STScI | SPACE TELESCOPE SCIENCE INSTITUTE

EXPANDING THE FRONTIERS OF SPACE ASTRONOMY

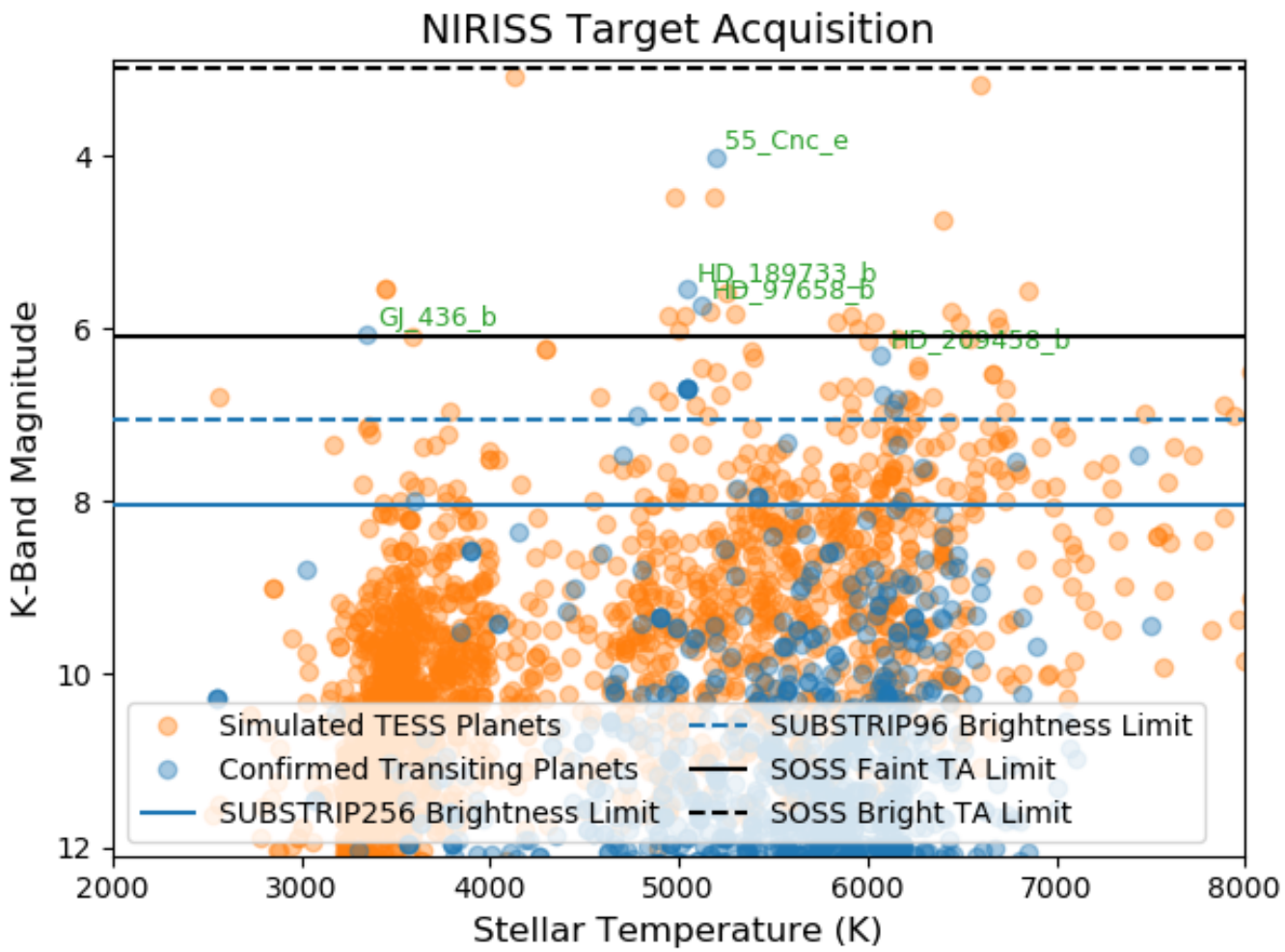
JWST Transiting Exoplanet Working Group Update

01/25/2018

Agenda

- Set up (5 min)
- Bright object target acquisition and other highlights (15 min, Kevin Stevenson)
- NIRCam target acquisition on saturated targets (15 min, Bryan Hilbert)
- Inconsistencies between ETC vs PandExo (10 min, Jonathan Fraine)
- Updates to APT and JDox (15 min, Sarah Kendrew)

