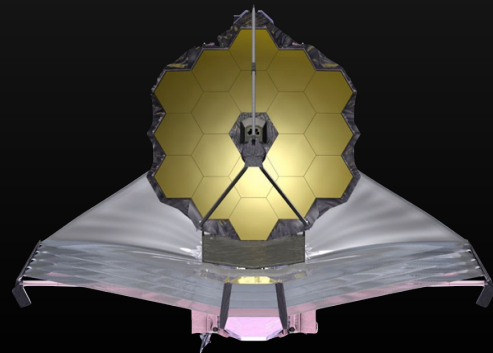


JWST USER TOOLS

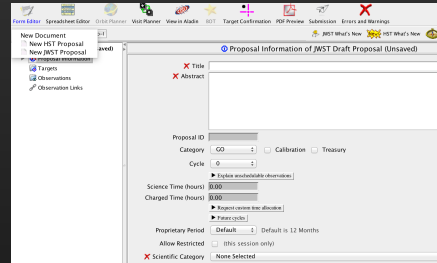
Klaus Pontoppidan
Deputy Project Scientist, JWST

JWST Town Hall, January 6, 2016

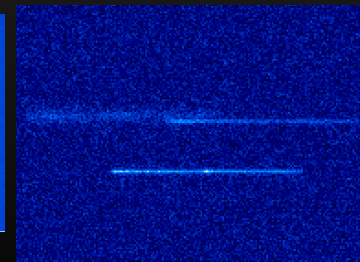
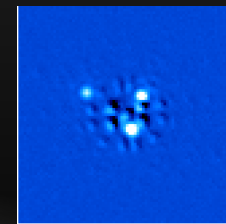
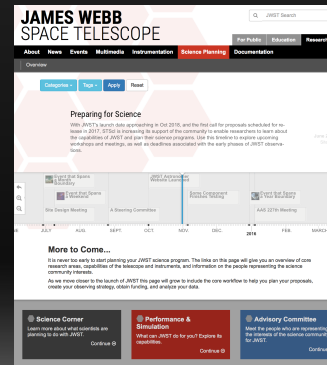
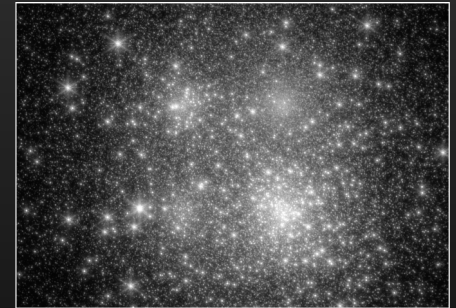


THE JWST USER TOOL STABLE

- Astronomer's proposal tool (APT)
- Exposure time calculator (ETC)
- Data simulators
- Calibration pipelines
- User documentation (handbooks, etc.)
- Archives
- Data analysis tools



JWST Simulator



ASTRONOMER'S PROPOSAL TOOL (APT)

- Familiar to HST users
 - To be used to develop JWST proposals.
 - Development release
- <http://www.stsci.edu/jwst/ptool>

The screenshot displays the Astronomer's Proposal Tool (APT) interface. The top 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. A 'New Document' menu is open, with a red arrow pointing to the 'New JWST Proposal' option. The main window shows the 'Proposal Information of JWST Draft Proposal (Unsaved)' form. The form includes fields for Title, Abstract, Proposal ID, Category (GO, Calibration, Treasury), Cycle (0), Science Time (hours) (0.00), Charged Time (hours) (0.00), Proprietary Period (Default), Allow Restricted (this session only), and Scientific Category (None Selected). Buttons for 'Explain unschedulable observations', 'Request custom time allocation', and 'Future cycles' are also visible.

APT TEMPLATES

- Similar to Spitzer, Herschel and Chandra (but unlike HST) JWST observations are defined by **templates**.
- Observing modes/strategies define the templates
 - e.g., MIRI imaging, NIRSpec IFU, NIRCcam coronagraphy,...
- Requires only necessary information
- Automatically splits **observations** into **visits** (sequences using a single guide star) and **exposures**.

