



**STScI** | SPACE TELESCOPE  
SCIENCE INSTITUTE

EXPANDING THE FRONTIERS OF SPACE ASTRONOMY

## **Cycle 2 Observing Tool Updates**

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## ETC updates

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- Essential updates
  - Update throughputs for all supported instrument configurations
  - Update PSFs used in ETC calculations
  - Release updated [Pandeia engine](#)
  - Update JWST Interactive Sensitivity Tool ([JIST](#))
- Planned updates
  - Make NIRCcam coronagraphy subarray names consistent with new names in APT
  - Improve usability of reports tab
  - Create folder structure for ETC workbooks
  - Support allowed NIRCcam SW+LW coronagraphy configurations
- Possible updates
  - Update model of infrared background



# Updating ETC reports tab

**Reports** ⓘ ETC 1.7

Calculation: 12, Mode: nircam\_sw\_imaging

Report [Warnings](#) [Errors](#) [Downloads](#)

Instrument Filter/Disperser:	f115w/null
Extraction Aperture Position (arcsec):	[0.00, 0.00]
Wavelength of Interest used to Calculate Scalar Values (microns):	1.15
Size of Extraction Aperture (arcsec):	0.1
Total Time Required for Strategy (seconds):	944.84
Total Exposure Time (seconds):	944.84
Maximum Fraction of Saturation:	0.01
Maximum Number of Groups Before Saturation:	736
Extracted Flux (e-/sec):	1.17
Standard Deviation in Extracted Flux (e-/sec):	0.13
Extracted Signal-to-Noise ratio:	9.09
Input Background Surface Brightness (MJy/sr):	0.43
Total Background Flux in Extraction Aperture (e-/sec):	9.41
Total Sky Background Flux in Extraction Aperture (e-/sec):	9.39
Fraction of Total Background due to Signal From Scene:	1.5e-3
Average Number of Cosmic Rays per Ramp:	0.22

**Reports** ⓘ ETC 1.8 dev

Calculation: 12, Mode: nircam\_sw\_imaging

Results [Warnings](#) [Errors](#) [Downloads](#)

**Results**

Extracted Signal-to-Noise Ratio	9.09	
Extracted Flux	1.17	e-/s
Standard Deviation of Extracted Flux	1.29e-01	e-/s
Brightest Pixel Rate	0.64	e-/s
Maximum Fraction of Saturation	5.98e-03	
Maximum Number of Groups Before Saturation	736.00	groups

**Instrument and Detector**

Instrument Filter/Disperser	f115w, n/a	
Total Time Required for Strategy	944.84	s
Total Exposure Time	944.84	s
Single Exposure Time	944.84	s
Fraction of Time Spent Collecting Flux	0.91	
Time Between First and Last Measurement, per exposure	858.94	s
Time Between First Reset and Last Measurement, per integration	944.84	s

**Extraction Strategy Settings**

Radius of Extraction Aperture	1.00e-01	arcsec
Area of Extraction Aperture	32.48	pixels
Effective Wavelength	1.15	microns
Extraction Aperture Position	0, 0	arcsec

**Background**

Input Background Surface Brightness	0.43	MJy/sr
Area of Background Measurement	362.49	pixels
Total Sky Background Flux in Background Aperture	9.39	e-/s
Total Flux in Background Aperture	9.41	e-/s
Fraction of Total Background due to Signal from Scene	1.50e-03	



## Development process for major observing enhancements

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- Backlog of requests for major observing enhancements
- New process to select enhancements for each quarterly build
  - Internal board (science, development, I&T, operations, SE) votes on priority
  - Development and I&T assess cost and schedule
  - JWST user committee provides feedback
  - JWST mission head approves plan
- Quarterly development plan can change
  - Patching critical bugs diverts resources (especially early in Cycle 1)
  - Priorities may evolve
- Limited resources
  - Onboard script subsystem (OSS) changes require rigorous testing
  - Large lead time for S&OC integration and test (I&T)



## Major observing enhancements considered for Cycle 2

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- Mandatory enhancements
  - Implement a micrometeoroid avoidance zone
- Planned enhancements
  - Allow MIRI anneal to execute in parallel with science visit (**OSS**)
  - Reduce overhead when switching between NIRSpec detector mode (**OSS, FSW**)
  - Show susceptibility region for NIRCams claws and NIRISS lightsaber in APT
  - Enable simultaneous LW+SW coronagraphy with NIRCams (**OSS**)
- Possible enhancements
  - Execute calibrations in parallel with station keeping visits (**OSS?**)
  - Improve handling of NIRSpec MOS pre-images
  - Enable MIRI imaging to have a target acquisition (**OSS**)



## Major observing enhancements considered for Cycle 2

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- Unlikely for Cycle 2, given current priority and available resources
  - Enable simultaneous use of NIRSpec prism with IFU and MSA apertures (OSS)
  - Enable use of entire detector in MIRI coronagraphy observations (OSS)
  - Allow parallels with NIRCам coronagraphy (OSS bug, ready for testing)
  - Reuse NIRSpec detector configuration when dithering or repeating (OSS)
  - Arrange mosaic tiles to cover region specified by observer at multiple orients
  - Enable use of DHS in SW channel when using grism in LW channel (OSS)
  - Allow more flexibility in JWST target names
  - Export APT observation specifications in format useful for simulators
  - Define new fiducial points for NIRCам focal plane (target not in module gap)
  - Put target in fixed slit while using MSA to observe other sources in the field
  - Use NAIF ID for solar system objects (partially implemented)



## Major observing enhancements considered for Cycle 2

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- Not ready for implementation (needs more study)
  - Enable "shadow observations" for moving targets (**OSS**, FSW)
  - Enable IRS2 detector mode for NIRSpec target acquisition
  - Allow observer to suppress MIRI full frame reset between TSO integrations (**OSS**)
  - Allow observer to specify a custom dither pattern
  - Enable NIRCам grism TSO with Module B (**OSS**, contingency)
  - Enhance APT and DMS handling of long slit formed by opening MSA shutters
  
- Schedule
  - Priorities will be finalized by the end of the month