



**STScI** | SPACE TELESCOPE  
SCIENCE INSTITUTE

EXPANDING THE FRONTIERS OF SPACE ASTRONOMY

# JWST Science User's Committee

---

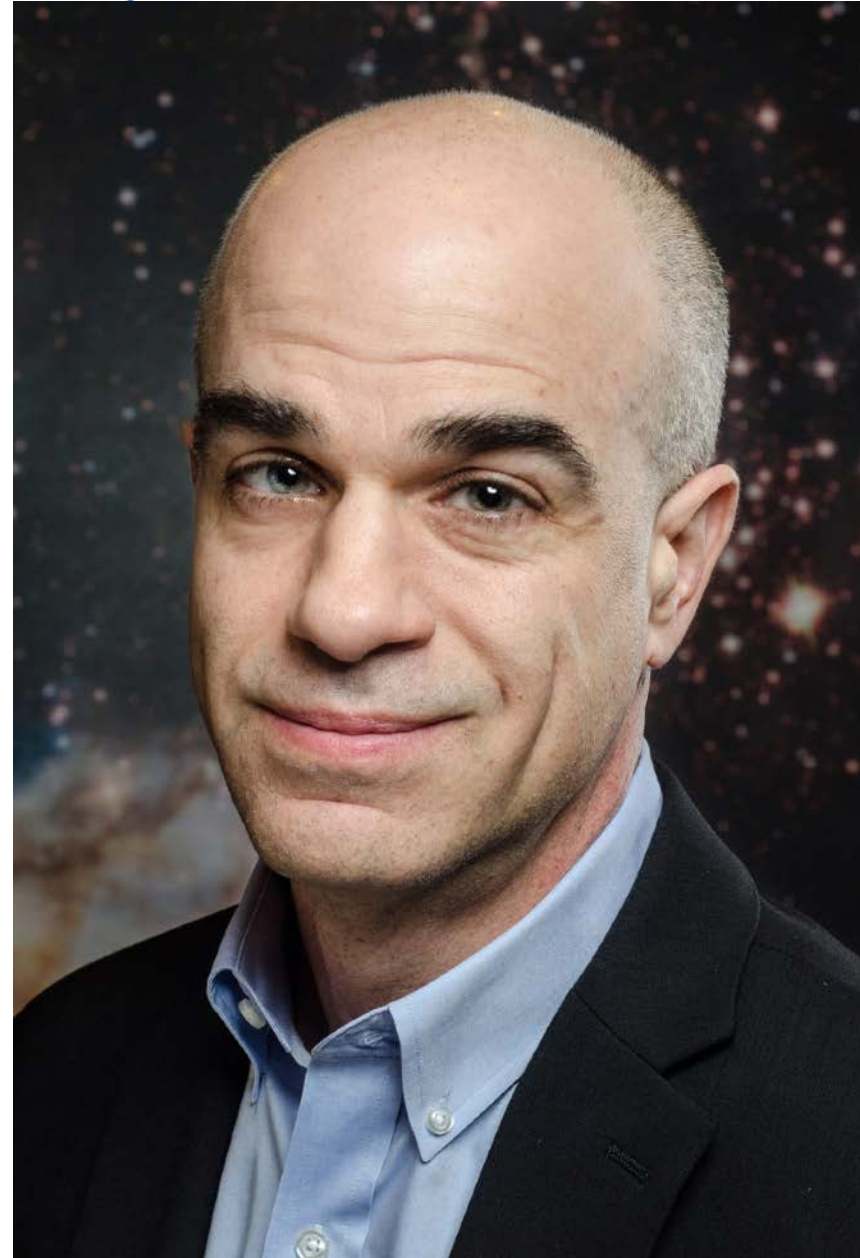
Jennifer Lotz, Director

November 11, 2024

# Leadership Updates



# STScI Leadership Updates



Tom Brown

JWST Mission Head



Mercedes López-Morales

Associate Director  
for Science



Neill Reid

Multi-Mission  
Project Scientist



Julia Roman-Duval

Interim HST Mission Head

*on-going internal search for STScI Science Policies Division head*



## thank you Eric Smith!

---

NASA Associate Director for Research, SMD

retiring after 34 years of service

— JWST Program Scientist since 2001

