



STUC

Kathryn Flanagan
16 April, 2015

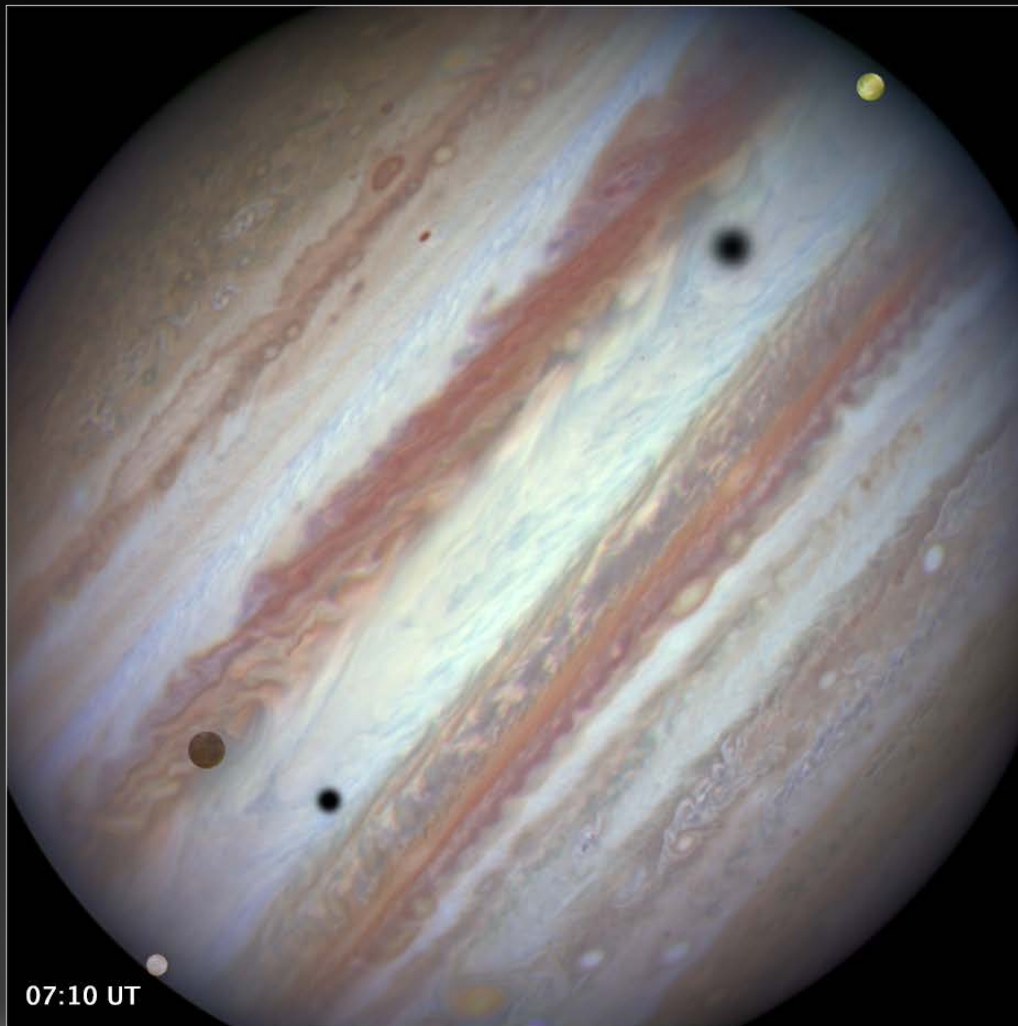
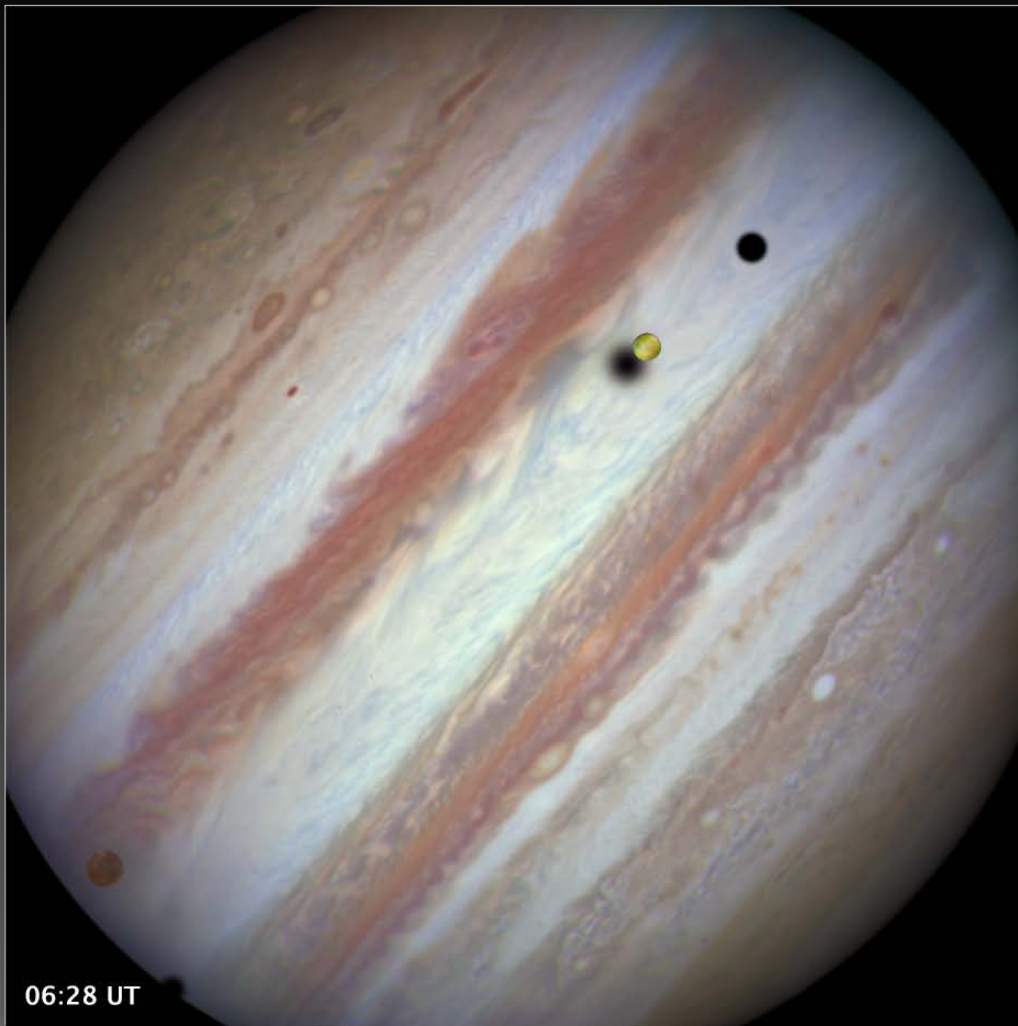
Science

