



STScI



# JWST @ STScI

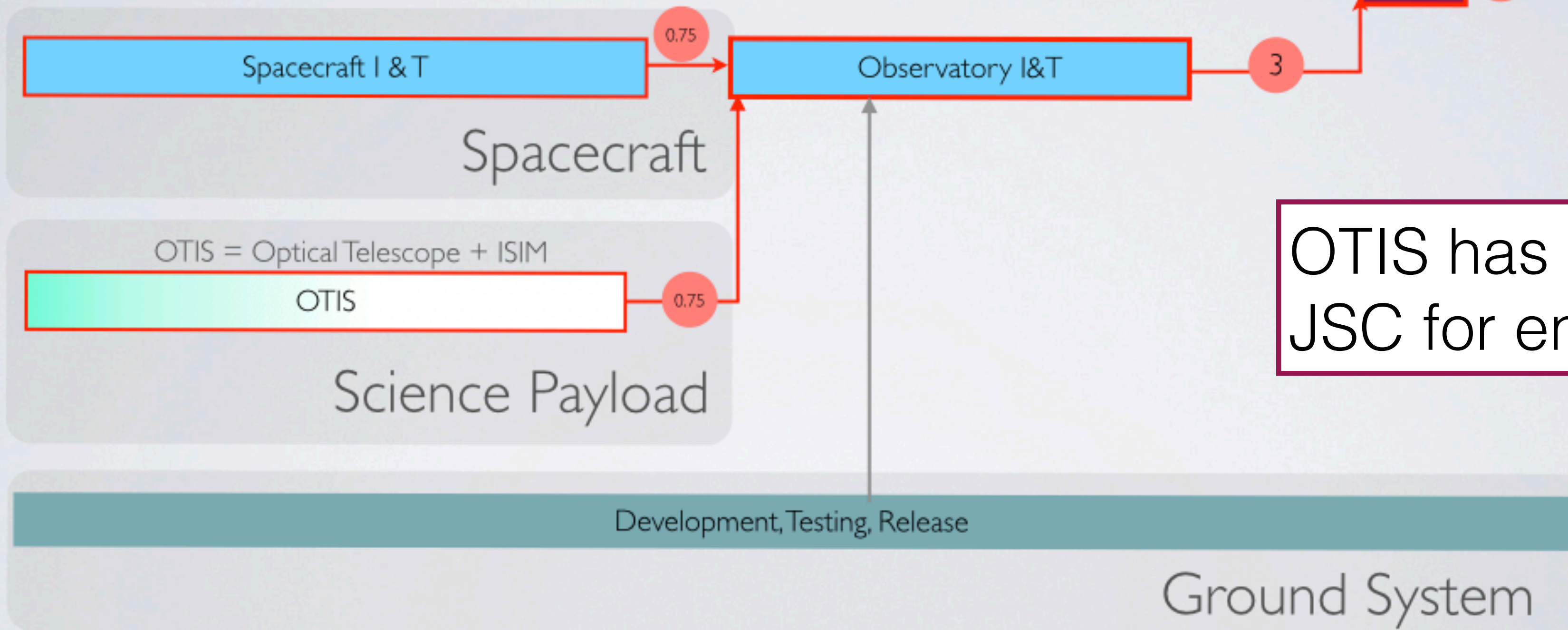
Nikole K. Lewis  
JWST Project Scientist  
Space Telescope Science Institute



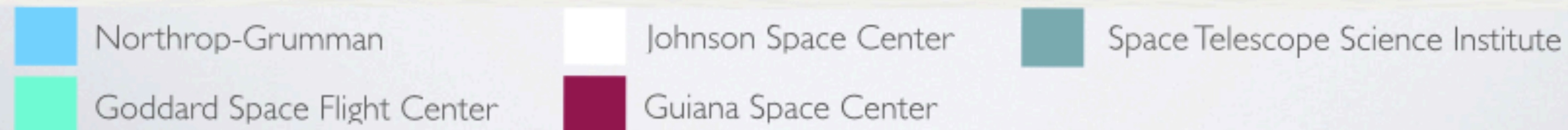
# SIMPLIFIED SCHEDULE

2017												2018											
J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D

**k** months of project funded critical path (mission pacing) schedule reserve



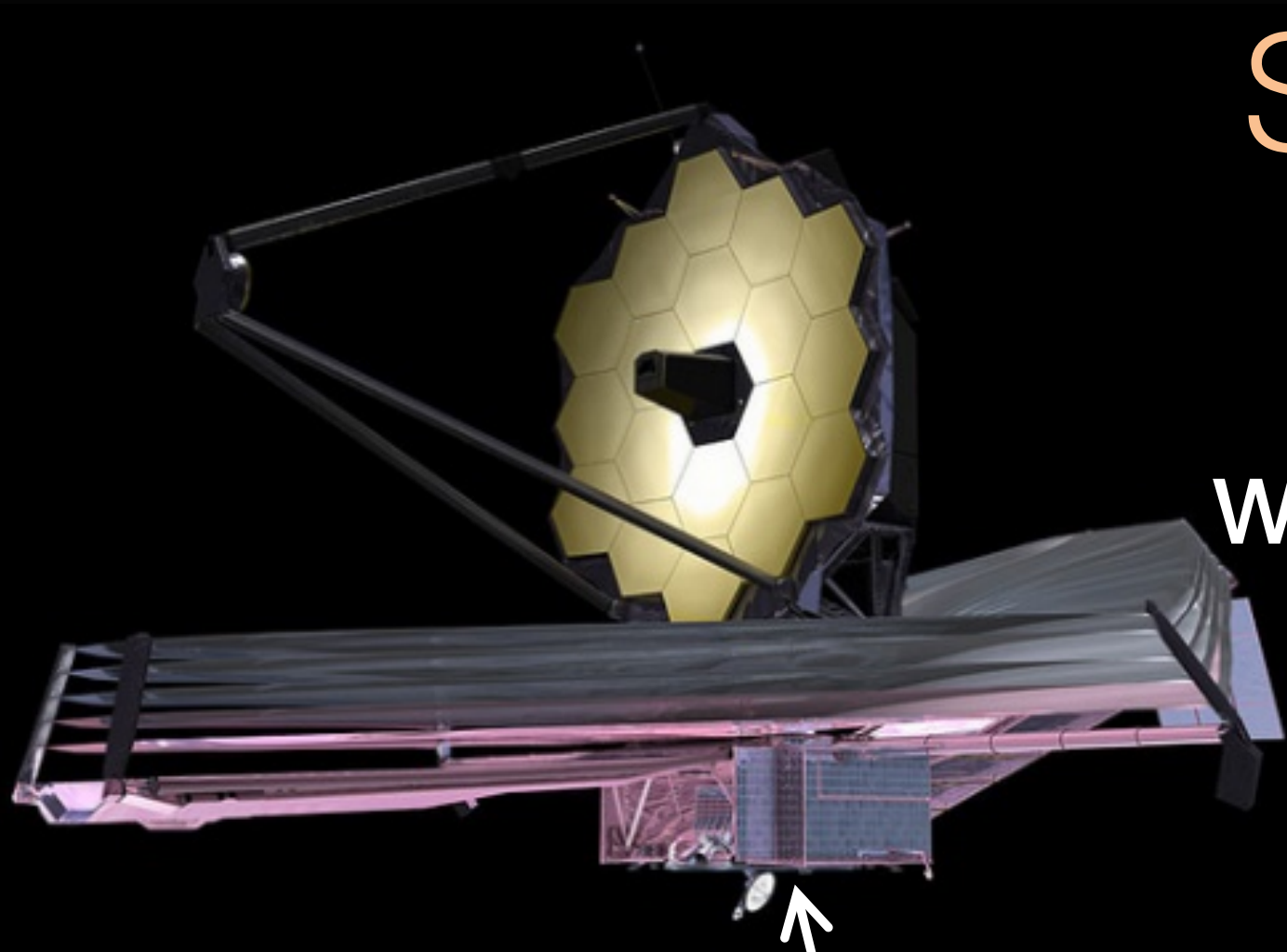
OTIS has been shipped to JSC for environmental testing!





# STScI Operations Flow

on-board scripts (OSS)  
wavefront sensing (WFSC)



