

# Pandeia Engine News

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The Pandeia engine of the Exposure Time Calculator is released to the community to support users who wish to script their calculations, run more extensive parameter space studies, and have more direct control of their scenes. We also recognize that the community has developed more extensive wrappers and public tools that depend on the Pandeia engine.

This page is intended to facilitate communication with developers in the community with Pandeia engine dependencies.

The latest release of the Pandeia engine is [3.2 \(JWST\)](#), [3.1 \(Roman\)](#).

- Get the [latest engine release](#) software, installable with pip
- See the [installation instructions](#)
- Get the [Synphot data files](#) that support certain target spectra manipulations
- Get the required mission-specific items:

Webb	Roman
<ul style="list-style-type: none"><li>• get the <a href="#">Webb data</a></li><li>• see <a href="#">release notes</a> and <a href="#">known issues</a></li></ul>	<ul style="list-style-type: none"><li>• get the <a href="#">Roman data</a></li><li>• see <a href="#">release notes</a> and <a href="#">known issues</a></li></ul>

- View [usage instructions](#) (Webb-specific)
- View the [Input API](#) documentation
- View the [Output API](#) documentation

## Next Planned Release

The next release of the Pandeia Engine will be for the JWST Cycle 4 call for proposals.

We will update this page with the list of new items for the next release as they are worked.

Tickets in the upcoming release include:

Key	Mission	Description
JETC-2897	JWST	The NIRSpec "msa" mode ("mos" in the webapp) has been renamed to "mos", internally.  The NIRCам "ssgrism" mode ("lw_tsgrism" in the webapp) has been renamed to "lw_tsgrism".  Though old input dictionaries will continue to function until ETC 5.0, anything using build_default_calc() will need to update to use the new names.
JETC-3058	JWST, Roman	The "total_exposure_time" in the "information" report dictionary now takes into account the number of on-source dithers.
JETC-3056	JWST	Duty cycle is now an accurate representation of the fraction of exposure time spent collecting photons.

Version 4 will be released for both missions and contain all of these changes plus additional functionality to be worked.

## What support is available?

Questions about the Pandeia engine for Webb may be directed to the [JWST help desk](#); for Roman, email [help@stsci.edu](mailto:help@stsci.edu) with Roman and/or WFIRST in the subject line or body. However, due to the complexity of the engine, support will be limited and response times may be longer than for other tools.

We welcome comments and feature requests, and these will be considered along with other ETC work.

## What is the Pandeia Engine?

The Pandeia engine uses a pixel-based 3-dimensional approach to perform calculations on small (typically a few arcseconds) 2-dimensional user-created astronomical scenes. It models both the spatial and the wavelength dimensions, using realistic point spread functions (produced using [WebbPSF](#)) for each instrument mode. It natively handles correlated read noise, inter-pixel capacitance, and saturation. Since the signal and noise are modeled for individual detector pixels, the ETC is able to replicate many of the steps that observers will perform when calibrating and reducing their JWST data. This simplifies interpretation of the extracted signal-to-noise ratio (SNR) calculated by the ETC.



While the Pandeia engine includes many effects not typically included in other ETCs, it is not an observation simulator. It does not simulate the full detector, nor does it include 2-dimensional effects such as distortion.

Details on the algorithms used to compute signal and noise on the detector and the strategies used to compute the extracted products can be found in [Pontoppidan et al. 2016](#).