STScI | SPACE TELESCOPE SCIENCE INSTITUTE

EXPANDING THE FRONTIERS OF SPACE ASTRONOMY

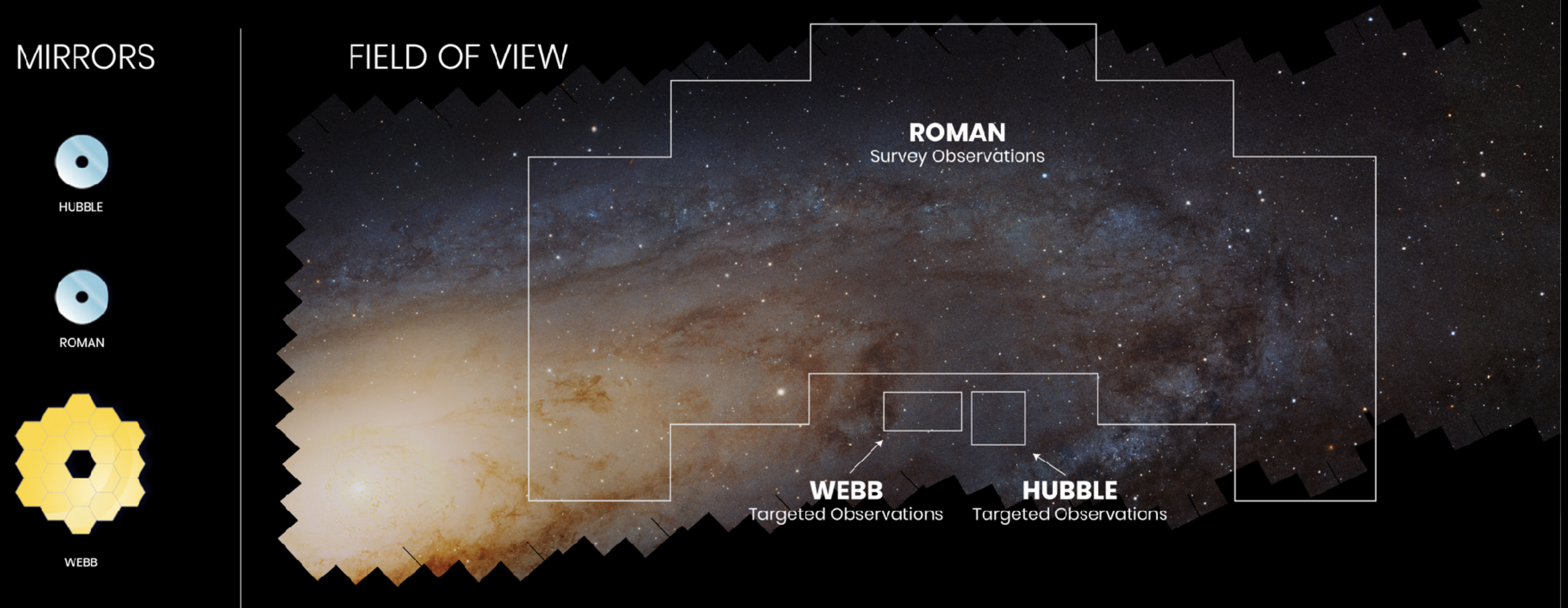
Hundreds of Hubbles in the 2020s

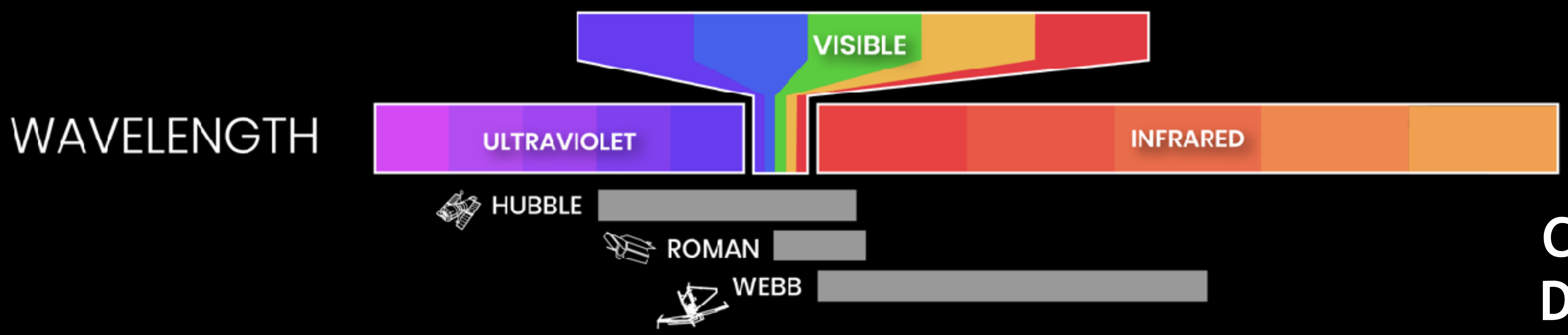
Realizing the scientific potential of the Roman Space Telescope Archive

