

James Webb Space Telescope Users Committee (JSTUC) Report

February 28 - March 1 2023

JSTUC Members: Stephane Charlot, Kalliopi Dasyra, Catherine Espaillat, Adam Ginsburg, Alistair Glasse, Tom Greene, Joel Kastner, Tiffany Kataria, David Lafreniere, Mercedes López-Morales, Casey Papovich, Mike Ressler, Erik Rosolowsky, Shobita Satyapal, J.D. Smith, Cristina Thomas, Dominika Wylezalek

Meeting Summary: This was the second in-person JSTUC meeting since the beginning of the COVID-19 pandemic, and the successful launch of JWST. The JSTUC was presented information on the following topics: On day one we heard about JWST Project Updates (Gardner/Johns), and the status of the JWST SOC (Pontoppidan), JWST efficiencies (Garcia-Marín), ESA and CSA Updates (Evans and Dupuis), NASA HQ Update (Smith), the JWST Calibration Plan (Sloan), Instrument Status Updates (Noriega-Crespo, Boyer, LaMassa, and Muzerolle), and Additional Capabilities for Cycles 2 and 3 (Garcia-Marín). On day two we heard about Cycle 2 proposal submissions, TAC preparations, and Cycle 3 Plans (Chen), Exclusive Access Period Community Survey Preliminary results (Watkins), Accessing JWST Data in MAST (Abney/Fleming), Grants update (Alatalo), and Citizen science with JWST (Kuchner).

Artemis Impact and DSN performance

The JSTUC was given an update on the impact of the Artemis I mission on JWST's access to the NASA Deep Space Network (DSN). Artemis I successfully launched on November 16 2022 and returned to Earth on December 11 2023, after about 25.5 days in orbit. The JSTUC members were happy to hear that there was no impact to the JWST DSN coverage because the moon and the telescope were in opposite parts of the sky at the time of the launch. The JSTUC also acknowledges the work that STScI did to be prepared to reschedule observations, had that been needed.

Although the impact for JWST was minimal during the Artemis I mission, the JSTUC is still concerned that the problem raised during the previous JSTUC meeting in August 2022, before the Artemis I launch, still exists: Future interruptions of access by JWST to the DSN Ka-band might have a significant impact on the science performance of the telescope. The JSTUC hopes that NASA/STScI will anticipate similar planned outages in DSN coverage and provide the community with sufficient time to react with mitigating program ideas and to come to terms with potential changes to normal GO operations.

The JSTUC was also notified of the current DSN downlink data volume limit of 57 GB per day. This limit, combined with the limited solid state recorder storage space on board JWST, and the

limited time access of the telescope to the DSN restricts the science productivity of the observatory.

Therefore, **the JSTUC still encourages NASA to explore options for establishing sufficient datalinks by building or upgrading existing ground-based infrastructure needed for JWST datalinks, and to fully explore *all* DSN datalink contingency options to cover uncommon situations.** These contingencies could include utilizing NASA partner infrastructure like ESA, legacy radio astronomy facilities with large telescopes equipped with Ka-band receivers (e.g., MIT Haystack), or other creative solutions.

The JSTUC encourages NASA and STSCI to seek ways to expand data downlink bandwidth to enable full exploitation of the current instrument suite. Parallel-mode and high data rate capabilities should be more fully supported.

The JSTUC urges NASA and STScI to continue developing contingency plans in the event of future DSN blackouts. Plans could include developing a program category analogous to the HST SNAP program, or creating lists of generic targets that would benefit the community. The STScI call for filler programs for Artemis I was a good attempt and it had a good community response, in spite of the short turnaround. The JSTUC is ok with similar calls in the future, but encourages giving the community earlier notice.

Micrometeoroid Avoidance Mechanisms

The JSTUC was updated on micrometeoroids impact rates on the JWST mirrors. In the previous meeting we were notified of seven significant impacts, one of them outside predictions. The updated number is 28 measurable micrometeoroid impacts since launch, but still only one larger than predicted impact, so rates are now more consistent with pre-launch predictions. The JSTUC was also given an update on the outcome of the NASA working group study, which determined that high energy particle strikes similar to the one observed in May 2022 can still occur but will be infrequent. These findings led to the recommendation of a JWST pointing avoidance zone, that has been already implemented and will remain in place for Cycle 2 and future Cycles.