Hubble

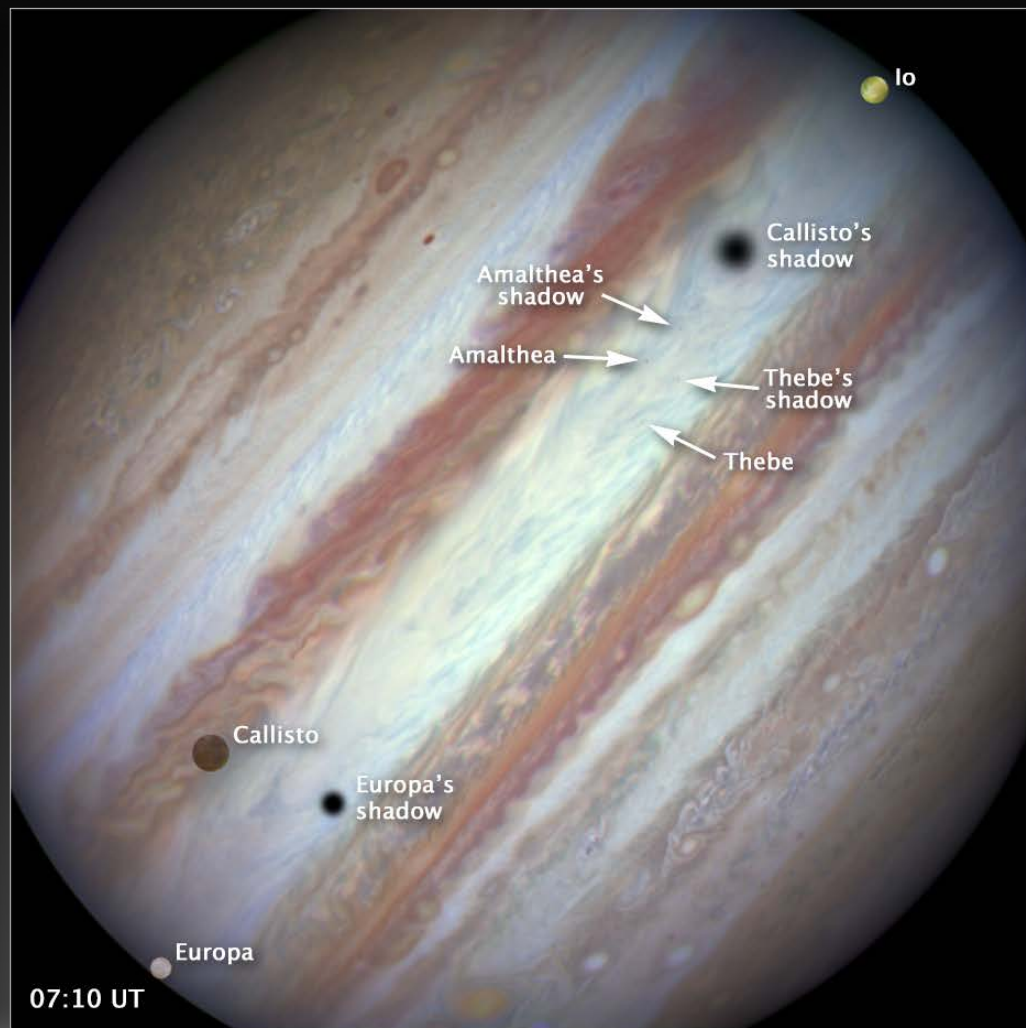
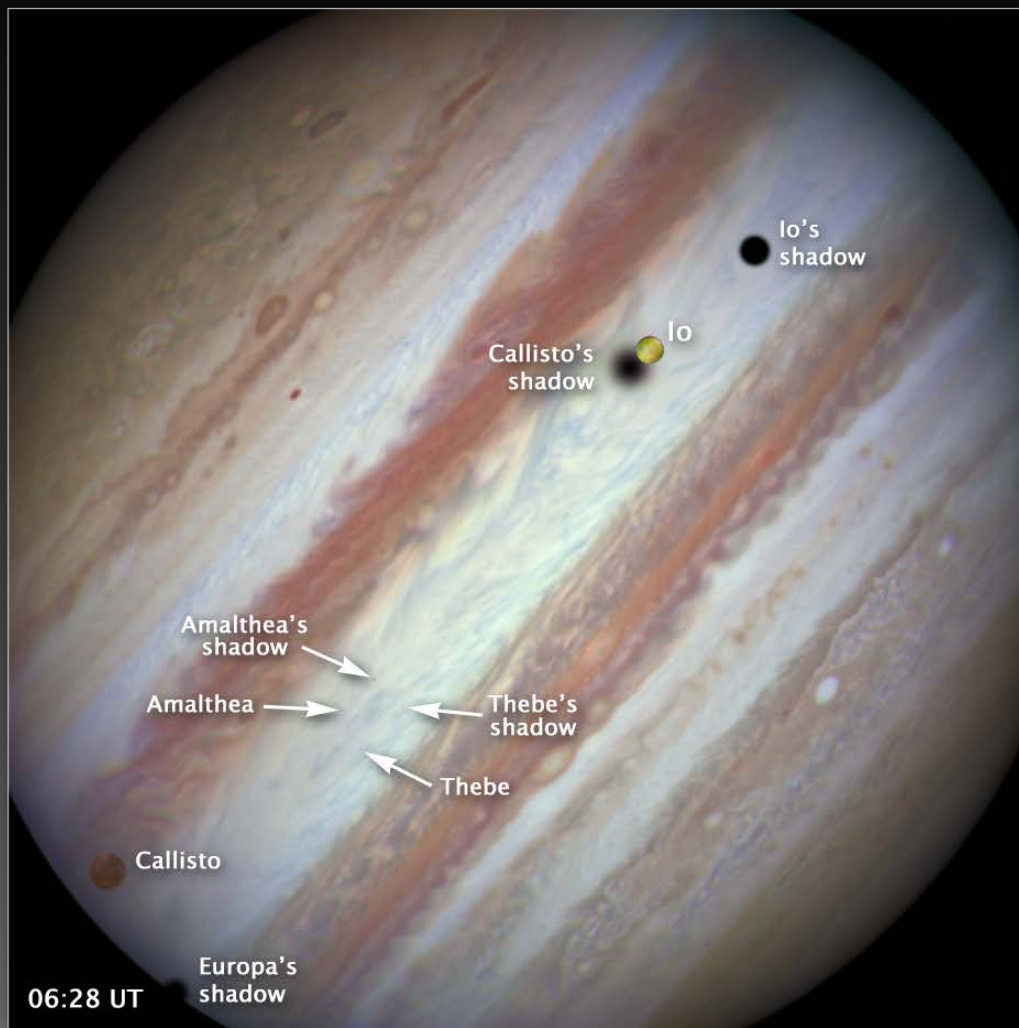
STScI