— JWST Program Director, JWST Deputy Project Scientist

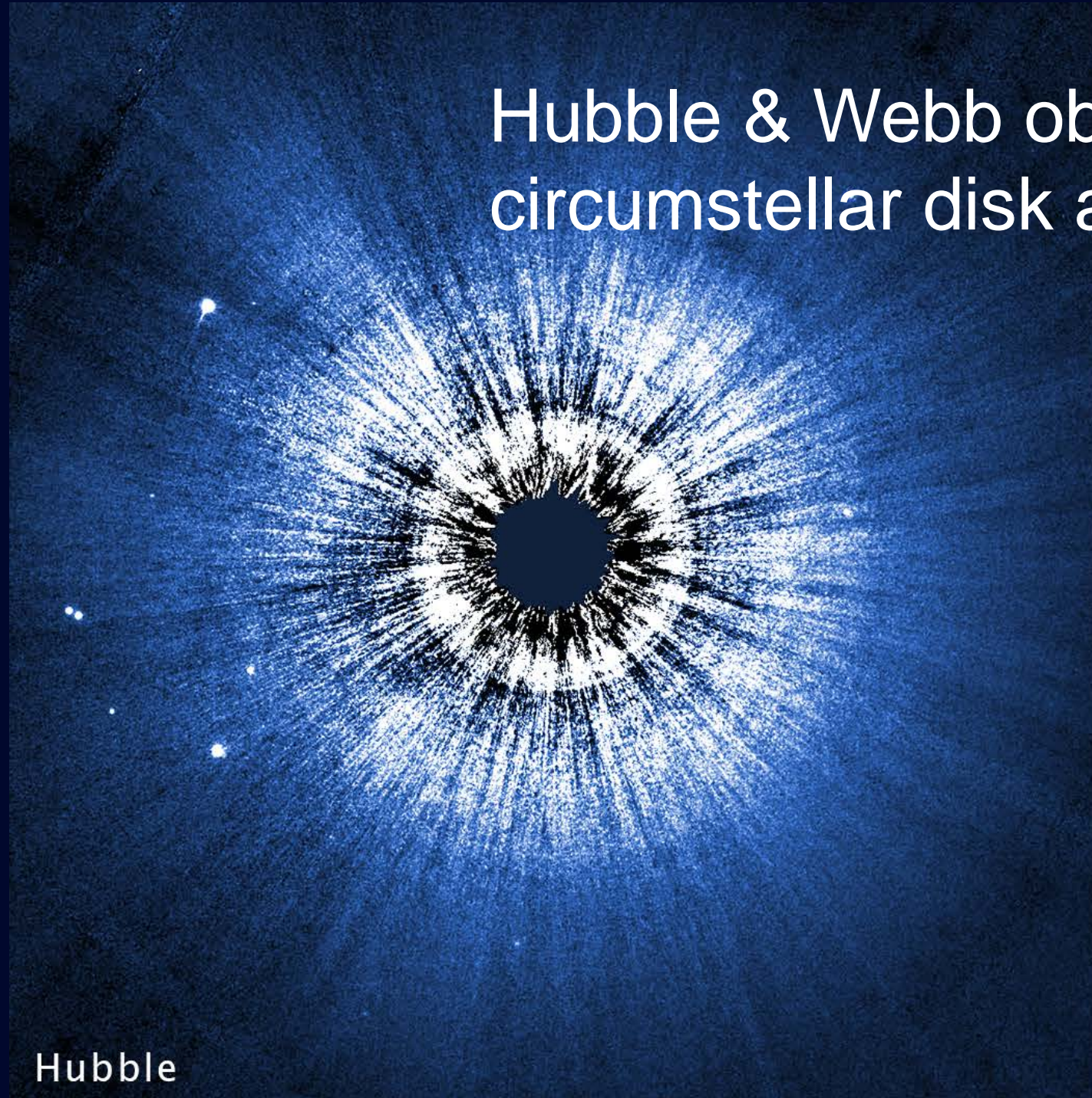
— Hubble Program Scientist

As JWST Program Scientist, Eric was responsible for the definition and safeguarding of the "Level 1" science requirements for Webb.



# STScI Mission Updates

Hubble & Webb observe smooth circumstellar disk around Vega



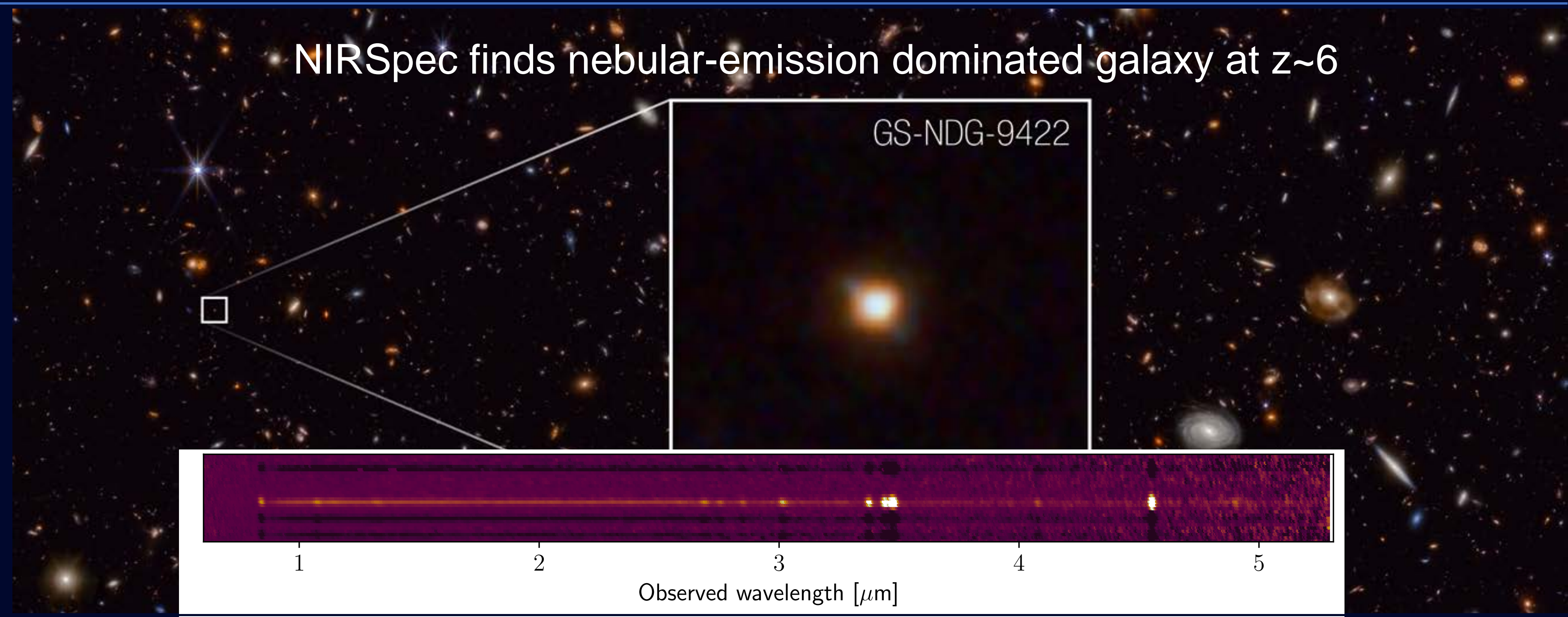
Hubble

NIRCam & MIRI probe jets and active star-formation in extreme outer galaxy molecular clouds



**JWST Science continues to grow in impact and breath**

NIRSpec finds nebular-emission dominated galaxy at  $z \sim 6$



GS-NDG-9422

Observed wavelength [ $\mu\text{m}$ ]