PPS

Proposal Preparation

Proposal Selection

Science Planning

Operations Scheduling

Flight Operations

FOS

Data Processing and User Tools

DMS

Data Archiving



Science Community and Public Outreach





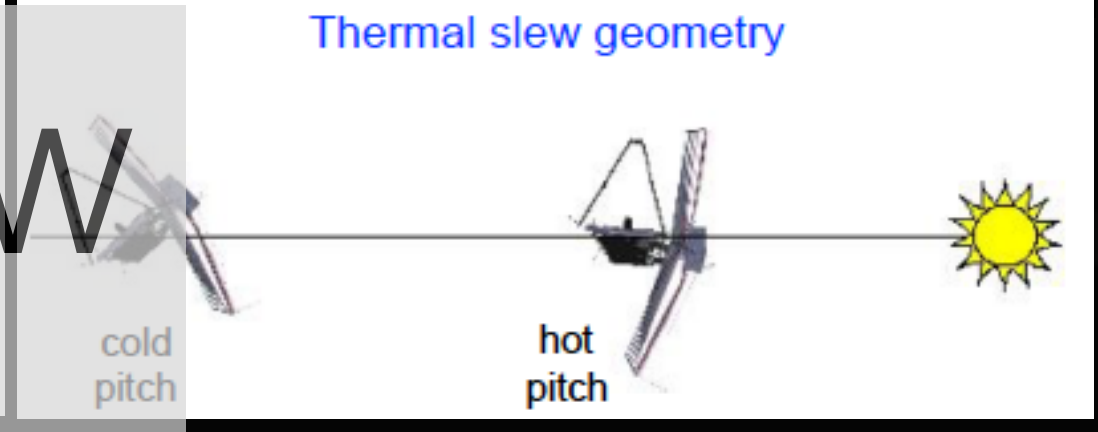
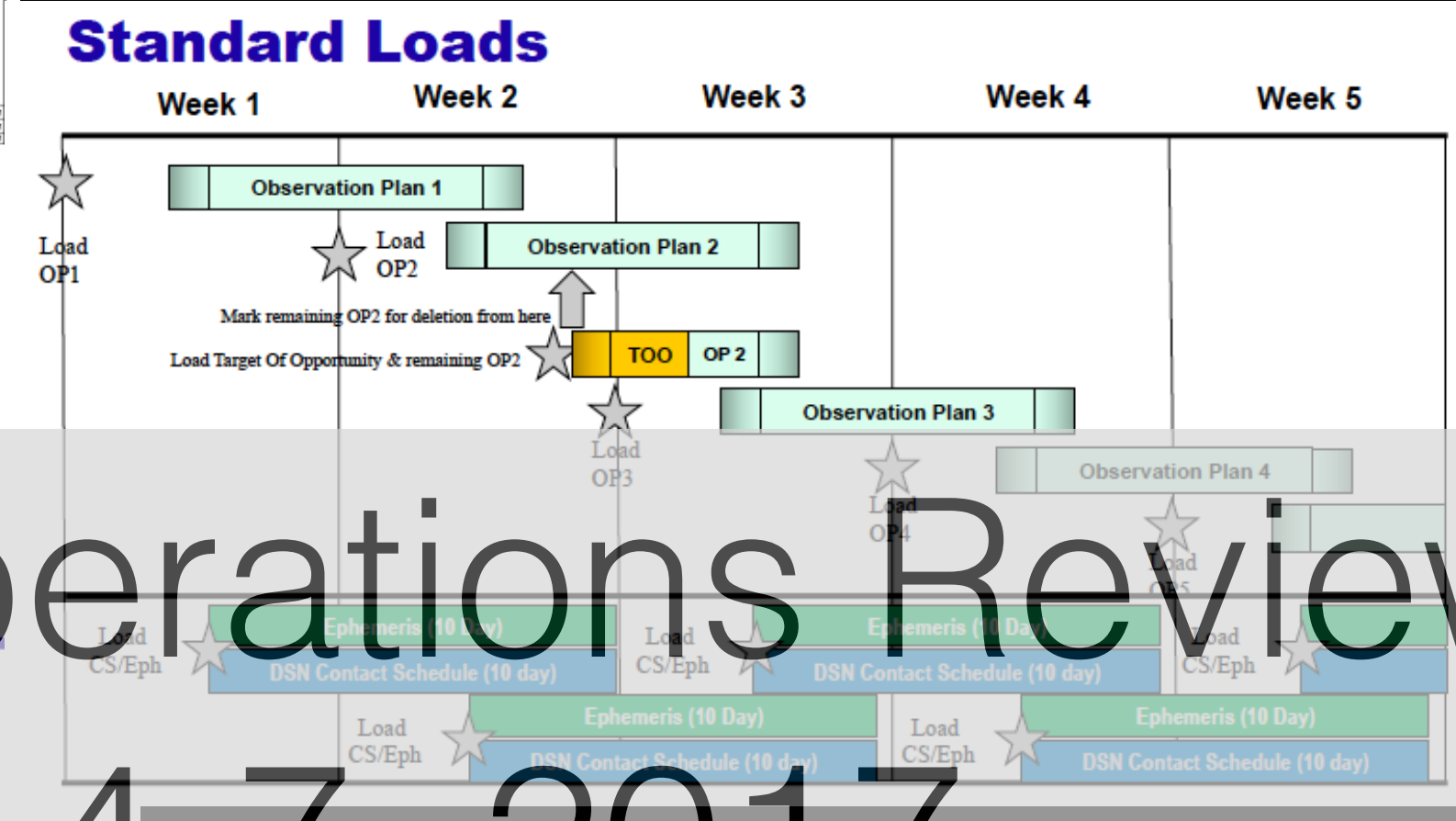
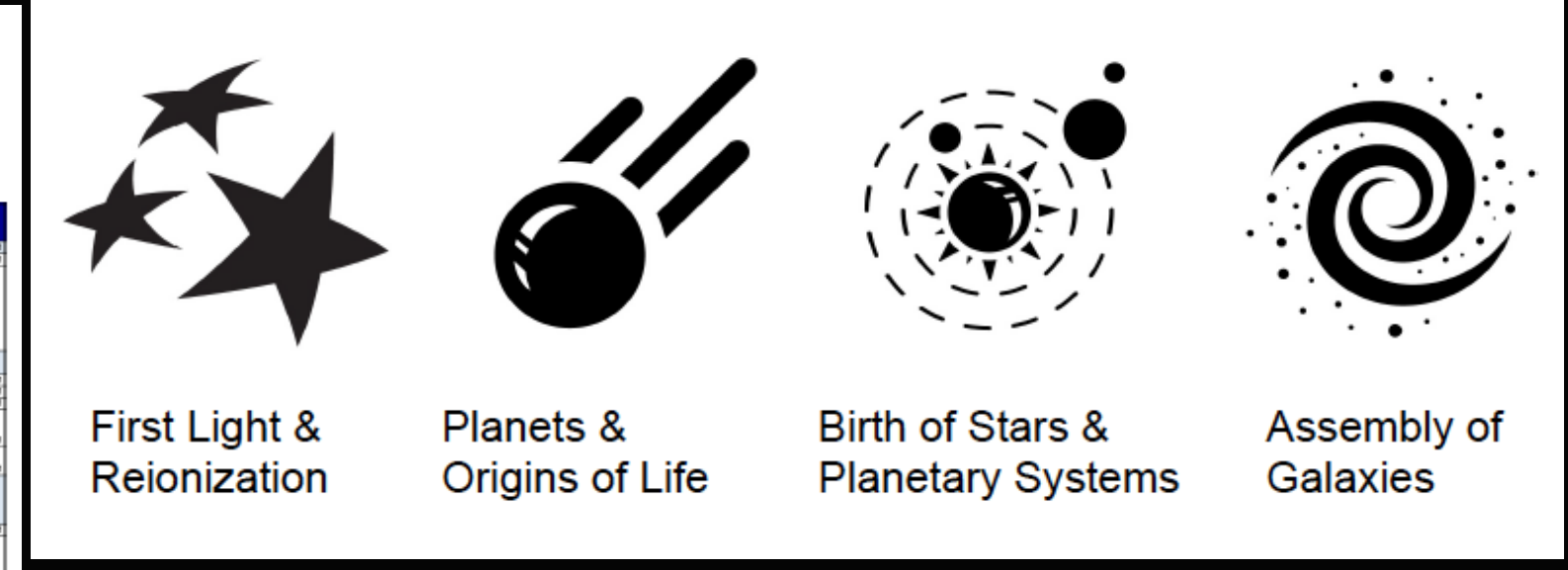
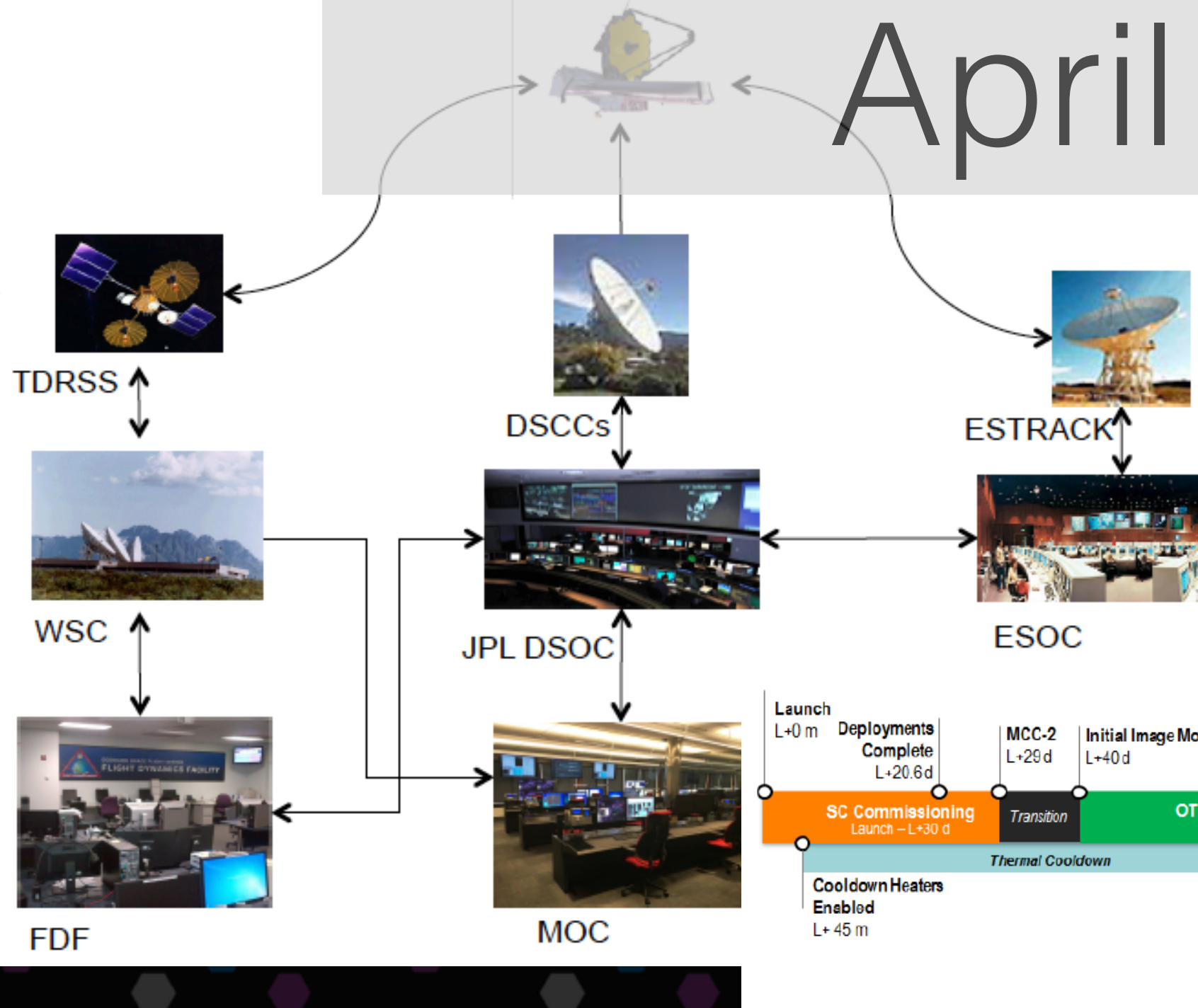
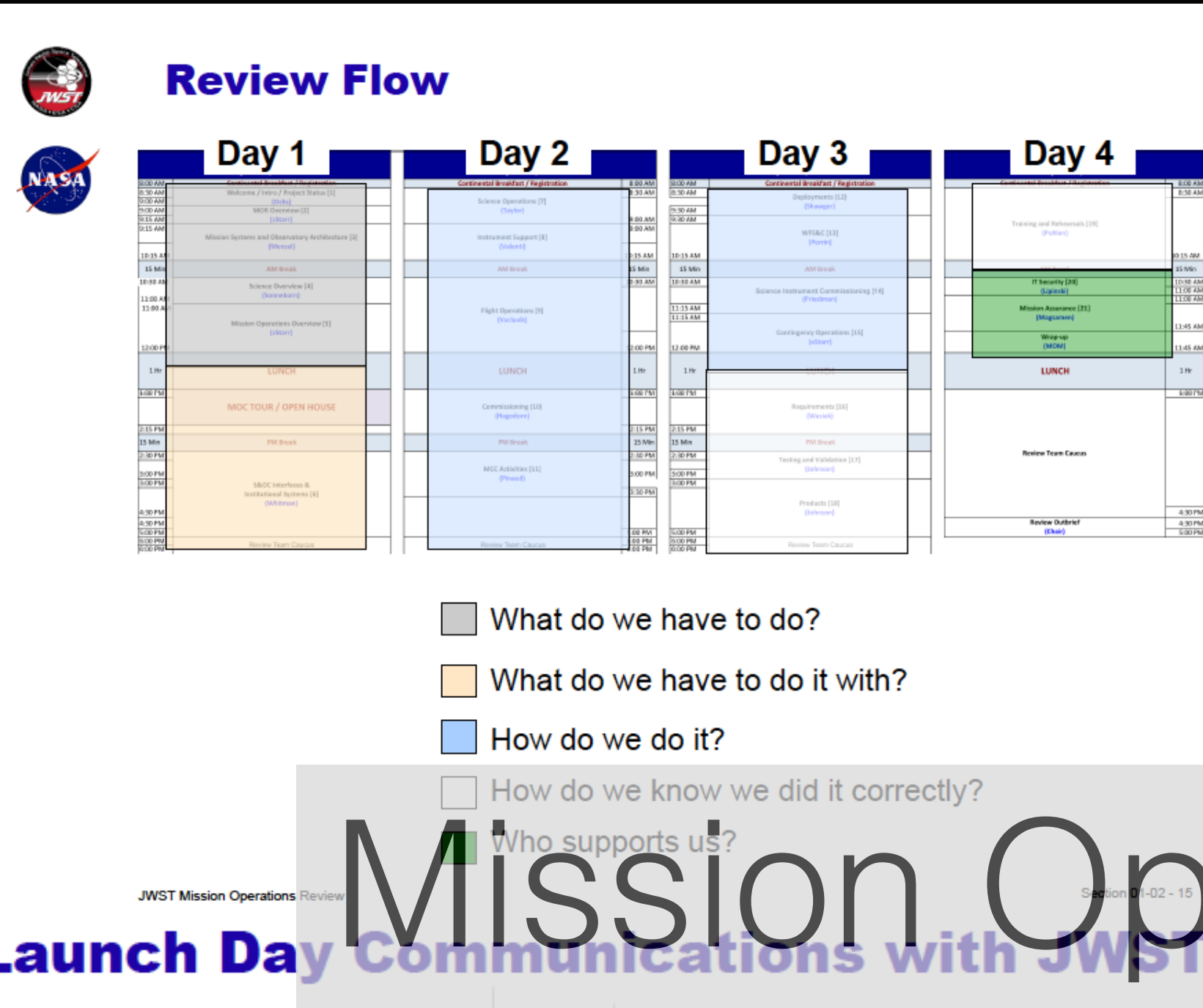
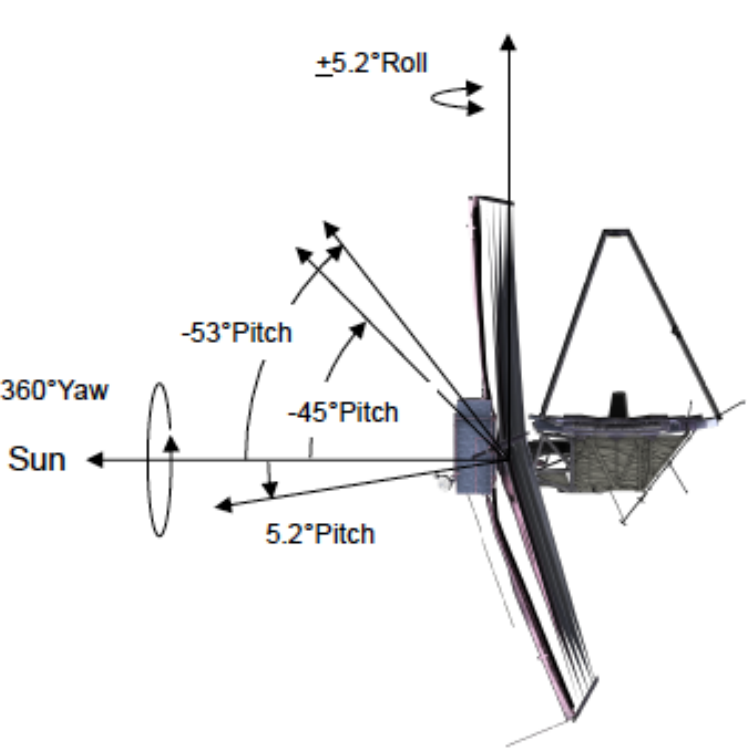
# Recent Key JWST S&OC Events