Missions

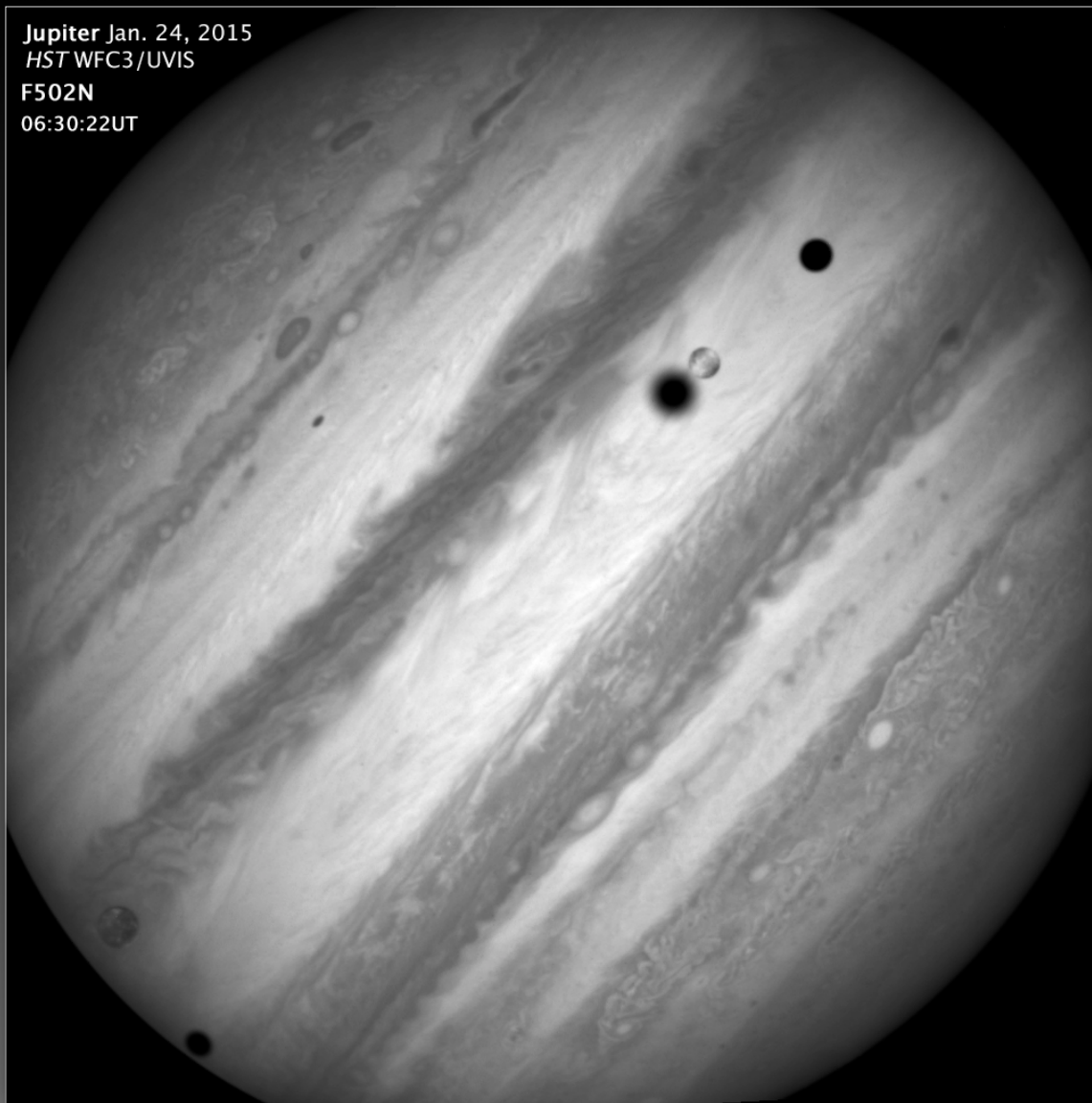
Jupiter • 24 January 2015 • *HST*WFC3/UVIS



Jupiter • 24 January 2015 • *HST* WFC3/UVIS



Jupiter Jan. 24, 2015
HST WFC3/UVIS
F502N
06:30:22UT



Outer Planet Atmosphere Legacy program

- Routine monitoring of atmospheric features on Jupiter, Uranus, Neptune & Saturn (post-Cassini)
 - Paired global maps
- Global maps of the outer planets provide full longitudinal coverage & determine the spatial variation of distinct cloud features
- Pairs of global maps provide global measurements of the wind field
- Long-term DD program
 - 29 orbits/year (41 with Saturn, post-Cassini)

Jupiter: full rotation



Courtesy Amy Simon-Miller

6 strong-lensing clusters
+ 6 adjacent parallel fields

140 HST DD orbits per pointing

ACS/ WFC3-IR in parallel

~29th ABmag in 7 bands



Brammer, VLT/Hawk-I K

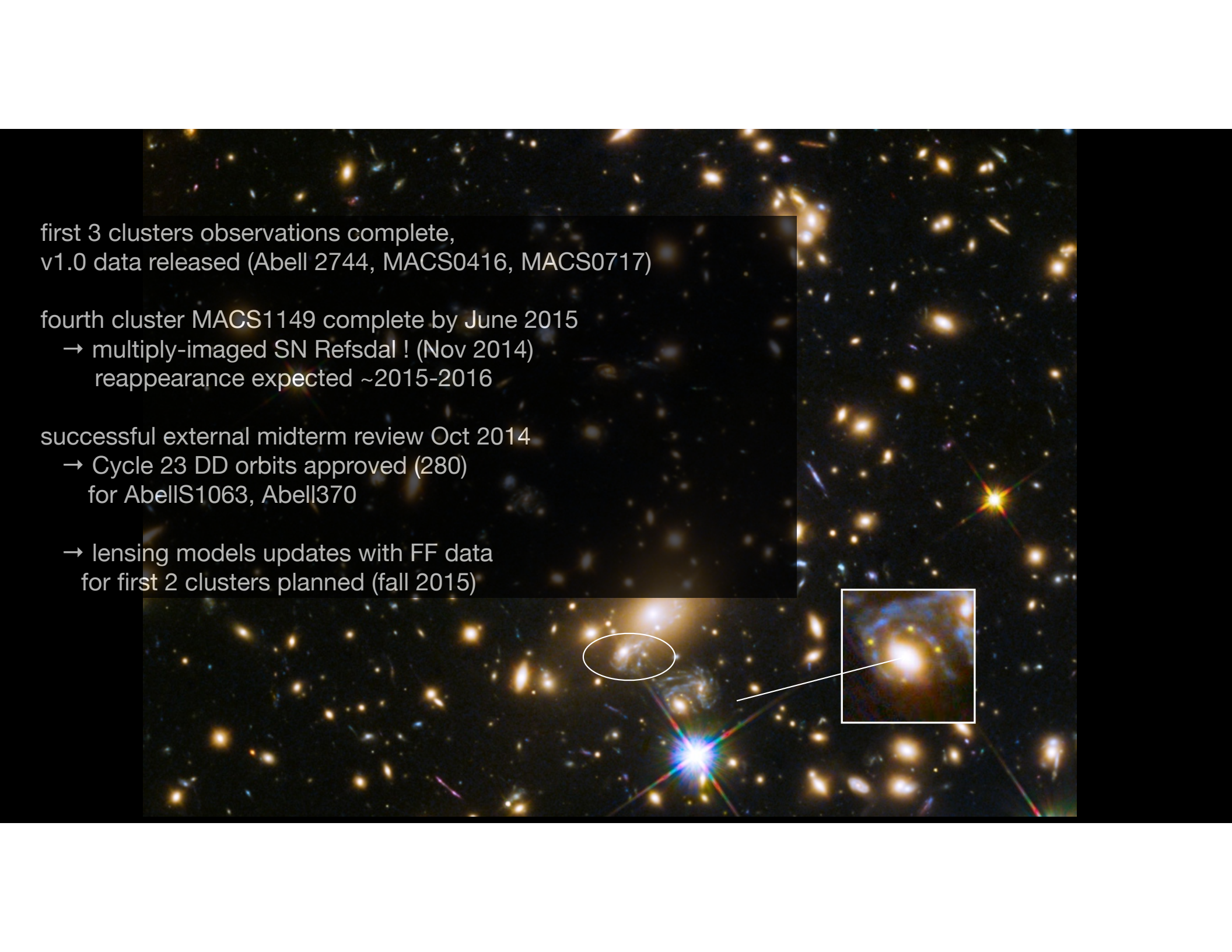
Blank Field

2 clusters per year x 3 years

→ 840 total orbits

Cluster





first 3 clusters observations complete,
v1.0 data released (Abell 2744, MACS0416, MACS0717)

