# SPARCS CAMERA and Early Science Observations

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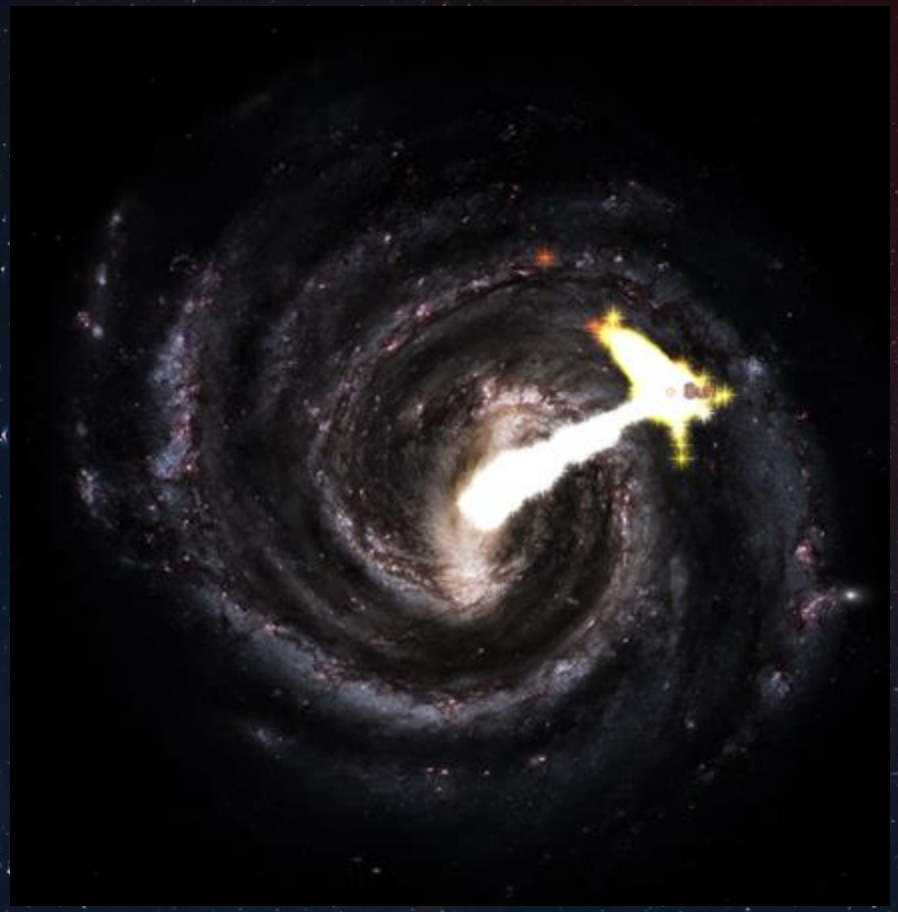
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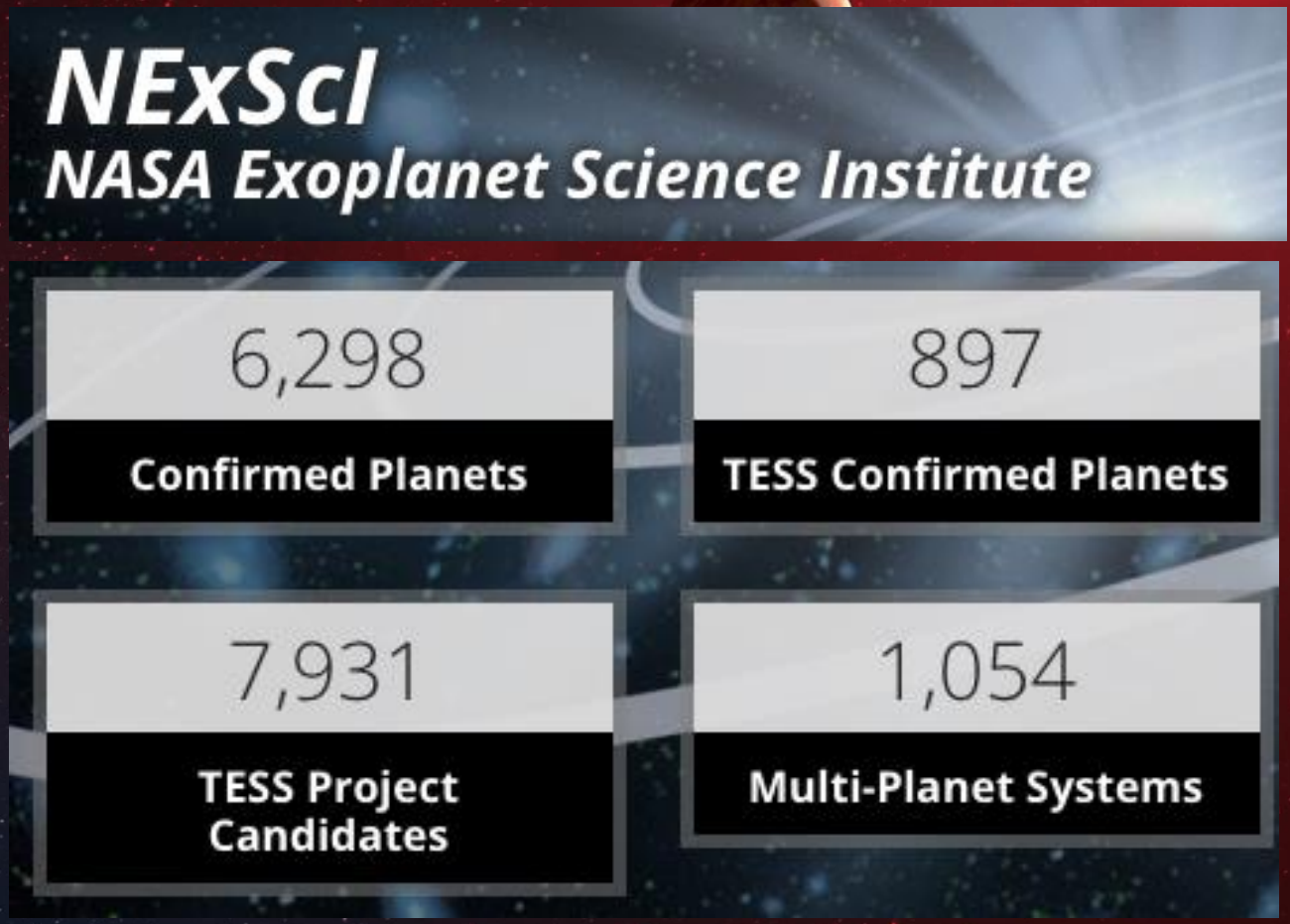