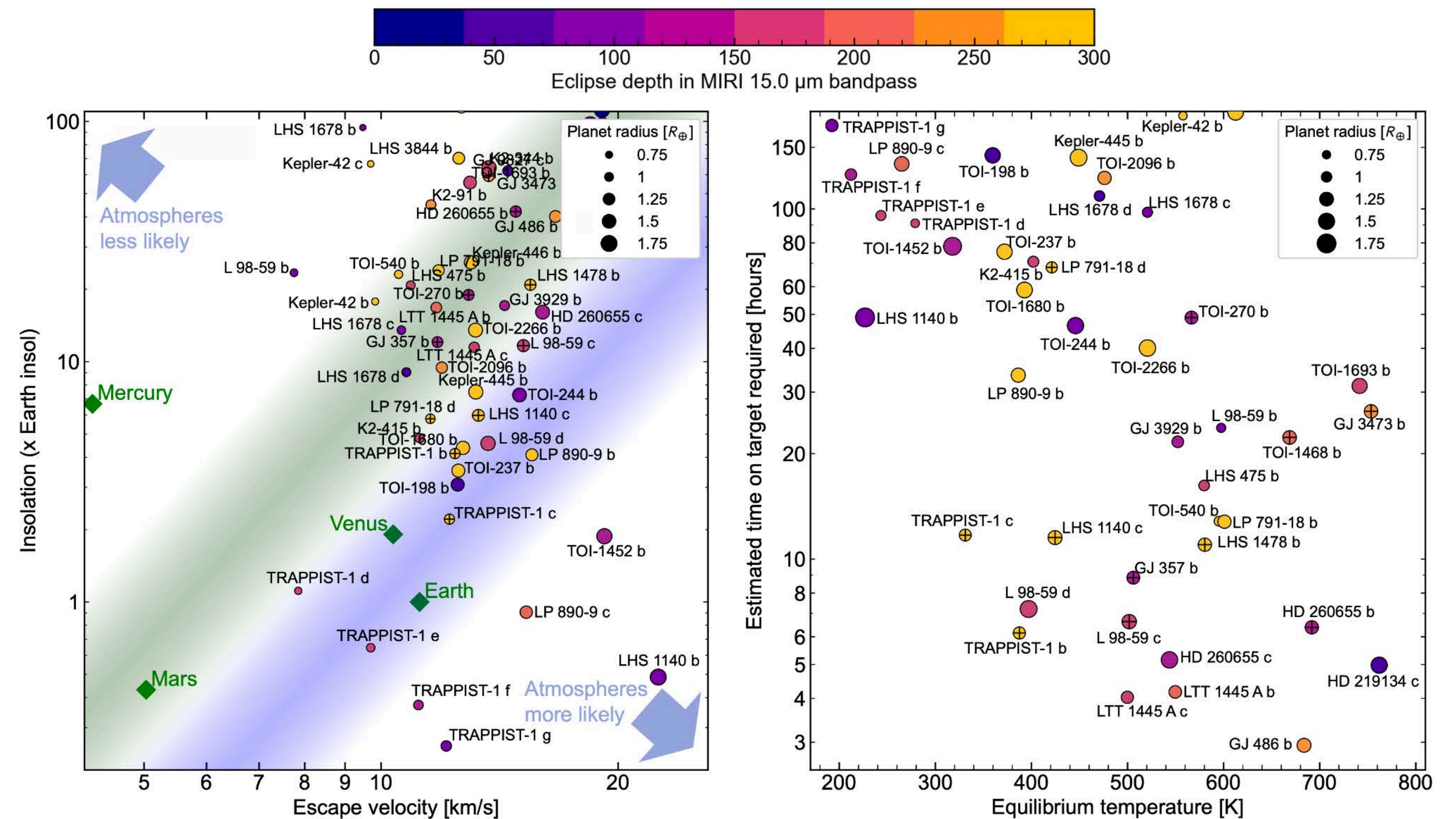
# STScI Director's Discretionary Time Strategic Exoplanet Initiative

Survey of 15-20 rocky M-dwarf exoplanets to detect atmospheres down to habitable zone.

- 500 hours JWST/MIRI observations to probe atmospheres
- 250 orbits of HST COS/STIS UV to characterize the activity of the host stars
- Top recommendation of Strategic Exoplanet Initiatives WG (chair Seth Redfield)