- S&OC Release 1 Verified and Delivered, on track for timely delivery of flight build.
- First End-to-End Test of the Observatory Test Bed Simulator at STScI.
- Successful completion of Mission Operations Review
- Release of Suite of Proposal Tools at Winter 2017 AAS meeting.
- JWST Cycle 1 Science Programs Solicited (GTO and DD ERS) and Preliminary Descriptions Received.



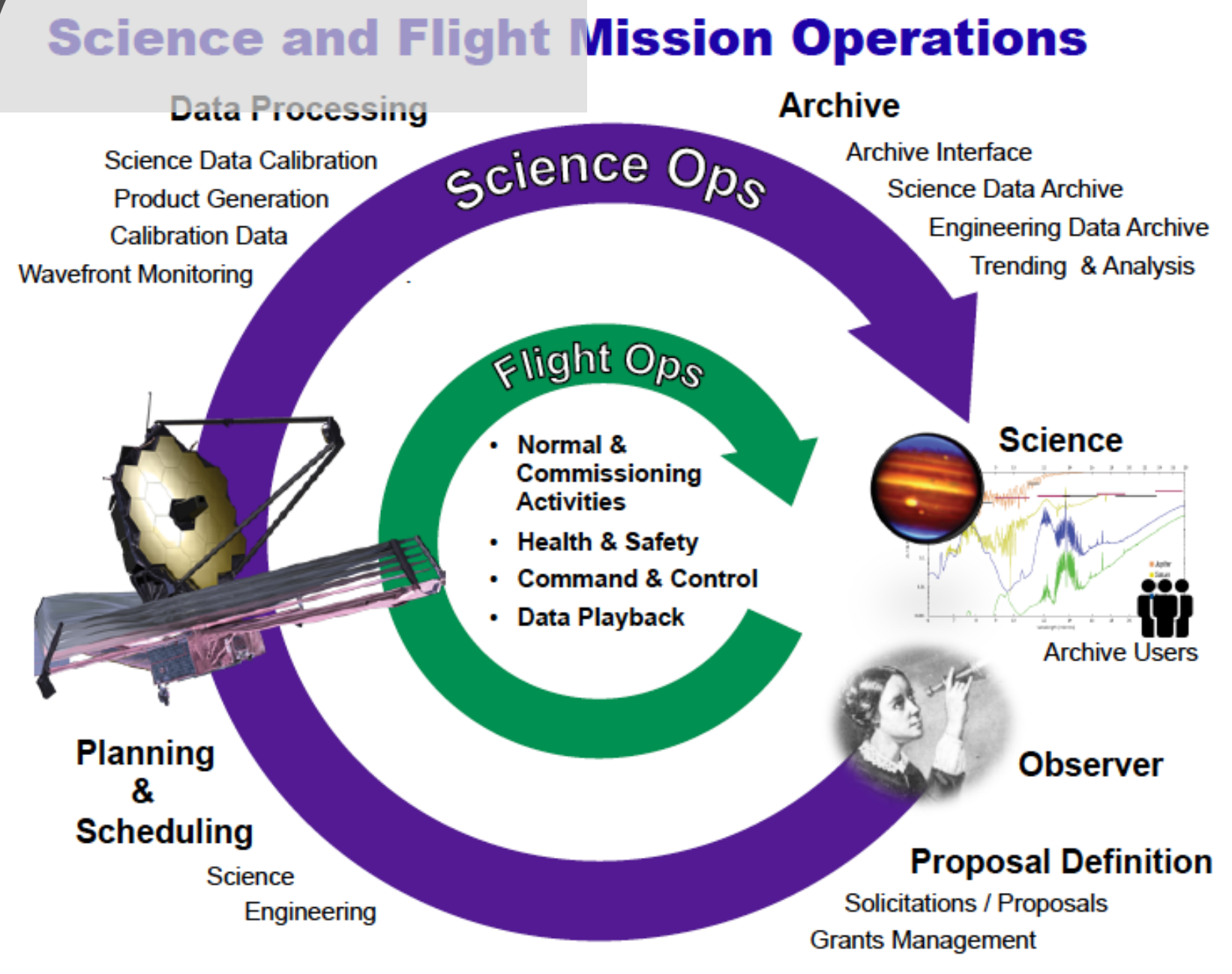
JWST MOC @ STScI



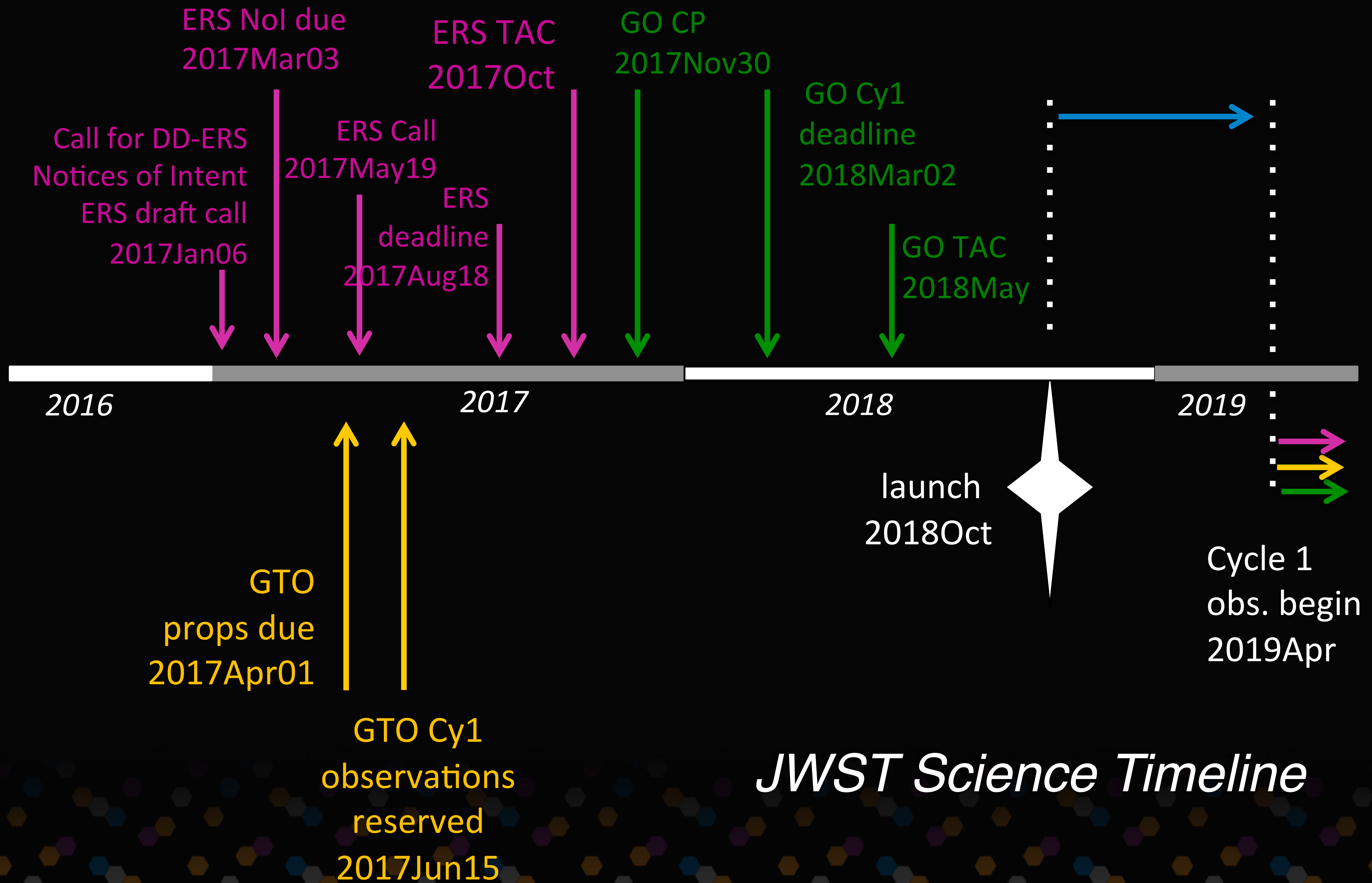


# Mission Operations Review

April 4-7, 2017







## JWST Science Timeline



# JWST@229th AAS

**JWST Town Hall**  
**January 5, 6.30-8.00pm**



JWST User Tools and  
Calls for Proposals/  
NOIs Released!