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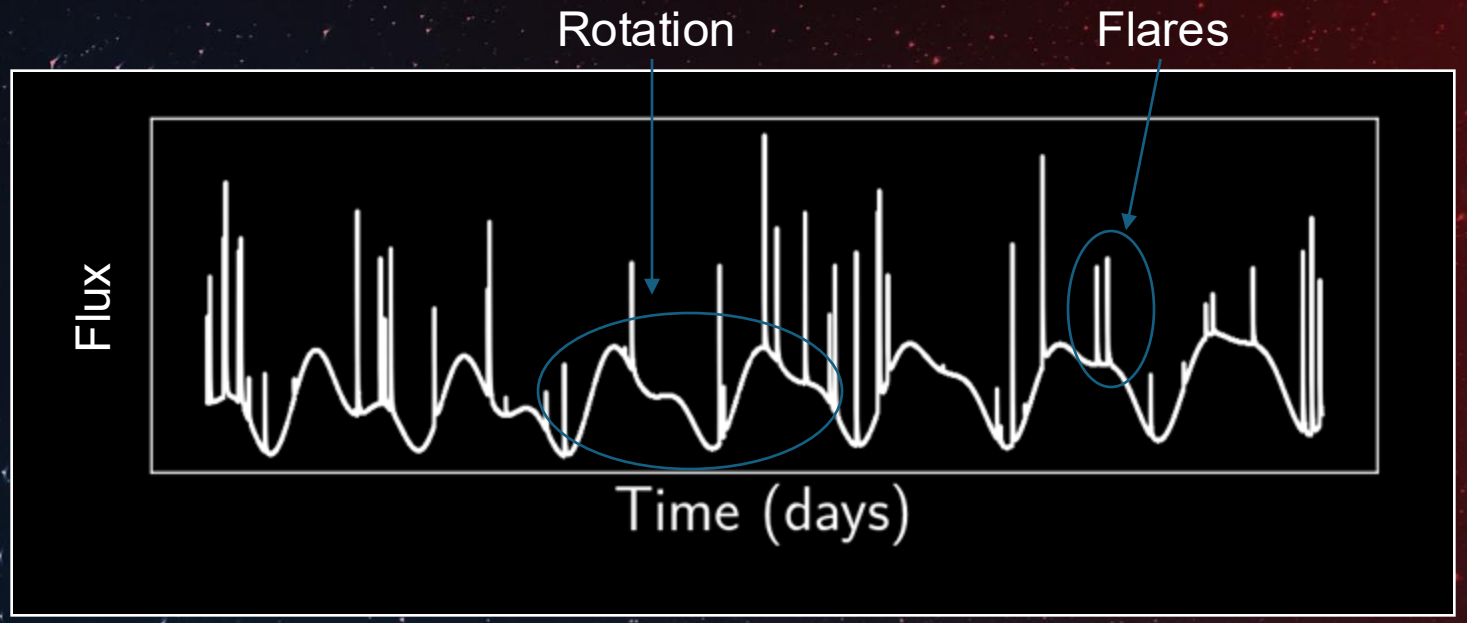
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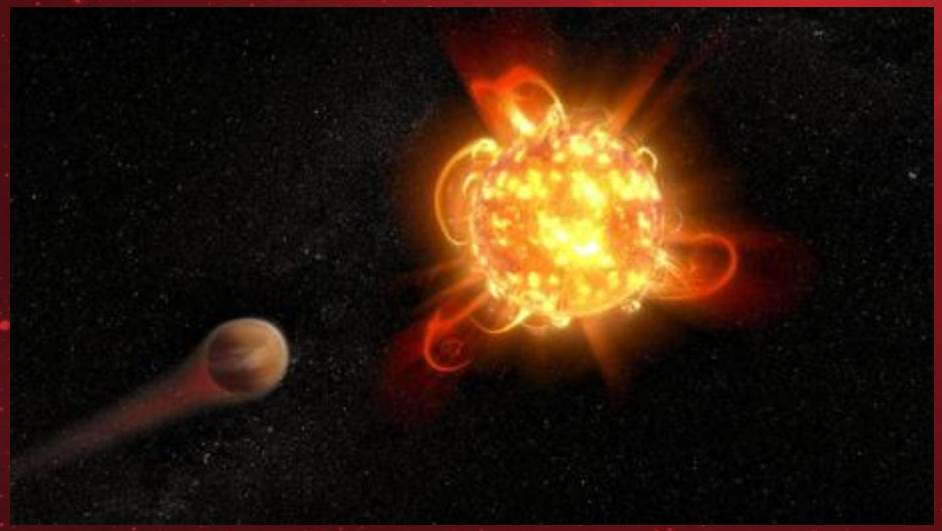
# Planets everywhere! 100 billion potential planets in our Galaxy