STScI leads: Nestor Espinoza  
Hannah Diamond-Lowe

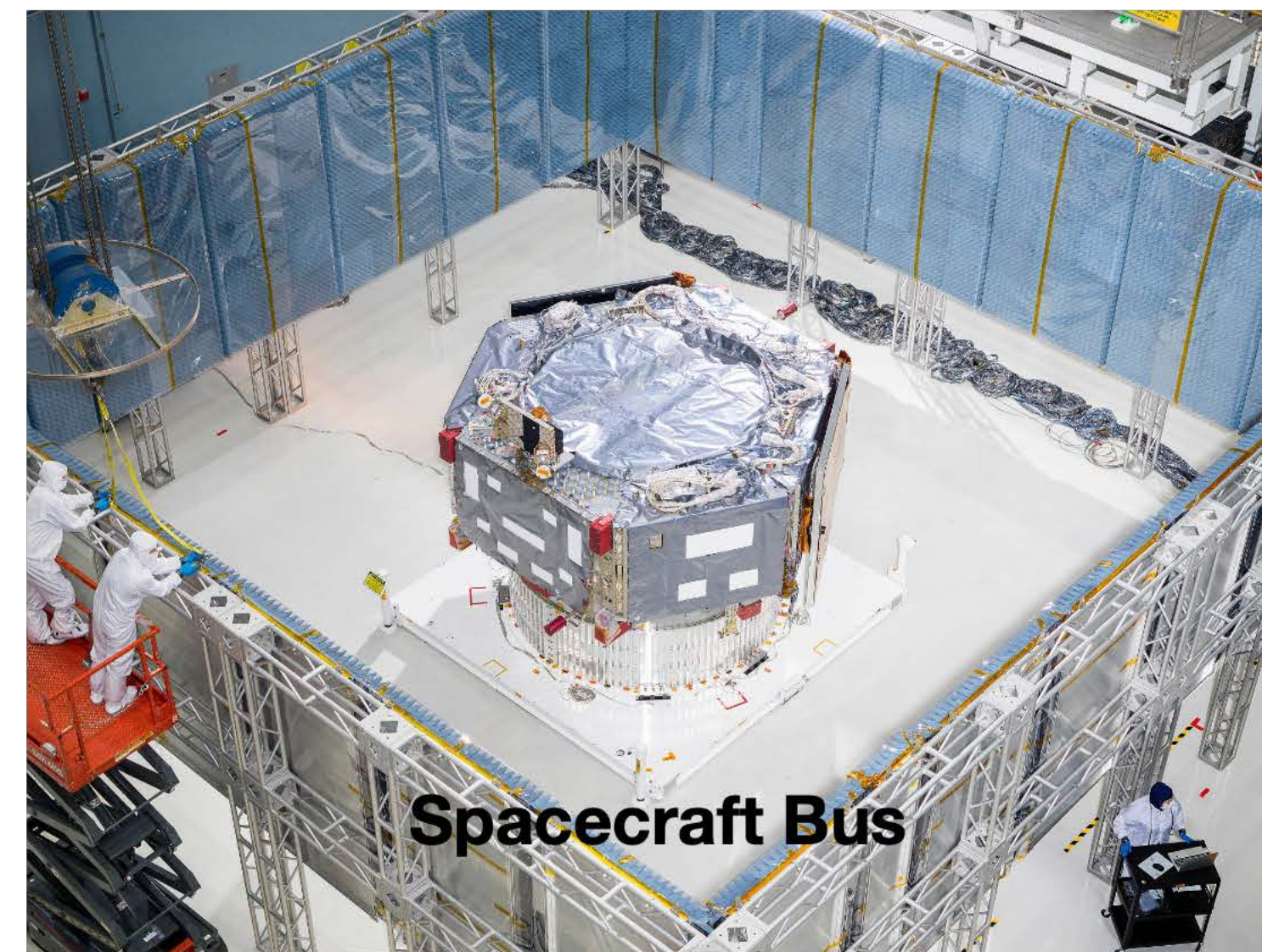
First 2 targets were announced before Cycle 4 proposal deadline.



*JWST MIRI secondary eclipse detections of exoplanet atmospheres, combined with HST UV observations of host star radiation fields will measure the “cosmic shoreline” for M-dwarf exoplanets with a variety of properties.*