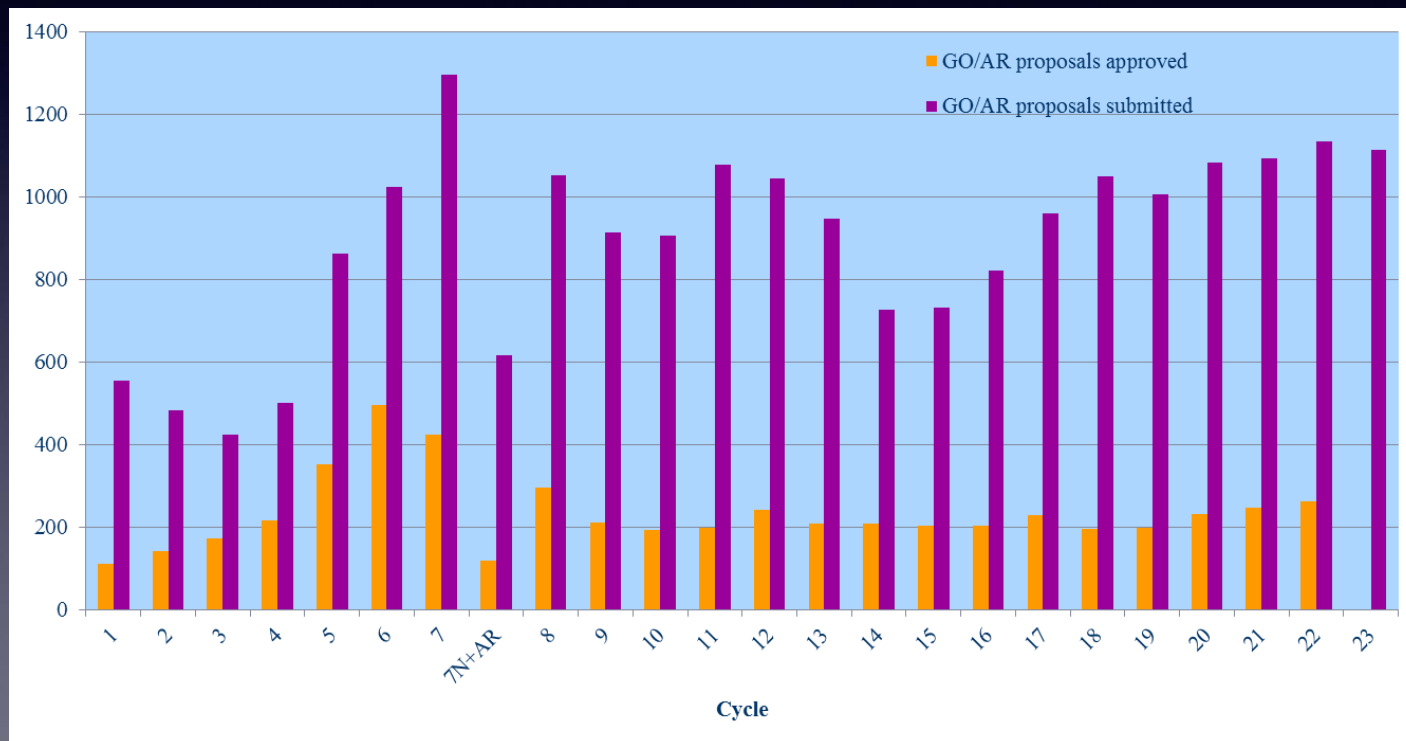
fourth cluster MACS1149 complete by June 2015
→ multiply-imaged SN Refsdal ! (Nov 2014)
reappearance expected ~2015-2016

successful external midterm review Oct 2014
→ Cycle 23 DD orbits approved (280)
for AbellS1063, Abell370

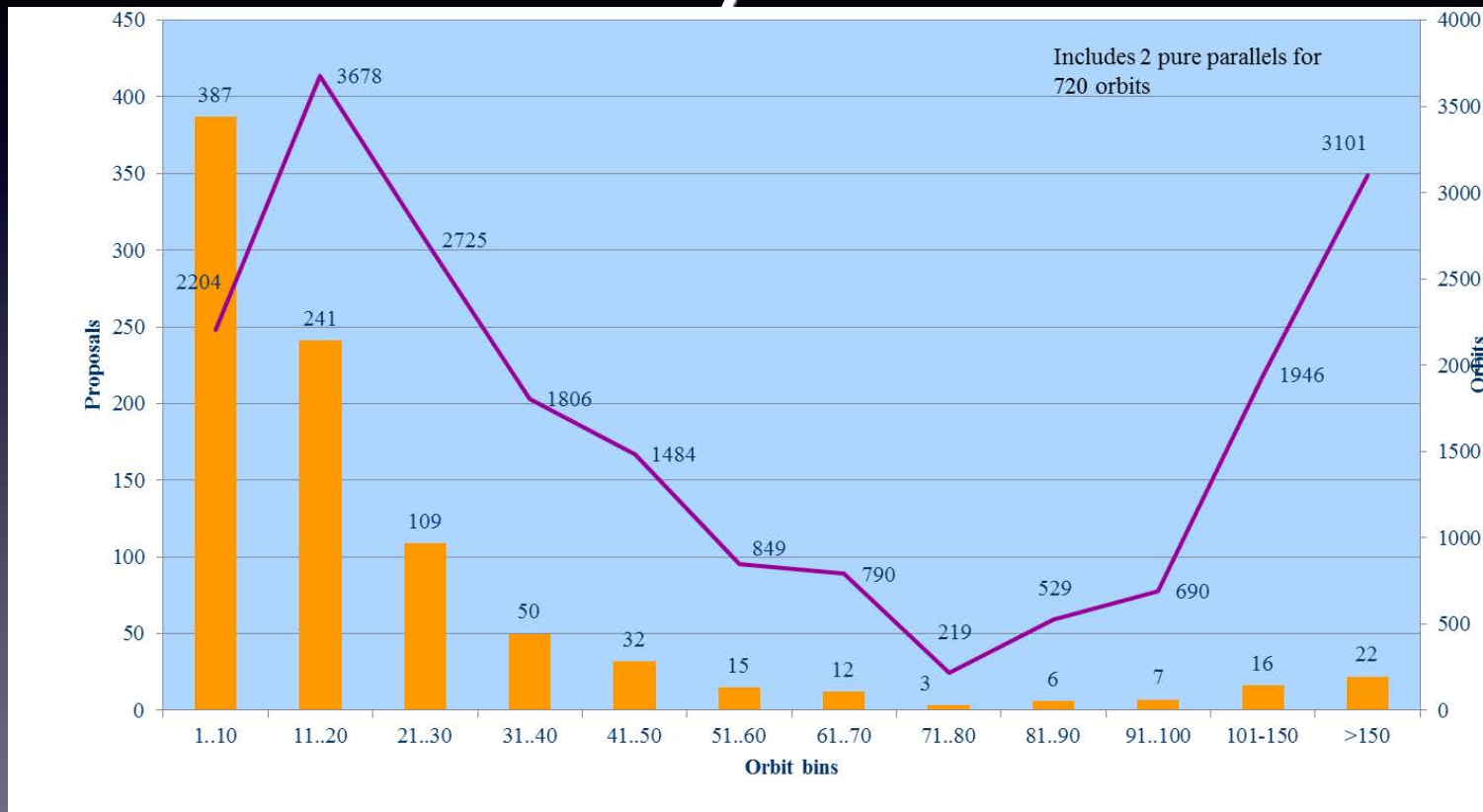
→ lensing models updates with FF data
for first 2 clusters planned (fall 2015)