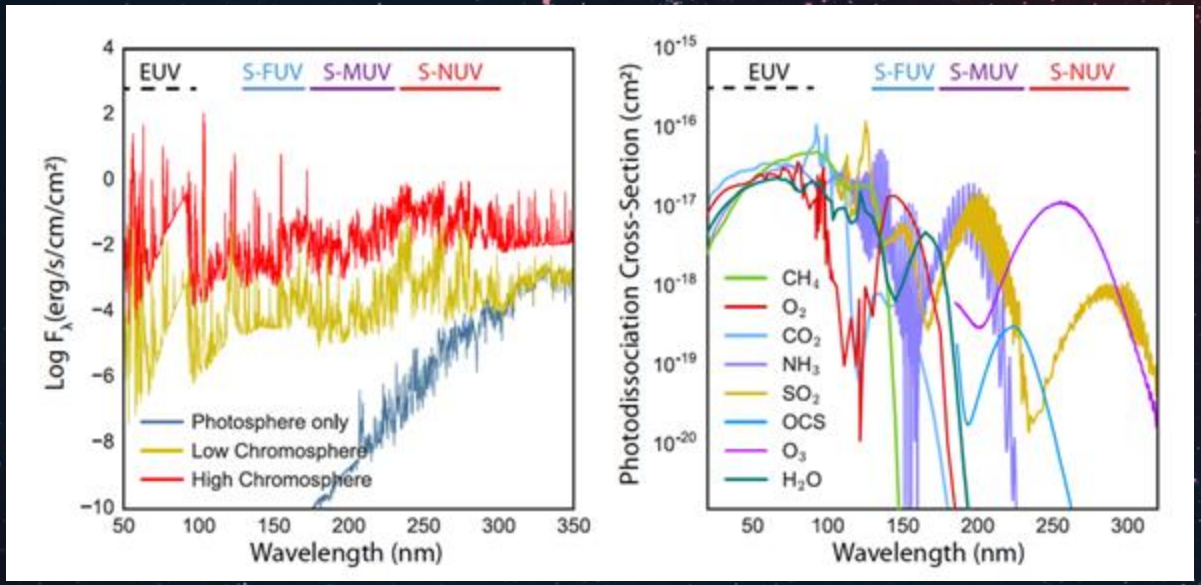


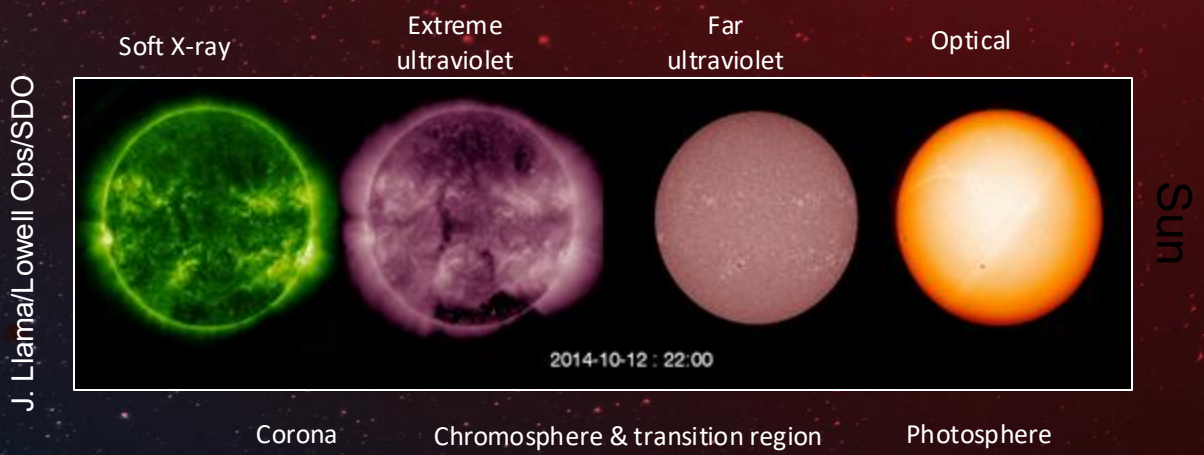
# SPARCS goal: Study stellar variability in the ultraviolet



HST observations of 200x UV superflare in M dwarf (Artist conception, Loyd et al. 2019)



# Star-Planet Activity Research Cubesat

## OVERVIEW

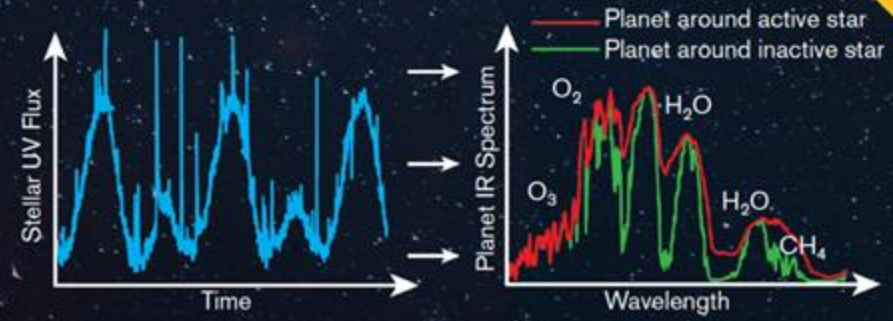
**Mission** SPARCS will be the first ever mission dedicated to monitoring the high-energy radiation environments of exoplanets throughout their lifetimes by continuously and simultaneously measuring the FUV and NUV emission of low-mass stars from young to old.

**Technology** SPARCS will advance UV detector technology by flying state of the art '2D-doped' detectors and metal dielectric filters.

**Education** SPARCS is training the next generation of scientists and engineers in mission development, operations, and data analysis.

## DELIVERABLE SCIENCE

**SPARCS** will determine the high-energy radiation environment around the most common types of exo-planet hosts. By measuring month-long light curves in two UV bands, SPARCS will map stellar activity due to flares and stellar rotation. These data are crucial to understand the evolution and habitability of planets and for interpreting their spectra and atmospheres.




## KEY SPECIFICATIONS

**Spacecraft:** 6U CubeSat, 9 cm telescope

**Orbit:** Sun synchronous terminator for continuous power, cooling, and uninterrupted observations

**Bands:** FUV [153 - 171 nm] and NUV [258 - 308 nm]

**FOV:** 0.7°

**Photometric Requirements:** 1% to 10% per observation

**Pointing:** Stable to <6"

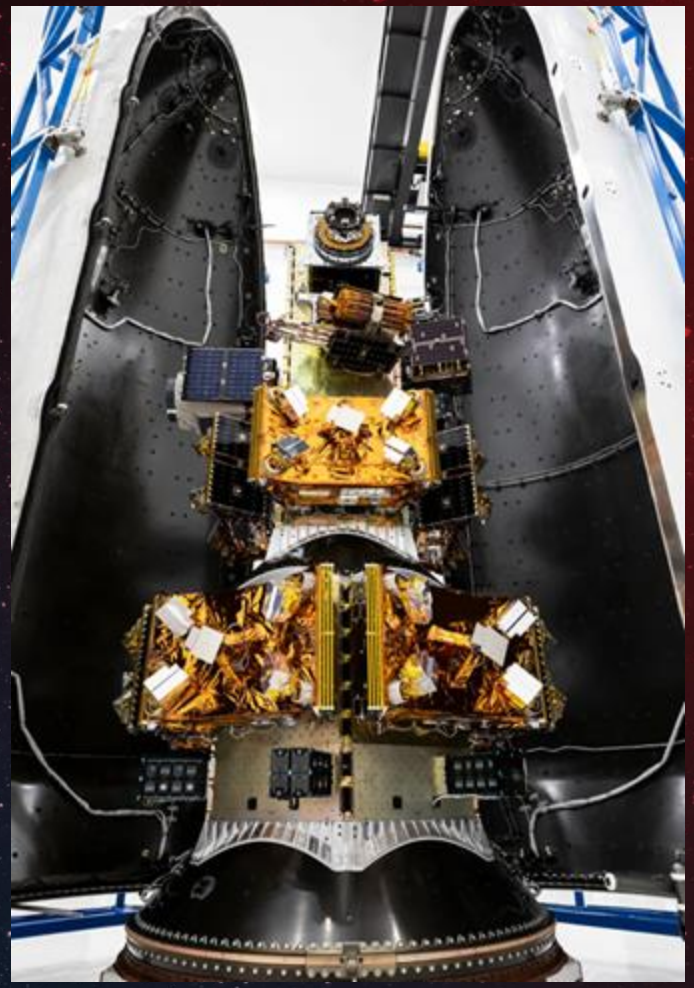
**Cadence:** 0.1 - 60 min observations
5 - 45 days per M star