# Nancy Grace Roman telescope on track for late 2026 launch



**the telescope has arrived at GSFC!**

# MIRRORS



HUBBLE

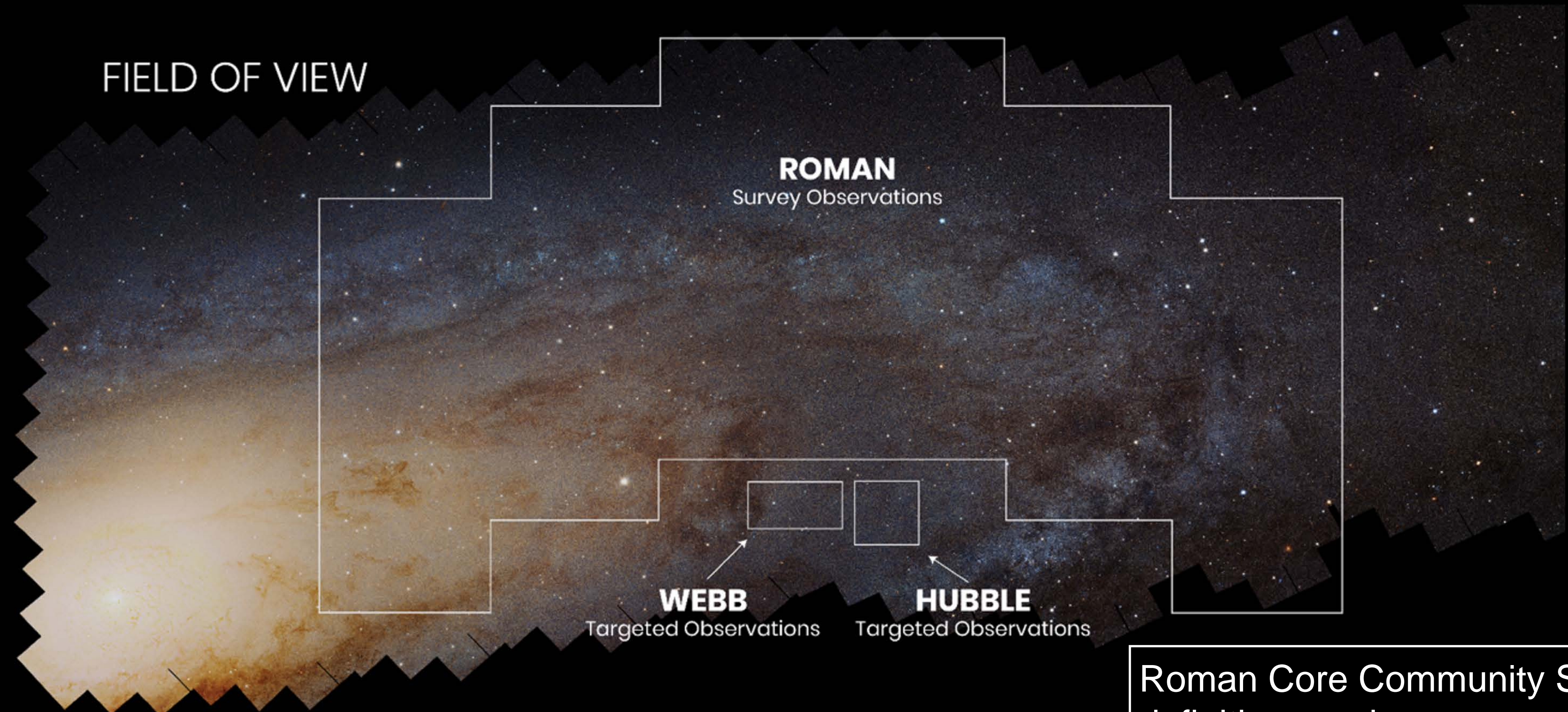


ROMAN

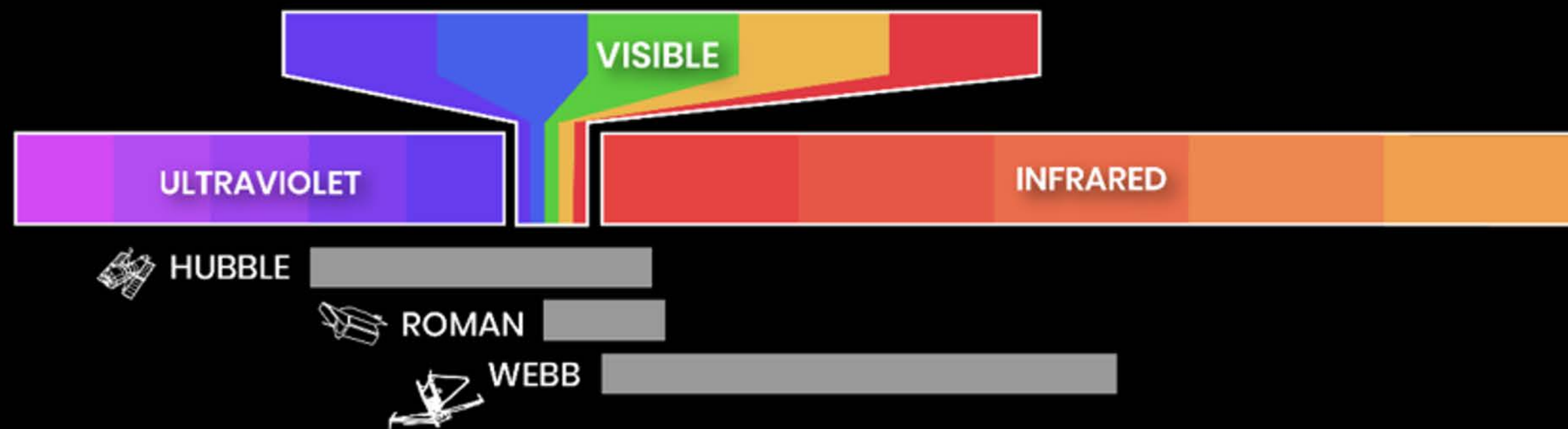


WEBB

# FIELD OF VIEW



# WAVELENGTH



Roman Core Community Survey definitions underway now

1st Call for Proposals - Fall 2025

STScI will be Roman Science Operations Center and host data archive/science platform.

GSFC/STScI/IPAC/JPL



# Hubble remains a scientific powerhouse despite flat budgets

---

**Hubble has been doing more science with fewer resources for over a decade**

29% increase in publications, 27% increase in GO publications over past 10 years