Cycle 23 submission statistics

- Hubble received the third highest number of proposals in history (1115)



Requested proposal size distribution for Cycle 23



See Claus's presentation

Other News

- Expecting RFP for 5 year contract (May 1, 2016 - April 30, 2021) consistent with 2020 Vision and overlap with JWST. Expect level GO/AR funding at ~\$28.6M
- As part of the 2020 vision, solicited input from the community: What should HST do in the next 5 years? Received 20 white papers - see Neil's talk

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Val Schnader

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HST
Ken Sembach

JWST
Massimo Stiavelli

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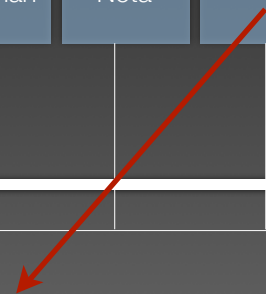
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Gender-correlated systematics

STScI will continue to monitor HST proposal success rates as a function of PI gender

Gender estimates are based on publicly available sources

Look at this as the canary in the coalmine...peer review may not be as objective as some believe



Actions

Convened meeting of representatives from NASA observatories in early February

Lisa Storrie-Lombardi (Spitzer), Julie McEnery (Swift), Andrea Prestwich (Chandra), Neill Reid (HST) & Kathy Flanagan (STScI)

Joint discussions with Joan T. Schmelz (NSF & AAS/CSWA)

NASA observatories are collaborating on further investigations

Monitoring results from each observatory & pooling statistics

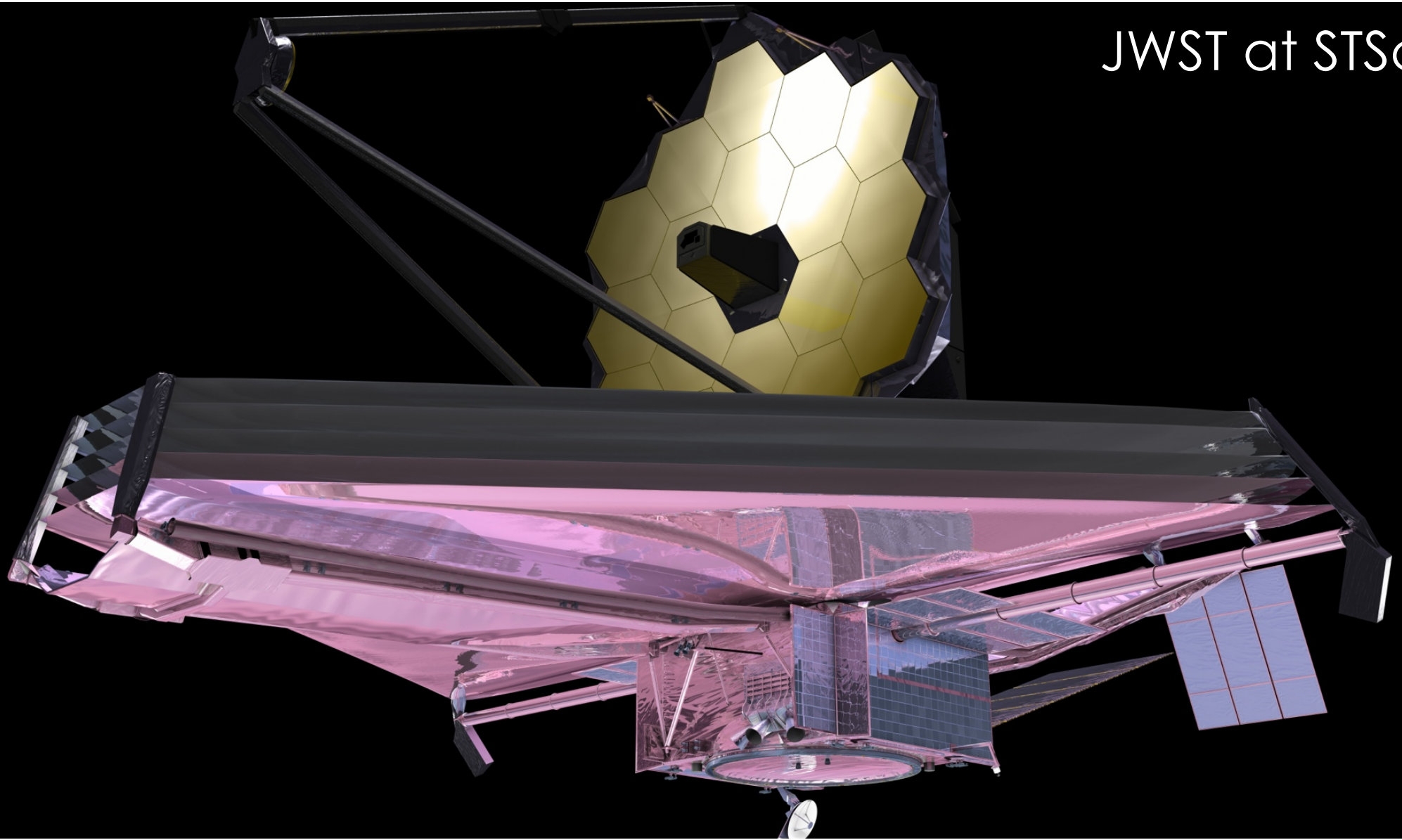
Any decisions regarding changes in process will be based on discussions with user committees and the community, and will be taken jointly