Karoline Gilbert

Nancy Grace Roman Space Telescope, Mission Scientist

STScI Town Hall, 236th AAS meeting



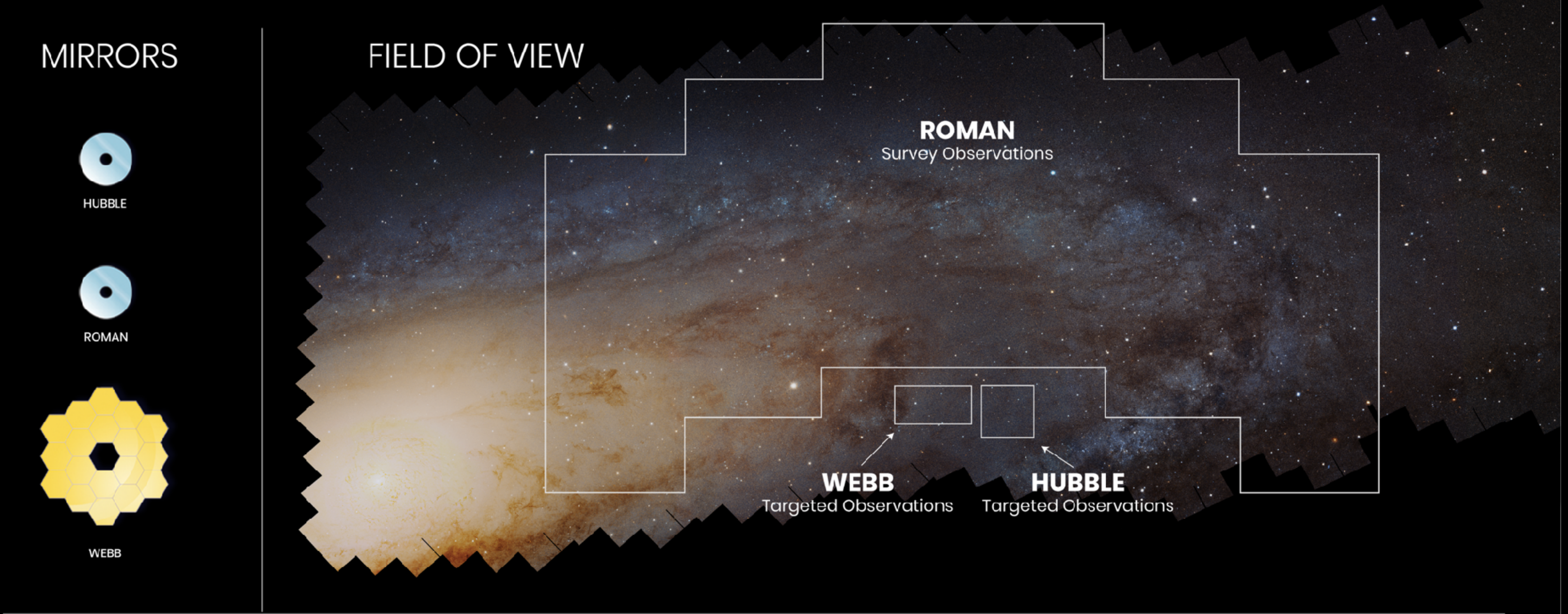


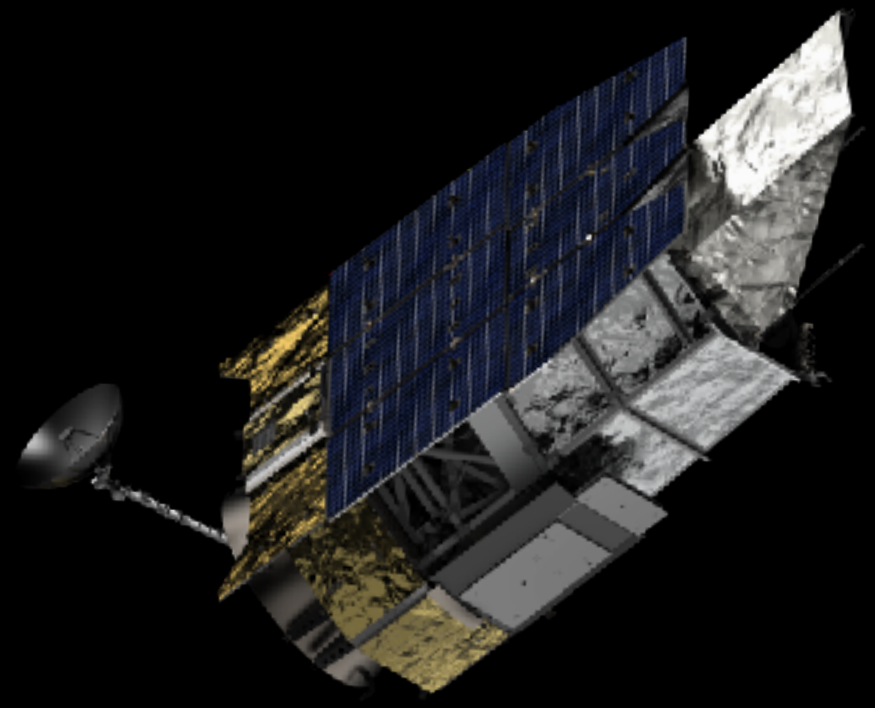
Wide Field Instrument

imaging from 0.5-2 μm

slitless spectroscopy from 0.75-1.93 μm

Coronagraphic Technology Demonstration Instrument





The Partners

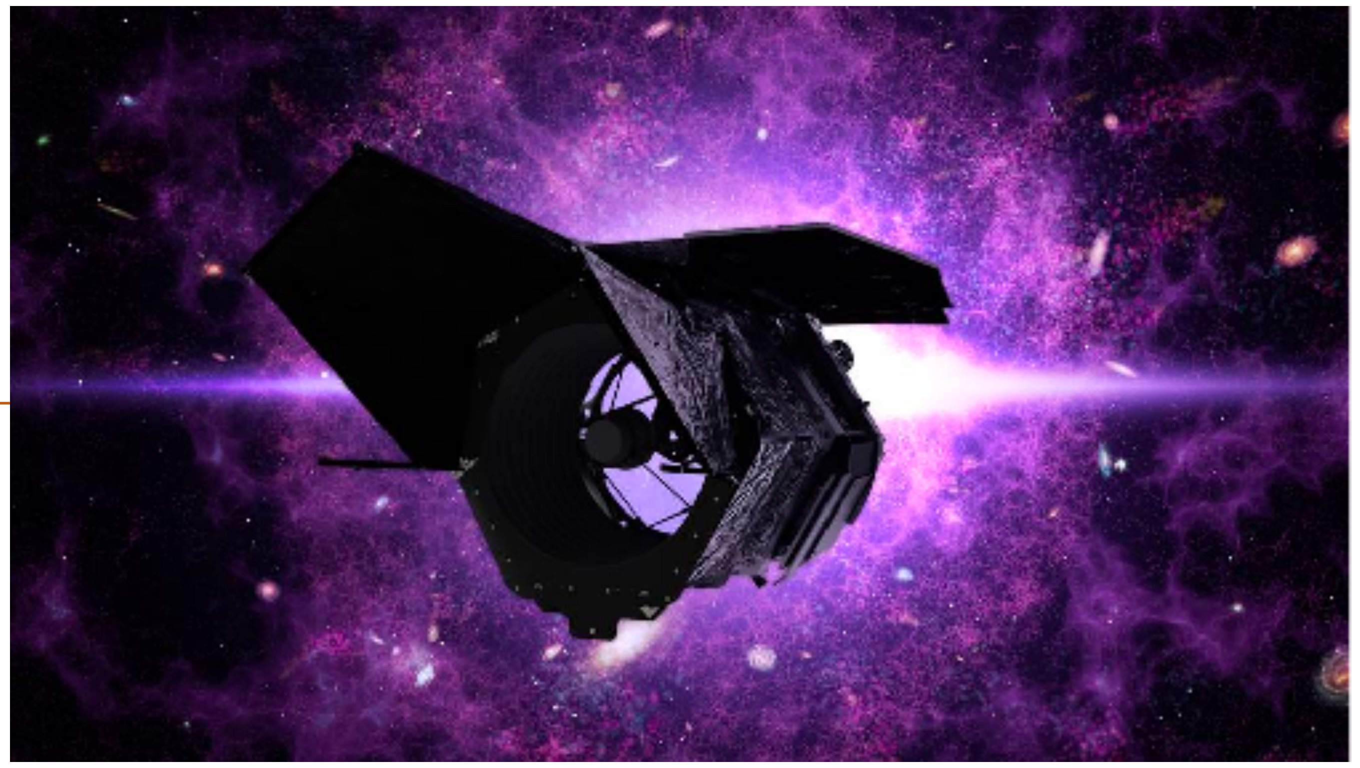
Distributed Operations Model

STScI is the Science Operations Center

NASA
Goddard SPACE FLIGHT CENTER
JPL Jet Propulsion Laboratory
STScI | SPACE TELESCOPE SCIENCE INSTITUTE
ipac

Plus Industry, International, and Academic Partners

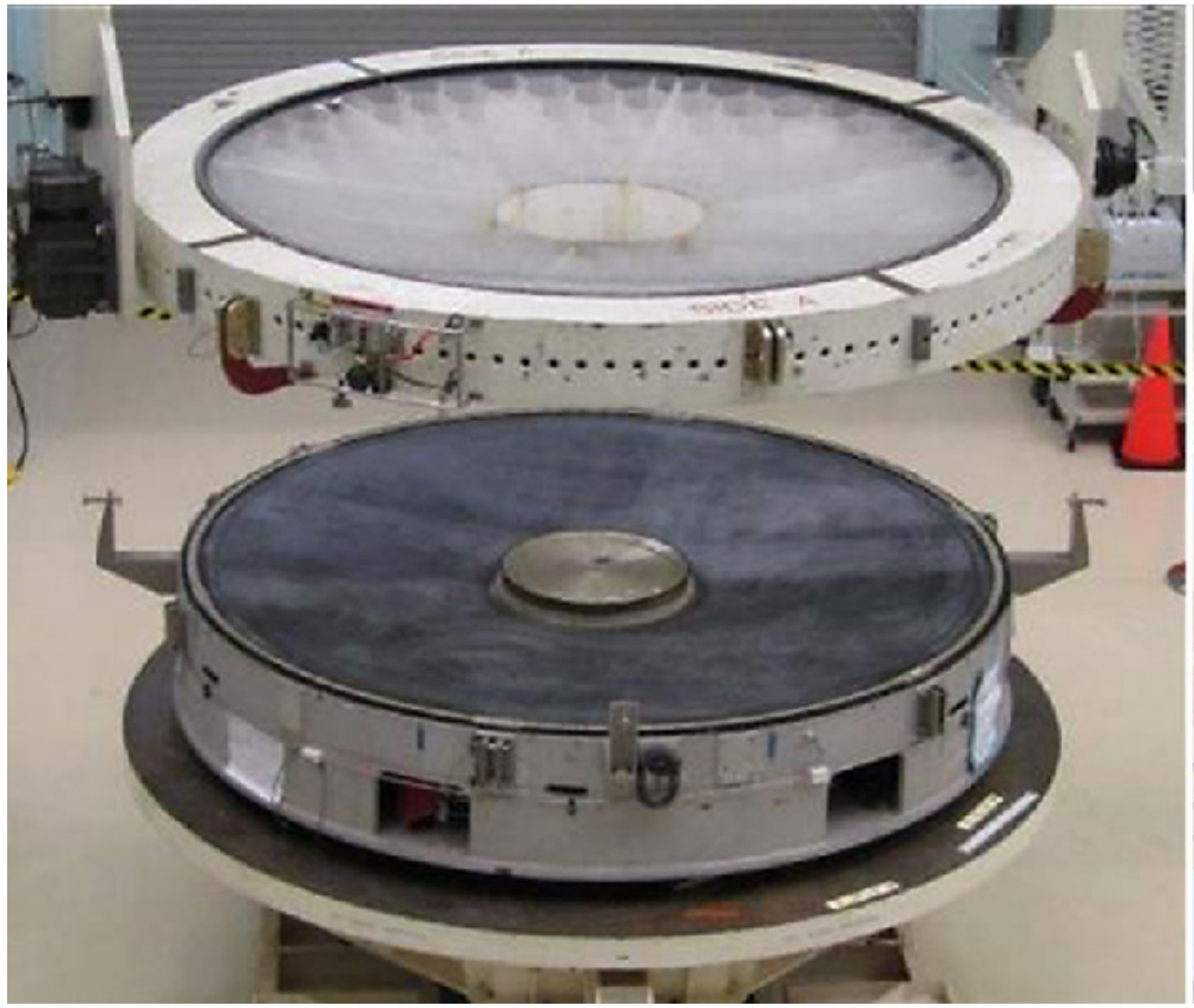
Roman Space Telescope Mission Status



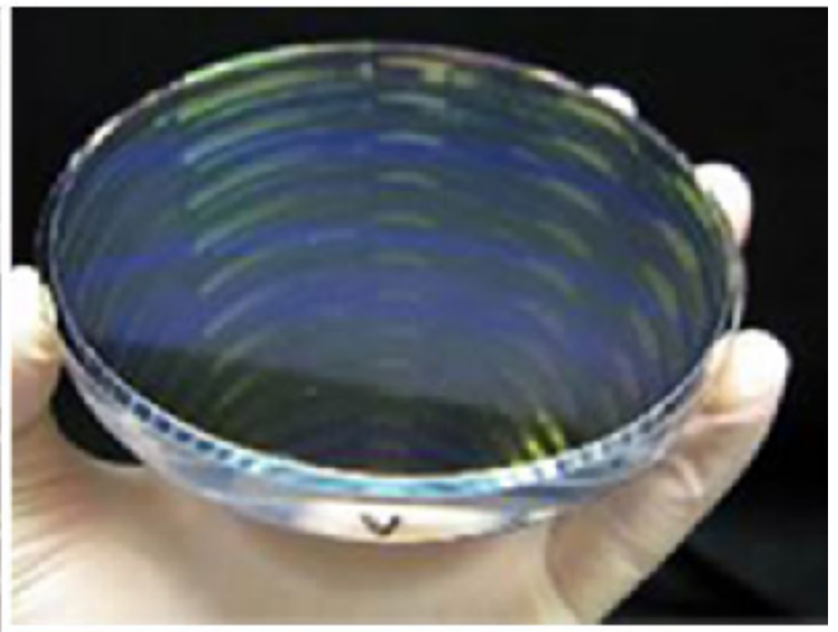
Major mission milestone passed in February 2020: Out of “Formulation” and into “Implementation”