& flat/shrinking budgets = effective 28% decrease in spending power

**Hubble science operations, grants likely to be impacted by NASA Science budget pressures.**

- Cycle 32 will continue full instrument suite, grants \$15M with formula
- We are planning for potentially limited ACS/WFC & WFC3/IR support in Cycle 33
- HST Bridge Program received >60 proposals for science only possible with ACS/WFC, WFC3/IR or cross-calibration programs for ACS/WFC, WFC3/IR with other instruments (including JWST)

If new HST WFC3/IR programs are not supported beyond Cycle 33, PIs will be encouraged to apply for JWST.



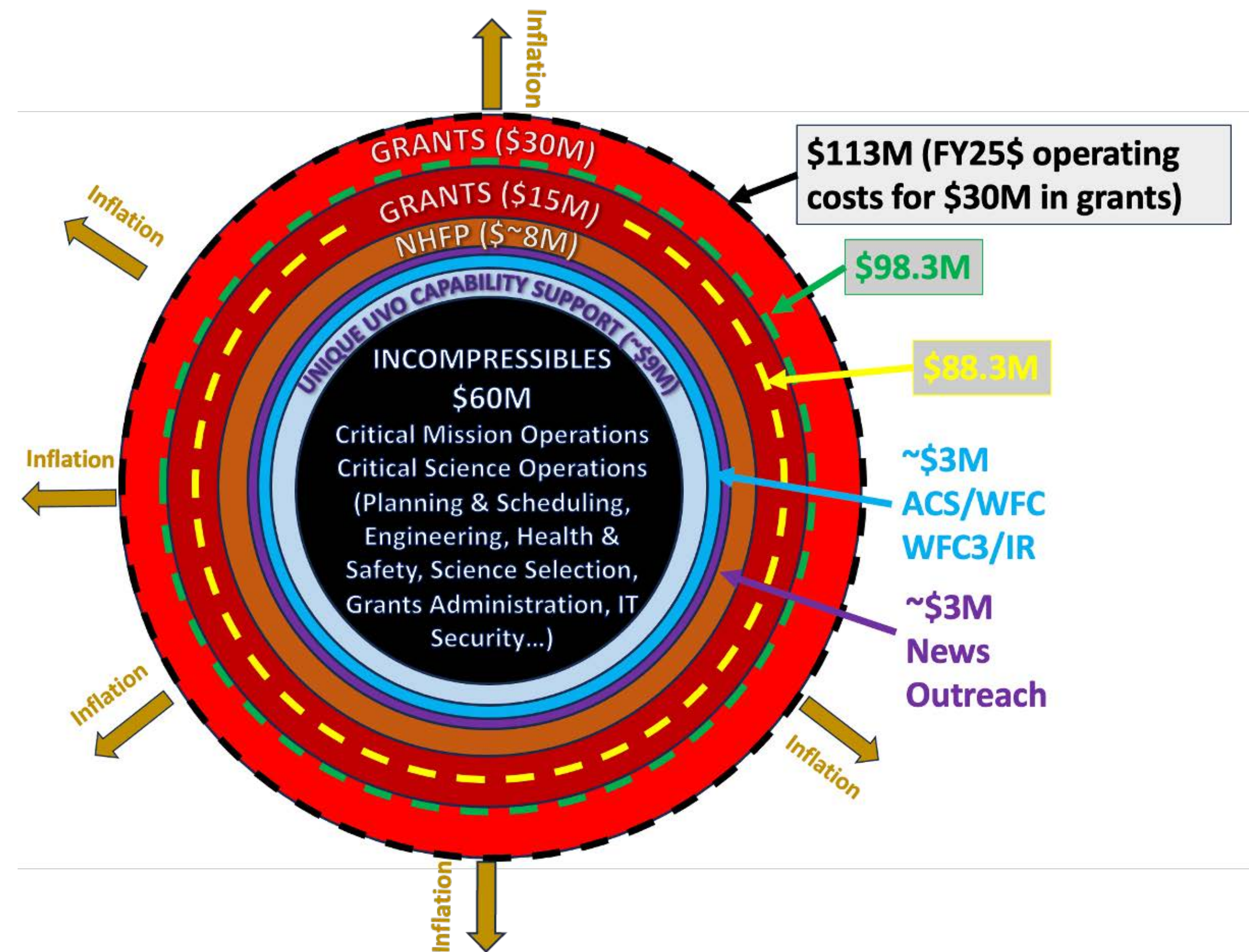
# Hubble Budget and Operations Scenarios