The screenshot shows the configuration interface for a JWST observation template. The main configuration area includes:

- Number: 1
- Label: (empty)
- Instrument: NIRCAM
- Template: NIRCcam Coronagraphic Imaging
- Target: None Selected
- Visit Splitting: Splitting Distance (20.0 Arcsec), Number of Visits (1)
- Duration (secs): Science (126), Total Charged (3325)
- Data volume: 3 MB

Below the main configuration, there are tabs for "NIRCcam Coronagraphic Imaging", "Mosaic Properties", "Special Requirements", and "Comments". The "NIRCcam Coronagraphic Imaging" tab is active and shows:

- Coronagraphic Mask: MASK210R
- Acq Target: Same Target as Observation
- Acq Filter: F182M
- Acq Readout Pattern: RAPID
- Acq No. of Groups: 3
- Acq No. of Integrations: 1
- Acq Photon Collect Duration: 12.538

A table below these settings shows the configuration for the observation:

#	Filter	Readout Pattern	No. of Groups	No. of Integrations	Photon Collect Duration	Total Photon Collect Duration
1	F210M	RAPID	10	3	125.38	125.38

Buttons for "Add", "Duplicate", "Insert Above", and "Remove" are located at the bottom of the table.

JWST Exposure Time Calculator (Pandeia)

Reference files

throughput, PSFs, noise parameters

Engine

General Python library

Server

Stores your calculations

User interface

Web application accessed through your browser

RELEASE SCHEDULE

ETC engine development release: **Spring 2016**

ETC WebApp release: **January 2017**

Available Workbooks

#	Name	Load	Description	Options
1024	Imaging workbook	[Load]	Imaging observations of a 1 microJy flat spectrum source.	[Copy] [Remove] [Sharing]
1025	High-resolution spectroscopy workbook	[Load]	High-resolution spectroscopy observations of a 1 mJy flat spectrum source.	[Copy] [Remove] [Sharing]
1026	Medium-resolution spectroscopy workbook	[Load]	Medium-resolution spectroscopy observations of a 1 mJy flat spectrum source.	[Copy] [Remove] [Sharing]
1027	Multiple extended source workbook	[Load]	Multiple extended sources observed in imaging and spectroscopy.	[Copy] [Remove] [Sharing]
1028	Sample NIRSpec MSA Calculations	[Load]	Sample of NIRSpec MSA calculations showing the effects of shutter location, source location within the shutter, and the impact of multiple sources within a scene.	[Copy] [Remove] [Sharing]
1029	Example Source Flux Distributions	[Load]	Example imaging calculations for each of the supported source geometries: point, flat, 2D gaussian, and sersic	[Copy] [Remove] [Sharing]
1030	Sample Coronagraphy Calculations	[Load]	Coronagraphy calculations using three faint sources, one central star, and one reference source	[Copy] [Remove] [Sharing]
1031	Sample NIRISS WFSS Calculations	[Load]	Sample NIRISS WFSS Calculations	[Copy] [Remove] [Sharing]
1032	Sample backgrounds	[Load]	Same calculation for five different background options	[Copy] [Remove] [Sharing]
1033	IFU starter sample workbook	[Load]	Modified, to be edited	[Copy] [Remove] [Sharing]

[Create New Workbook](#)[Get a Copy of the Sample Workbooks](#)