ASU · Arizona · W · SwRI · NASA · JPL · Lowell

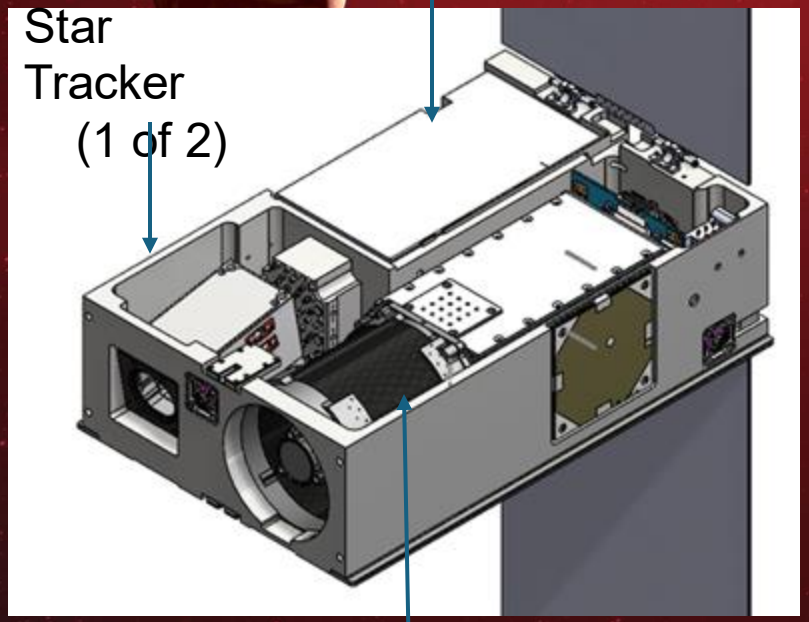
# Launch!