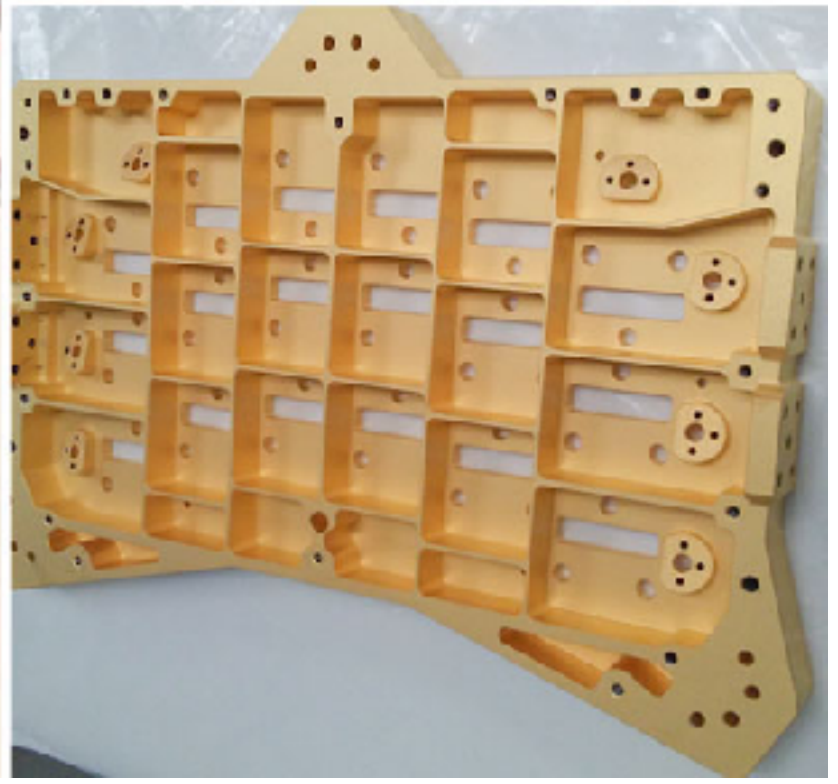
Hardware in development, flight detectors being built and delivered

Primary Mirror



Engineering Test Unit WFI Filter





WFI Focal plane mosaic plate

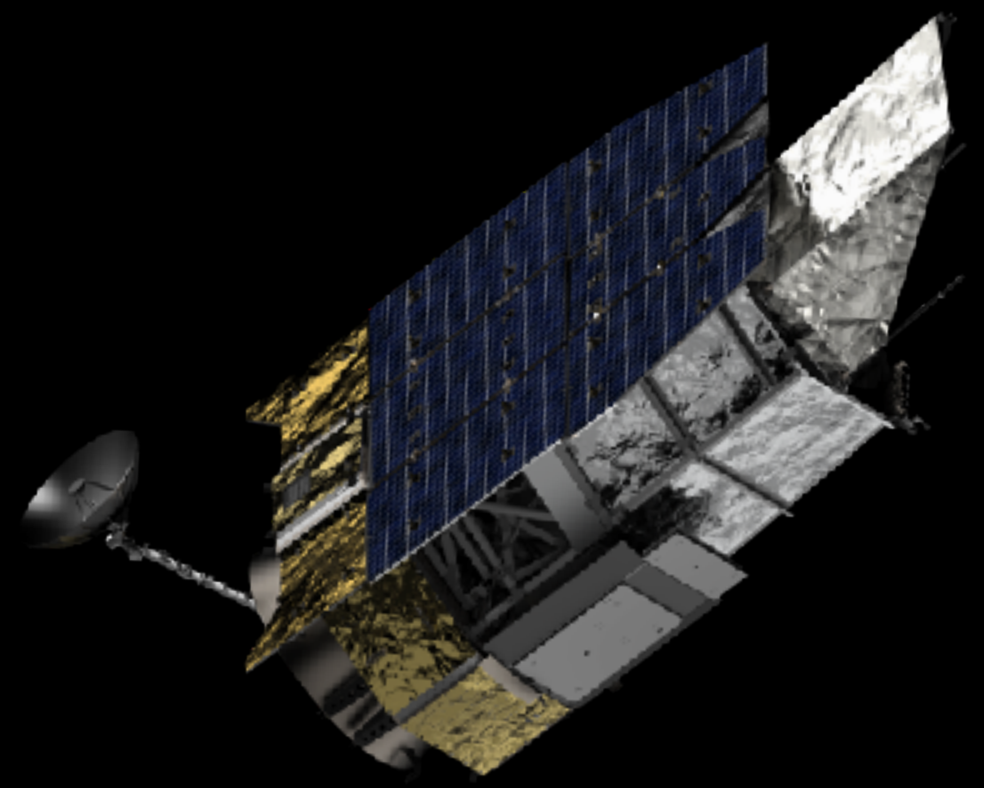
All Observing Time remains available

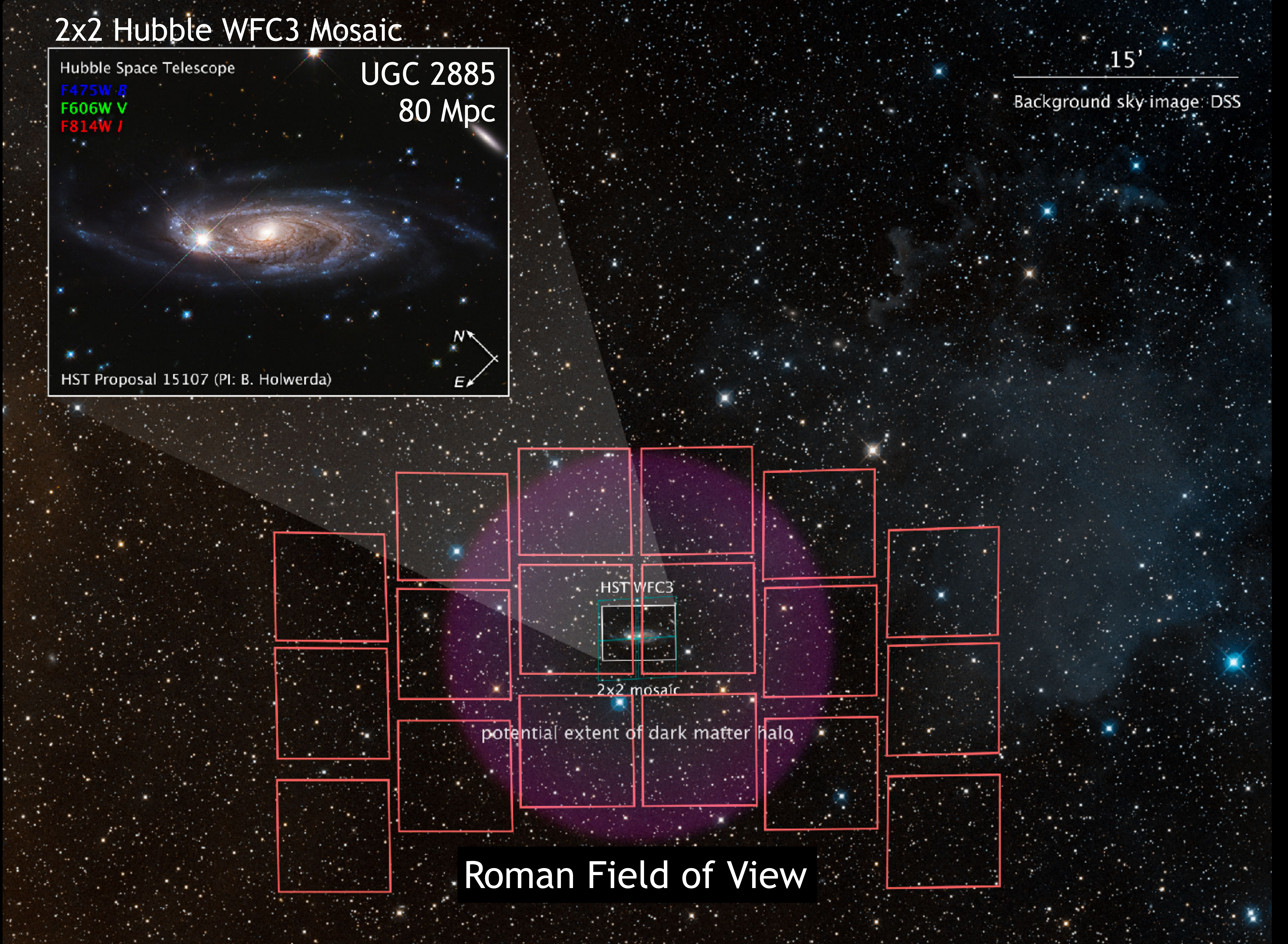
All data will be publicly available with no proprietary period

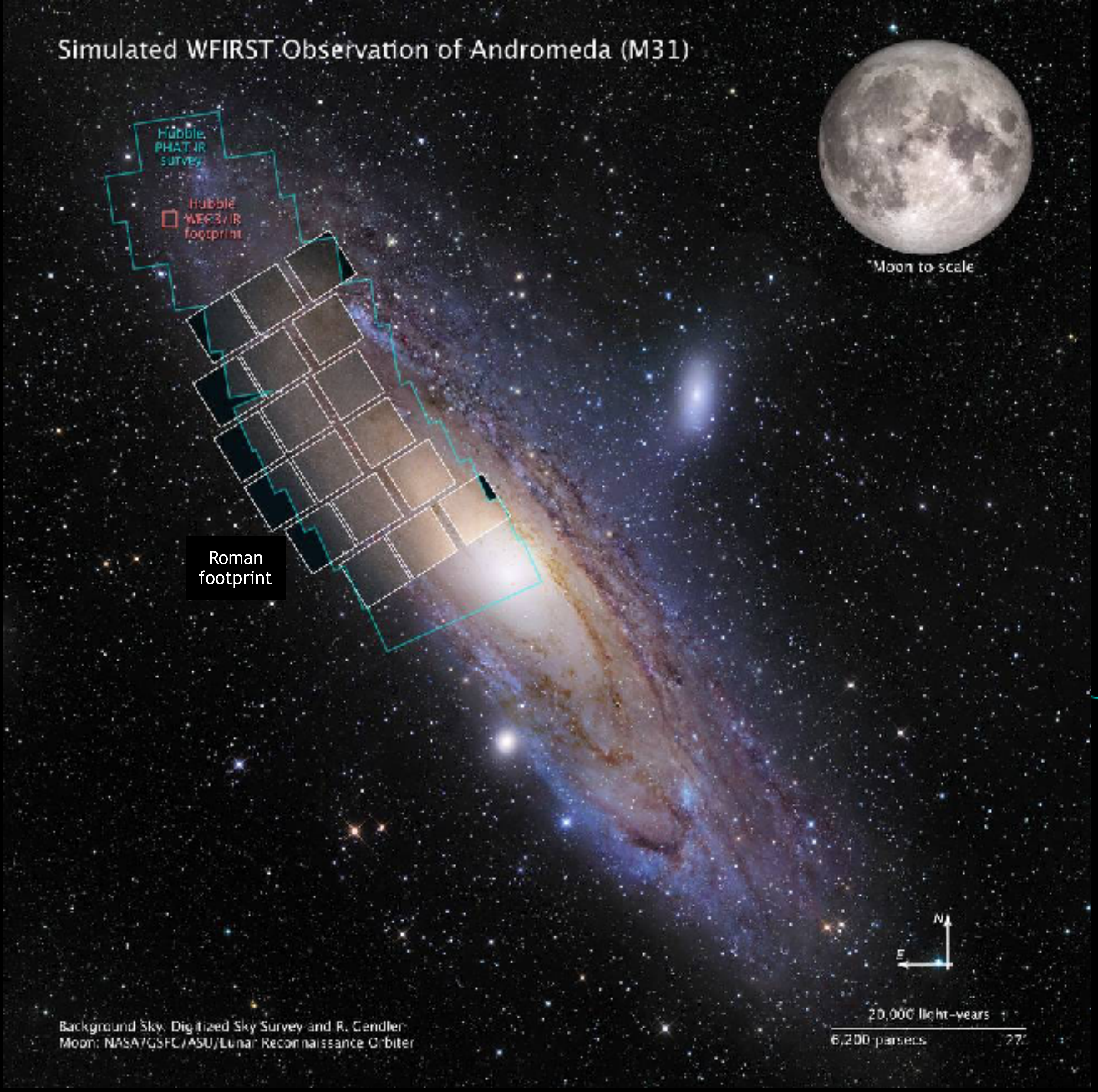
Look for Proposal opportunities for a range of preparatory science programs beginning in 2021