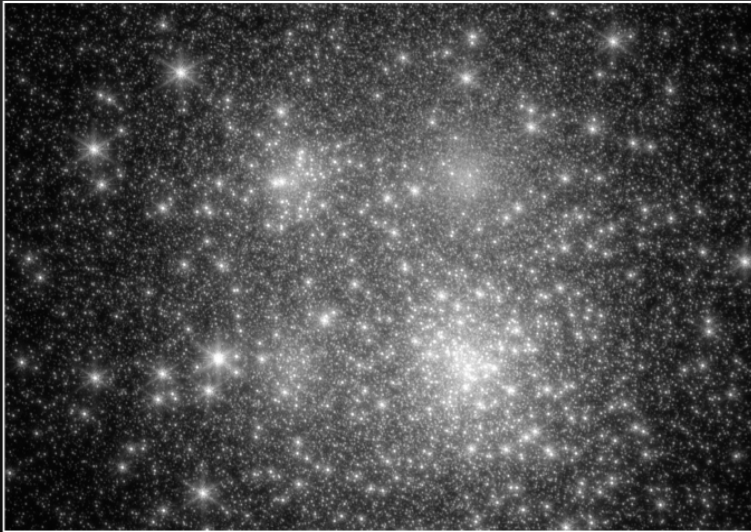
User Access Permissions for ???

User	Read	Write	Grant	Revoke
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JWST SIMULATOR (*STIPS*)

Space Telescope Image Project Simulator

JWST Simulator



- Not all tasks are best done with the ETC.
- Simulators are needed to model full fields of view, complex observing sequences, dithers, and simulated data products.
- STIPS
 - Web tool
 - Initial release includes JWST imaging modes
 - Different astrophysical models: stellar populations, galaxy populations
 - Full FOV, WebbPSFs
- Initial release in 2016.

NEW WEBSITE AND DOCUMENTATION

A New Paradigm for JWST User Documentation (coming 2016)

New JWST website will contain higher level mission information and JWST science content

New documentation system: “Every page is page one” (Mark Baker)

- 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

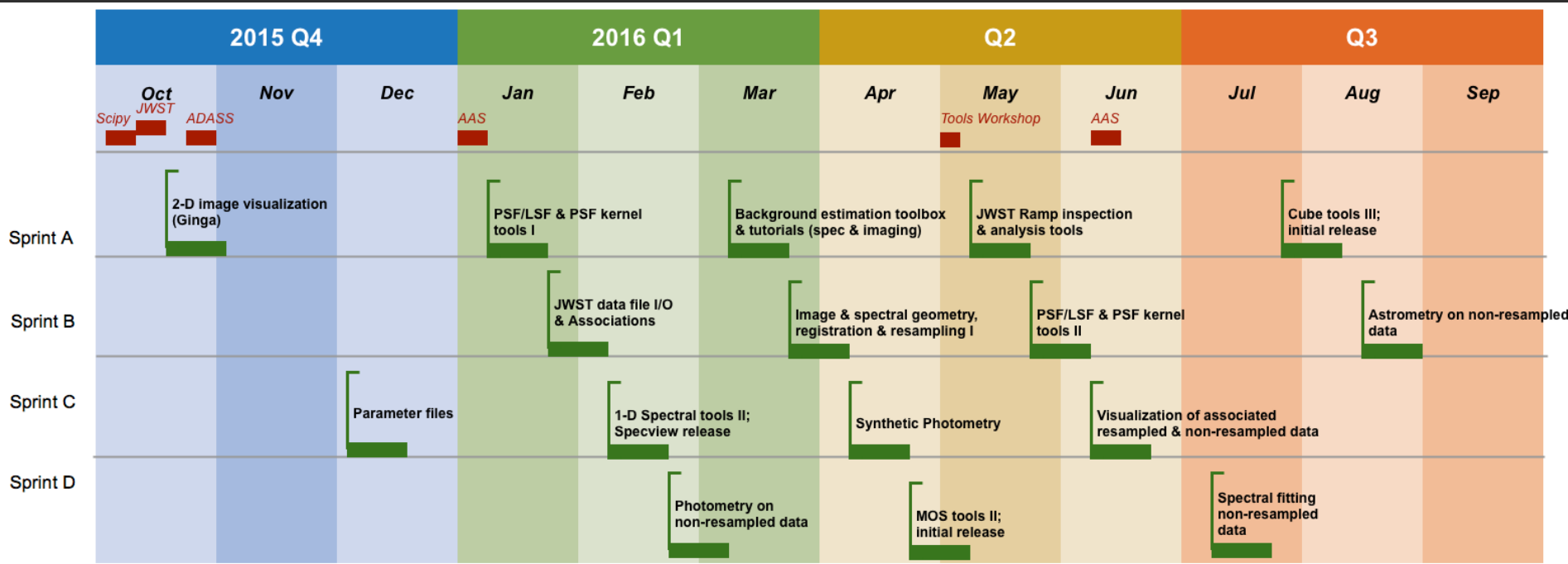
The screenshot shows the top navigation bar of the James Webb Space Telescope website. It includes a search bar, a 'JWST Search' button, and tabs for 'For Public', 'Education', and 'Researchers'. Below this is a secondary navigation bar with tabs for 'About', 'News', 'Events', 'Multimedia', 'Instrumentation', 'Science Planning', and 'Documentation'. The main content area features a 'Preparing for Science' section with a timeline from July 2015 to March 2016. Key events on the timeline include 'Event that Spans a Month Boundary', 'Event that Spans a Weekend', 'Site Design Meeting', 'A Steering Committee', 'JWST Announcement Website Launch', 'Science Component Feedback Ticking', and 'Event that Spans a Year Boundary'. The timeline is overlaid on a large, stylized hexagonal graphic.