As a result of NASA Science budget pressures, HST's Senior Review budget guidance for FY26-28 are >20% less than mission cost. Future HST funding depends on outcome of NASA Senior Review planned for early 2025, and Congressional appropriations .

**Flat \$88M**  
Stop Science Ops for ACS/WFC and WFC3/IR  
\$10M in grants

**Flat \$93.3M (FY23-25 funding level)**  
Stop Science Ops for ACS/WFC and WFC3/IR  
\$15M in grants  
— OR —  
Support all capabilities  
\$12M in grants in FY26, \$15M in FY27-28

**Flat \$98.3M**  
Support all capabilities  
\$15M in grants



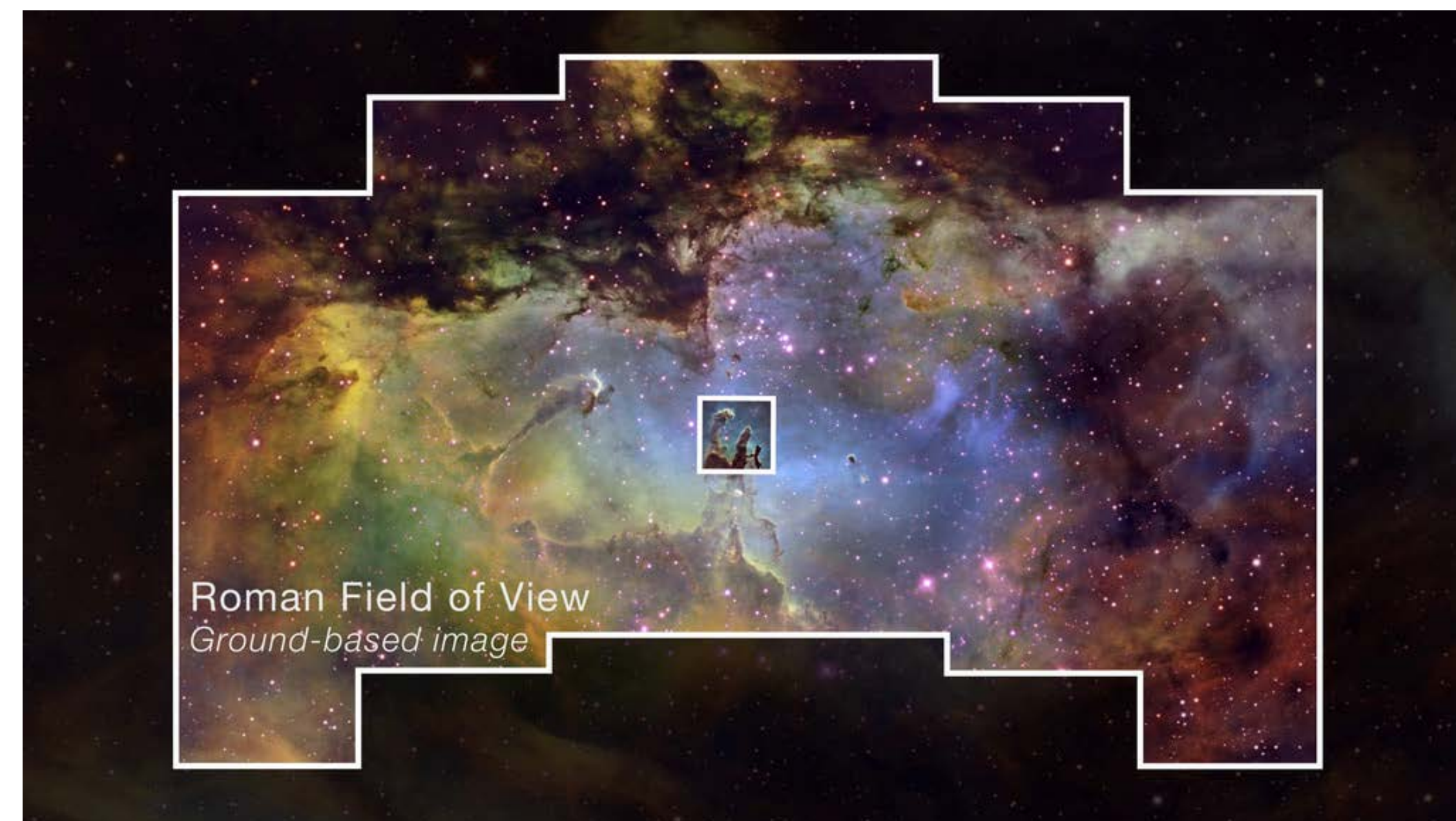
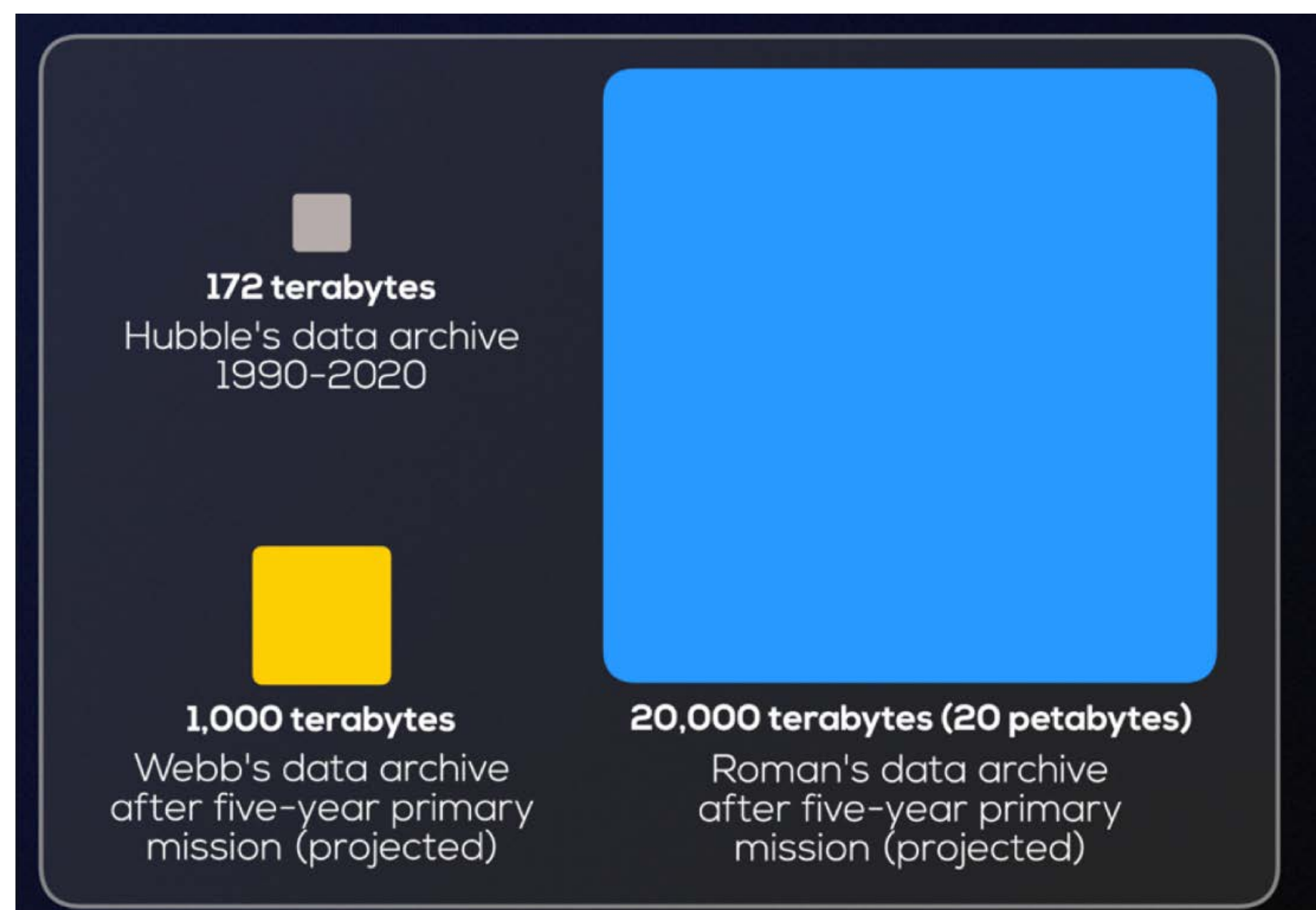
Looking ahead



# Roman surveys will impact JWST science

“Planets by the thousands, galaxies by the millions, stars by the billions”