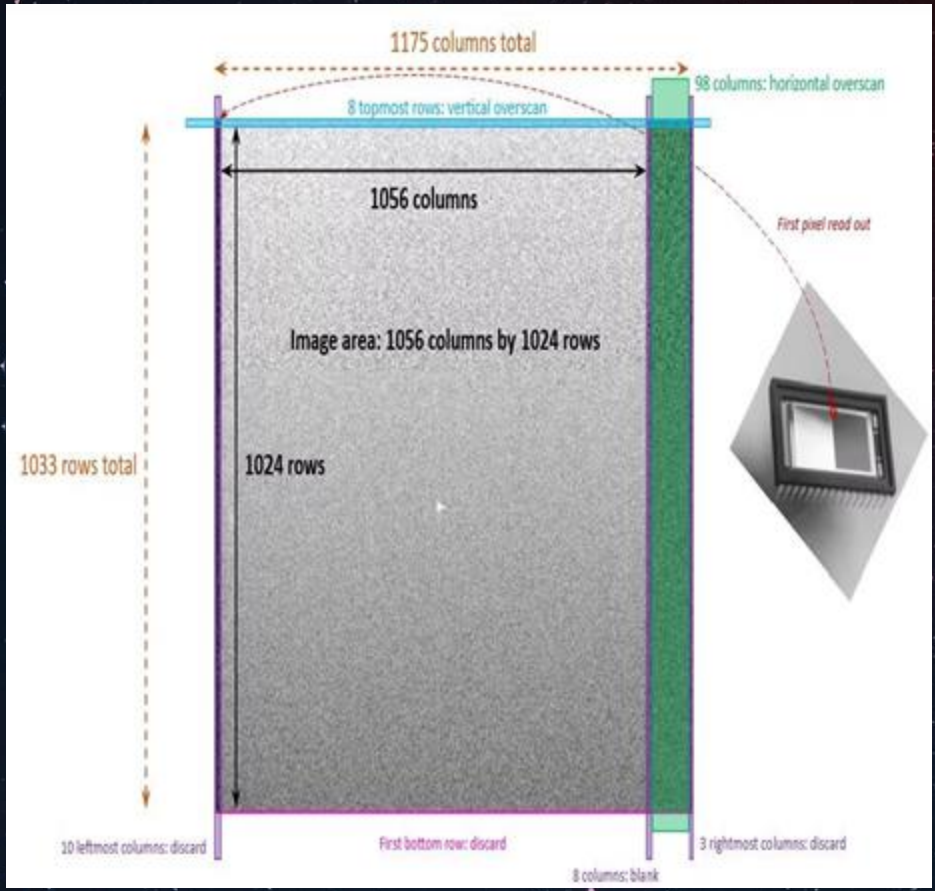
Jan 11 2026
Vandenberg Space Force Base

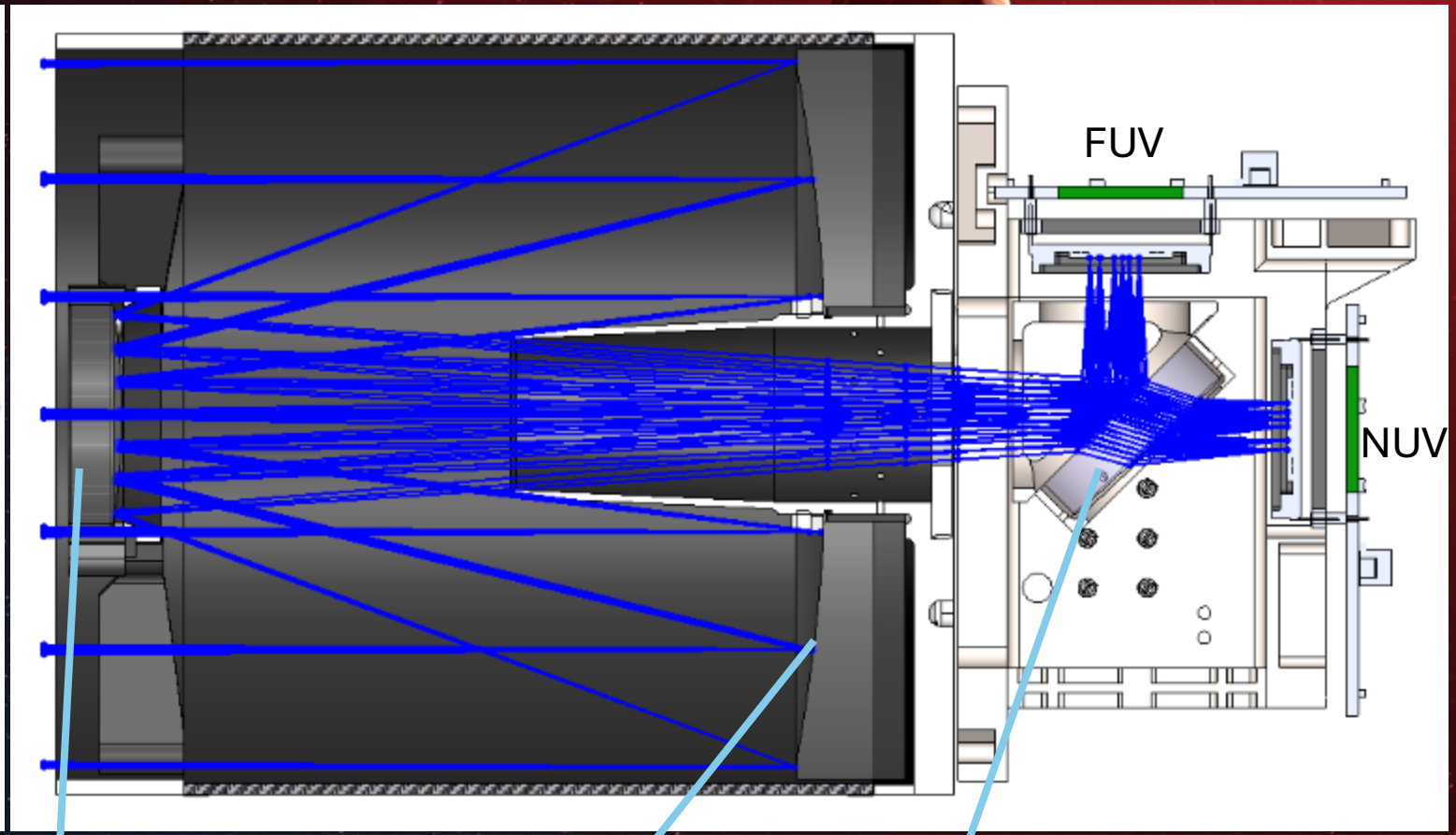


40+ satellites launched with SPARCS
Only 3 NASA, or NASA-funded satellites

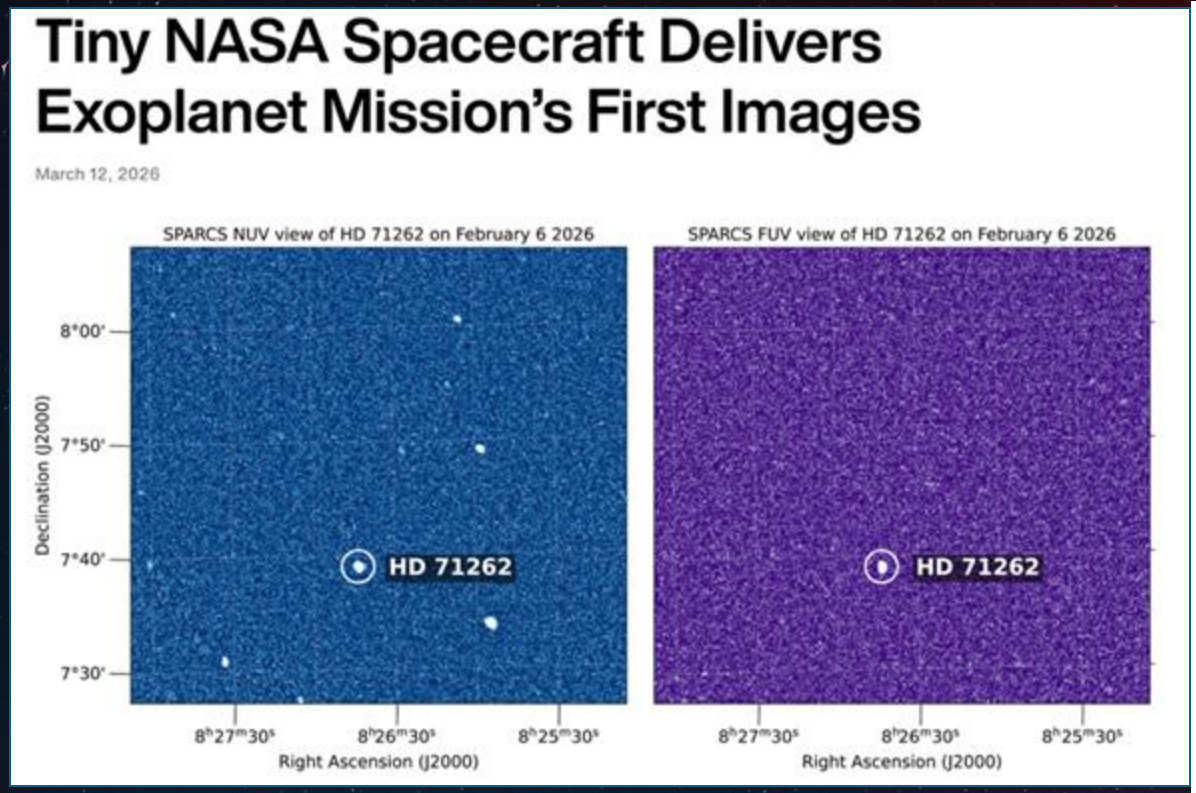


# Detector geography

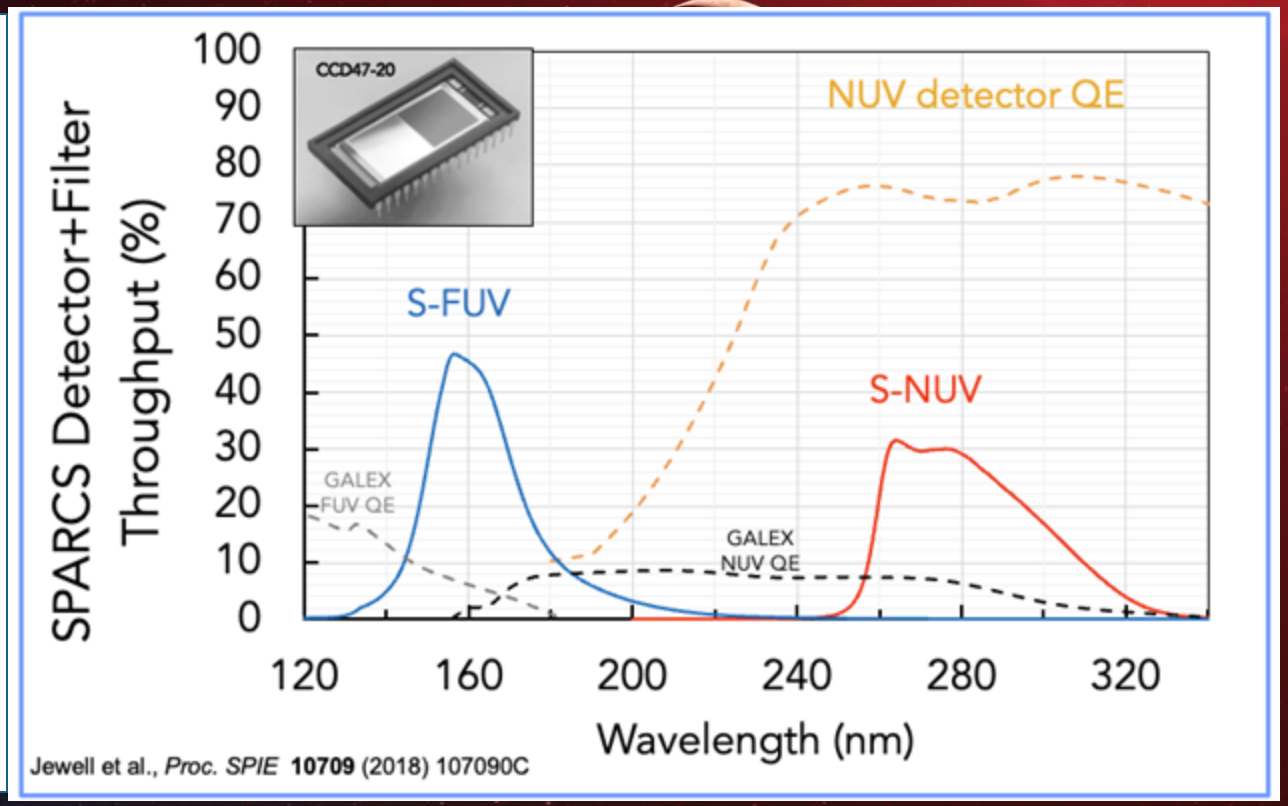


