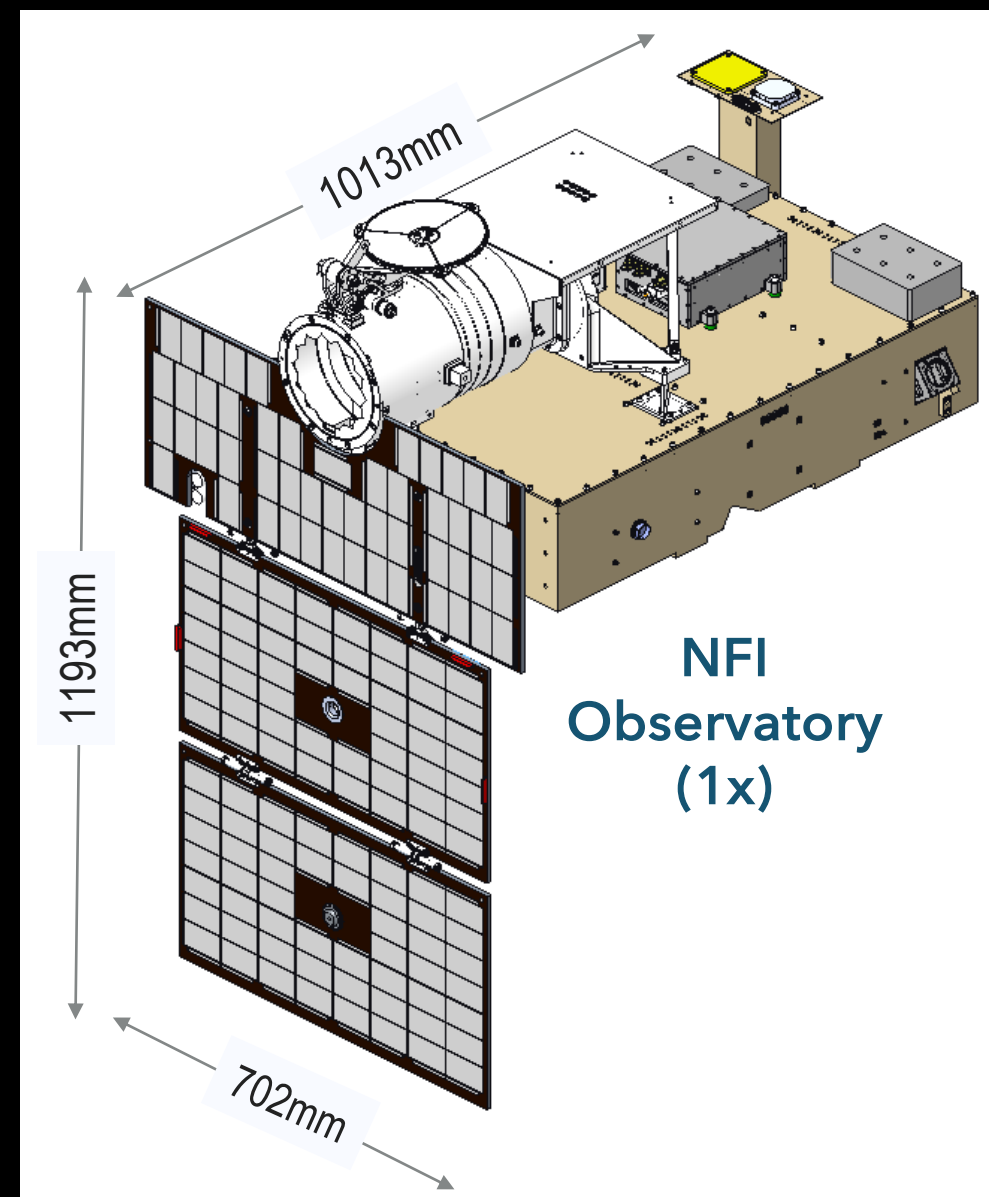
# PUNCH TRACKS SPACE WEATHER ACROSS THE SOLAR SYSTEM

- Solar storm coming!
- This single frame from the complete PUNCH constellation shows an inbound CME halfway between the Sun and Earth
- PUNCH tracked the CME front until it left our FOV 2 hours before impact with NOAA's GOES spacecraft at Earth
- *PUNCH is taking data continuously right now, and will continue to do so throughout its 2-year mission.*
- *These are preliminary data, before full calibration and starfield removal (scheduled for this summer).*



