JWST Update

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JWST Program Office
30-June-2021
RECENT EVENTS

Observatory
- All observatory post-environmental testing deployments are complete
- Final stow and preparations underway prior to shipping

Science and Operations
- Ground segment testing and operations rehearsals continuing
  - Completed Launch Readiness Exercises #3 and #4 and commissioning rehearsals
  - LRE #4 last week saw more mission operations center (MOC) room staffing
- Cycle 1 program defined

Programmatic
- On track to complete observatory for August ship date and a 10/31/21 LRD
- Working with ESA & Arianespace to be the 3rd Ariane 5 launch this year after they return to flight in late July.
- NASA Senior management is fully aware of concerns raised by members of our community regarding the mission’s name (and the petition about the topic) and is working with historians on the matter.
REMAINING I&T STEPS

Observatory Deployments

- Release, Deploy, Stow - J2 Wing
- SMSS/Wing Flinch/Pull in Test
- Deploy DTA #4
- Partial Stow UPS
- Install 4-bar/J3 panel MRDs (x23)
- Final Stow DTA #4
- Full Stow UPS
- Star Tracker Final Integration

Observatory Final Build

- Install & Walkout DRSA-V
- Install & Walkout DRSA-H
- Receive & Install Transponders
- Delta CST5 & GSEG4 Testing
- DSN/SN CST6 S-band Dry Run
- OTE Omni Air-link Test
- Final RF Close-out
- Shipping Preps

- Start MLI and Close-out Inspection
- Install Solar Array
- Finalize MLI and Close-out Inspections

Blue box indicates first time activity
COMMISSIONING AT A GLANCE

Commissioning begins at launch and is ~ 180 days long marked by the following key events:

1. Launch and Ascent – power positive, safe attitude, and communications established
2. Mid Course Correction – MCC1 (a and b) corrects launcher dispersions for proper L2 trajectory
3. Deployments
4. Cool-Down/Cryo-Cooler Activation
5. Mirror segment deploy and wave-front control
6. Science Instrument calibrations and checkout
SPACECRAFT COMMISSIONING

• **Spacecraft Systems**
  Any spacecraft related commissioning activities not captured under another phase fall under the spacecraft systems phase
  50 total activities, spanning the course of the 180-day commissioning
  Most activities are within the first 30 days of commissioning

• **Launch & Ascent (L&A)**
  Autonomously commanded phase from launch through solar array deployment, sun capture, and comm establishment

• **Mid-Course Correction (MCC)**
  Activities related to achieving final mission orbit

• **Deployments**
  All deployment activities up to mirror segment deployment
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COOLDOWN

• Objective of Cooldown:
  To get to operational temperatures safely while preventing and/or mitigating contamination of sensitive surfaces on the JWST Observatory

• Begins after LV fairing is jettisoned
  Cooling rate increases for most of the hardware once Sunshield has been successfully deployed

• Ends when all the following have been achieved
  Telescope optics and Science Instruments (SIs) have stabilized at cryogenic operational temps
  MIRI opens Contamination Control Cover and ready for on-sky observations (~L+98 days)
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SI COMMISSIONING

• GOAL: Bring the science instrument modes to readiness for “turning them loose on the universe”

• Characterize the performance and operational aspects of each mode well enough to know how to take “science-quality data” with it

• Important earlier functional checkouts and internal calibrations are interleaved with telescope commissioning; the heart of SI commissioning corresponds to the final two months of commissioning

• This is the time period for “on-sky” commissioning activities with an aligned/phased telescope (i.e., after telescope commissioning)
CYCLE 1 GO/AR RESULTS

Slides courtesy STScI
JWST CYCLE 1 OVERVIEW

- More than 10,000 hours of observing time allocated for science during Cycle 1
- Includes
  - Guaranteed Time Observations (GTO, ~3,500 hours)
  - Director’s Discretionary Early Release Science (DD-ERS, ~500 hours)
  - General Observer Programs (GO, ~6,000 hours)
- Almost 400 individual programs
- More than 2,500 worldwide investigators
- A new call for proposals anticipated every year during the science mission
- Nearly every area of astrophysics and planetary astronomy is already represented during the first year of observations

All approved programs can be viewed at https://jwst.stsci.edu
EXECUTIVE SUMMARY

• Submission statistics
  1172 proposals, 1084 GO for ~25,278 hours
  1169 proposals compliant with dual anonymous protocols
  374 with ESA PIs, 44 with Canadian PIs

• Review process
  Small & Medium proposals are reviewed by topical panels
  Large and Treasury proposals are reviewed by the Executive Committee
  • Panel chairs, At-Large members, TAC chairs

• Acceptance Rate
  • GO 1 in 4 for proposals (286) and Hours (5981)
    • Small (<25 hrs): 52% of total time allocated – 1 in 4.1 by proposals
    • Medium (25-75 hrs): 32% of time allocated – 1 in 3.8 by proposals
    • Large (>75 hrs): 16% of time allocated - 1 in 4.75 by proposals
  • Archival Research 20/75 = 1 in 3.75 acceptance by proposals
    Regular 15 recommended
    Theory 5 recommended