Measure complete satellite and cluster populations with Hubble-like sensitivity and resolution

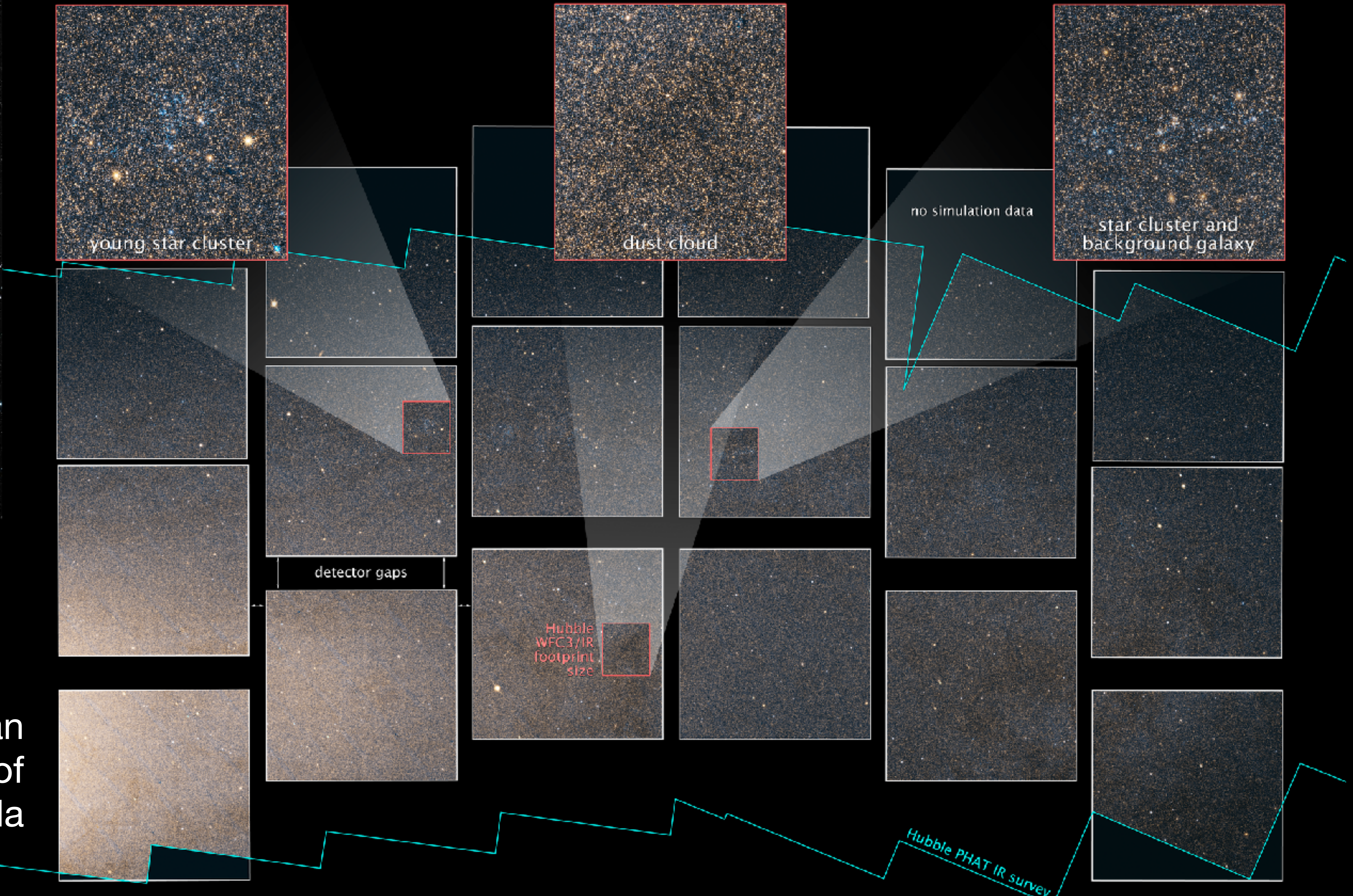
in one pointing







Survey Nearby Galaxies ~1500 Times Faster

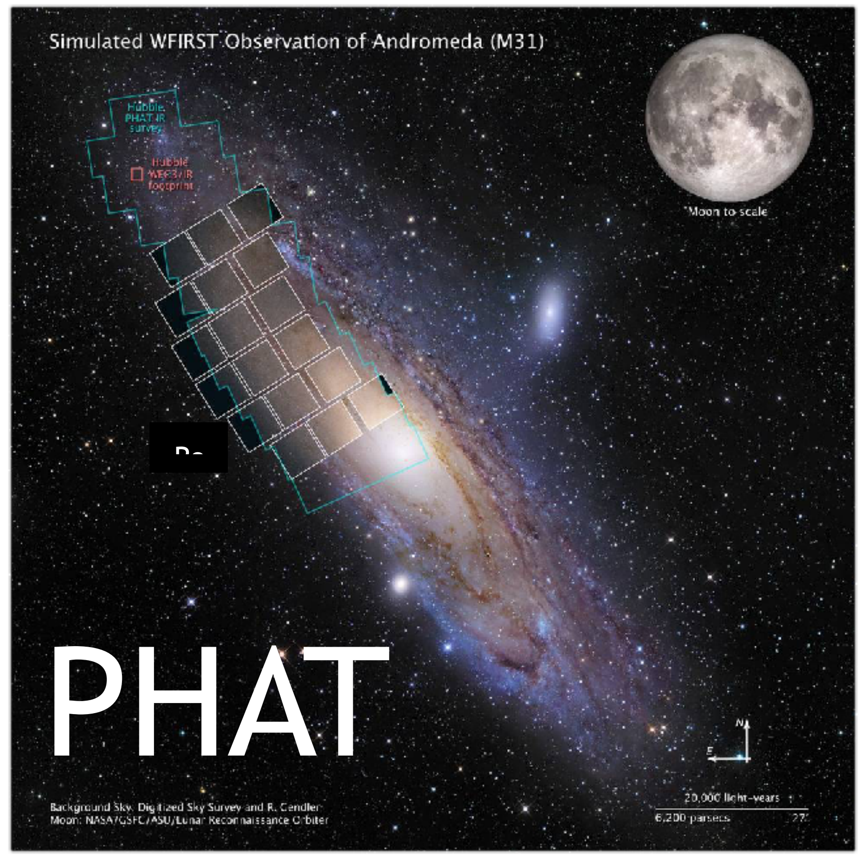


Simulated Roman WFI Image of Andromeda

produced using STIPS, available on GitHub and PyPI
[*https://github.com/spacetelescope/STScI-STIPS*](https://github.com/spacetelescope/STScI-STIPS)

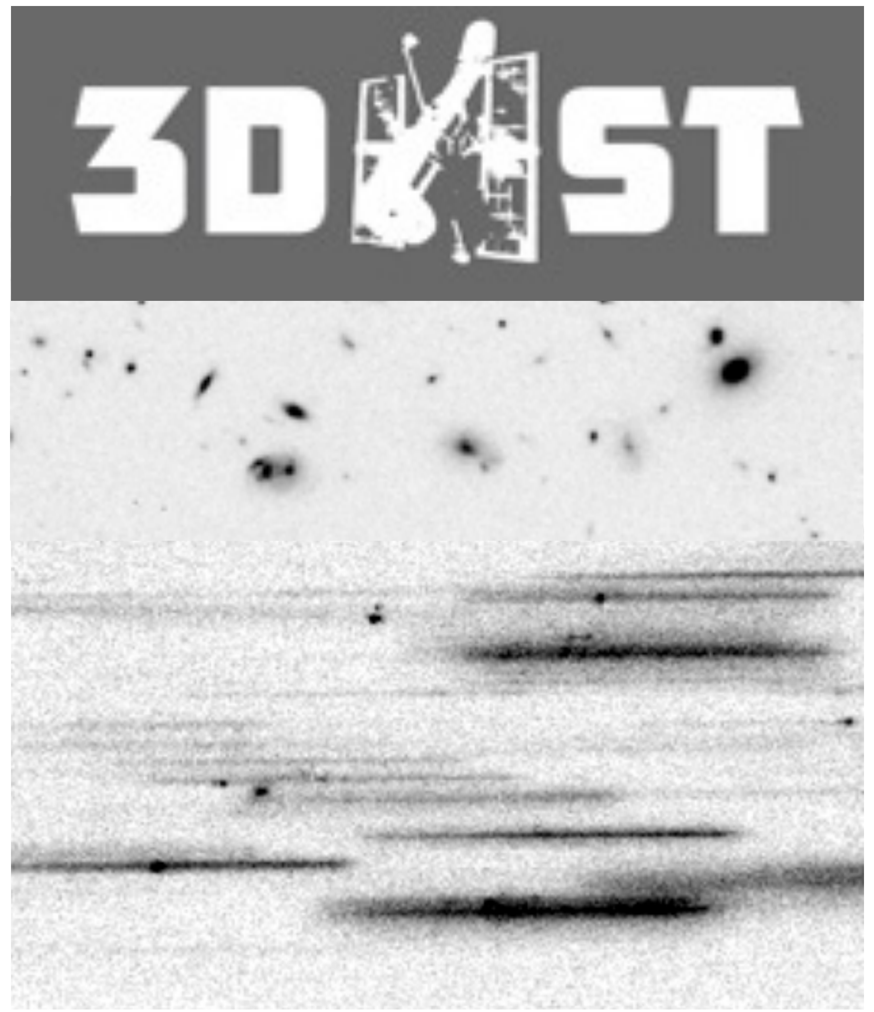
NASA, STScI, and B. F. Williams (University of Washington)