The screenshot shows the 'JAMES WEBB SPACE TELESCOPE USER DOCUMENTATION' page for the 'MIRI Imaging' instrument. The page has a dark header with the JWST logo and navigation tabs for 'About', 'Instruments', 'Proposing', 'Data', and 'Reference'. The main content area is titled 'MIRI Imaging' and includes a sub-header 'JWST Telescope and Instrumentation Home / MIRI'. Below this is a paragraph of text: 'MIRI is the only JWST instrument that offers imaging at wavelengths longer than 5.2 micron. MIRI offers science-mode imaging in 9 broad band filters covering wavelengths between 5.6 and 25.5 micron over a free field of view of up to 74x113". The MIRI imaging mode supports the use of detector subarrays for bright targets, as well as a variety of other patterns, which may act to improve sampling at the shortest wavelengths, remove detector artifacts and cosmic rays, facilitate self-calibration by removing diffuse background contributions from both the telescope and celestial sources. MIRI imaging can also be used in conjunction with the APT mosaicking tool to image large fields.' Below the text is a section titled 'Basic Properties' with a paragraph: 'Imaging with MIRI is generally diffraction-limited in all filters, with Strehl ratios in excess of 80%, although the detector plate scale of 0.11" slightly undersamples the PSF at the shortest wavelengths <6.25 micron. At the shortest wavelengths, the sensitivity of the MIRI imager is limited by detector noise, while it becomes dominated by background noise, in particular from the JWST primary, at wavelengths longer than ~15 micron.' The page also features several diagrams and images related to the instrument's design and operation.

DATA ANALYSIS AND VISUALIZATION TOOLS

- JWST users need to inspect, manipulate, and model their data
- JWST data analysis will be in **Python/Astropy**
- Basic capabilities familiar with users of IRAF, STSDAS, and IDL will be available (many already are)
- Visualization will be in **Ginga & Glue**
- Tools understand JWST data structures, including uncertainties, data associations, and data quality flags
- Extensible visualization tools are being developed for interactive workflows
- Up-to-date development code and discussion available via: **bit.do/jwst**