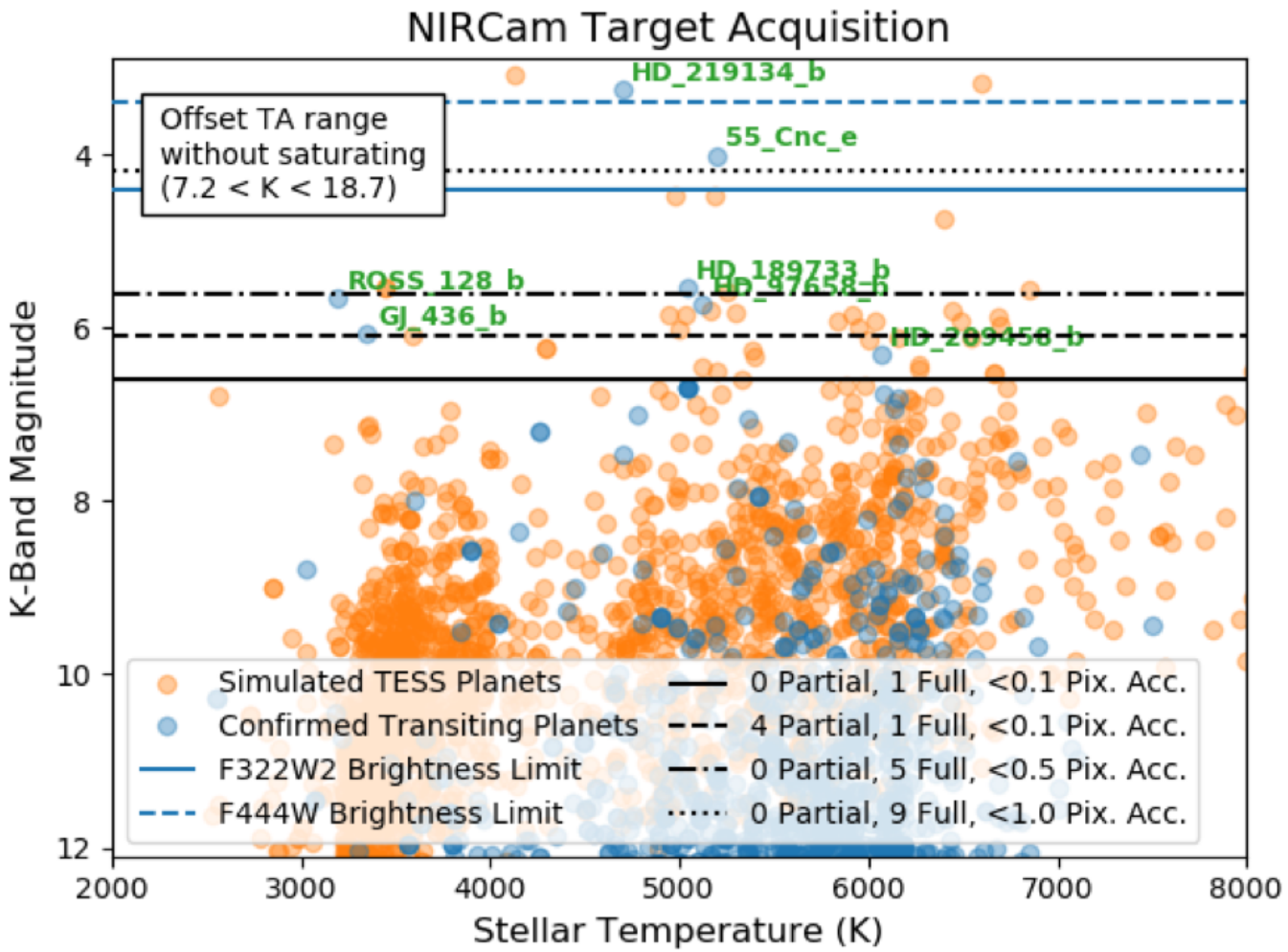
NIRISS Target Acquisition



- Filters: F480M
- Groups: 3, 5, 7, …, 19
- Readout pattern: Faint, Bright
- Subarray: 64x64
- Offset TA range: N/A