**Data Analysis Workshop**  
**January 3**

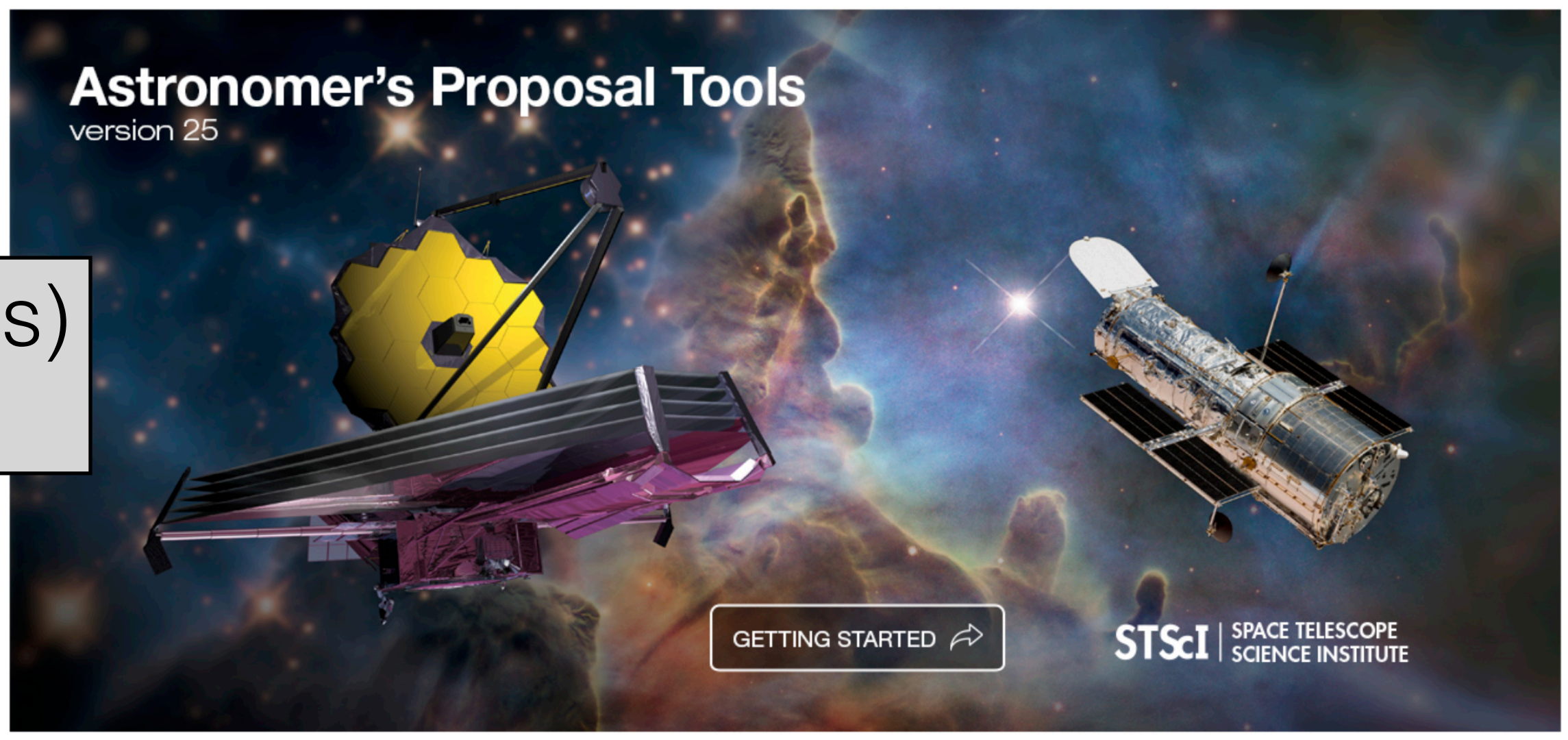


**Ask-an-Expert at the  
STScI Booth**



# User Tool Releases

APT 25.0.5 (Includes Parallels)  
<http://apt.stsci.edu>

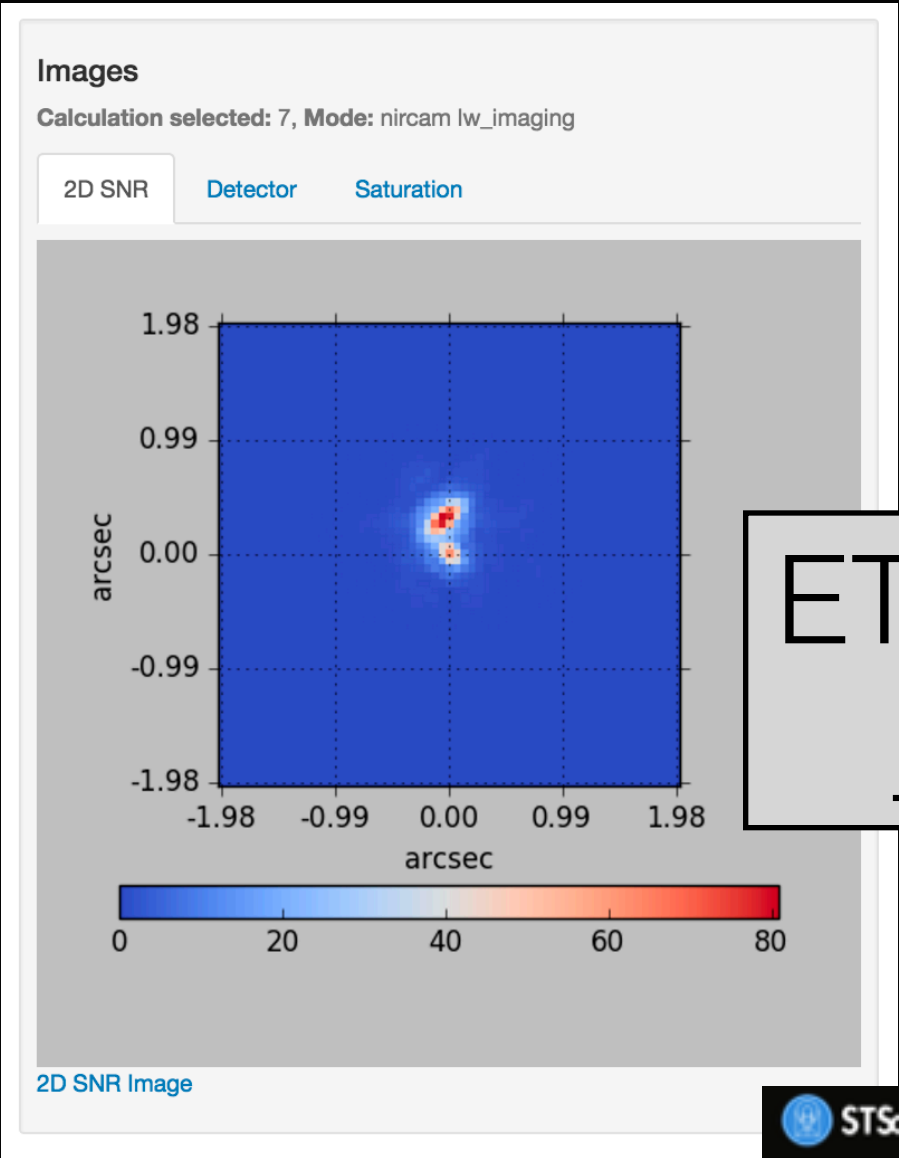


Calculations   Scenes and Sources   Uploaded Spectra

MIRI ▾   NIRCam ▾   NIRISS ▾   NIRSpec ▾

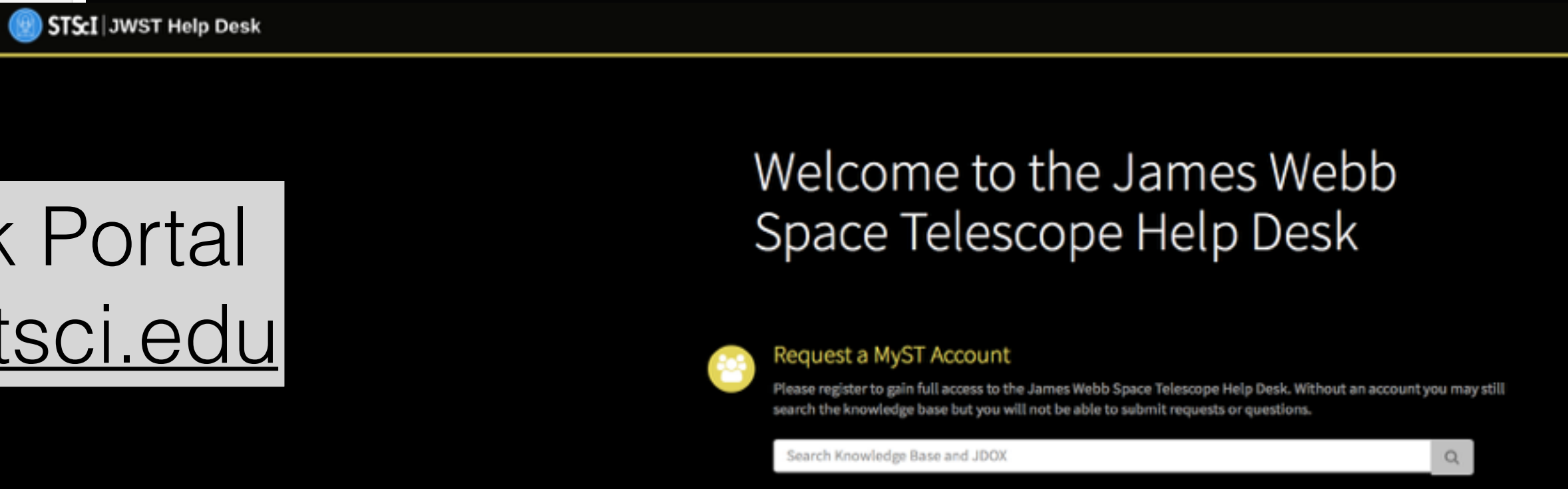
ID ▴	Plot	Mode -	Scene -	(s) -	SNR -	⚠
7	<input type="checkbox"/>	nircam lw_imaging	1	63.78	124.40	✓
6	<input type="checkbox"/>	nircam lw_imaging	1	63.78	191.76	✓
5	<input type="checkbox"/>	nirspec fixed_slit	1	458.40	125.73	✓
4	<input type="checkbox"/>	miri imaging	1	277.50	1163.14	✓
3	<input type="checkbox"/>	nircam lw_imaging	1	63.78	120.43	✓
2	<input type="checkbox"/>	nirspec fixed_slit	1	458.40	22.66	✓
1	<input type="checkbox"/>	nirspec fixed_slit	1	458.40	133.39	✓
-	-	---	-	---	---	-

JWST ETC



ETC WebApp Flight Release  
<https://jwst.etc.stsci.edu>

JWST Help Desk Portal  
<https://jwsthelp.stsci.edu>





# The JWST Astronomer's Proposal Tool (APT)

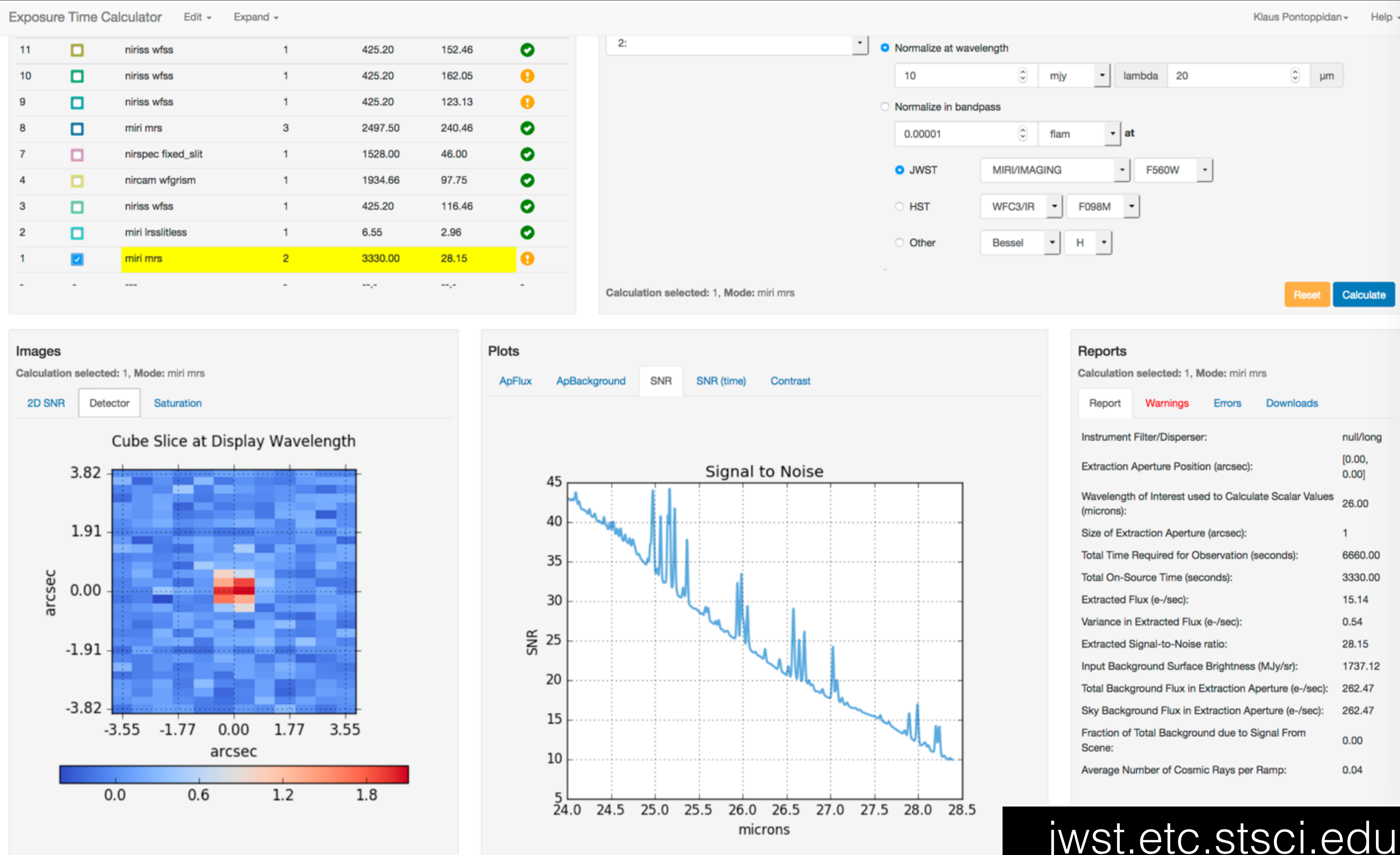
- Familiar to HST users
- To be used to define JWST observing programs and submit JWST proposals.
- Development releases of JWST APT available together with HST APT

The screenshot displays the JWST APT software interface. At the top, a menu bar includes options like 'Form Editor', 'Spreadsheet Editor', 'Orbit Planner', 'Visit Planner', 'View in Aladin', 'BOT', 'Target Confirmation', 'PDF Preview', 'Submission', 'Errors and Warnings', and 'Run'. Below this, a toolbar contains icons for 'JWST What's New', 'HST What's New', and 'Roadmap'. A left-hand pane shows a 'New Document' menu with options: 'New HST Proposal', 'New JWST Proposal', 'Proposal Information', 'Targets', 'Observations', and 'Observation Links'. The main window is titled 'Proposal Information of JWST Draft Proposal (Unsaved)'. It contains several input fields and buttons: 'Title' and 'Abstract' (both marked with a red 'X' icon), 'Proposal ID' (text input), 'Category' (dropdown menu set to 'GO', with checkboxes for 'Calibration' and 'Treasury'), 'Cycle' (dropdown menu set to '0'), 'Science Time (hours)' (text input set to '0.00'), 'Charged Time (hours)' (text input set to '0.00'), 'Proprietary Period' (dropdown menu set to 'Default', with a note 'Default is 12 Months'), 'Allow Restricted' (checkbox, currently unchecked, with a note '(this session only)'), and 'Scientific Category' (dropdown menu set to 'None Selected', marked with a red 'X' icon). There are also buttons for 'Explain unschedulable observations', 'Request custom time allocation', and 'Future cycles'.