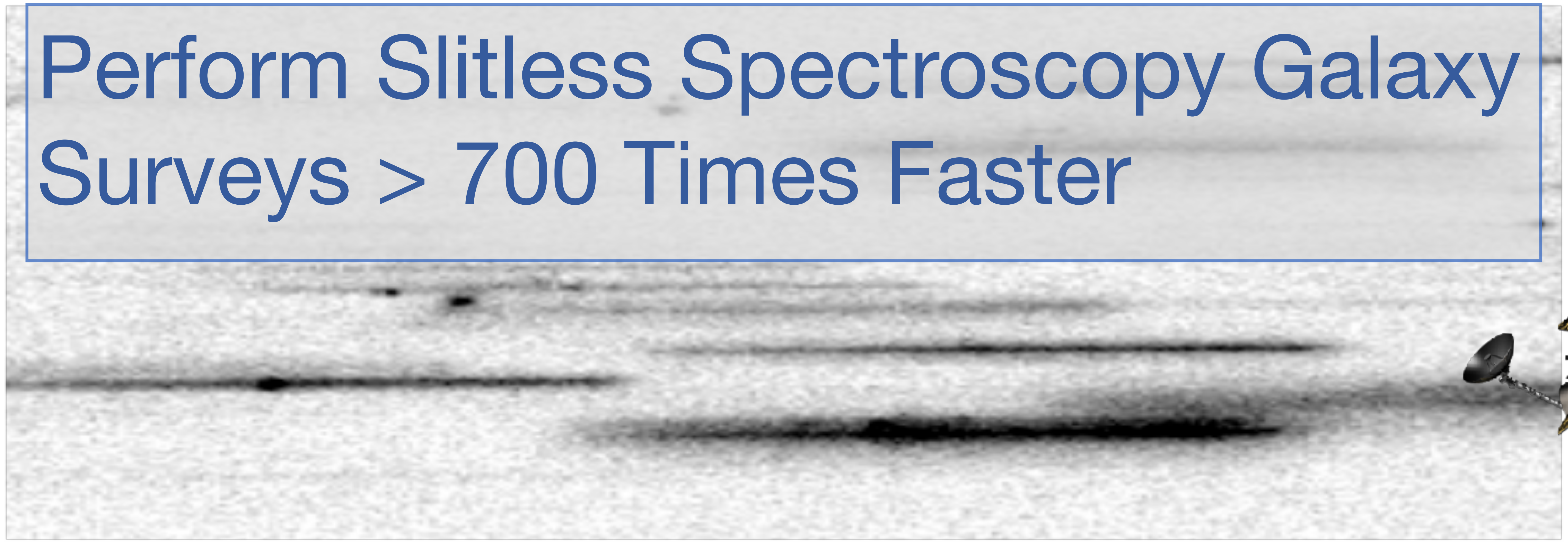
PI J. Dalcanton

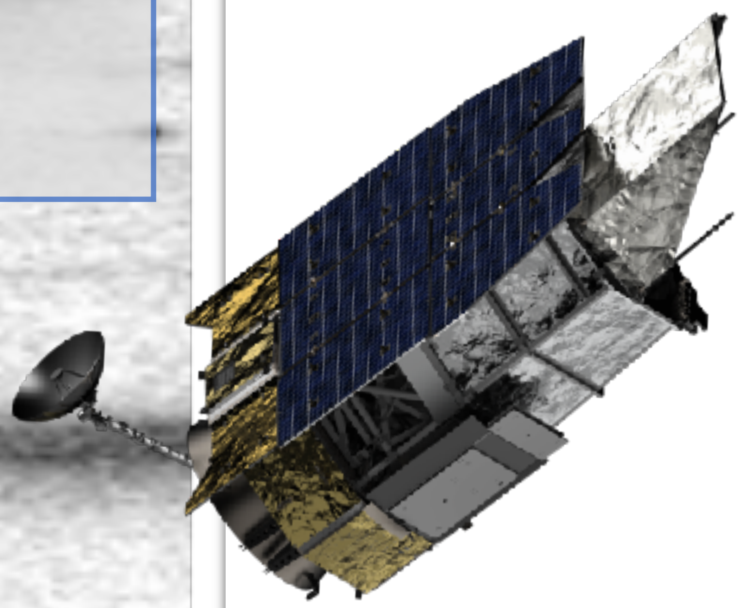


PIs S. Faber,
H. Ferguson

PI P. van Dokkum

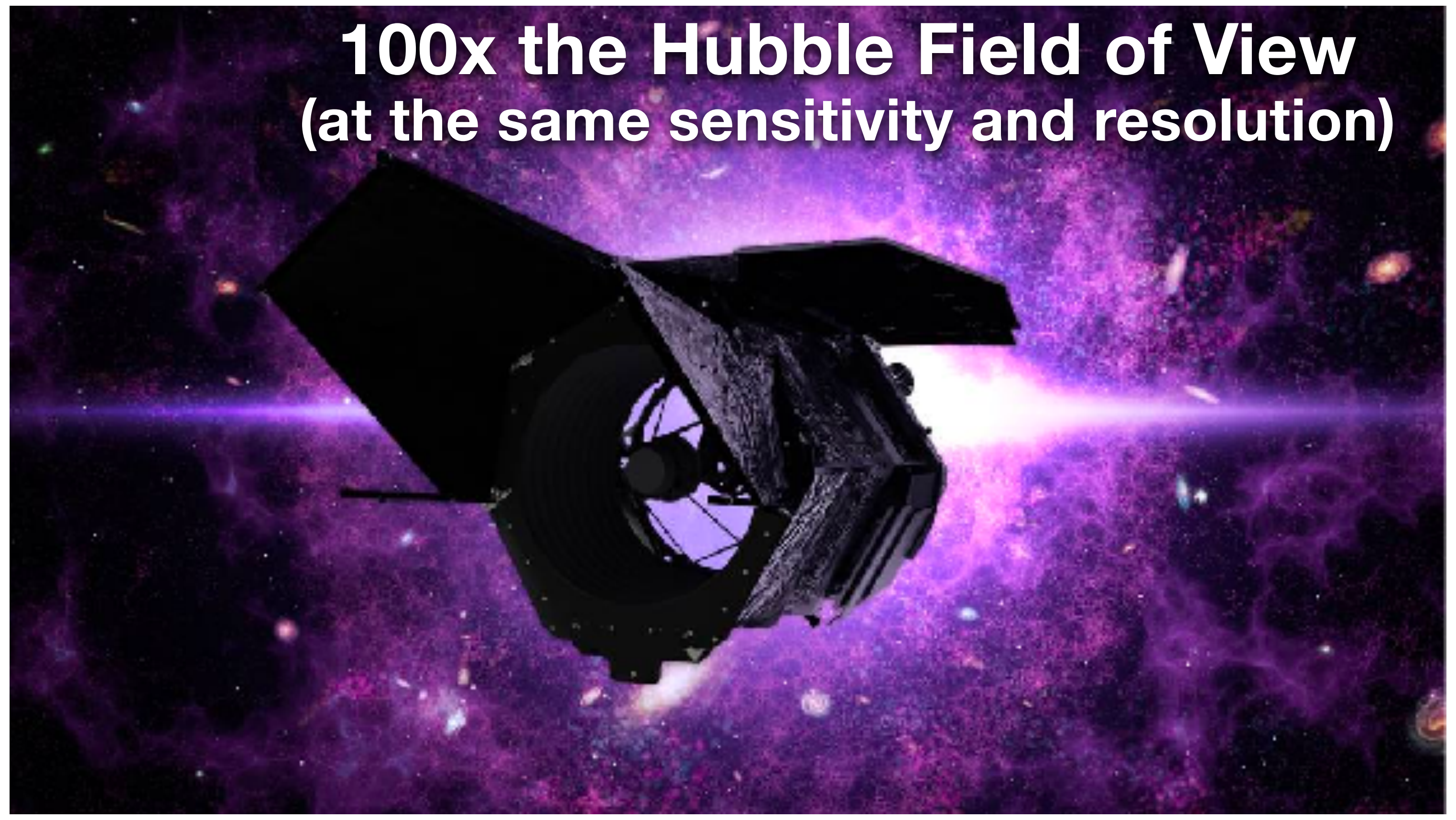


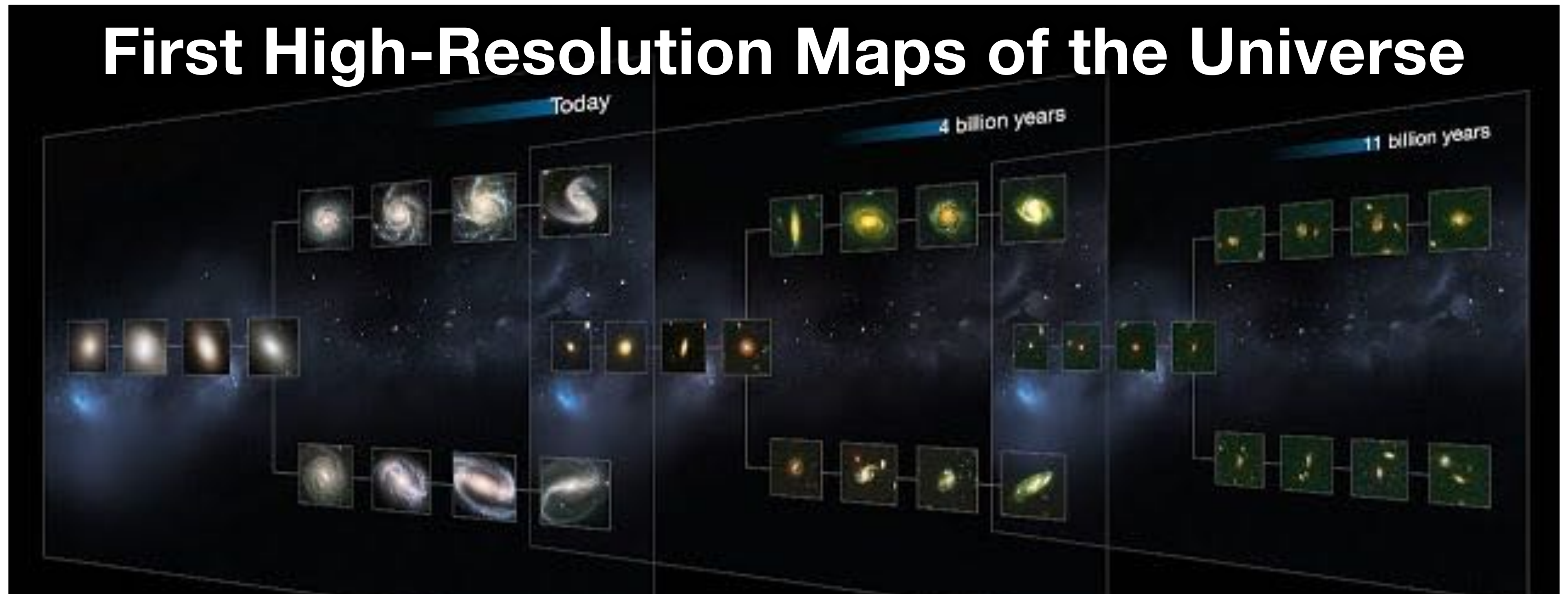


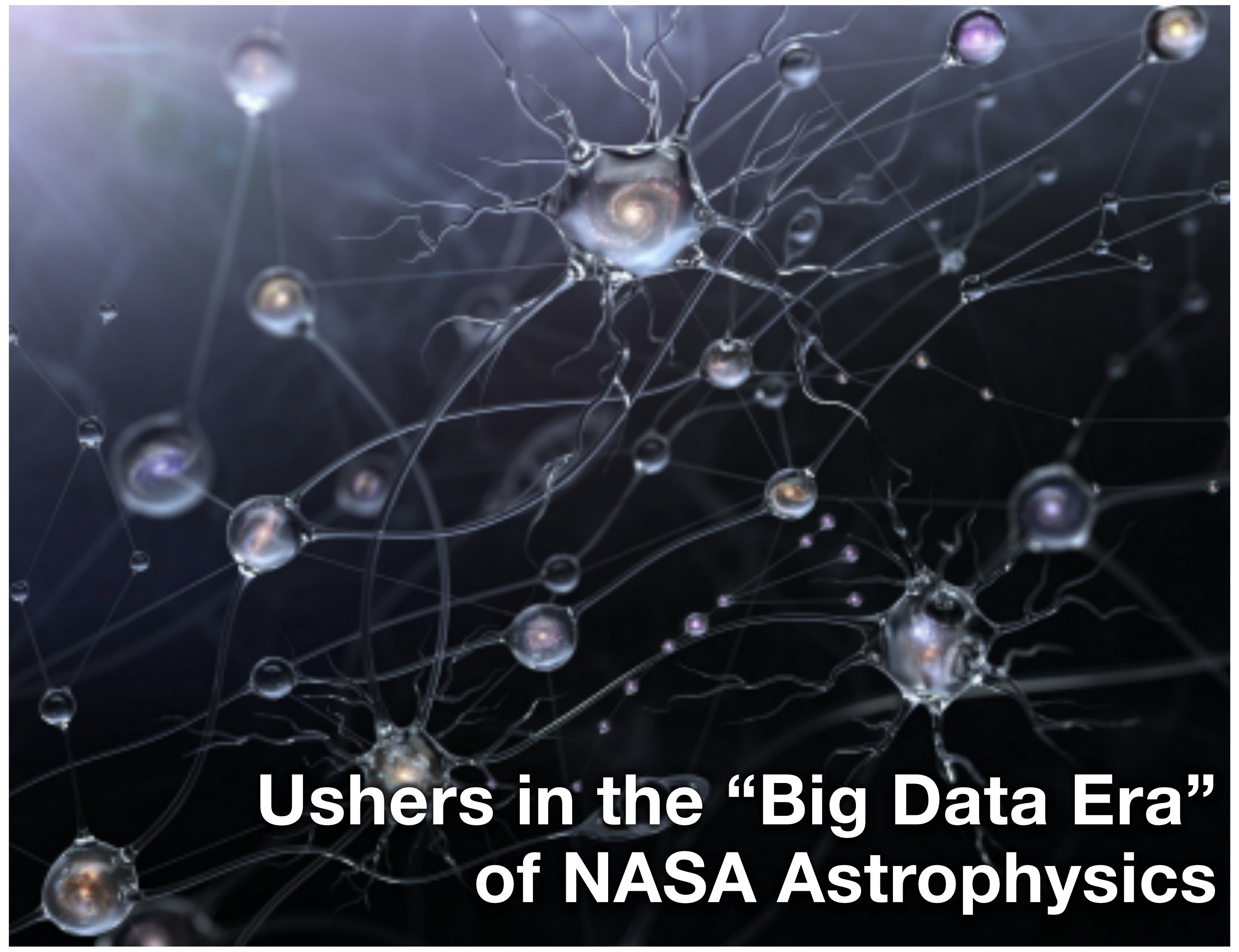


STScI | SPACE TELESCOPE SCIENCE INSTITUTE

Enabling Guest Observer and Archival Science







Scale of Roman data will require a modern archive and data processing environment

STScI will host the Roman archive, which will **include MAST-like capabilities and interfaces**

Bring the software to the data