## NFI'S "FIRST CME LIGHT"

- Early CME image from NFI shows detailed structure
- Preliminary background removal is working
- Focus and sensitivity are excellent
- *NFI supplies data for the area inside the white circle of the full constellation movies.*

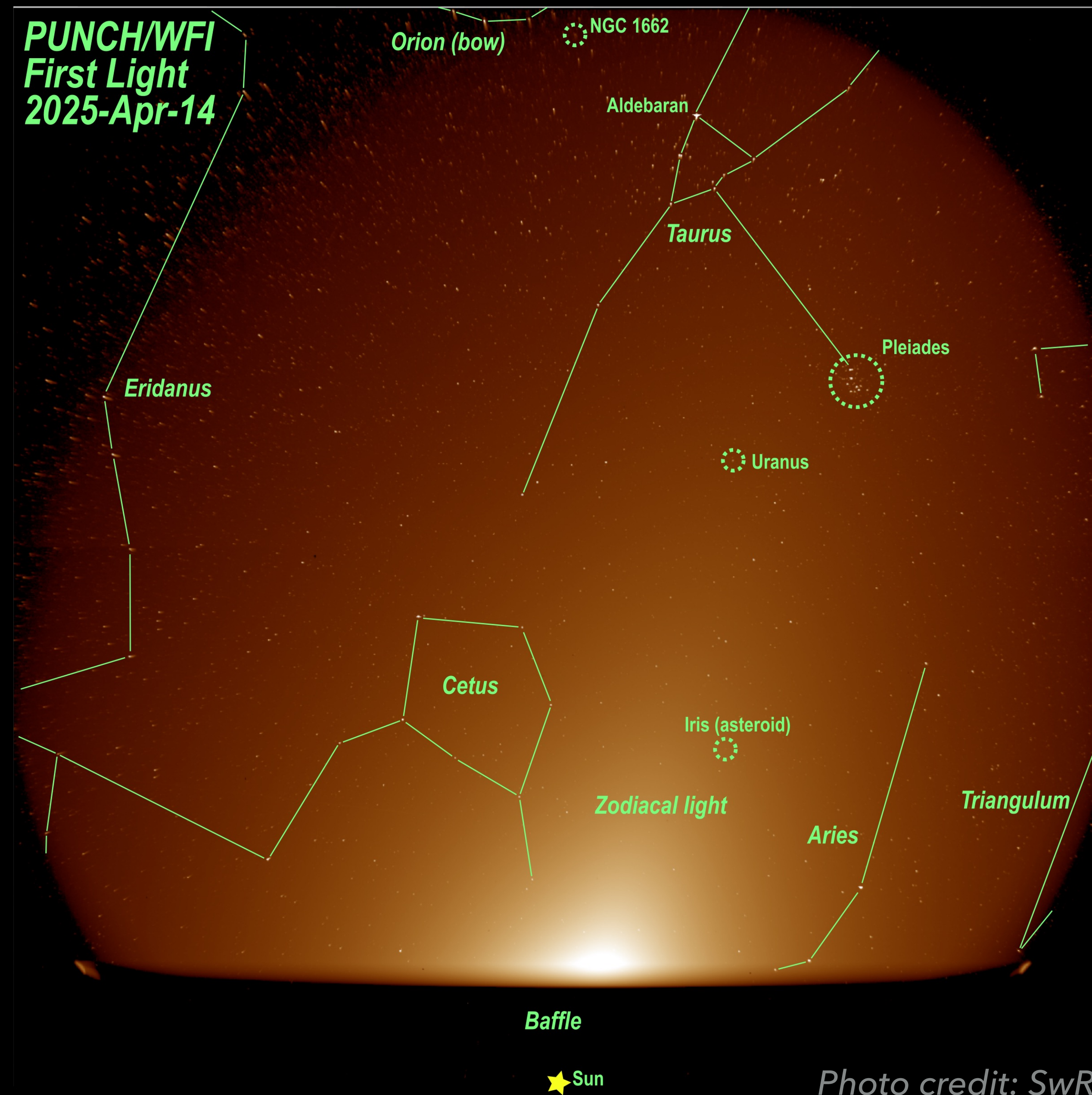
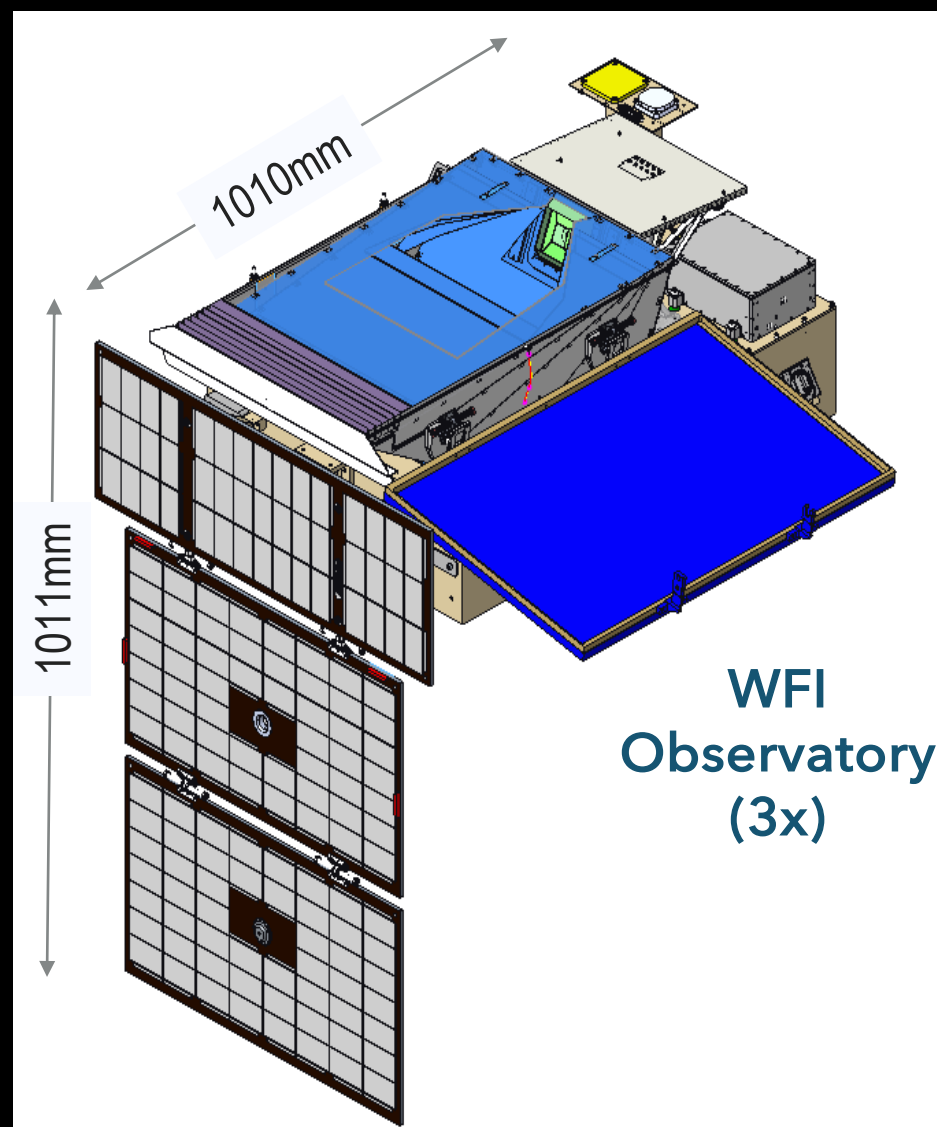