Download Latest Version at <http://apt.stsci.edu>



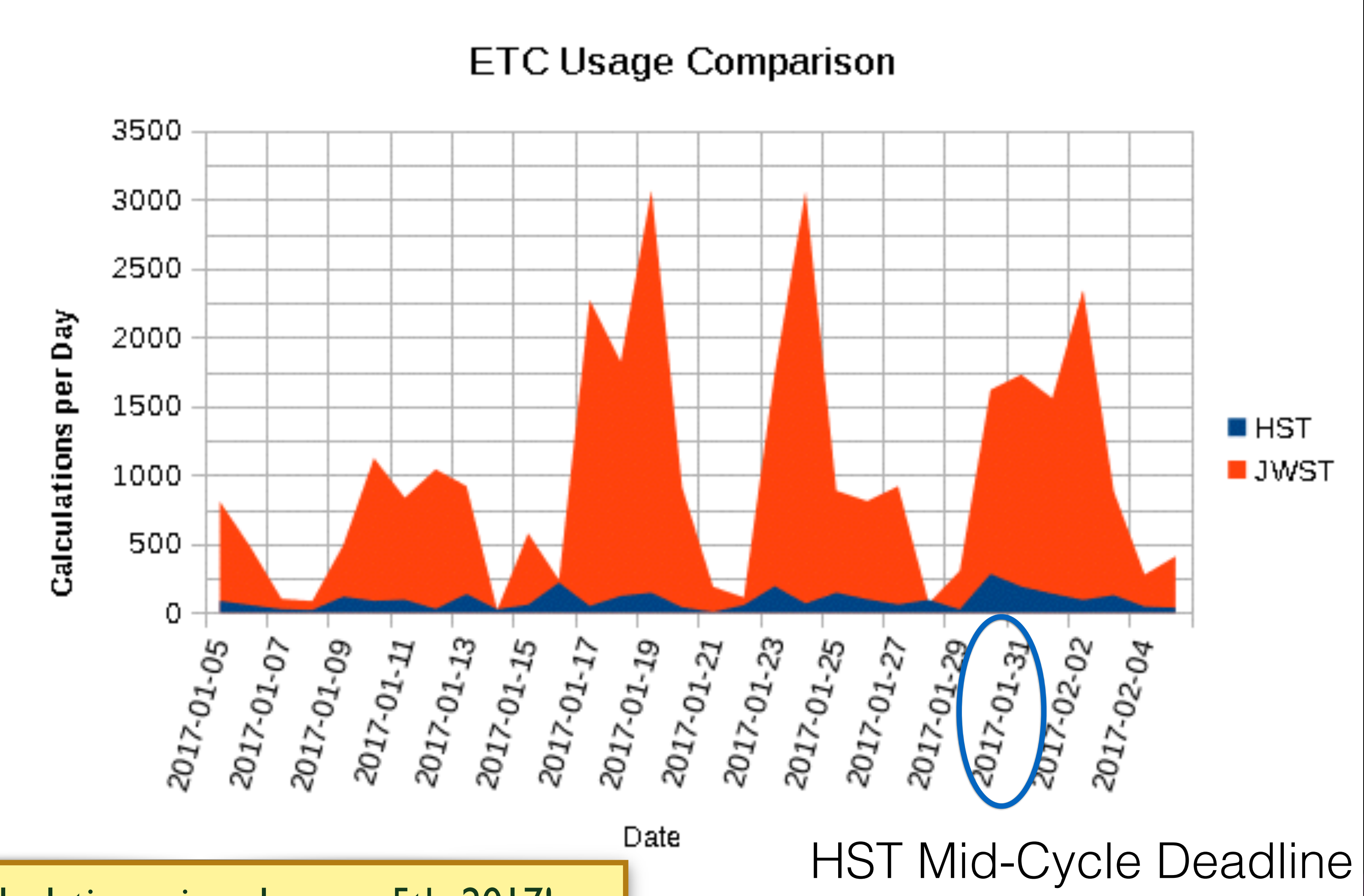
# JWST Exposure Time Calculator



[jwst.etc.stsci.edu](http://jwst.etc.stsci.edu)



# JWST Exposure Time Calculator



100,000+ Calculations since January 5th, 2017!



# JWST Help Desk

James Webb Help Desk

**APT Support**  
Request assistance with the Astronomer's Proposal Tool (APT)

View Details

**ETC Support**  
Request assistance with the Exposure Time Calculator (ETC)

View Details

**JWST Science Policies**  
Request assistance for Science Policy Issues.

View Details

**MAST Services**  
Information about the MAST Archive

View Details

**MIRI Support**  
Request assistance with the Mid-Infrared Instrument (MIRI)

View Details

**NIRCam Support**  
Request assistance with the Near-Infrared Camera (NIRCam)

View Details

**NIRISS Support**  
Request assistance with the Near-Infrared Imager and Slitless Spectrograph (NIRISS)

View Details

**NIRSpec Support**  
Request assistance with the Near-Infrared Spectrograph (NIRSpec)

View Details

**Office of Public Outreach**  
Contact the STScI Office of Public Outreach about JWST

View Details

**Operations and Scheduling**  
Ask questions about scheduling and operations with JWST.

View Details

**Pipeline Support**  
Request assistance with the JWST pipeline

View Details

**WebbPSF / JWST Telescope**  
Request assistance with the WebbPSF tool or the Telescope optical system.

View Details

**JWST General Support**  
Request general JWST support for issues not covered by another category.

View Details



## STScI | JWST Help Desk

# Welcome to the James Webb Space Telescope Help Desk

[jwsthhelp.stsci.edu](http://jwsthhelp.stsci.edu)

160+ help tickets have already been received and resolved!

## How can we help?

Search JWST Knowledge Base and Documentation System (JDOX)

How can we help?



**Knowledge Base**

Browse and search JWST Knowledge Base and Documentation (JDOX)



**Get Help**

Contact support to make a request, or report a problem



**Community Forum**

Community-sourced answers to your questions





# JWST User Documentation (JDox)

## A New Paradigm for JWST User Documentation

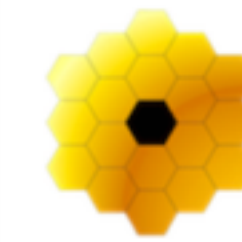
New documentation system: “Every page is page one”

- Short articles
- Self-contained, one-level information
- Hyperlinked network rather than monolithic handbook

Think Wikipedia (but it's not a wiki)

Multiple conceptual spaces: Background articles, planning cookbooks, science policy, engineering specs

Incremental releases (as articles are written and reviewed), beginning with instruments, APT, ETC articles



### JWST Observatory and Instrumentation

Expand all Collapse all

- › Mid-Infrared Instrument, MIRI
- › Near Infrared Camera, NIRCAM
- › Near Infrared Imager and Slitless Spectrograph, NIRISS
- › Near Infrared Spectrograph, NIRSpec



### JWST Opportunities and Policies

Expand all Collapse all

- › JWST Cycle 1 Proposal Opportunities
- › JWST General Science Policies




[jwst-docs.stsci.edu](http://jwst-docs.stsci.edu)


Over 230 pages published to date!



# JWST User Documentation (JDox)



James Webb Space Telescope User Documentation


HOME INSTRUMENTS ▾ PLANNING ▾ CALL FOR PROPOSALS ▾ POLICIES ▾ DATA ▾ Search 

... / MIRI Observing Modes

MIRI Low Resolution Spectroscopy

Last Updated Mar 22, 2017

Low-resolution spectroscopy is an observing mode for JWST's [Mid-Infrared Instrument \(MIRI\)](#) that offers slit and slitless spectroscopy from 5 to 12  $\mu\text{m}$ .



MIRI  
Mid-Infrared  
Instrument

Introduction

MIRI's low-resolution spectrometer (LRS; [Kendrew et al. 2015](#)) offers both slit and slitless spectroscopy from 5 to 12  $\mu\text{m}$  using a [double prism](#) mounted in the MIRI [filter wheel](#), designed to provide a spectral resolving power of  $R = 40$  at 5  $\mu\text{m}$ , and  $R = 160$  at 10  $\mu\text{m}$  for compact sources ( $<2''$ ). The long-wavelength limit for this mode is determined by the combined throughput of the prisms and the slit mask, which drops off steeply from a peak of around 80% at 8–9  $\mu\text{m}$  to just 25% at 12  $\mu\text{m}$ . Point source [sensitivity](#) will be nearly a factor of 10 $\times$  better when using the slit.

Users should ultimately use the [Exposure Time Calculator](#) for all [sensitivity](#) calculations.

On this page

- [Introduction](#)
- [Slit vs. slitless spectroscopy](#)
  - [Note on wide-field slitless spectroscopy while using the slit](#)
- [Dither patterns with LRS](#)
- [LRS exposure specifications](#)
- [Related links](#)
- [References](#)



# JWST Calls for Proposals/NOIs

JWST Opportunities and Policies

## JWST Cycle 1 Proposal Opportunities

The James Webb Space Telescope will offer proposal opportunities for General Observers (GO), **Guaranteed-Time Observers (GTO)**, and **Early Release Science Programs (DD ERS)** during Cycle 1. JWST Cycle 1 observations will commence in Spring 2019, with Cycle 1 proposals deadlines in 2017/2018.

We invite scientists to participate in the first cycle of investigations with the James Webb Space Telescope (JWST). JWST is an international collaboration between **NASA**, the **European Space Agency (ESA)**, and the **Canadian Space Agency (CSA)**. JWST is operated and managed by AURA's **Space Telescope Science Institute (STScI)**. The links below provide information, policies, deadlines, and instructions for proposing opportunities with JWST in Cycle 1.