# First light!

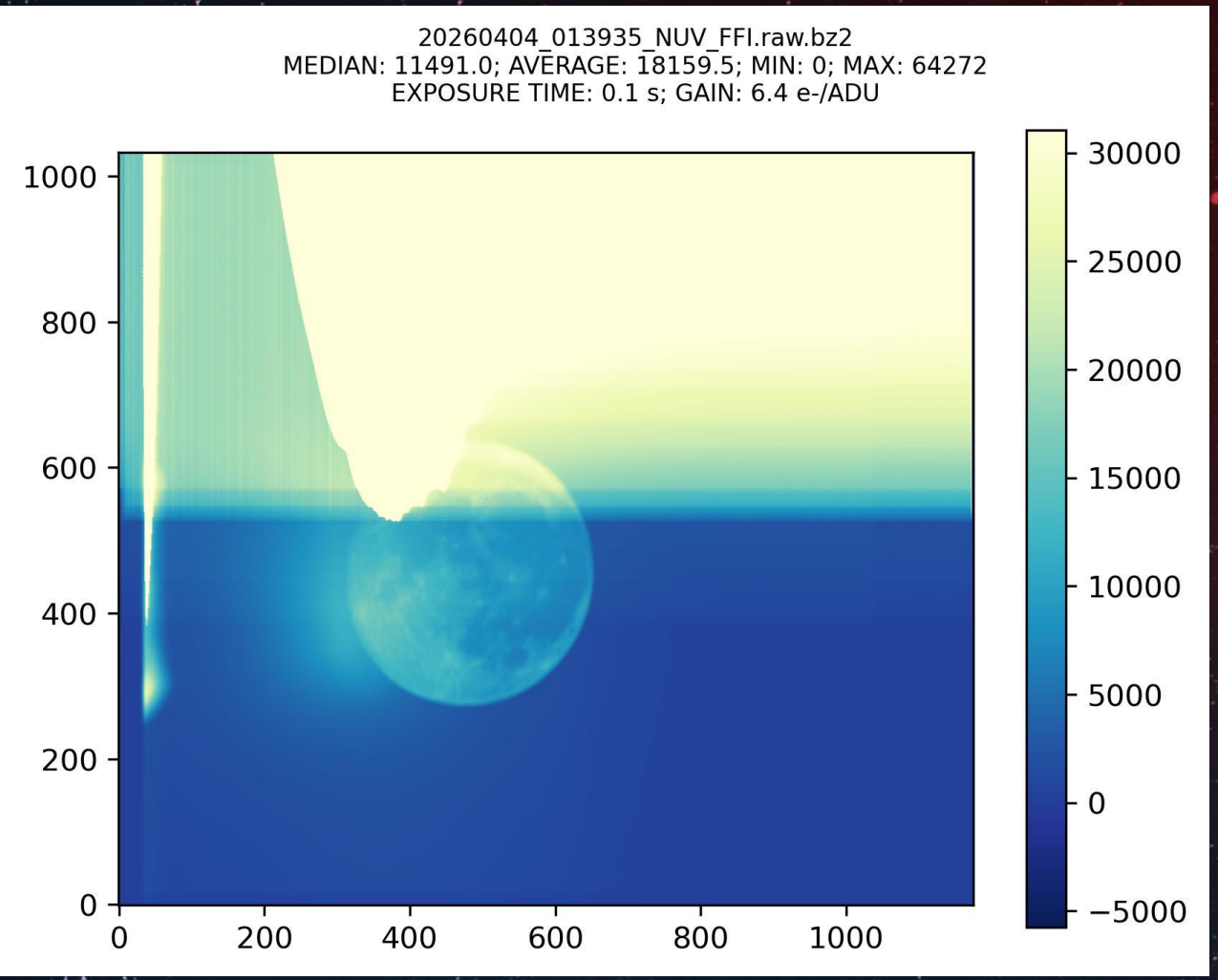


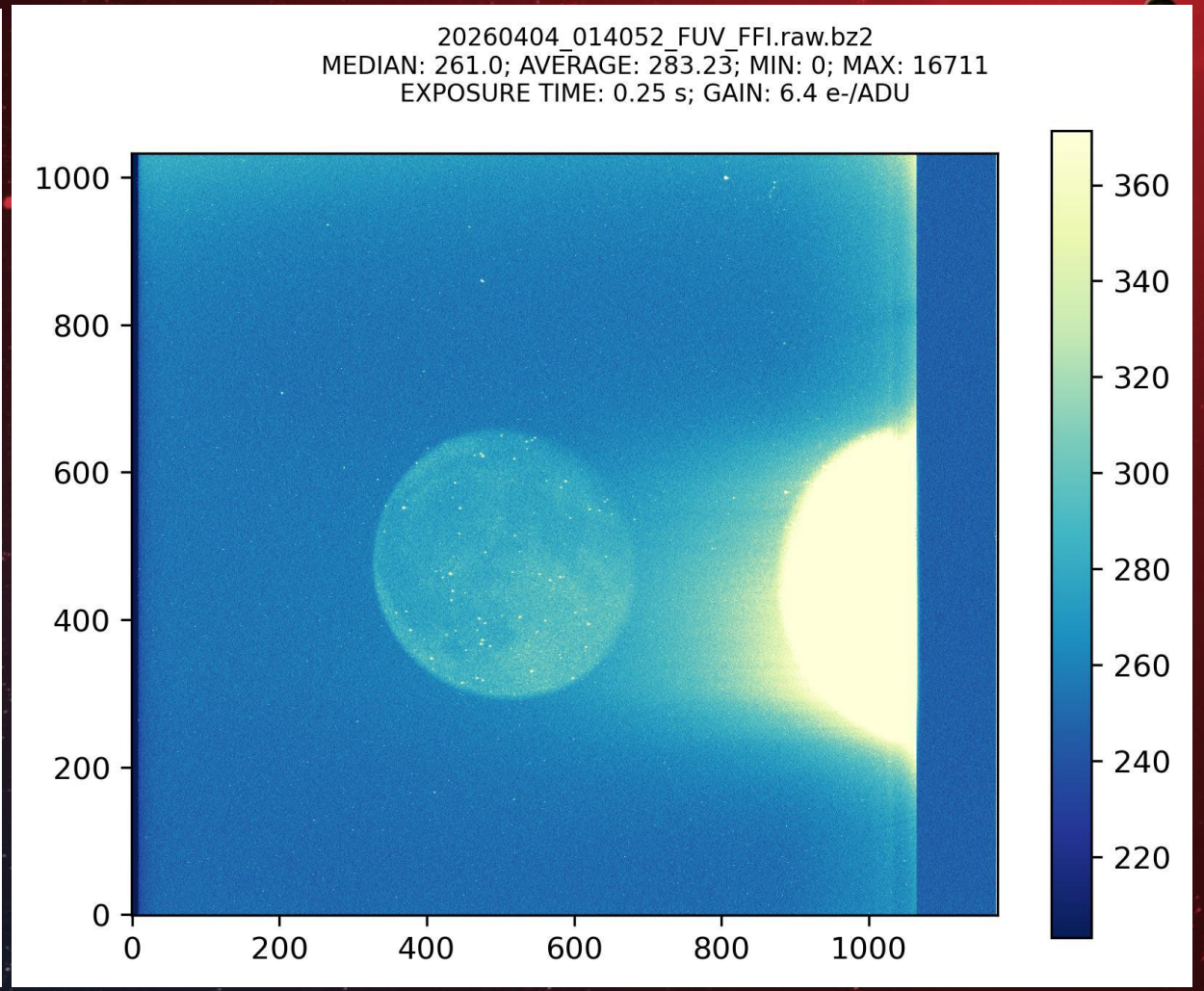

First light image



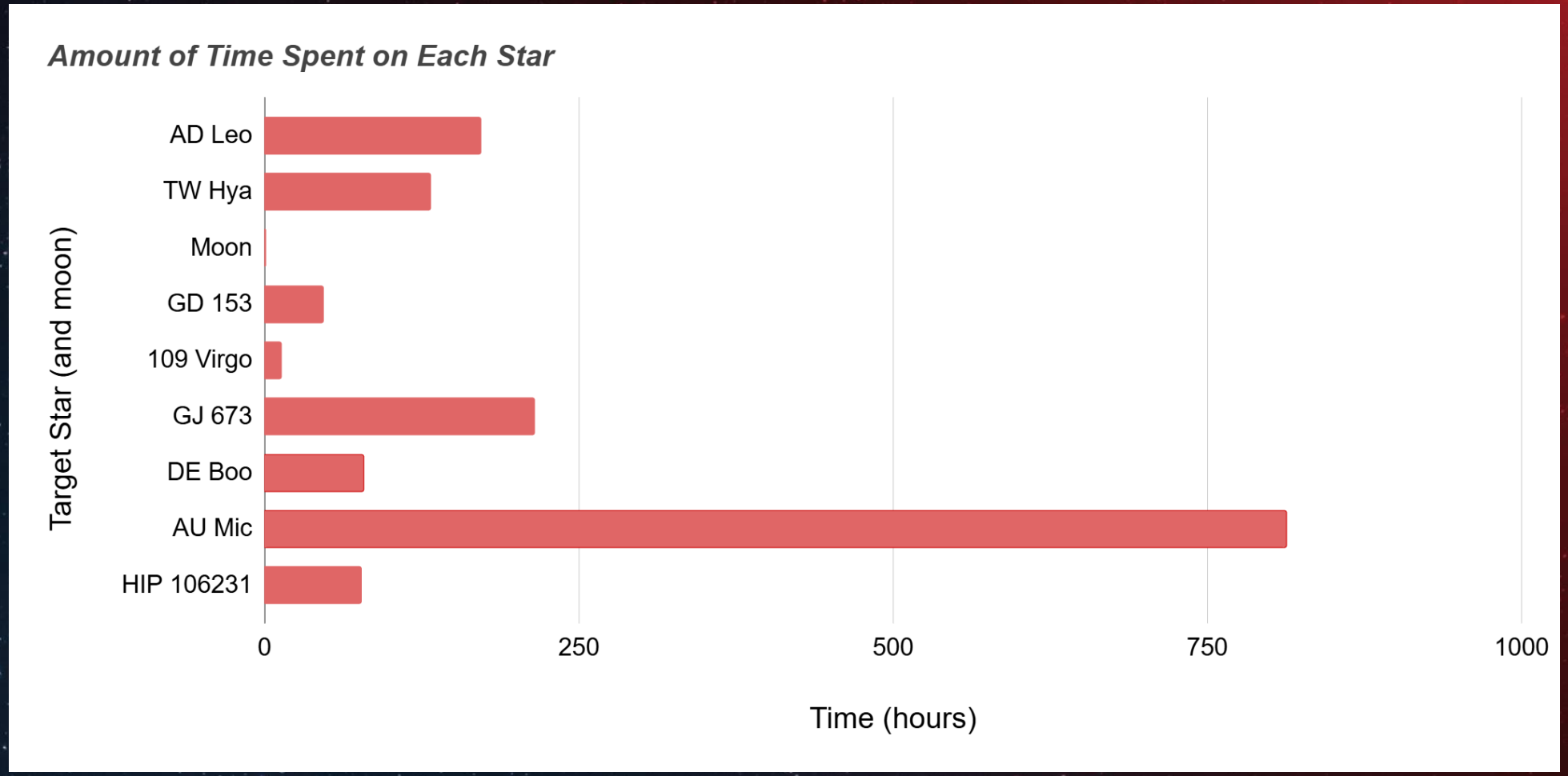

SPARCS Technology: Ordinary silicon detectors are "Delta-doped" to give them UV response.