Hubble 25th Anniversary

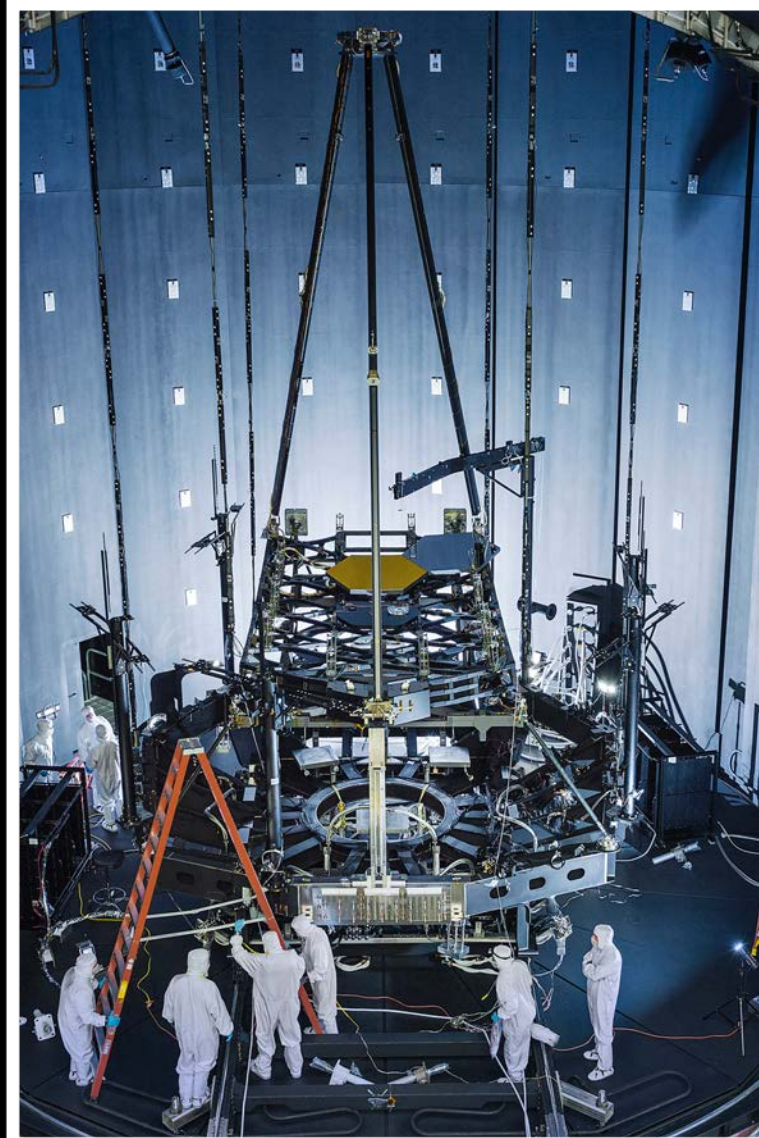


See Hussein's
presentation

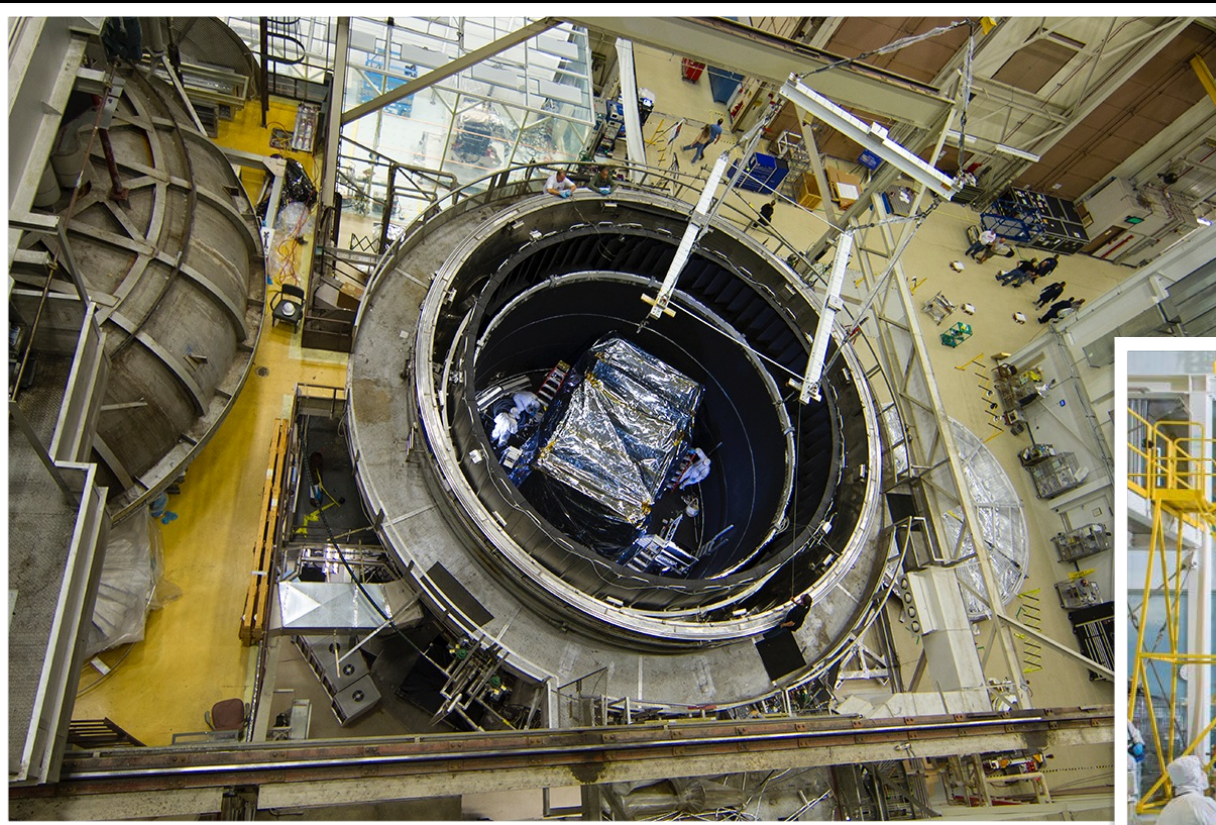
JWST at STScI



50 Years After Apollo Pathfinder Testing at Chamber A



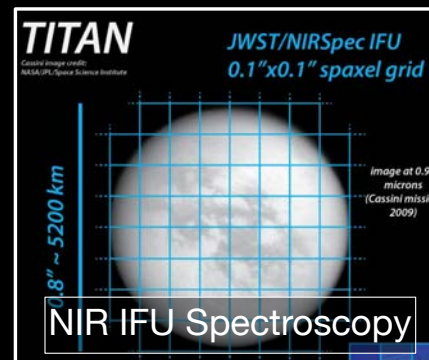
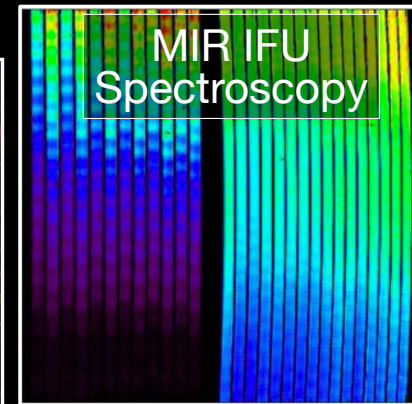
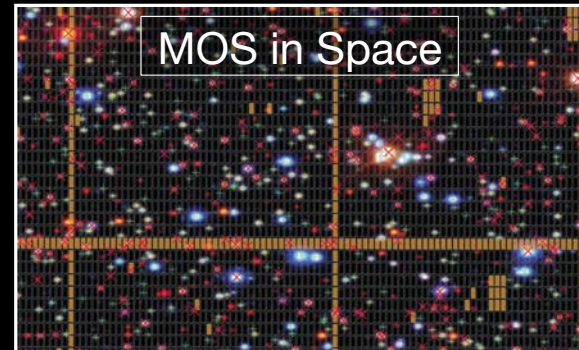
All JWST Science Instruments Completed CV2
STScI Scientists and Engineers Supported 100s of On-Site Shifts