- Targets fainter than K = 6.1 should use “Faint” mode
- Targets brighter than K = 6.1 should use “Bright” mode
- Always perform TA on science targets

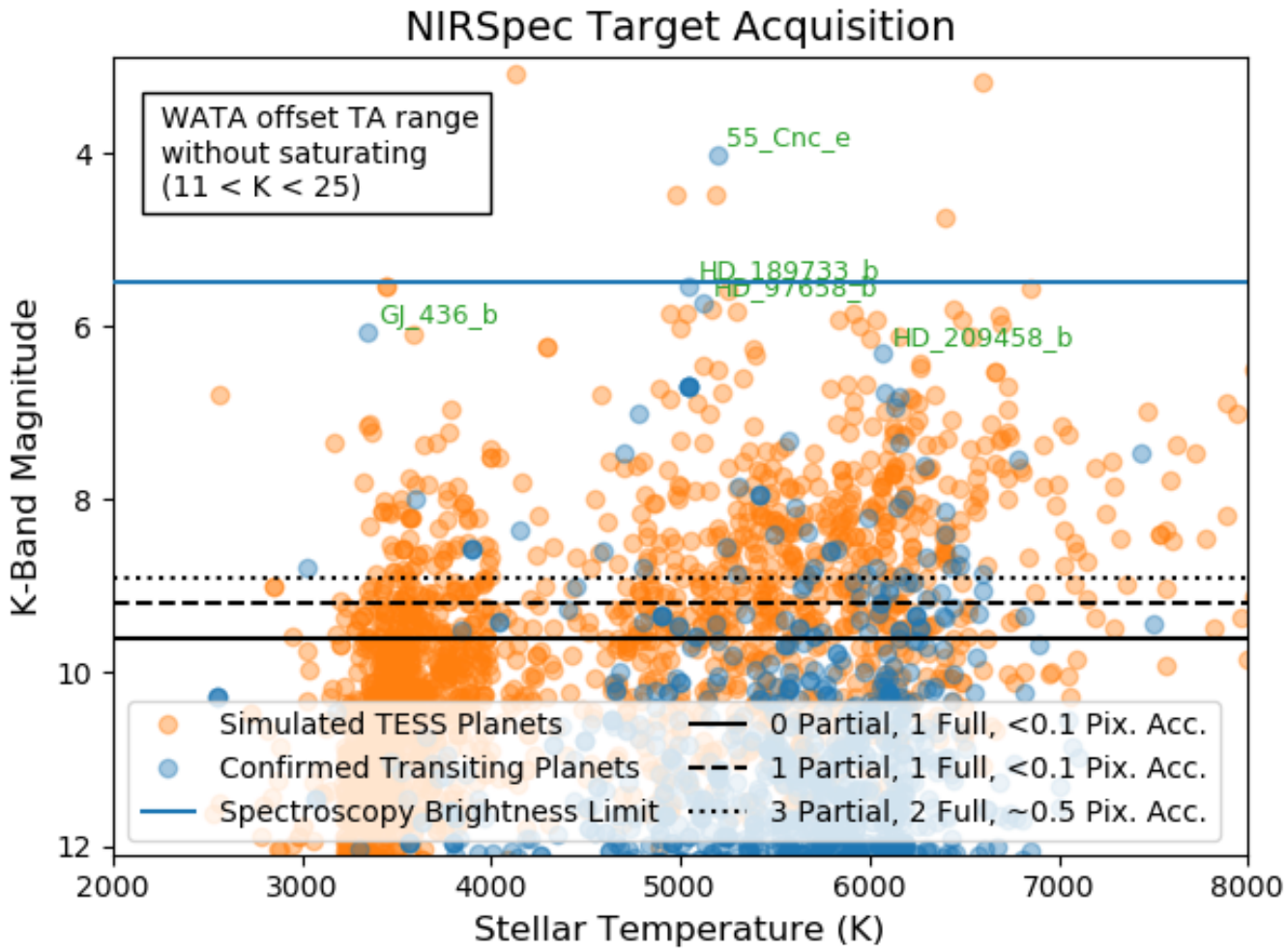
NIRCam Target Acquisition



- Filters: F335M (Cycle 2: narrow)
- Groups: 3, 5, 9, 17, 33, 65
- Readout pattern: 9 options
- Subarray: 32x32
- Offset TA range: 7.2 < K < 18.7