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Photo credit: SwRI

# WFI FIRST LIGHT

- First-light image from WFI shows constellations
- Zodiacal light is present on the sky (subtracted from movie)
- WFI shows its extraordinary sensitivity
- *Three WFI's supply data outside the white circle of the full constellation movies.*



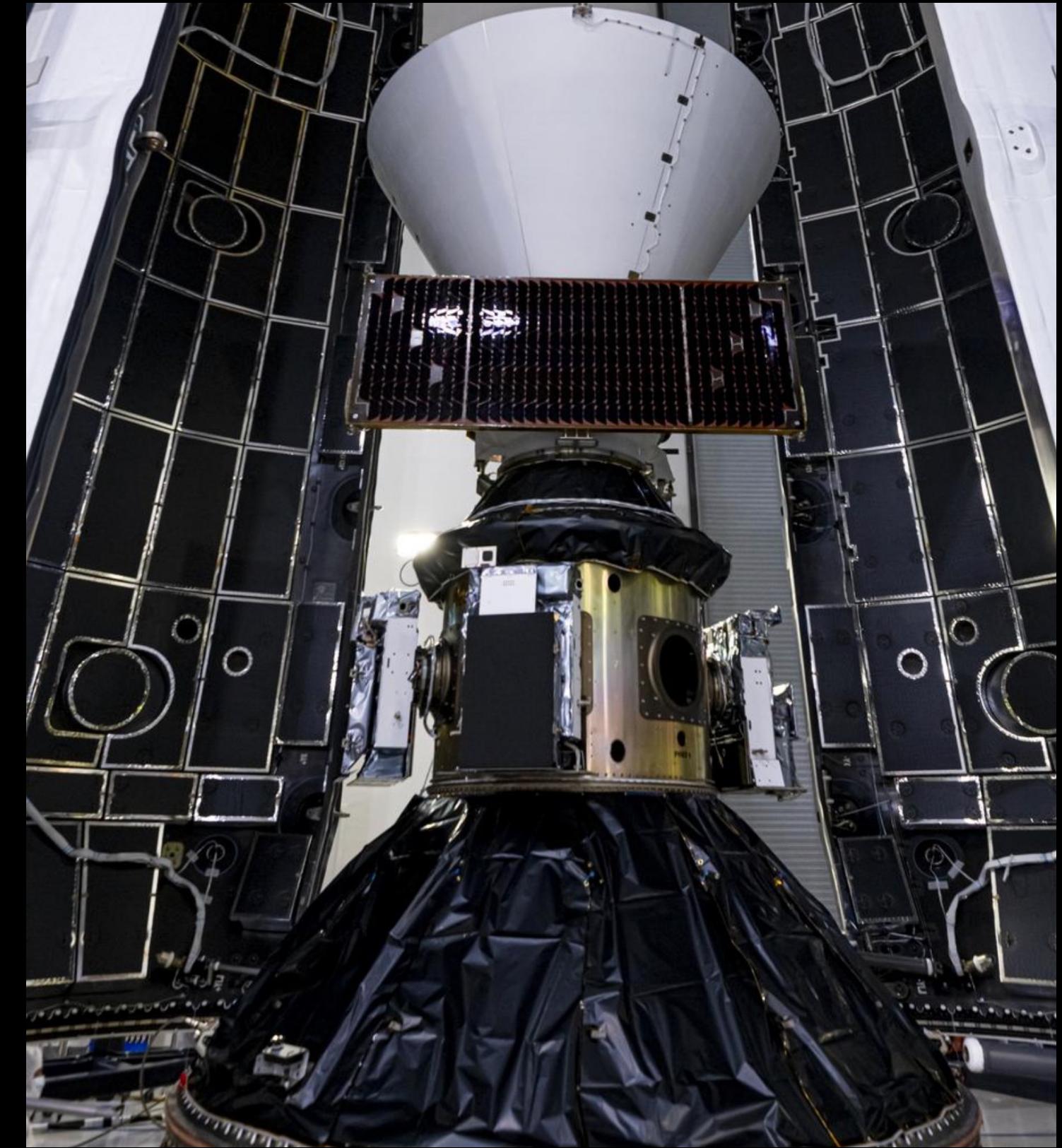
# PUNCH SMALLSATS ARE SMALL

Four PUNCH satellites at Vandenberg Space Force Base in February, ready for integration