STScI Preparing the Community for JWST Data



Workshops, Town Halls, Focus Groups at LPSC and DPS
Data Analysis Workshop and Town Hall at the AAS
User Training Workshop at STScI (May 2015)



STScI Led High-Impact JWST Outreach Events at SXSW

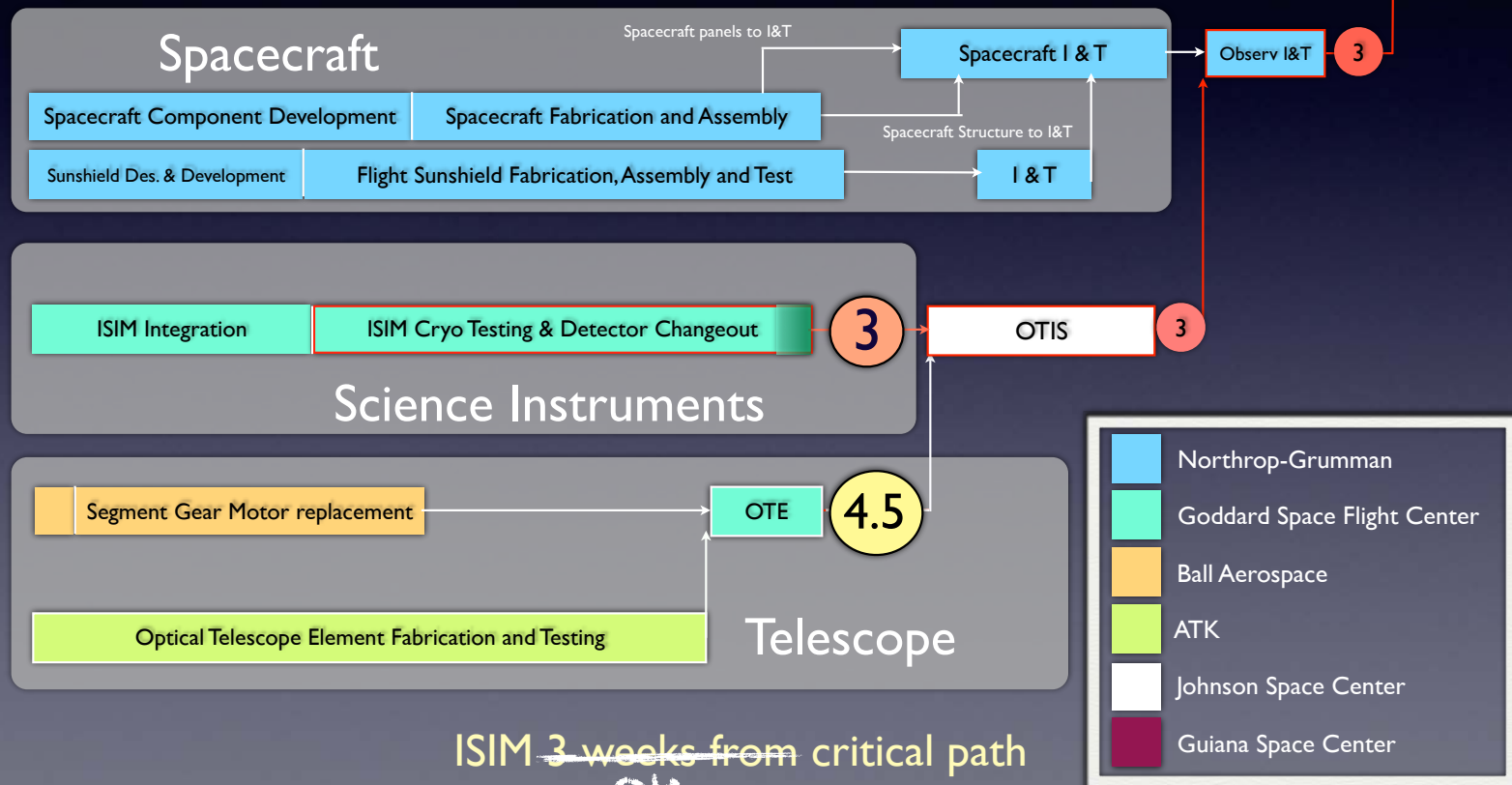
Panel w/ John G. on Hubble 25 and JWST
Exhibit on JWST w/ NGAS (gaming expo)
Exhibit on JWST w/ NASA (interactive festival)
Many informal talks and outreach events



Slide
shown
Member
Reps.
April'14



April'15



NASA's James Webb Space Telescope:

Observations of Titan

After the end of the Cassini mission in 2017, the James Webb Space Telescope (JWST) beginning in 2020 will provide us with the missing links of the changing seasons on Saturn's moon, Titan. As Saturn slowly circles the Sun, Titan experiences a 2.93 Earth year orbital cycle, which will be further enhanced by JWST's deeper observations. Spatial imaging using an infrared field of view of 10° will allow JWST to observe Titan's surface, and together with Hubble will allow long-term monitoring of the changing spatial distribution of glaciers, clouds and haze, and thereby resolve the interplay of chemistry and dynamics in response to the seasonal cycle.

Example Titan Science Investigations:

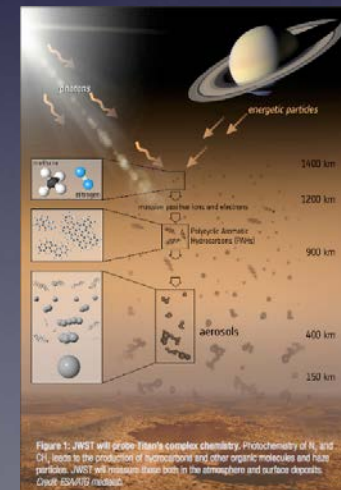
- **Atmospheric Composition:** With a near 0° spectral resolution, JWST's high-resolution infrared MIRI will investigate the spatial distribution of atmospheric methane, which Hubble can't measure as effectively due to atmospheric gases in its field of view.
- **Clouds:** A cloud monitoring campaign at selected near-IR wavelengths will build on the long-term database of clouds tracked by Cassini and ground-based observations (see poster).
- **Hazes:** MIRI-IR in F10 mode can spectrally image at 2.1-2.2 μm . If Titan were in Earth's orbit, allowing monitoring of seasonal changes in haze distribution.
- **Surface Temperature:** At 10 μm Titan's atmosphere is mostly transparent, allowing MIRI to measure the disk-averaged surface temperature over time.
- **Surface Chemistry:** JWST's MIRI and NIRCam can monitor Titan's surface in multiple near-infrared wavelengths, allowing monitoring of surface albedo changes due to dust, organic activity or sea level changes.

Figure 1. JWST will observe Titan's atmosphere, characterized by 90 km thick clouds and haze, and the surface, which is covered by liquid methane and ethane. The diagram shows the JWST in orbit around Saturn, observing Titan. The diagram includes labels for the JWST, Saturn, Titan, and various atmospheric features like clouds, haze, and surface features. A scale bar indicates distances from 1000 km to 1300 km.