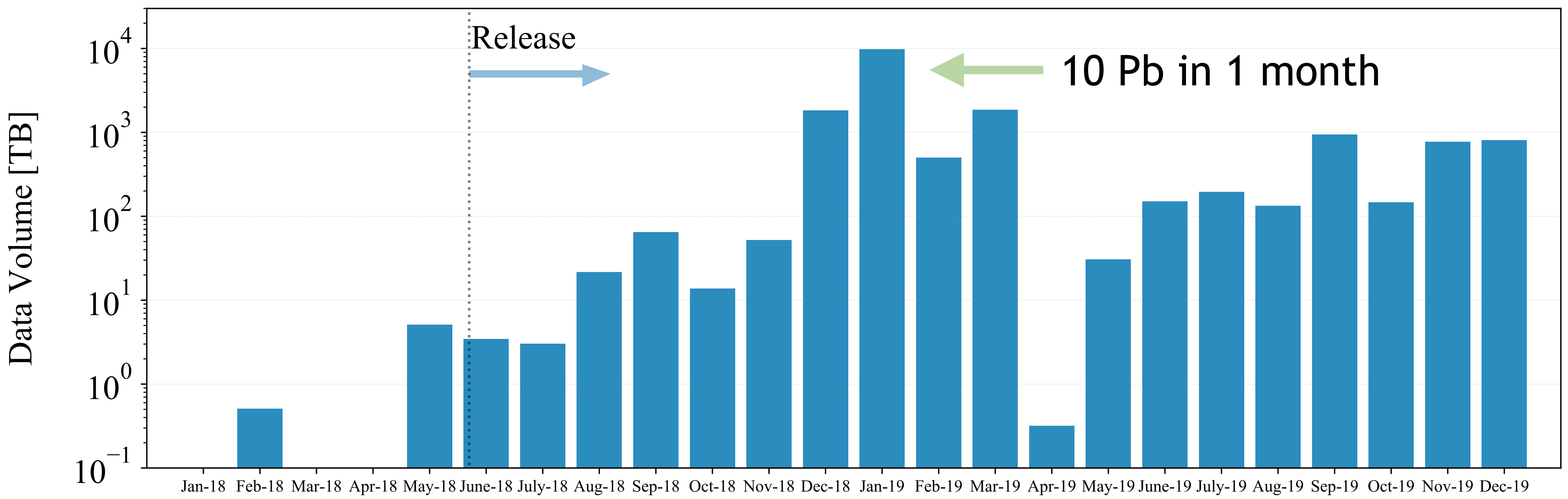
An open source and modular science platform: Operations will include a cloud-based data management framework for high-level data processing

Common environment accessible to all users: STScI operations, survey teams, General Observers, and archival investigators

Enabling Guest Observer and Archival Science

Precursors to Roman Compute Environment

Hubble Usage on Amazon Web Services



Hubble, Kepler, and TESS data are in the cloud

STScI has staged all the *public* data from currently active Hubble instruments, Kepler, and Tess on Amazon Web Services