- Targets fainter than K = 6.1 should achieve 0.1 pixel accuracy
- Targets fainter than K = 4.2 should achieve 1 pixel accuracy
- TA possible for all science targets

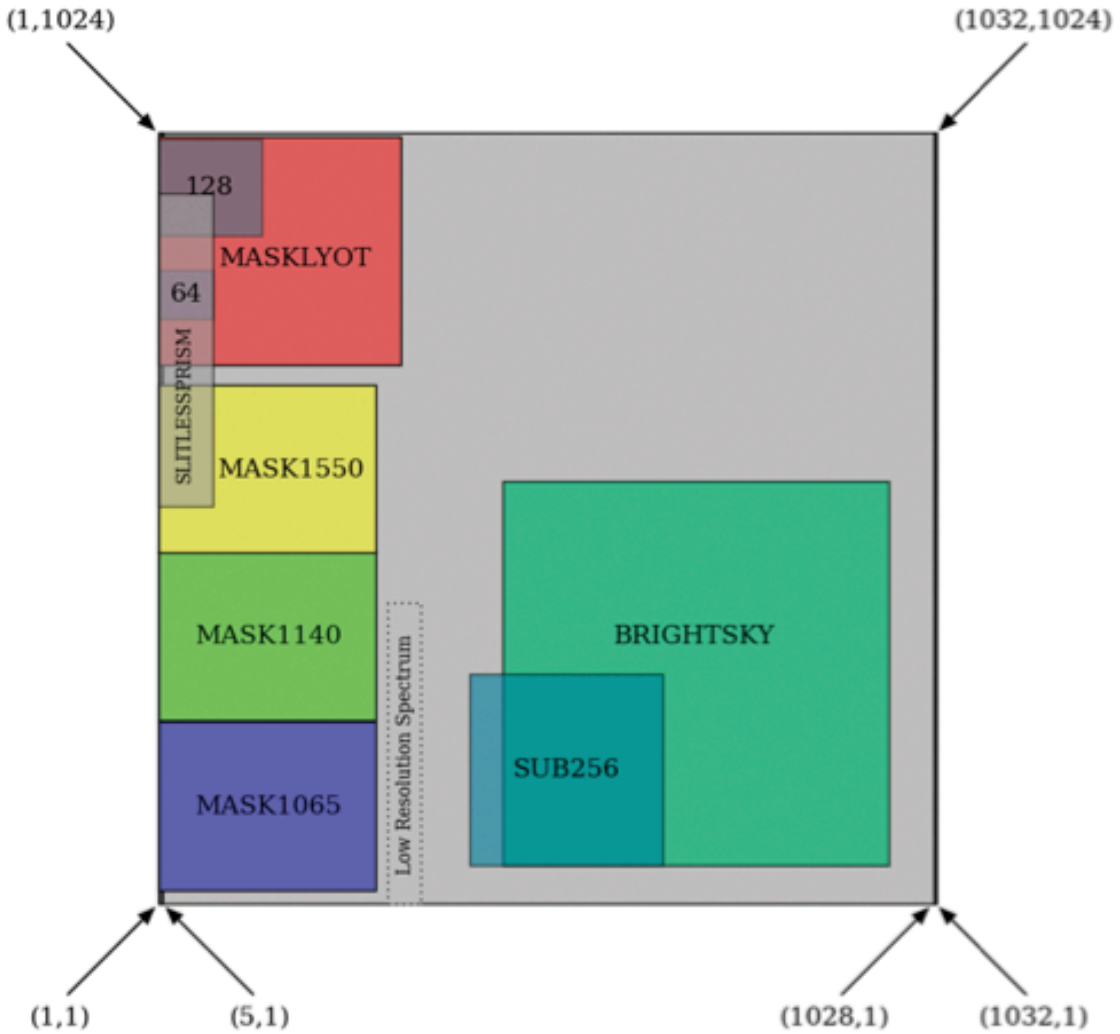
NIRSpec Wide Aperture Target Acquisition (WATA)



- Filters: F110W, F140X, Clear
- Groups: 3
- Readout pattern: 4 options
- Subarray: 32x32, Full
- Offset TA range: 11 < K < 25

- Targets fainter than K = 9.2 should achieve 0.1 pixel accuracy
- Targets brighter than K = 9.2 should use offsets for TA
- TA possible for all science targets