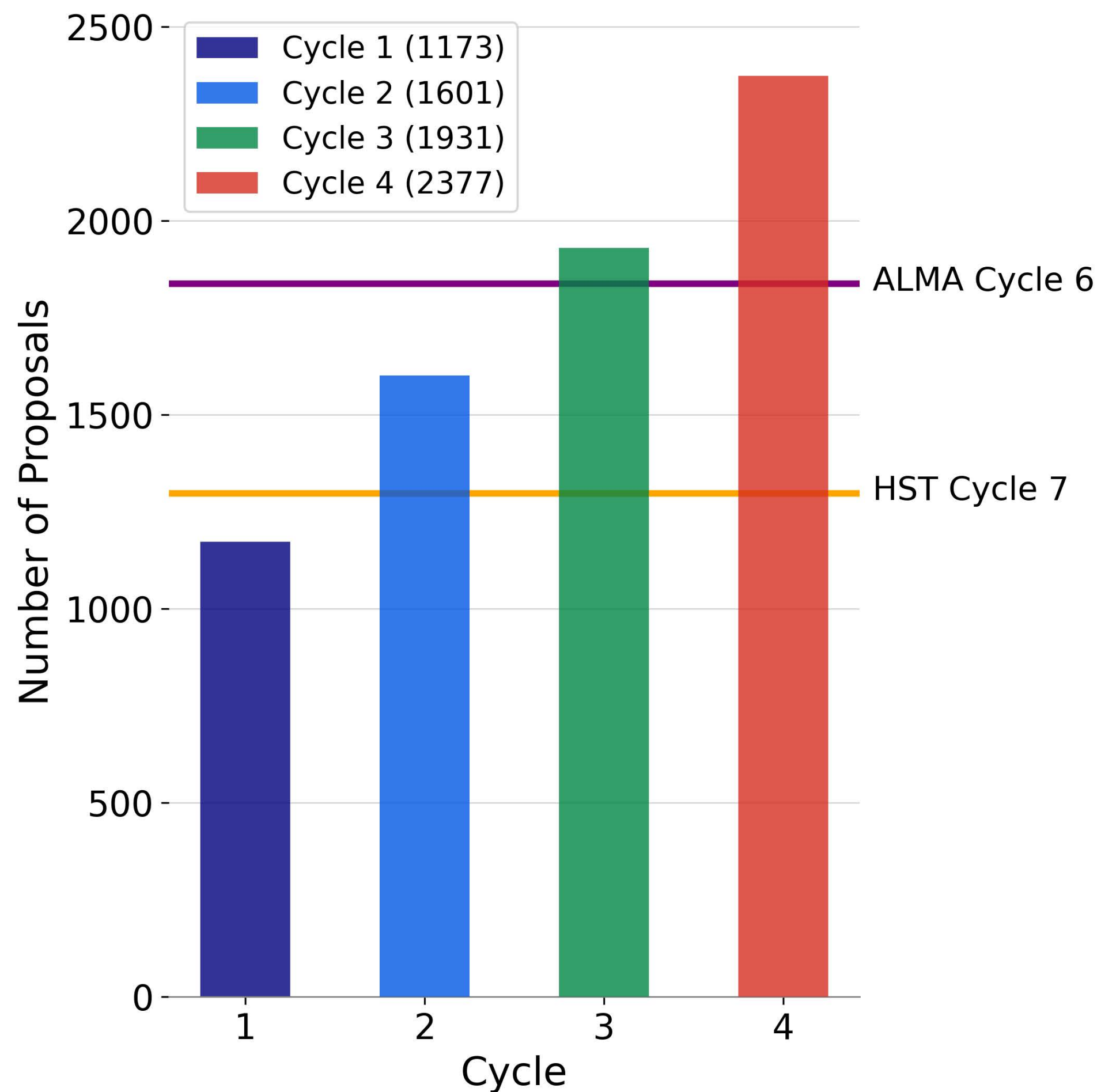
→ many potential follow-up targets, including ToOs



Roman's cloud-based data pipeline and science platform will be a major shift for space-based optical/NIR astronomy.



# We are not even close to hitting peak JWST demand or science



JWST Scientific discovery cycle will accelerate, as initial discoveries are understood and new questions arise and Roman/EUCLID/Rubin follow-up programs start.


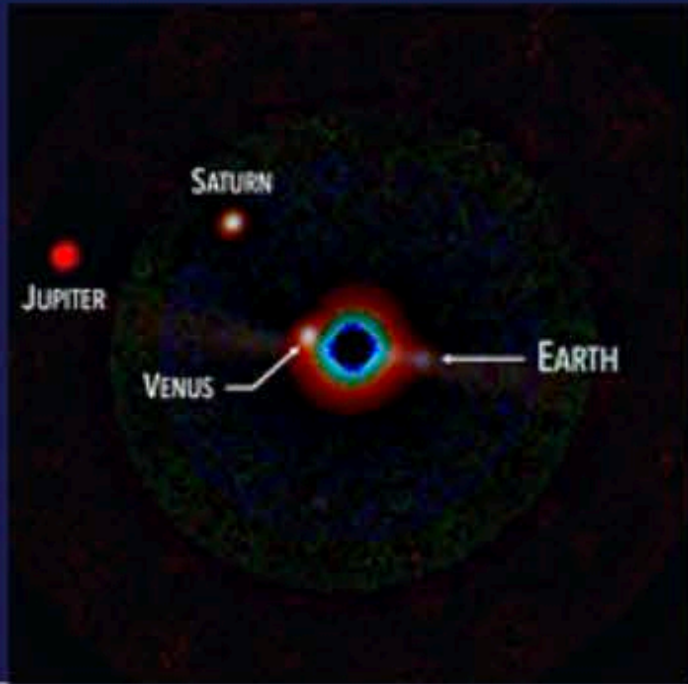


The number of JWST proposals likely to continue to grow for several more years, especially if HST NIR capabilities and funding declines.

\$60M/yr for grants and >8500 hours per cycle means fewer grant \$\$ per program going forward.

→ need to continue strong support for JWST community via grants, user support, tools, and pipelines for the foreseeable future

*End of “prime mission”, inflation, and NASA Science budget pressures mean JWST support at risk*

# Science in 2041: JWST + “super Hubble” HWO

| Telescope   |                     | Coronagraph*  |                              | High-Resolution Imager  |              | UV Multi-Object Spectrograph  |              |
|---|---------------------|---|------------------------------|---|--------------|---|--------------|
| Diameter  | 6+ meters           | High-contrast imaging and imaging spectroscopy  |                              | UV/Vis and NIR imaging  |              | UV/Vis multi-object spectroscopy and FUV imaging                                      |              |
| Bandpass  | 100 nm (TBR)-2500nm | Bandpass  | ~350–1800 nm                 | Bandpass  | ~200–2500 nm | Bandpass  | ~100–1000 nm |
| Diffr. Lim. Wavelength, Line of Sight   | .5um, .4mas LOS     | Contrast  | $\lesssim 1 \times 10^{-10}$ | Field-of-View   | ~3' x 2'     | Field-of-View   | ~2' x 2'     |
|  |                     | R ( $\lambda/\Delta\lambda$ )   | Vis: ~140<br>NIR: ~70, 200   | ~67 science filters + grism   |              | Apertures   | ~840 x 420   |
|   |                     |  |                              | High-precision astrometry?  |              | R ( $\lambda/\Delta\lambda$ )   | 500–50,000   |
| Fourth Instrument To be defined   |                     |   |                              |  |              |  |              |

\* High contrast NUV could be fourth instrument (XI)