Solar System Focus Groups

- ◆ Develop more detailed science use cases for a wide variety of sub-topic investigations
- ◆ Products:
 - ◆ Sub-topic flyers
 - ◆ Focussed white papers summarizing JWST capabilities for that sub-topic, special observatory capabilities needed

Asteroids	Andy Rivkin [JHU/APL]
Comets	Chick Woodward [U. Minnesota]
Giant Planets	Jim Norwood [NMSU]
Mars	Geronimo Villanueva [GSFC]
NEOs	Cristina Thomas [GSFC]
Occultations	Pablo Santos-Sanz [IAA-CSIC]
Rings	Matt Tiscareno [Cornell]
Satellites	Laszlo Kestay [USGS]
Titan	Conor Nixon [GSFC]
TNOs	Alex Parker [SWRI]



JWST User Training



python-based! Need to support training for community

➡ Annual Astropy tutorial at AAS meeting (started in Seattle, Jan. 4, 2015)

➡ User Training in JWST Data Analysis meeting @ STScI - May 6-8, 2015

- 2 1/2 day event
- Python for the novice user
- focus on Astropy tools
- hands-on use of tools
- first in an series

http://www.stsci.edu/institute/conference/ut_jwst_da

A screenshot of the Space Telescope Science Institute (STScI) website. The page is titled "Space Telescope Science Institute User Training in JWST Data Analysis". It features a navigation bar with links to Home, About Us, Current Missions, Data Archives, News and Education, Future Missions and Initiatives Support, Research, and Events. The main content area includes a sidebar with links to Event, Home, Agenda, Register, Visitors, Directions, Parking, Hotels, Restaurants, Local Attractions, and Connectivity. The central banner for the event "User Training in JWST Data Analysis" is dated May 6-8, 2015, and is held at the Space Telescope Science Institute in Baltimore, MD. Below the banner, there is a section titled "About The Event" which describes the purpose of the 2 1/2 day meeting and the tools being used, including Astropy. The text mentions that the meeting will include topics like Python for the Novice User and Getting Familiar with Astropy, and that it will focus on hands-on use of tools, soliciting feedback, and collecting suggestions for improvement. It also notes that a nominal registration fee will be assessed for onsite attendees, and that remote presence will be allowed.



Transiting Exoplanet Survey Satellite (TESS)

P.I. George Ricker, MIT

Project management: Goddard

P.I./Technical: MIT, Lincoln Labs

Data processing: NASA Ames, CfA

NASA Astrophysics Explorer Mission
Est. Launch: 2017

Two year survey, 4 cameras $24^\circ \times 96^\circ$ FOV viewing ecliptic latitude 6° to the ecliptic pole.

(see Ricker et al (2014) SPIE 9143, 20 for details)

TESS will:

- *Detect transits of Earths / Super-Earths around brightest $\sim 200,000$ stars (I mag $< \sim 13$) stars with periods < 10 days.*
- *Provide continuous viewing of ecliptic pole (includes JWST CVZ)*
 - *Detect transiting Earth-sized planets in habitable zone of M stars*
- *Monitor 30,000 square degrees observed for at least 27 days; 900 square degrees for more than 300 days*

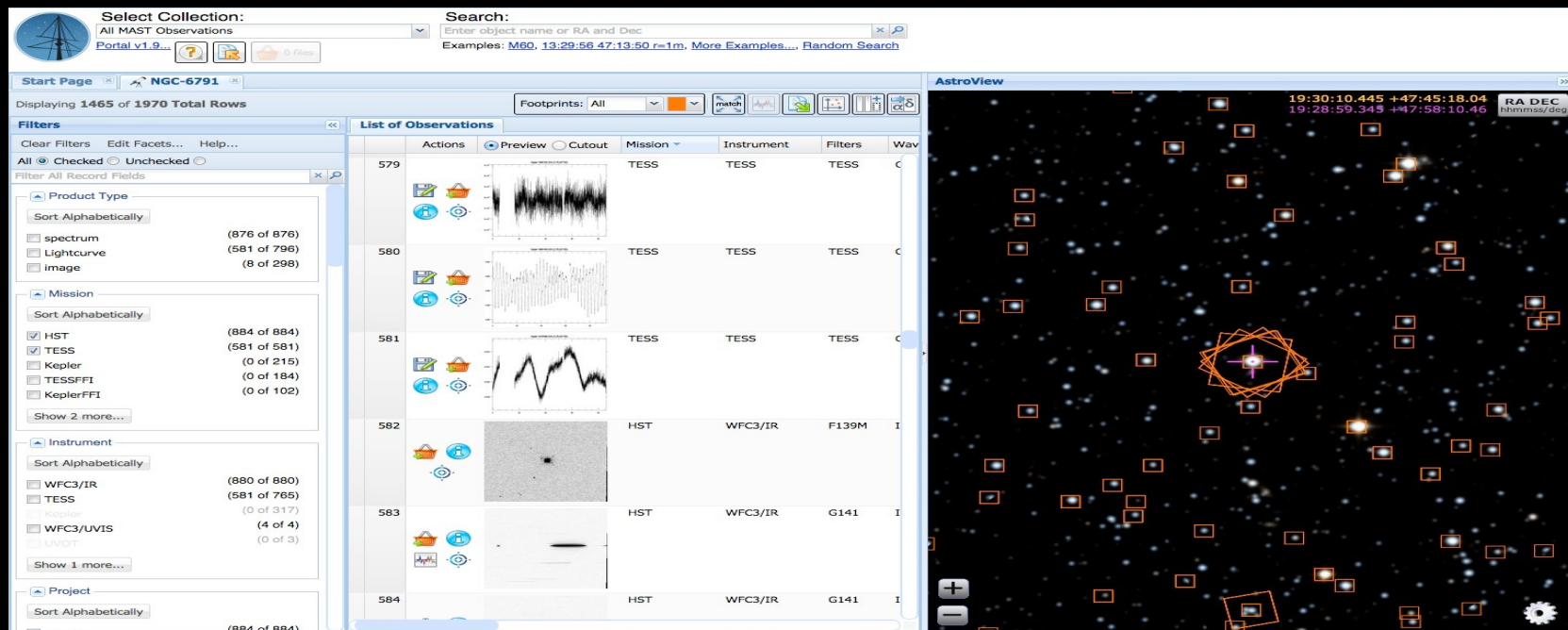
Analysis Tools

Tools for handling data

- Sub-array extraction from TESS Full-Frame Images

Tools for analyzing data; building on the MAST discovery portal

- Light curve viewers
- Image viewers; multi-mission overlays, time domain views
- Spectrum viewer (for ancillary data from other observatories)



Community Science Program, Data Marketplace and MAST

Community Science Program

- Proposal driven guest investigator program
- Designed to acquire new TESS postage stamp observations
- Archival use of Full Frame Images (FFIs) – a spectacular resource at 30min cadence

Data Marketplace

“Next generation” enhanced archive for TESS in which the archive is a **tool** for research, not only data repository. Promotes community interaction; provides working environment for TESS analysis.

Builds on experience of MAST, diverse mission holdings of MAST and new capabilities being developed for MAST:

- Online forum for community discussion and planning
- “digital lab notebooks” dynamically configured web pages with links to science data; capability to upload data
- Toolkit for analysis, building on generic MAST discovery portal capabilities