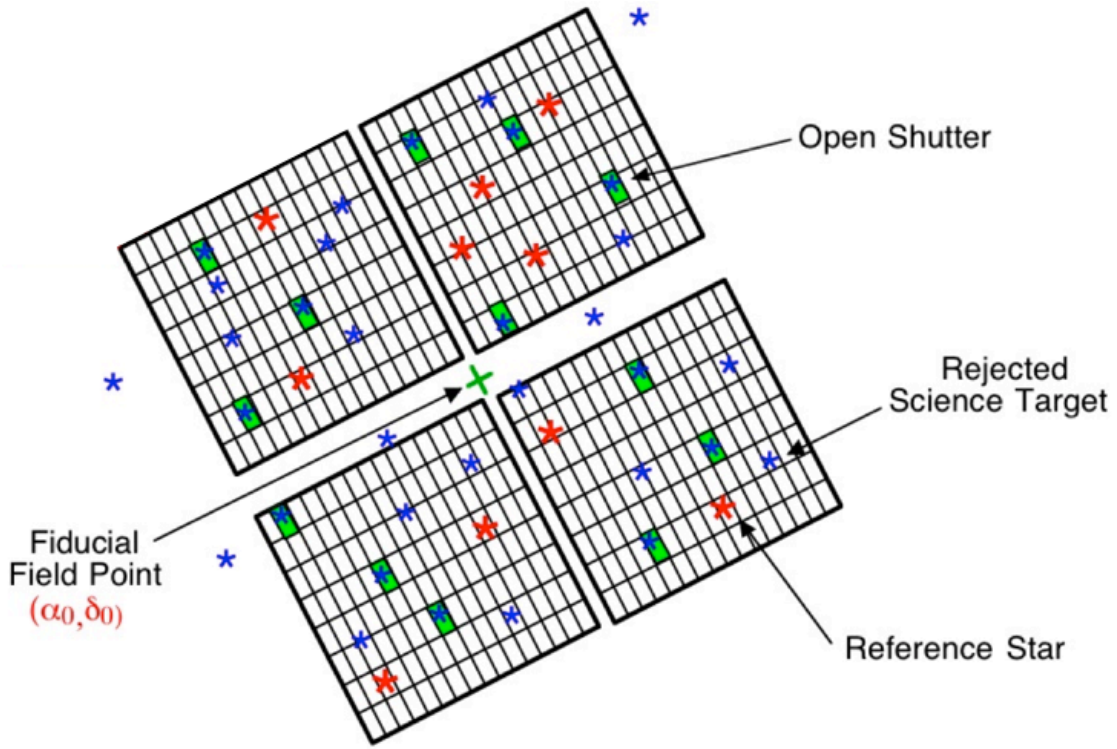
MIRI Target Acquisition



- Filters: F560W, F1000W, F1550W, Neutral Density
- Groups: 3, 5, …, 1571
- Readout pattern: 2 options
- Subarray: Full for LRS
- Offset TA range: N/A

- TA possible for all science targets
- TA not available for MIRI TSO photometry in Cycle 1
  - Blind pointing accuracy is well within SUB64 FoV (7x7”)

Potential Target Acquisition Improvements for Cycle 2



- Narrow filter for NIRCam
  - 2.5 mag improvement
- Fewer groups (1 or 2)
  - 1 mag improvement
- Improved TA on saturated targets
- Micro-shutter assembly (MSA) TA for NIRSpec

Recent Highlights

- MIRI TSO photometry enabled for full array and all subarray modes.

- There is no easy way to timestamp each integration, but we have developed a strategy to create a FITS extension that contains start, mid, and end times in BJD_TDB for each integration. The method interpolates times between each science (full frame) image and is precise to within a few msec.

- Finalized data chunking strategy for large TSO datasets. Exposures will be split roughly evenly into "segments" so that no segment is greater than 2GB and no segment is significantly smaller than the rest. Segments will not contain partial integrations. Smaller files enable faster data processing and are easier to download from MAST.

- Provided detailed description of expected exoplanet science impact to the Science Requirements Advisory Board (SRAB) based on the WFE oscillations seen during OTIS testing
  - Mounts for OTIS testing are stiffer than flight mounts, resulted in oscillations in optical path
  - Flight-like mounts have reduced the oscillation amplitudes by a factor of 4

- Update your local version of PandExo!!!