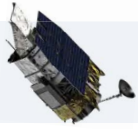


# Nancy Grace Roman Space Telescope Mission, Operations, and User Tools



## Roman Space Telescope

### The Mission

- The Roman Project is currently planning for observatory launch in late 2026
- Top large space priority of ASTRO2010 Decadal Survey
- STScI will be the Science Operations Center for Roman, with science support activities shared by GSFC, STScI, and IPAC
- Passed the mission critical design review (CDR) in September 2021

### Science

- *Dark Energy*: Distinct equation-of-state measures
- *Exoplanets*: Microlensing discovery down to sub-Earth masses; Coronagraphic imaging and spectroscopy
- *Astrophysics*: New observations and archival research programs

### Telescope

- Existing Hubble-size 2.4-m primary, 3-mirror anastigmat

### Wide Field Instrument (WFI)

- 0.5–2.3 microns, 0.28 degrees<sup>2</sup> (100× Hubble's FOV)
- Eight broad-band filters + slitless spectroscopy

### Coronagraphic Instrument

- 0.4–1.0 microns, 10<sup>-9</sup> contrast goal



## Space Telescope Science Institute

### STScI Science Operations Center

- Create scheduling system, data archive, WFI data processing system, and dark energy survey products
- Technical Reports on various mission topics, available at the STScI Roman Space Telescope Documentation webpage
- Community engagement and Science Team support
- Questions? Email [help@stsci.edu](mailto:help@stsci.edu)

### Software and Simulation Tools for Roman/WFI

#### STScI Science Planning Toolbox includes:

**WebbPSF**: Provides realistic field-dependent PSF simulations

**Pandeia**: Produces simulated data, exposure times, and signal-to-noise ratios

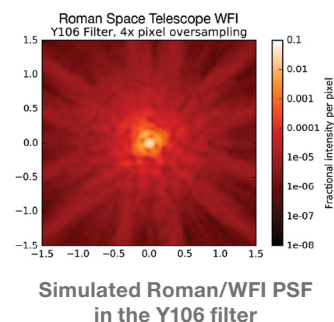
**STIPS**: Simulates complex astronomical scenes

**Field-of-View (FOV) Overlay**: Displays FOV footprint on top of DSS, SDSS, or GALEX images

### WebbPSF

A customizable multi-mission interface to perform point-spread function (PSF) simulations and calculations

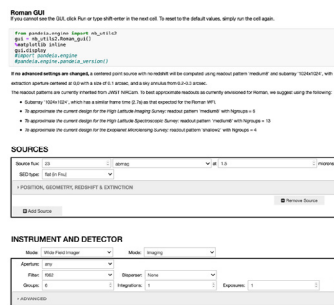
- Simulated PSFs are critical to predict the performance of the observatory and to simulate scenes
- WebbPSF accounts for pupil shapes, source spectral energy distributions, filter bandpasses, and field-dependent aberrations
- WebbPSF contains flexible Python tools for analysis or export of PSFs



### Pandeia

A multi-mission data cube simulator and signal-to-noise ratio/exposure time calculator (ETC)

- Accounts for the effects of wavelength-dependent PSFs and pixel-to-pixel correlations inherent to modern IR detectors
- Self-contained Python package designed for scripting calculations

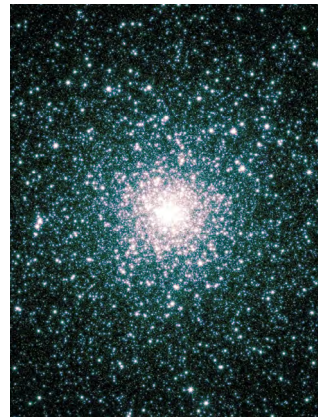


Pandeia provides a GUI as a Jupyter notebook for ease of use

### STIPS

A tool designed to produce full-scene pipeline-processed simulated data

- Generate complex astronomical scenes through user-specified inputs (e.g., star cluster structural and population characteristics)
- Possibility to include post-pipeline data reduction residuals

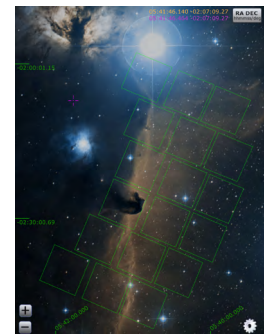


Simulated composite-color Roman/WFI globular cluster image

### Field of View Overlay

Quickly and simply display the FOV outline of the Roman instruments over sky images

- Supports overlays on DSS, SDSS, or GALEX images
- Object catalogs can be extracted and shown in a separate window
- Uses functionalities of the Mikulski Archive for Space Telescopes (MAST)
- As MAST Portal functionality expands, tool features will improve



MAST-FOV Overlay of the Roman/WFI field on Barnard 33

NASA's Nancy Grace Roman Space Telescope was previously known as the Wide Field Infrared Survey Telescope (WFIRST).

Links to tools created by STScI and Roman Space Telescope Partners are available at <https://www.stsci.edu/roman/science-planning-toolbox>

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