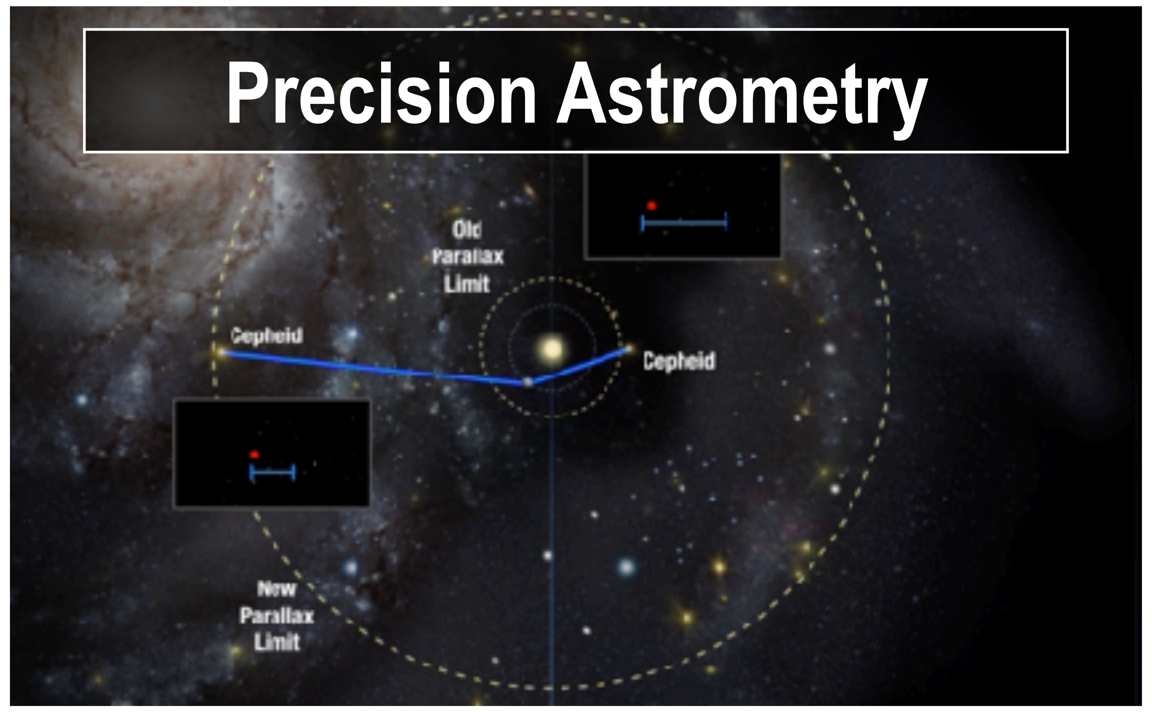
Users can now bring their software to the data

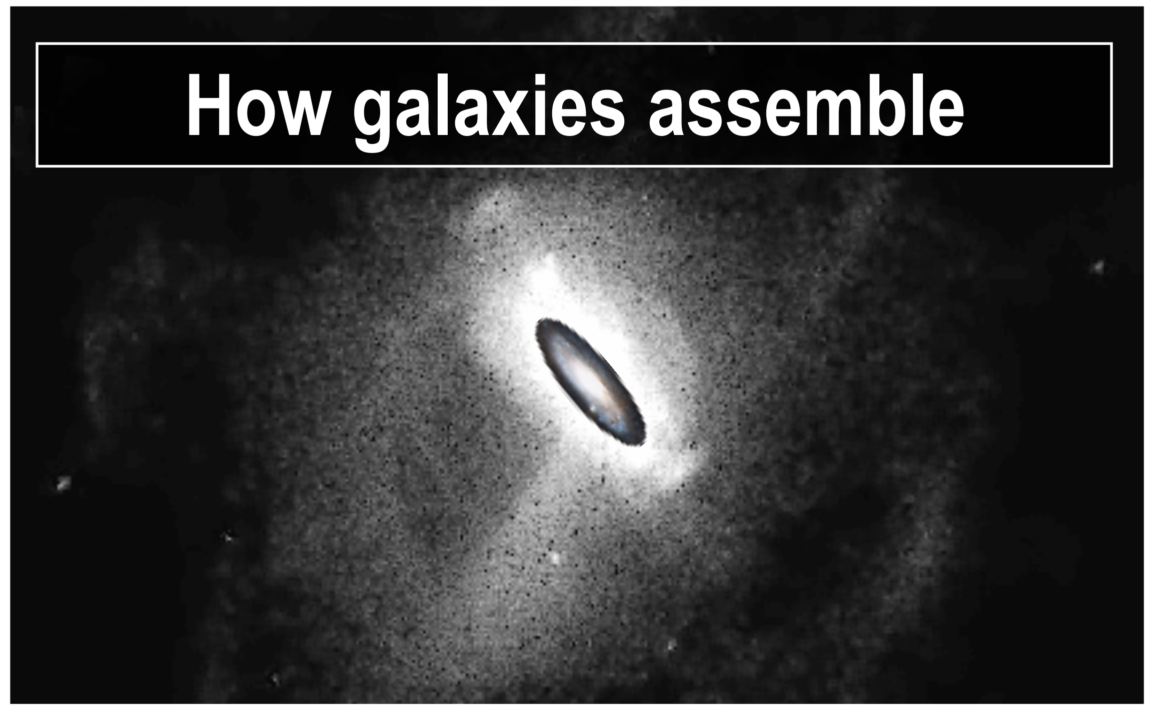
Staging data on AWS allows for large scale archival analysis and application of AWS services to full Hubble dataset

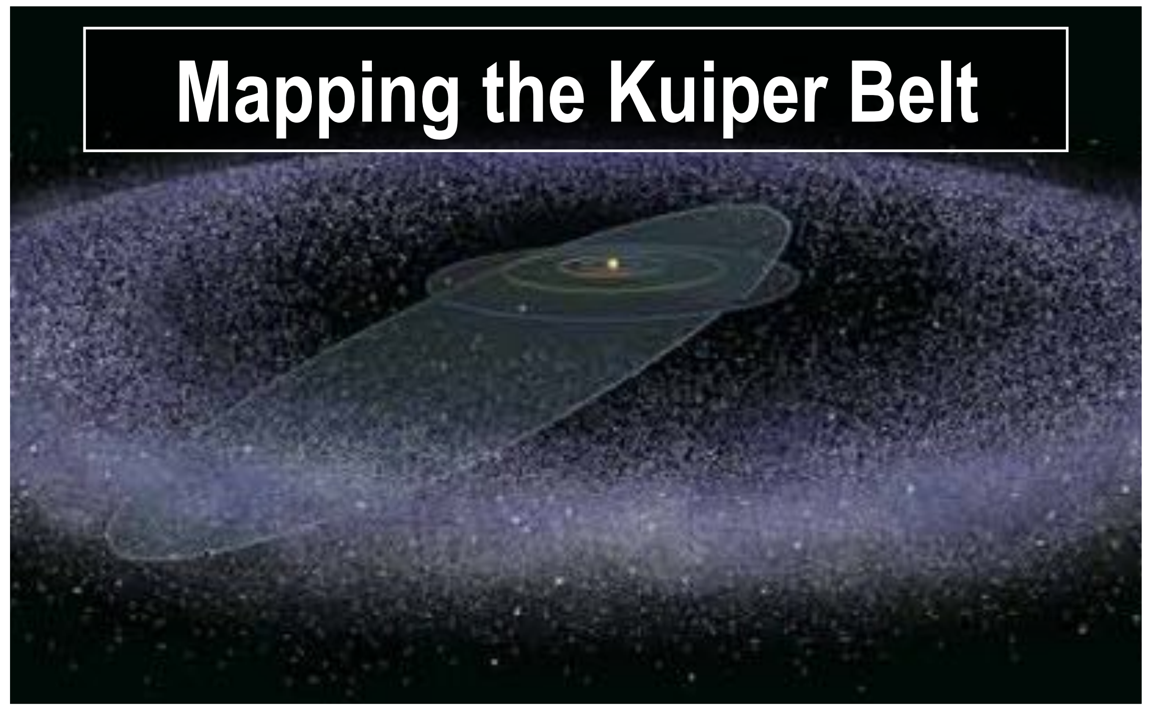
Jupyter Lab environments and notebooks ease access and lower the learning curve