- **Guaranteed Time Observation (GTO) Program [PDF]**
- **Director's Discretionary Early Release Science (DD ERS) Program [PDF]**
  - **Call for Notices of Intent to propose**
  - **Call for Proposals**
- **General Observer (GO) and Archival Research (AR) Program**

## Important Dates

Release of the Cycle 1 Call for GTO Proposals	January 6, 2017
Release of the Cycle 1 Call for ERS Letters of Intent	January 6, 2017
ERS Letters of Intent due	March 3, 2017
Cycle 1 GTO Science Descriptions and Observation Specifications due	April 1, 2017
Release of the Cycle 1 Call for ERS Proposals	May 19, 2017
APT version 25.2 Released (with final Cycle 1 overhead calculations)	June 1, 2017
GTO Observation Specifications Published (public)	June 15, 2017
GTO APT Technical Reviews and Revisions Begin	July 28, 2017
ERS Proposal Deadline	August 18, 2017
GTO APT Technical Reviews and Revisions End	September 15, 2017
ERS Results Released	November 2017
Release of the Cycle 1 Call for GO Proposals	November 30, 2017
GTO APT Files Published (public)	December 15, 2017
ERS APT Files Published (public)	December 2017
Cycle 1 GO Proposal Deadline	March 2, 2018

<https://jwst-docs.stsci.edu/display/JSP/JWST+Cycle+1+Proposal+Opportunities>



# The JWST Director's Discretionary Early Release Science (DD ERS) Program

- STScI Director Ken Sembach will allocate ~500 hours of Director's Discretionary time for Early Release Science (DD-ERS) to*
- accelerate the diffusion of JWST know-how, and*
  - expand early opportunities for the community to gain experience with JWST data and scientific analysis.*

*Early resources are allocated to support up to 15 teams. Proposals will be selected in research areas spanning the science themes of JWST :*



*First Light &  
Reionization*



*Assembly of  
Galaxies*



*Birth of Stars &  
Protoplanetary  
Systems*



*Planets & Origins  
of Life*



200 Notices of Intent to Propose to Director's Discretionary Early Release Science (DD ERS) Program Received!



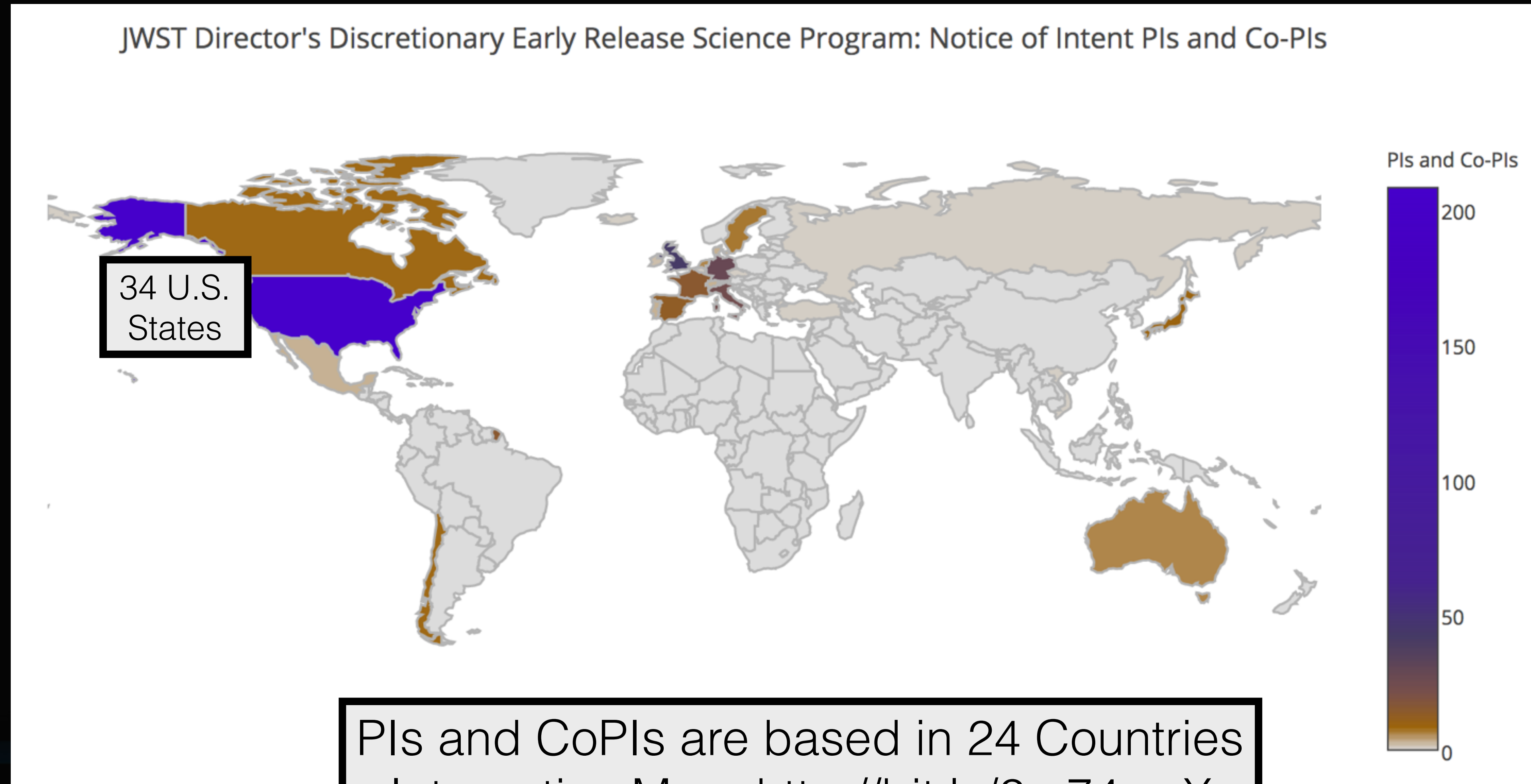
# The JWST Director's Discretionary Early Release Science (DD ERS) Program

Total of 3,665 Named Investigators/Collaborators  
Average of 18 Scientists per Team  
Largest Team is 119 Investigators  
2,379 Unique Investigators/Collaborators  
477 New User Investigators/Collaborators



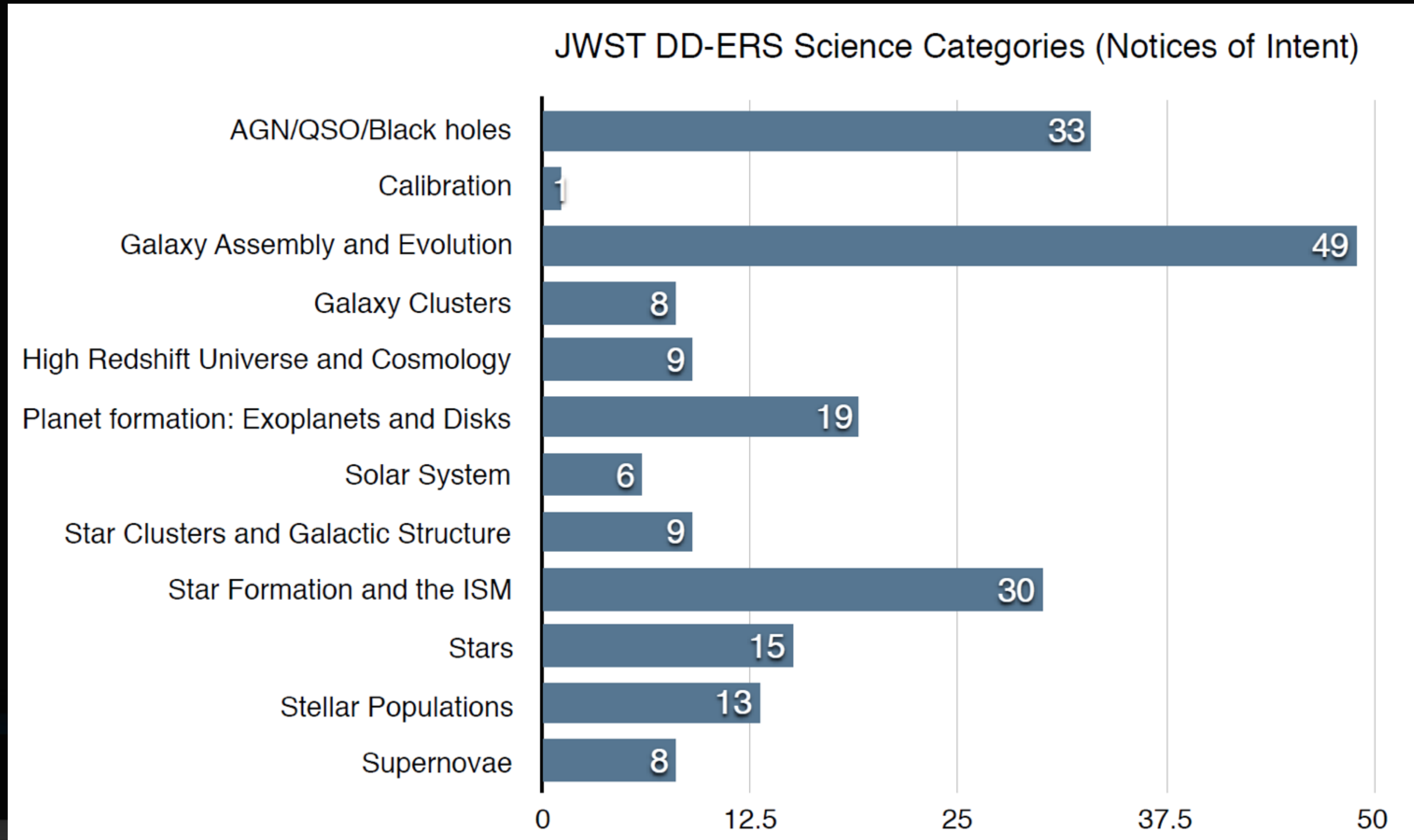


# The JWST Director's Discretionary Early Release Science (DD ERS) Program



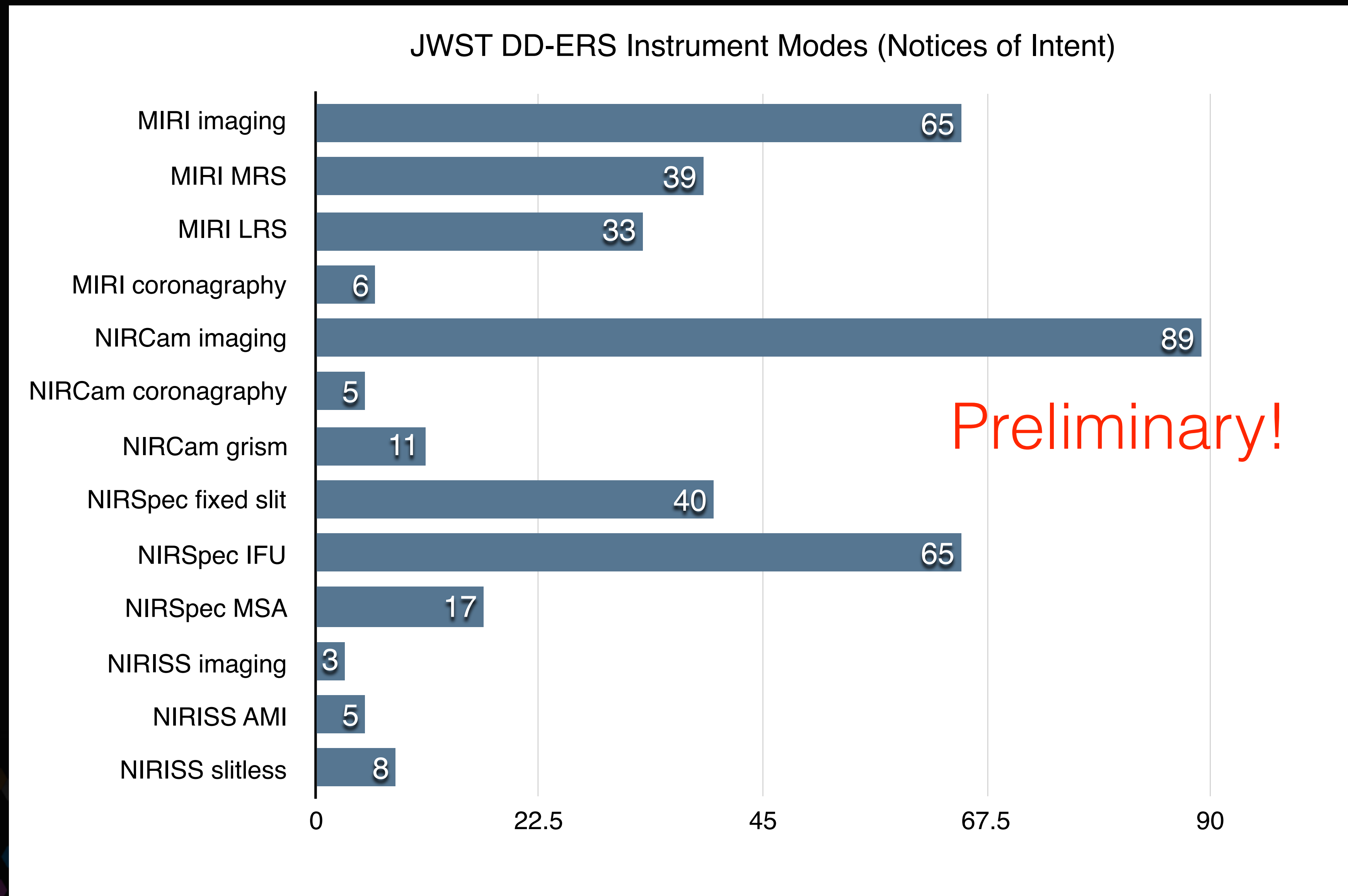


# The JWST Director's Discretionary Early Release Science (DD ERS) Program





# The JWST Director's Discretionary Early Release Science (DD ERS) Program





# Online Resources

 [About STScI](#) | [Archive](#)

## NASA's James Webb Space Telescope

Developed in partnership with ESA and CSA. Operated by AURA's Space Telescope Science Institute

[PUBLIC](#) [EDUCATORS](#)

[JWST SCIENCE](#) [NEWS & EVENTS](#) [INSTRUMENTATION](#) [SCIENCE PLANNING](#) [DOCUMENTATION](#) [Q](#)

### JWST @ SXSW





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[Site Map](#)



The NASA James Webb Space Telescope, developed in partnership with ESA and CSA, is operated by AURA's Space Telescope Science Institute.