• Instruments: MIRI 28.1%, NIRCam 24.4%, NIRISS 6.7%, NIRSPEC 40.8%
EXECUTIVE SUMMARY

- **CSA Acceptance**
  - 4% for proposals and hours of total observing program
  - CSA Submitted vs Accepted is
    - 23% for proposals 10 accepted from 44 submitted
    - 31% for hours 249 allocated from 813 requested
  - CoIs are 2% of the total CoIs

- **ESA Acceptance**
  - 33.5% for proposals 30% for hours of total observing program
  - ESA Submitted vs Accepted is
    - 24% for proposals 89 out of 374
    - 22% for hours 1786 out of 8222
  - CoIs are 36% of the total CoIs

- **Student-led proposals**
  - 25 accepted proposals from 122 submitted

- **Calibration & mission support**
  - 4 calibration proposals
  - 4 mission support proposals
>2000 HOURS WITH NO EXCLUSIVE ACCESS PERIOD

Programs without exclusive access periods:
- All Director’s Discretionary and Early Release Science Programs,
- All Large General Observer programs
- Many Solar System Guaranteed Time Observing programs and some parallels
- Some Small and Medium General Observer programs

Courtesy Jon Gardner
SCIENCE CATEGORY DISTRIBUTION FOR HOURS

Expressed as a fraction of the whole
25,278 hours requested
5,981 hours allocated

- Stellar Populations and the ISM
- Stellar Physics and Stellar Types
- Solar System
- Large-scale Structure of the Universe
- Galaxies and the IGM
- Exoplanets and Exoplanet Formation
- Supermassive Black Holes and Active Galaxies

Approved
Submitted

5,981 hours allocated
25,278 hours requested
INSTRUMENT MODES

Imaging 30% vs 70% Spectroscopy
All proposals are subject to technical and scheduling reviews by STScI staff. Key scheduling issues:

- High data volume – may preclude parallel observations in some instances
- Uninterrupted observations – only allowable when scientifically required
- Some programs may require adjustments that lead to longer charged times
- We will be flexible in allowing some such adjustments in Cycle 1
JWST SCIENCE TIMELINE

- **Launch readiness**: 10/31 2021
- **Commissioning (L+6 mo.)**: 1/7
- **HST Cy 30 Call deadline**: 3/15
- **Chandra Cy 24 deadline**: 3/15
- **HST Cy 30 Deadline**: 4/8
- **HST Cy 30 TAC**: 6/13
- **Chandra Cy24 TAC**: 6/20
- **HST Cy 31 Call**: 1/6
- **Chandra Cy 25 deadline**: 3/15
- **HST Cy 31 Deadline**: 4/7

**2021**
- **GTO Cy2 Call for proposals**: L+6
- **Start of Cycle 1 science observations**: L+8

**2022**
- **GO Cy2 Call for proposals**: L+11
- **GO Cy2 TAC Deadline**: L+13

**2023**
- **L+15.5 GO Cy2 TAC**: L+18
- **Cycle 2 starts**: L+18

HST & Chandra dates are estimates.
## Fiscal Year 2021 JWST HQ Milestones

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<th>Month</th>
<th>Milestone</th>
<th>Comment</th>
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<td>1 Complete Observatory Environmental Testing</td>
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<td>Dec-20</td>
<td>2 Complete Post Environmental Testing Spacecraft Bus Deployments</td>
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<td>Jan-21</td>
<td>3 Complete Post Environmental Testing Sunshield Deployments</td>
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<td>Feb-21</td>
<td>4 Complete Comprehensive System Test #5</td>
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<td>Mar-21</td>
<td>5 Complete Cycle 1 Geneal Observer Proposal Reviews</td>
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<td>6 Sunshield Fold Complete</td>
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<td>7 Launch Readiness Exercise #2</td>
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<td>May-21</td>
<td>8 Final Deployable Tower deployment</td>
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<td>Jul-21</td>
<td>9 Final Observatory Stow Complete</td>
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<td>10 Observatory Pre-Ship Review</td>
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<td>11 Launch Readiness Exercise #4</td>
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<td>12 Operational Readiness Review</td>
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<td>13 Ship Observatory to Launch Site</td>
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Blue font (underline) denotes milestones accomplished ahead of schedule, orange font denotes milestones accomplished late.
Since the September 2011 replan, JWST reports high-level milestones monthly to numerous stakeholders.

**Milestone Performance**

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<th>Total Milestones</th>
<th>Total Milestones Completed</th>
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<th>Deferred more than one quarter</th>
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*Milestone accounting in FY2014 was complicated by the government shutdown and multicomponent milestones. *Milestone reporting stopped during COVID-19 impacted months.
DUAL ANONYMOUS REVIEW

- Proposal reviews are conducted with the identities of the proposal teams removed from the proposals.
- Each panel has a Leveler who helps to keep the panel discussion focused on the selection criteria.
- Once the proposals are ranked, then the panel may examine the Team Expertise.