# NUV and FUV of the Moon



# SPARCS Archive, so far…



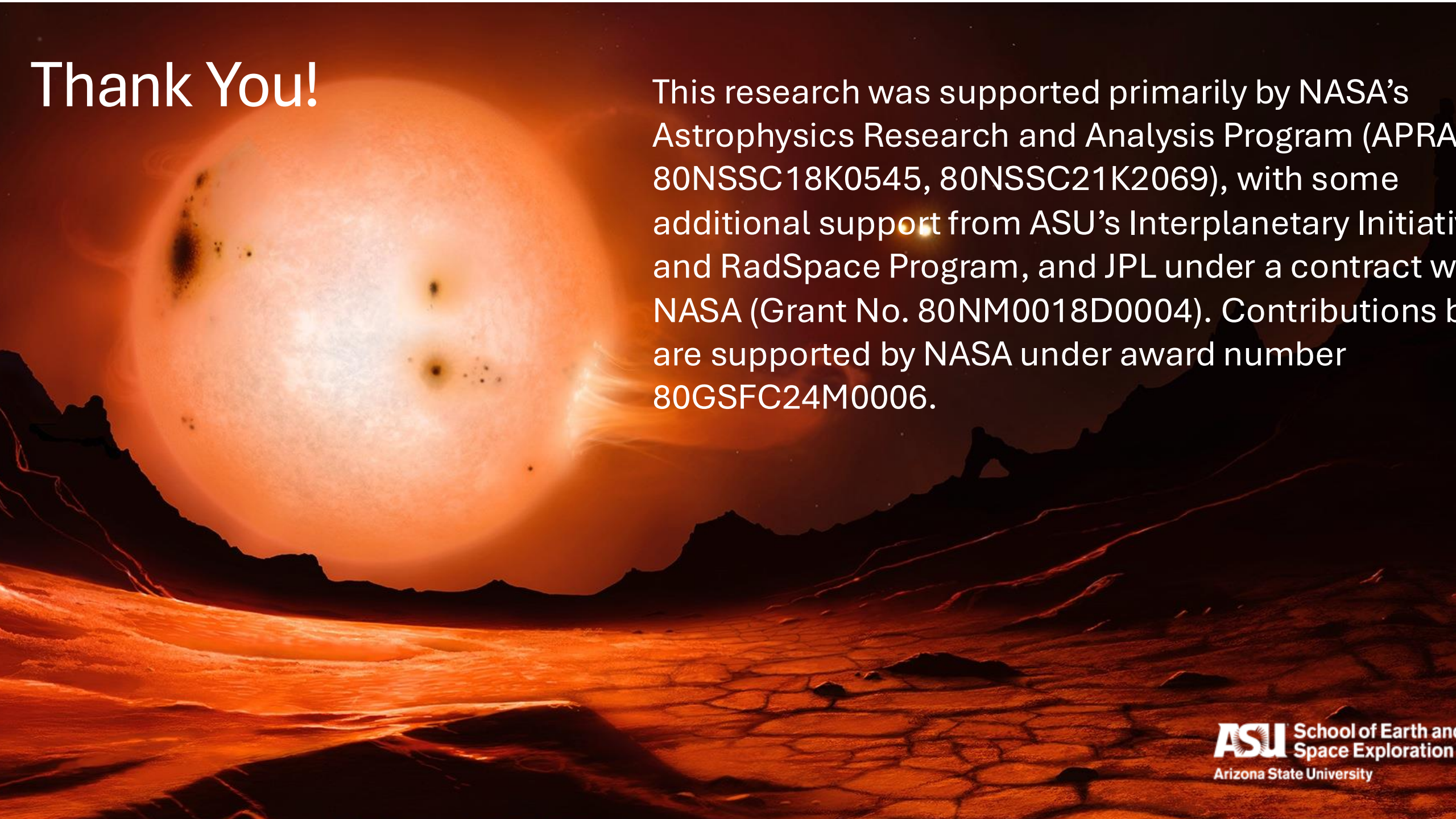

Data reduction pipeline under development – Data will be available in MAST soon.

# Technology Development Implications

- On orbit tech demo for future Astrophysics missions
- Adress challenges
  - Out-of-band light
  - Optical reflections
  - Read noise
  - Thermal Control
  - Observe detector degradation
- SPARCS technology directly supports concepts for NASA APRA, Pioneers, PRISM, the Habitable World Observatory

# Thank You!

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