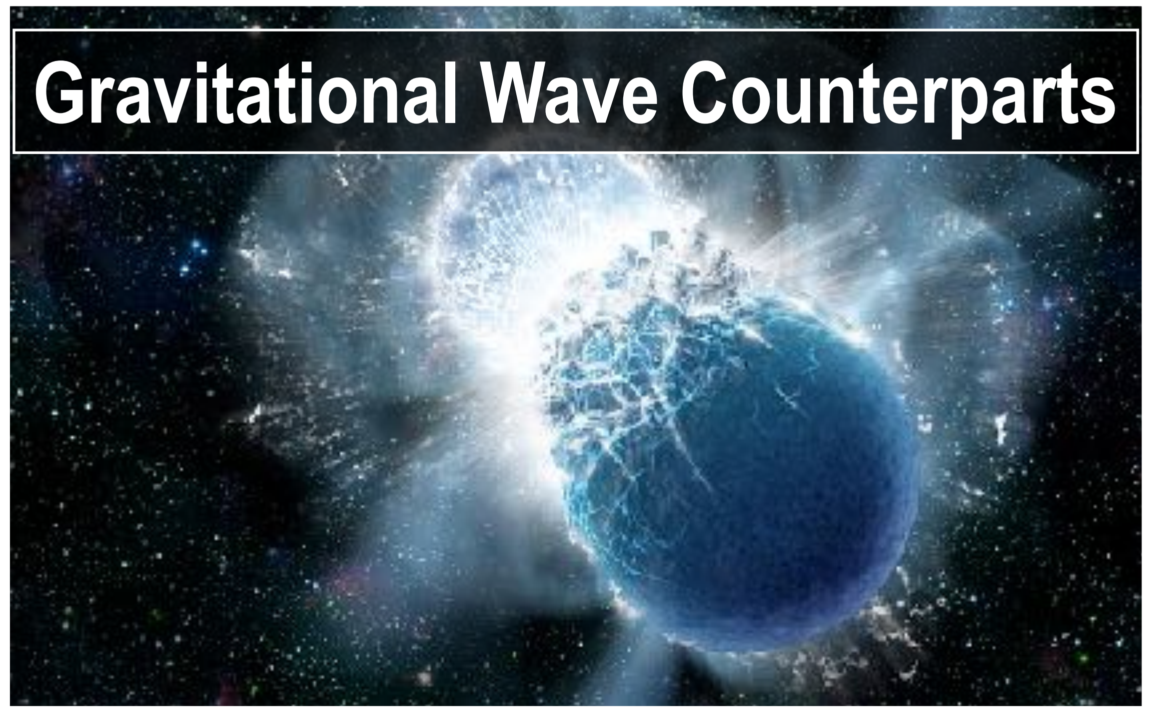
Precursor to Roman Compute Environment

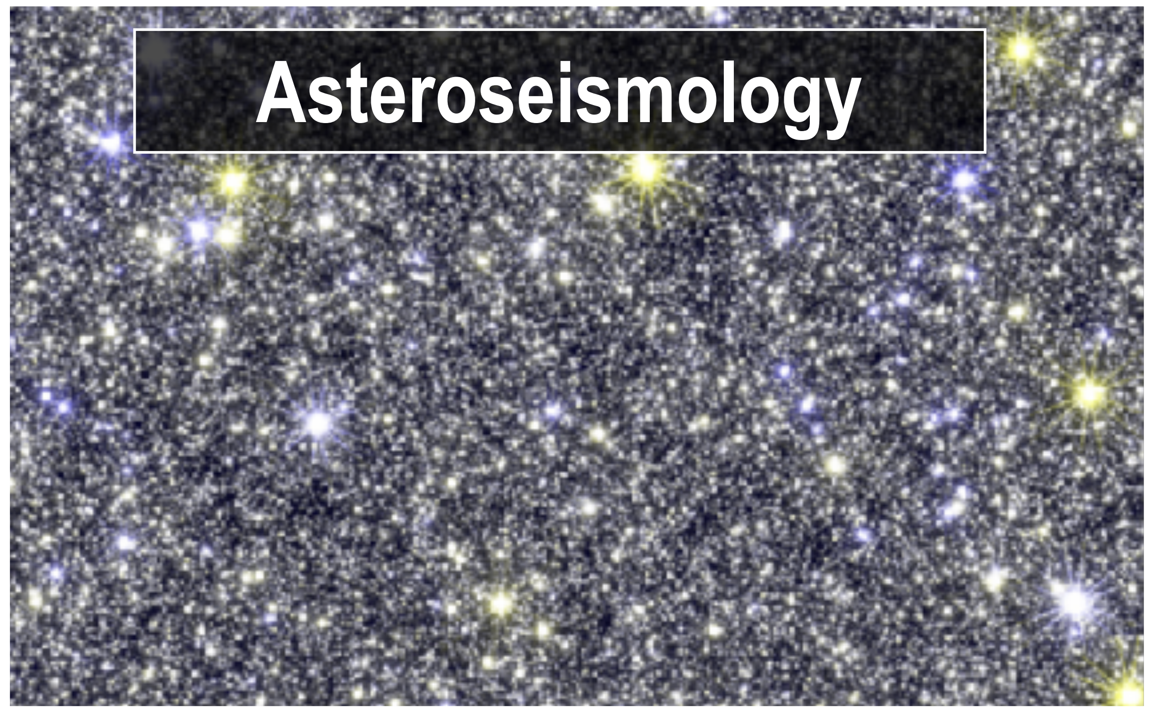
Great Observatory Science with the Roman Space Telescope

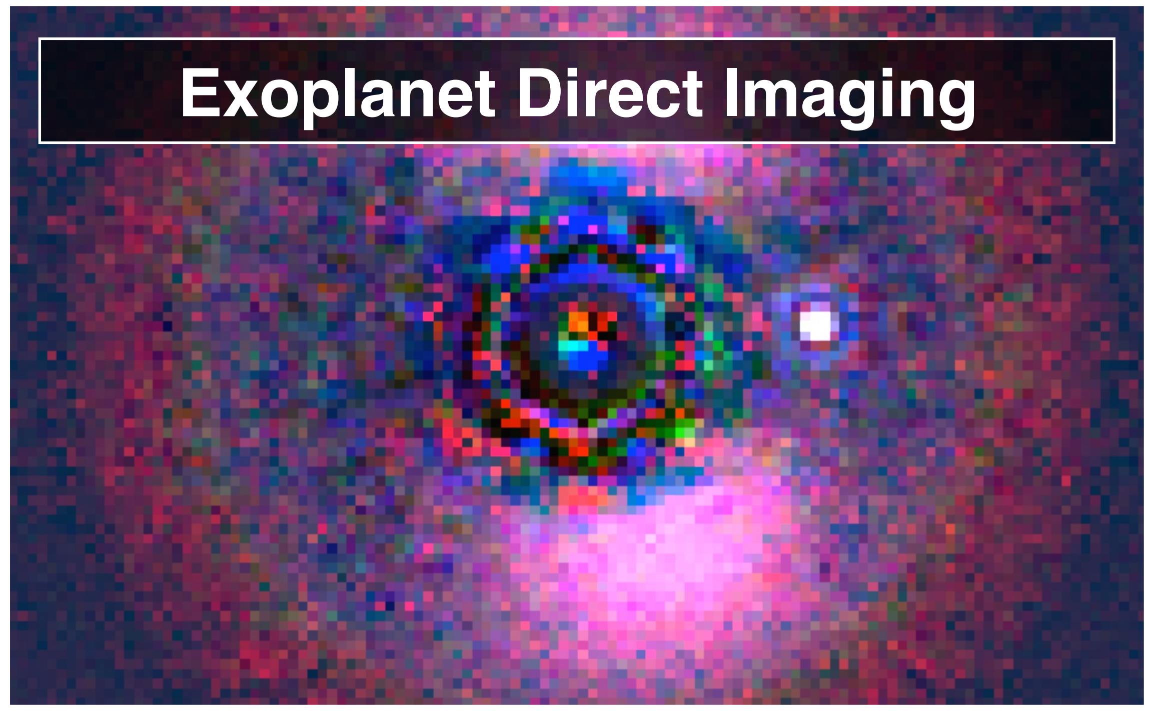


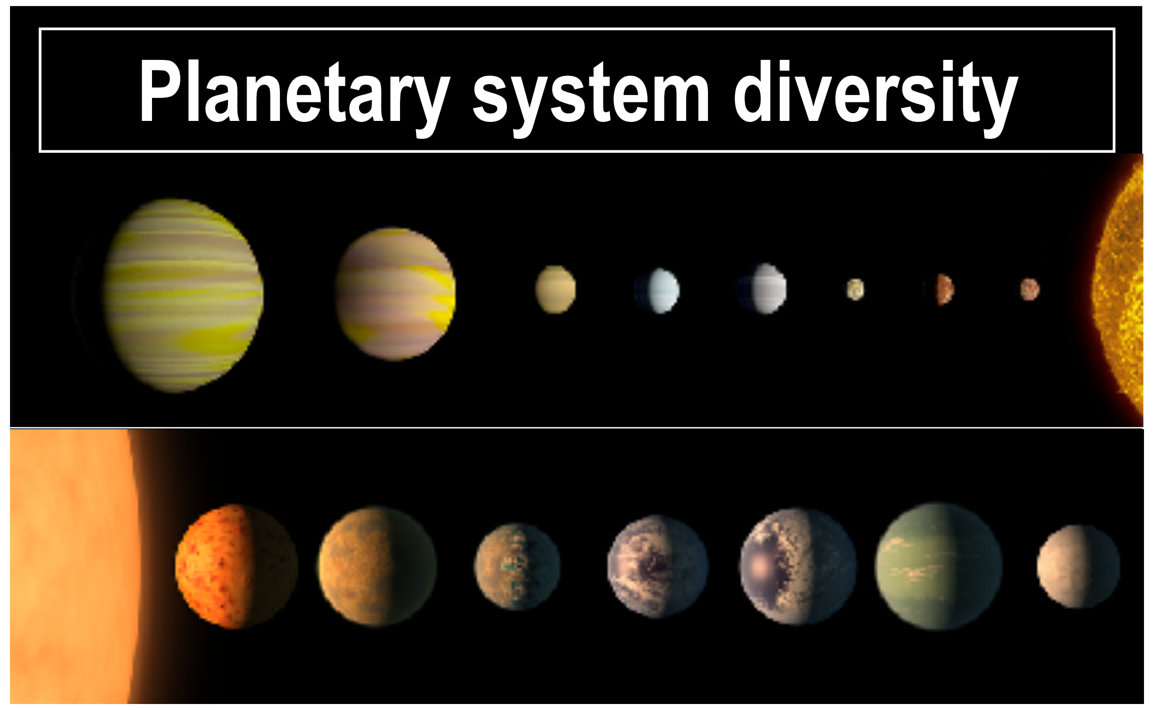












Join the Roman Conversation

Tell us how you will use the Nancy Grace Roman Space Telescope - participate in an open community survey by June 15

https://www.surveymonkey.com/r/P72X3DR

Look for proposal opportunities beginning in 2021 for a range of Roman preparatory science programs. The current terms of the Science Investigation Team will end in 2021.

Attend a virtual conference focused on the future of galaxy formation and evolution studies, October 5 - 9.

https://www.stsci.edu/events

Preregistration open, abstract submission deadline July 17

Additional Material

Roman Space Telescope Imaging Capabilities			
Telescope Aperture (2.4 meter)	**Field of View** (45′x23′; 0.28 sq deg)	**Pixel Scale** (0.11 arcsec)	**Wavelength Range** (0.5-2.0 μm)

Filters	**F062**	**F087**	**F106**	**F129**	**F158**	**F184**	**W146**
Wavelength (μm)	0.48-0.76	0.76-0.98	0.93-1.19	1.13-1.45	1.38-1.77	1.68-2.00	0.93-2.00
Sensitivity (5σ AB mag in 1 hr)	28.5	28.2	28.1	28.0	28.0	27.5	28.3

Roman Space Telescope Spectroscopic Capabilities				
	Field of View (sq deg)	**Wavelength (μm)**	**Resolution**	**Sensitivity (AB mag) (10σ per pixel in 1hr)**
Grism	0.28 sq deg	1.00-1.93	461	20.5 at 1.5 μm
Prism	0.28 sq deg	0.75-1.80	80-180	23.5 at 1.5 μm

Roman Space Telescope Coronagraphic Capabilities					
	Wavelength (μm)	**Inner Working Angle (arcsec)**	**Outer Working Angle (arcsec)**	**Detection Limit***	**Spectral Resolution**
Imaging	0.5-0.8	0.15 (exoplanets) 0.48 (disks)	0.66 (exoplanets) 1.46 (disks)	10^{-9} contrast (after post-processing)	47-75
Spectroscopy	0.675-0.785				

https://roman.gsfc.nasa.gov/science/WFIRST_Reference_Information.html