DATA ANALYSIS TOOLS DEVELOPMENT PLAN



Data Collection

Data
Subsets

Link Data

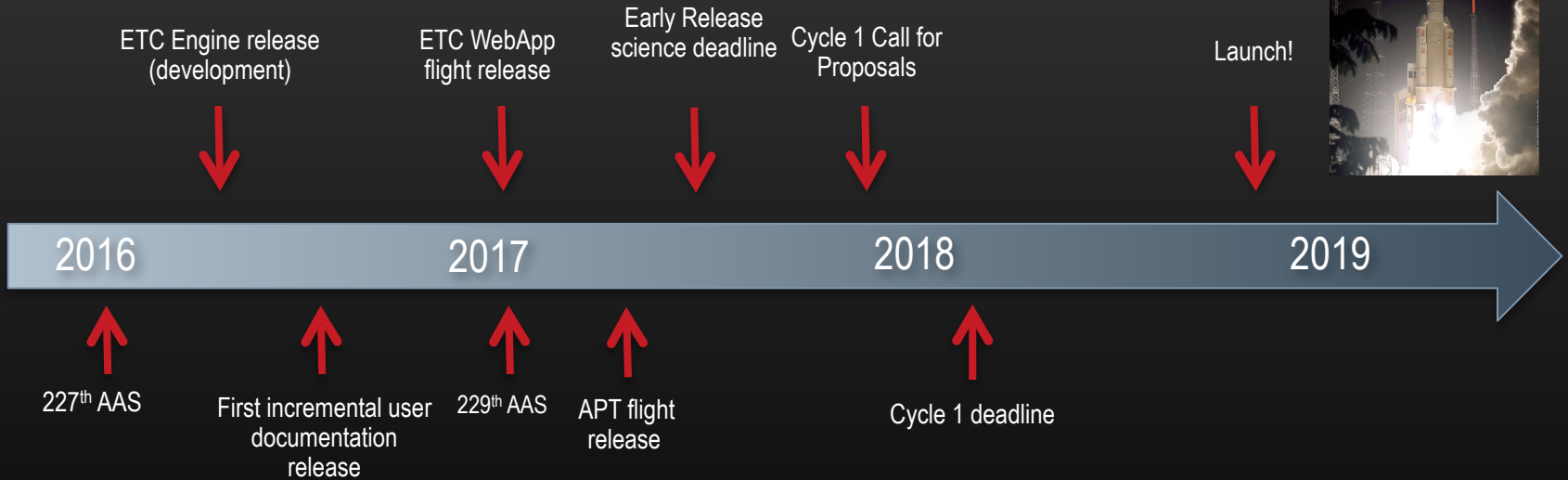
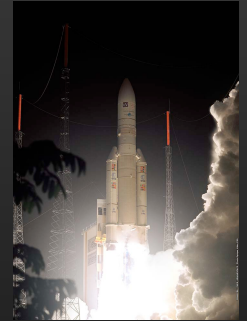
Plot Layers

Plot Options

Tab 1

Drag Data To Plot

USER TOOLS TIMELINE SUMMARY



Upcoming JWST Science Meetings and Preparation Workshops

Major International Science Conferences (~Annually)

Oct 2015 at ESTEC; “Exploring the Universe with JWST”

Fall 2016 in Canada; Exploring the Universe with JWST II

2017 in Venice; HST + JWST Conference

Topical Science Meetings

2-3 day workshops on major JWST science themes will be organized at STScI throughout 2016-2018

- meetings will include a component to introduce users to software and systems

User Training

Annual workshops at STScI and AAS on JWST data analysis tools

2017 - workshops on JWST planning tools (ETCs, simulators)

2017-2018 - workshops on APT, single stream, documentation

Annual workshops in Europe on JWST capabilities, proposal tools, and data analysis tools

JWST “Colloquium Series”

Contact us if you would like a holistic presentation about JWST and user preparation at your institution

JWST “Community Days” (Coming Soon)

Open call to US institutions to host hands-on JWST 1-2 workshops (w/ optional science meeting)

- ERS program planning, JWST modes and flight capabilities, observing techniques, etc.

**All meeting/workshops at STScI will have significant remote connectivity*