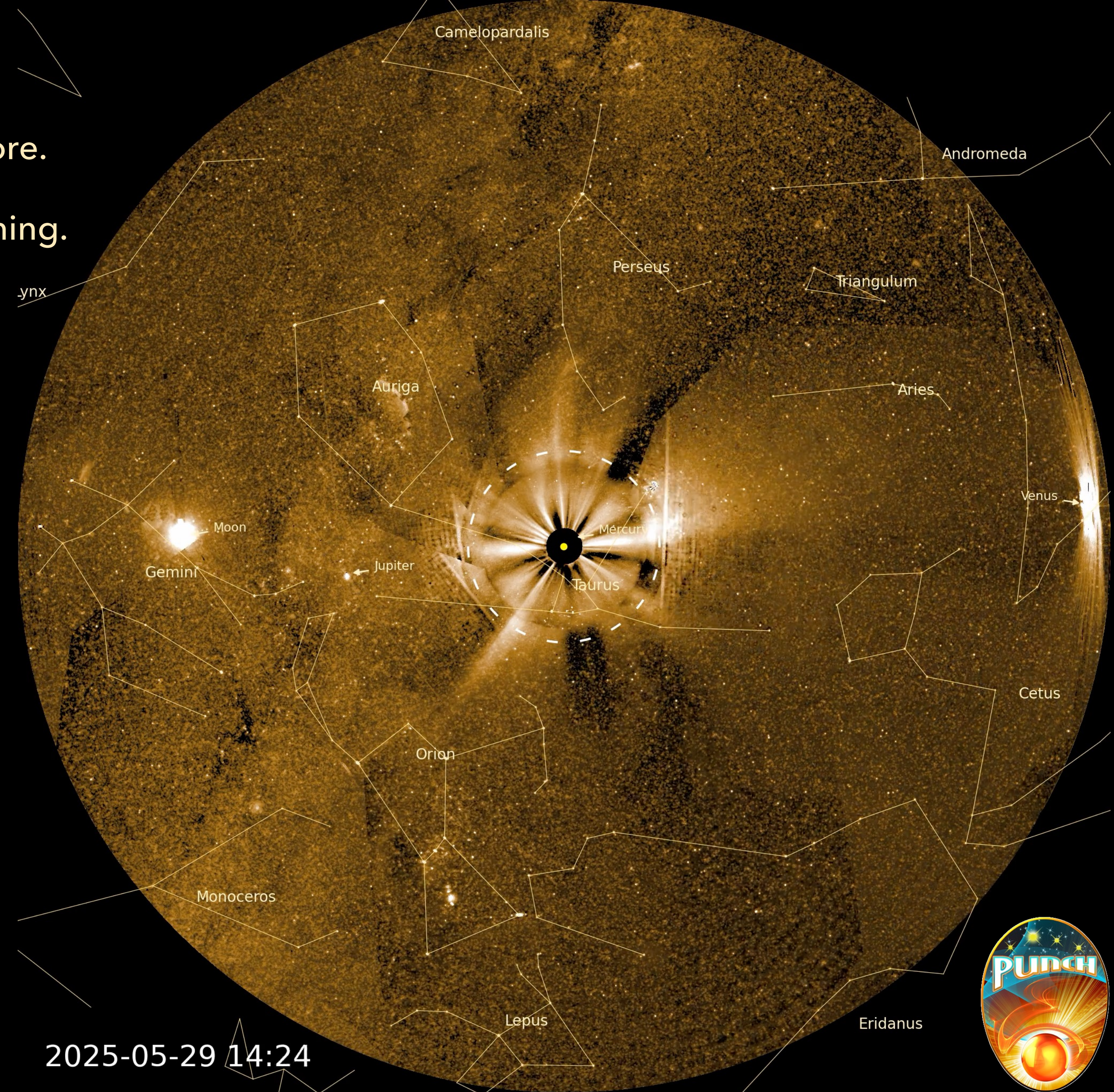
*Photo: NASA*

Four PUNCH satellites integrated with SPHEREx ready for encapsulation in a Falcon 9 fairing in February

*Photo: NASA*



- PUNCH is revealing space weather as you've never seen it before.
- The four-spacecraft constellation is still completing commissioning.
- PUNCH has tracked a CME continuously from Sun to Earth.
- The best is still to come.



**FOR MORE INFORMATION:**

PUNCH Principal Investigator: Dr. Craig DeForest  
 craig.deforest@swri.org, 303-641-5769

PUNCH Project Scientist: Dr. Sarah Gibson  
 sgibson@ucar.edu, 720-201-1735

PUNCH website: <https://punch.space.swri.edu>

SwRI Press Release: <https://www.swri.org/newsroom/press-releases/swri-led-punch-mission-images-huge-solar-eruption>

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*Movie credit: SwRI*