[jwst.stsci.edu](http://jwst.stsci.edu)







# Online Resources

## Proposal Planning Toolbox

Use these tools to craft a JWST proposal:

- The [Exposure Time Calculator \(ETC\)](#) calculates the detailed performance of the observatory by modeling astronomical scenes consisting of single or multiple point and extended sources. It offers full support for all of the JWST observing modes.
- The [Space Telescope Image and Spectroscopy Simulator \(STIPS\)](#) is used to simulate JWST observations of large astronomical fields.
- The [PSF Simulation Tool \(WebbPSF\)](#) is used to simulate detailed point spread functions for all the JWST instruments.
- The JWST project has two [Target Visibility Tools](#) to help you assess target visibilities before you enter information in APT.
- The [Astronomer's Proposal Tool \(APT\)](#) is used to write, validate and submit proposals for both the Hubble Space Telescope and the James Webb Space Telescope. [APT user documentation \(JDox\)](#) is also available to assist you in your proposal planning.
- The [simulated data sets](#) for NIRCам, NIRISS, NIRSpec, and MIRI will help you become familiar with the new JWST instruments.
- An overview of the [JWST sensitivities](#) is available.
- We also offer a handy [Pocket Guide](#) to all the JWST science modes.

**EXPOSURE TIME CALCULATOR** ⊕  
(ETC)

**IMAGE AND SPECTROSCOPY  
SIMULATOR** ⊕  
(STIPS)

**PSF SIMULATOR** ⊕  
(WebbPSF)

**TARGET VISIBILITY TOOLS** ⊕  
(GTVT and CVT)

**ASTRONOMER'S PROPOSAL TOOL** ⊕  
(APT)  
[↗](#)

**SIMULATED DATA** ⊕

[jwst.stsci.edu/science-planning/proposal-planning-toolbox](https://jwst.stsci.edu/science-planning/proposal-planning-toolbox)



# Online Resources

NEWS & EVENTS >

Events

Subscribe to Events: [RSS](#) [ICS](#) [UPCOMING](#) [PAST](#)

11

Apr 2017

Su	Mo	Tu	We	Th	Fr	Sa
9	10	11	12	13	14	15

### JWST Community Lecture Series – Wide-Field Slitless Spectroscopy with the James Webb Space Telescope (G. Brammer)

April 11, 2017 11:00 AM EDT - April 11, 2017 12:00 PM EDT • Baltimore STScI Muller Auditorium

Abstract: I will review the wide-field slitless spectroscopic (WFSS) capabilities of the JWST instruments NIRISS and NIRCam. Using a grism element and no slits, JWST WFSS will probe parameter space intermediate between standard imaging and IFU and multi-object spectroscopy observing modes, providing uniform spectra of large, unbiased samples of stars and galaxies that can be used to measure spectral...

25

Apr 2017

Su	Mo	Tu	We	Th	Fr	Sa
23	24	25	26	27	28	29

### JWST Community Lecture Series – The JWST Calibration Pipeline (H. Bushouse)

Community Lecture • April 25, 2017 11:00 AM EDT - April 25, 2017 12:00 PM EDT • Baltimore STScI Muller N420

Abstract: The JWST calibration pipeline is a modular, flexible collection of processing steps and pipelines that are used to remove detector artifacts, calibrate, and reduce data from all JWST instruments and provide products that are ready for scientific analysis. Unlike the HST calibration pipelines, which were very instrument-specific and mostly monolithic in nature, the JWST calibration pipelines...

SCIENCE PLANNING >

Workshops and Lectures


## Workshops & Lectures

Use the links below to learn about JWST workshops and lectures to prepare you for the ERS and GO Cycle 1 proposal deadlines and the overall JWST mission.


WORKSHOPS

COMMUNITY LECTURE SERIES

More than 15 events to learn more about JWST before end of 2017!

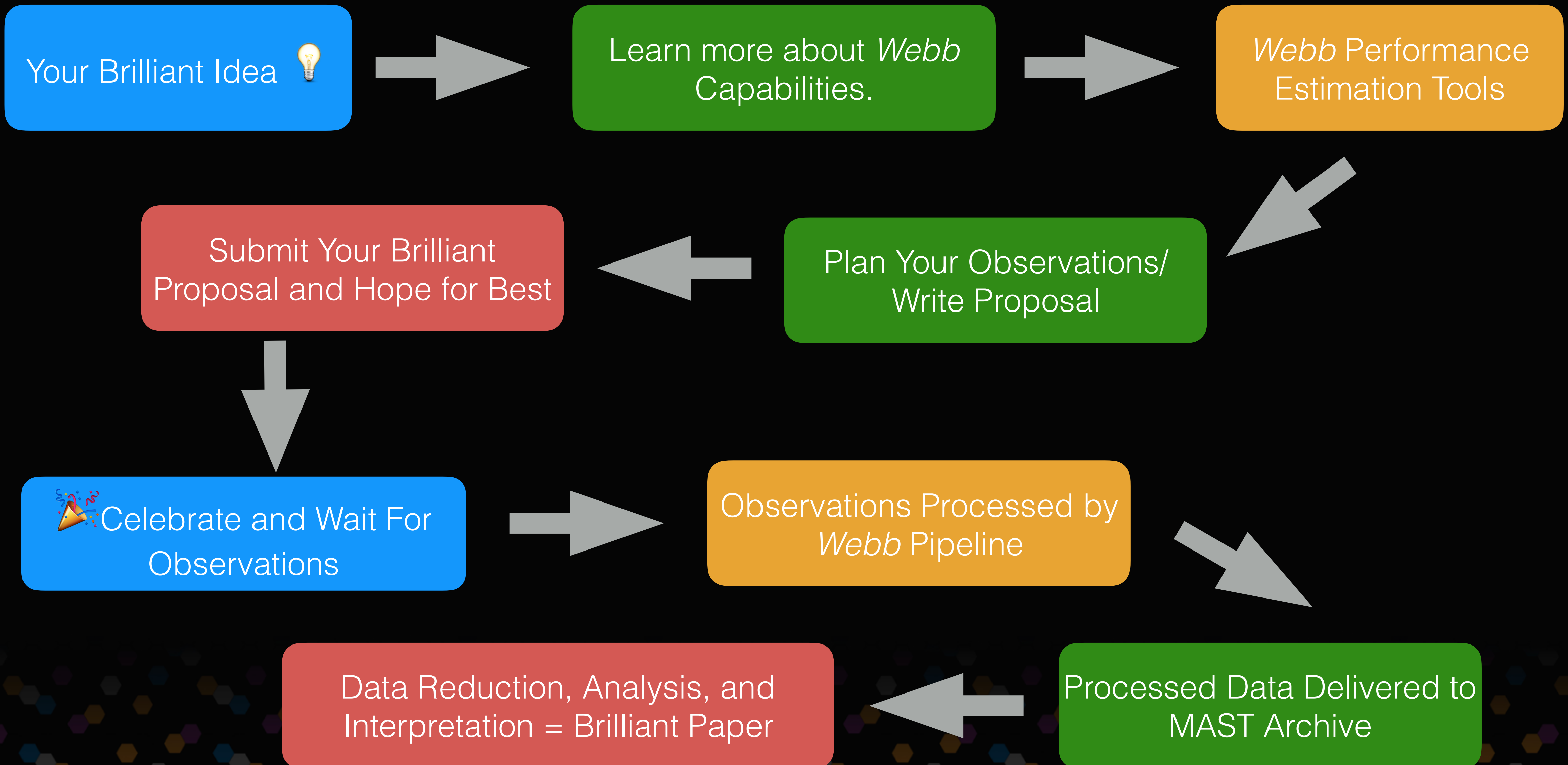


STScI





# Life-cycle of your observations with *Webb*





# The *Webb* Pipeline Architecture

## Pipeline Availability

- Written in python
- Freely available
- Easily configurable
- Users can rerun all or part of the pipeline
- Users can replace specific modules
- Hosted on github
- Based on astropy

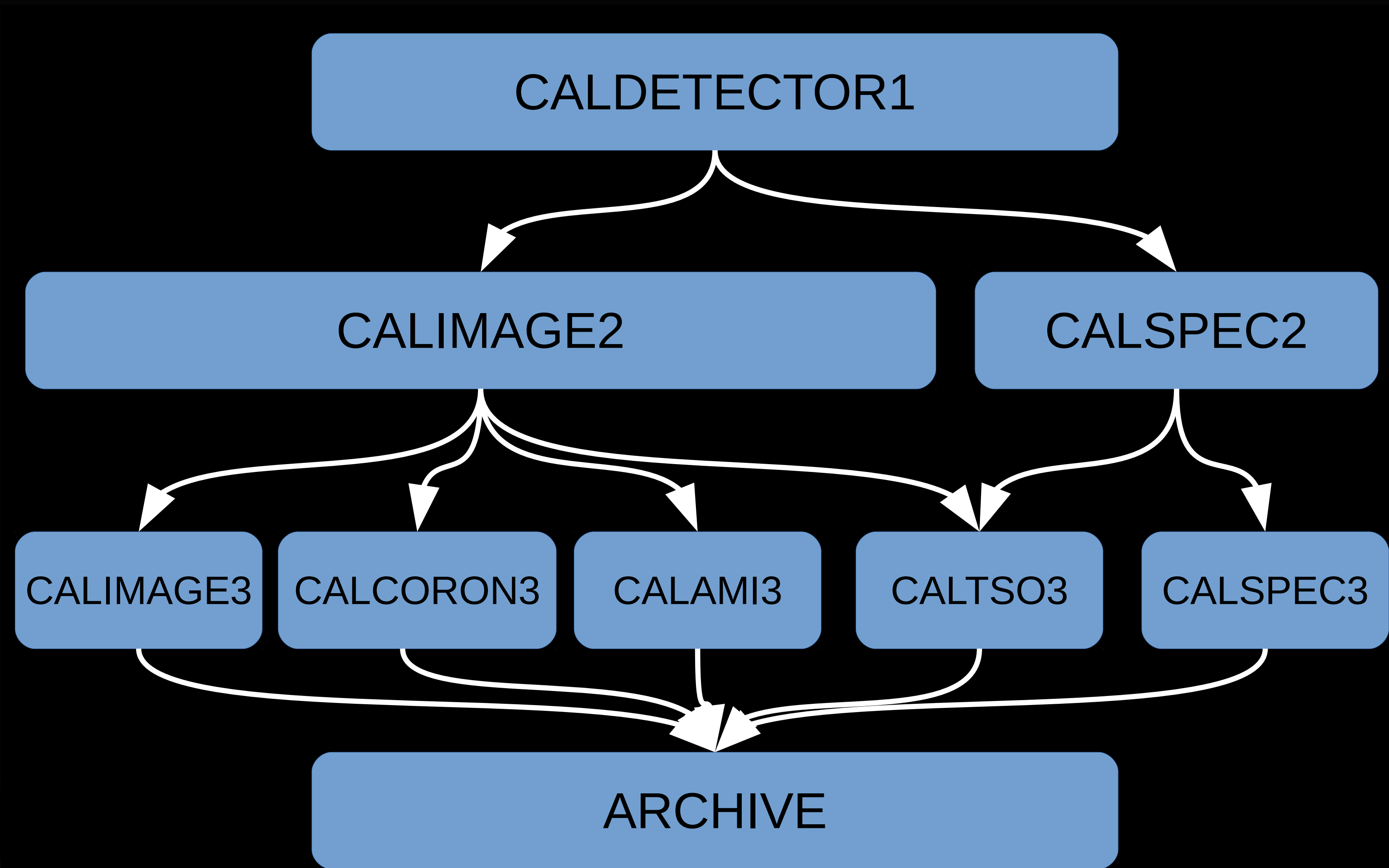
## Data Products

- Raw data
- Intermediate stage data
- Final data
  - Best quality from an automated pipeline
  - “browse-quality” data in Spitzer-speak
  - Flux, wavelength, and position calibrated
- Any user can rerun the pipeline offline
  - Changed parameters to specific steps
  - Replace a step with a user written version



Observations Processed by  
*Webb* Pipeline

# The *Webb* Pipeline Architecture



Ramps-to-Slopes

Calibrated Slopes

Ensemble Processing



## Processed Data Delivered to MAST Archive

# The MAST Archive in the Era of JWST

- Common Archive Observation Model (CAOM)
- JWST-specific views
- Distribution (URL & Curl-scripts)
- Subscription Service
- High Level Science Products (HLSP)
- Digital Object Identifier (DOI):  
Linking Data to Papers
  - Starting with AAS journals

The collage displays several key features of the MAST Archive interface:

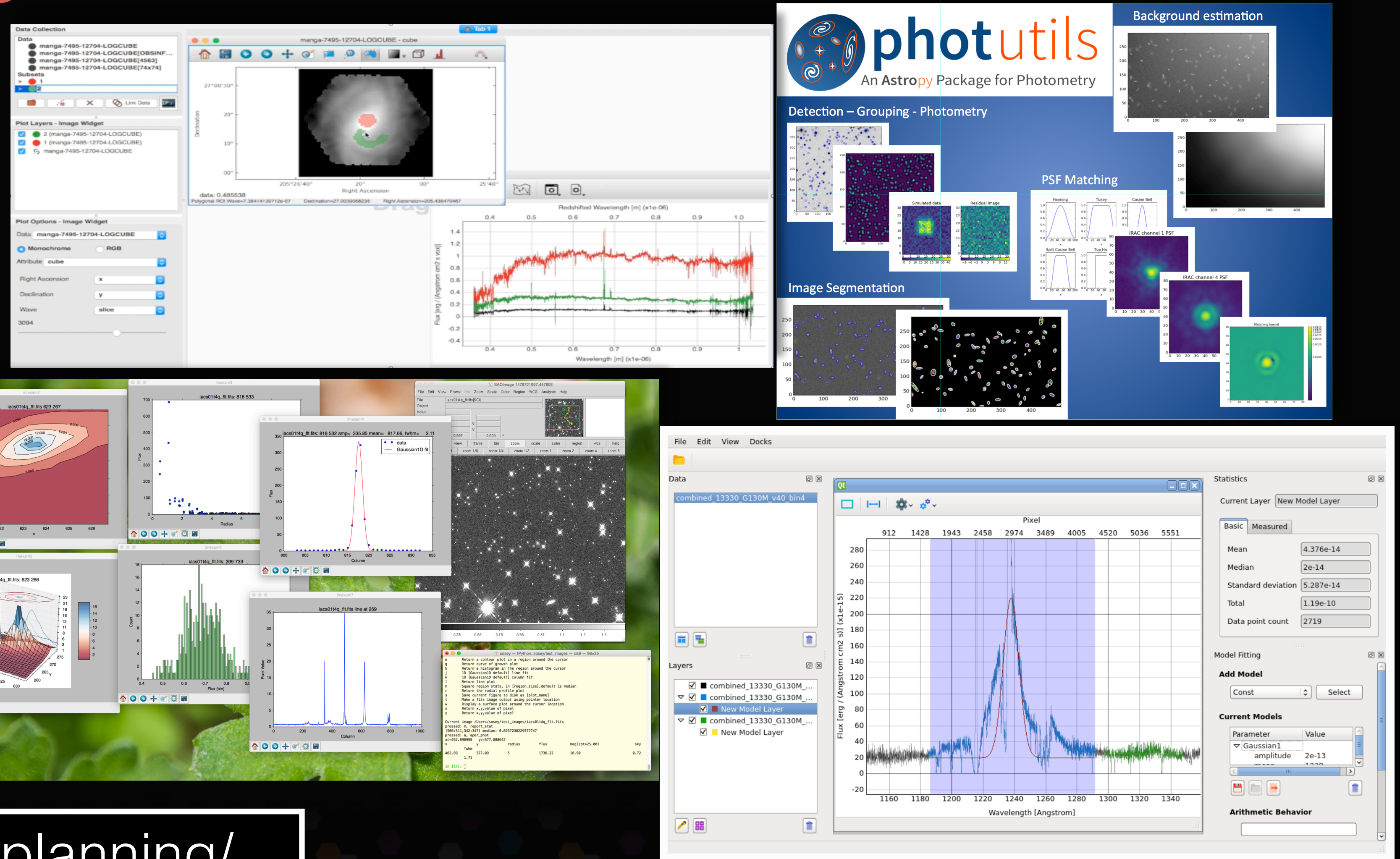
- Multi-mission target search:** A screenshot of the search interface showing filters for Mission, Instrument, and Project, with a search bar and a list of results.
- SID product search:** A screenshot of the 'SID product search' interface, showing filters for Product Type (Image, Timeseries, Spectrum, Cube) and Waveband (Optical, UV, Infrared, EUV).
- Instruments/FITS keyword:** A screenshot of the 'Instruments/FITS keyword' search interface, showing a list of keywords and their associated data.
- Image preview:** A screenshot of the 'Image preview' interface, showing a large image of a star field with a zoomed-in view of a specific region.
- Spectra preview:** A screenshot of the 'Spectra preview' interface, showing a plot of flux versus wavelength for a specific target.
- Timeline preview:** A screenshot of the 'Timeline preview' interface, showing a plot of flux versus time for a specific target.



## Data Reduction, Analysis, and Interpretation = Brilliant Paper

# JWST Data Analysis Tools

- Flexible, Modular tools
- In Python
- Supporting JWST data structures
- Simple installation



[jwst.stsci.edu/science-planning/  
data-analysis-toolbox](http://jwst.stsci.edu/science-planning/data-analysis-toolbox)



# Leveraging Web and Social Media to Engage User Community



[jwst.stsci.edu](http://jwst.stsci.edu)



JWST Observer



@JWSTObserver



# Back-up Slides



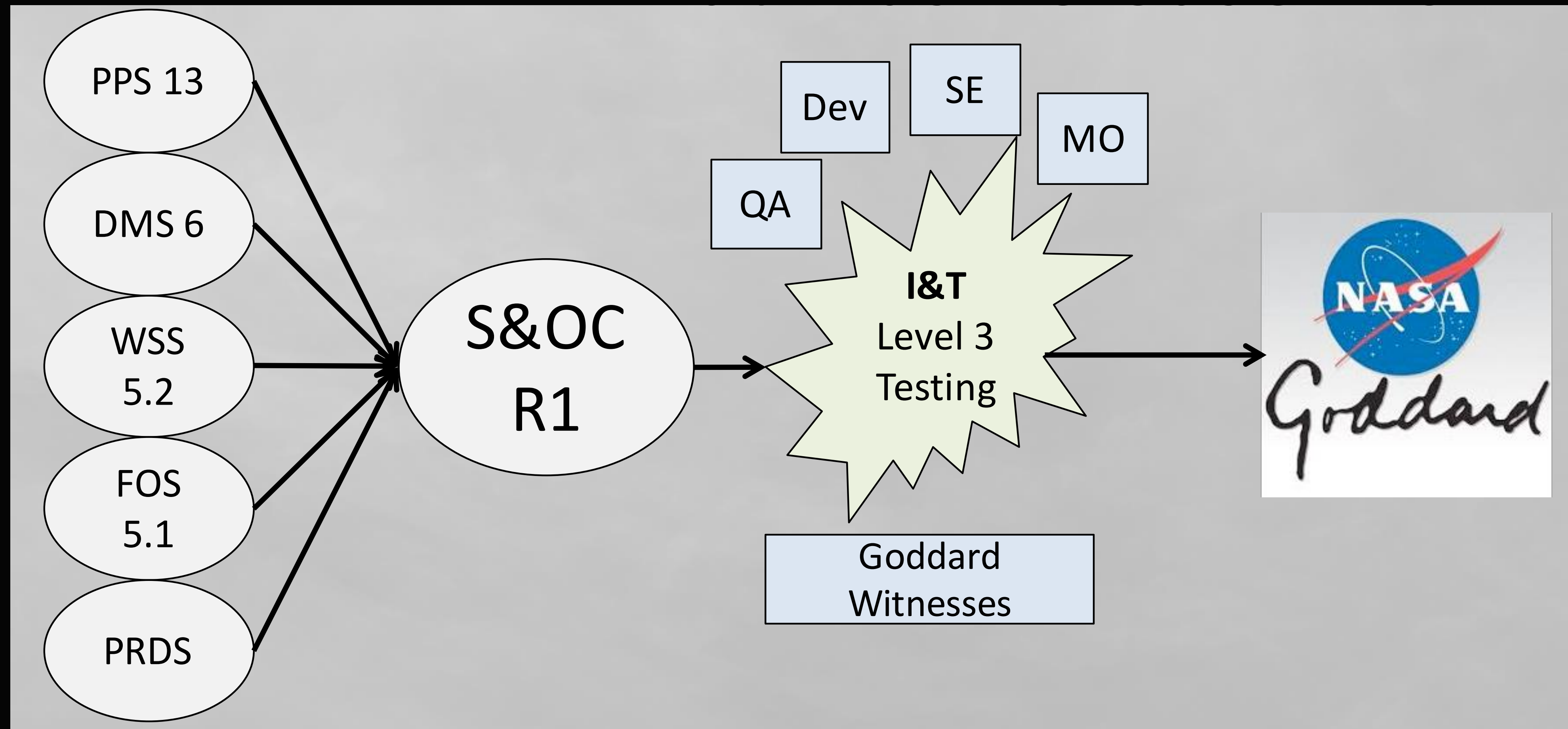
# S&OC & Subsystem Status

Subsystem	Build	Development completion date	I&T completion date	Status	% of requirements delivered to date	% of requirements verified to date
Data Management Subsystem (DMS)	5	October 2015	May 2016	I&T completed	89%	65%
	6	May 2016	December 2016	I&T Completed		
	7*	December 2016	April 2017	In I&T		
	7.1	November 2017	February 2018	In Development		
Proposal Planning Subsystem (PPS)	12	October 2015	April 2016	I&T completed	97%	81%
	13	April 2016	December 2016	I&T Completed		
	14*	December 2016	April 2017	In I&T		
	14.1	January 2017	June 2017	In Development		
Wavefront Sensing & Control (WFS&C) Software Subsystem	5.1	March 2016	May 2016	All requirements completed	100%	100%
	6*	January 2017	May 2017	In I&T		
	6.1	December 2017	February 2018	Planned		
Flight Operations Subsystem (FOS)	5	March 2016	July 2016	I&T completed	83%	48%
	6	February 2017	July 2017	In Development		
	6.1*	August 2017	December 2017	In Development		
Operations Scripts Subsystem (OSS)	5	May 2016		Level 2 certification testing completed	73% Level 2 certified	58% Level 3 certified
	6*	March 2017	August 2017	In Development		
Project Reference Database Subsystem (PRDS)	4.12*	July 2016	July 2016	Latest Sustaining Engineering release	100%	100%

\*Flight Build



# S&OC Release 1



Recent End-to-End Test with OTB Simulator  
Approaching Readiness for JWST Launch,  
Commissioning and Cycle 1 Science