The JSTUC was relieved to hear that there have been no additional high energy micrometeoroid impacts since the last report and the impact rate is moving towards what was expected before launch. The JSTUC also thanks NASA's working group and STScI for their swift assessment of the problem and prompt implementation of pointing restrictions in the APT to safeguard the mirrors. **The JSTUC encourages the team to continue collecting statistics on micrometeoroids impact rates and asks for the pointing avoidance zone requirements to be reassessed every year** to minimize losses in data over time for specific science cases affected by these pointing restrictions.

Exclusive Access Period

The JSTUC was informed that NASA's Science Mission Directorate issued an updated Policy Document (SPD-41a) on September 26, 2022. This document includes open access data guidance for new missions launched after its approval. Existing missions, like JWST, are encouraged but not required to adopt this new open access data guidance. The governing documents for existing missions remain the Memoranda of Understanding between international agencies. The JSTUC welcomed these updates on open access data policy.

The JSTUC was also presented with preliminary results of the STScI Community Survey to assess the community's opinions about changes in proprietary data access policy, requested by the JSTUC in our previous report. The full survey results will be presented at the HST Users Committee (STUC) Meeting later this year.

The JSTUC appreciates the prompt reactions by NASA and STScI on this item from our previous report. **We ask to be invited to the presentation of the full results from the Community Survey during the next STUC meeting. The JSTUC will provide a recommendation about this topic after the next JSTUC meeting.**

Parallel and Filler Programs

The JSTUC was informed that Pure Parallel Programs approved in Cycle 1 have now started to be observed. Coordinated parallel observations are being affected by the data volume downlink restrictions of 57 GB per day mentioned above. The JSTUC was also informed that the Filler Program concepts requested from the community as low data volume backup observations for possible DSN blackouts during the Artemis I mission were not needed in the end. The program concepts have been retained but are presently inactive.

We thank STScI for all the efforts being made to execute approved parallel programs and urge for efforts to perform these observations to continue. In the case of Coordinated Parallel programs, which increase the data volume, **we again urge NASA and STScI to seek ways to expand data downlink bandwidth to enable full exploitation of the current instrument suite.** Parallel-mode and high data rate capabilities should be more fully supported.

Survey and Station Keeping Programs

The JSTUC was informed about the need for Survey Programs designed to fill small scheduling gaps. These gaps amount to about 200 hours per cycle. Observations would have to be shorter

than 90-100 minutes each, and with minimal pointing and scheduling requirements. There is also the possibility of doing science observations during the observatory's station keeping maintenance activities, which amount to about 52 hours per year (6 hours, once every six weeks). Station keeping pointings are sometimes decided only two weeks in advance, which limits the time to plan possible observations.

The JSTUC approves of these plans. For observations during station keeping, the JSTUC recommends notifying the community ahead of time, when possible, where the telescope will be pointing during these times to facilitate the development of science cases.

Cycle 2 Proposals and Cycle 3 Plans

The JWST Cycle 2 call received 1601 successful proposal submissions; about a 35% increase with respect to the number of proposals received in the Cycle 1 call. Small proposals (< 15 hours) will be reviewed by external reviewers (five reviewers per proposal) and there will also be external, observatory specific expert reviewers for joint proposals with other observatories. All proposals larger than 15 hours will be reviewed by the regular TAC process. The TAC will have 1 to 3 parallel panels per topic, according to proposal pressure. In anticipation of proposal submission volumes for Cycle 3, STScI is considering changing proposal categories time boundaries from 15 hours to 18 hours for small proposals, and redefining the small to medium proposal boundary. They are also considering adding additional panels for high proposal pressure research areas. The JSTUC appreciates all the work done by the STScI team for the TAC process. **The JSTUC recommends keeping the current total (charged time) hour request boundaries for small and medium proposals to the current numbers, and increasing the number of panels in the high proposal pressure areas to keep panel pressure within reasonable amounts.**

The JSTUC noted that information about < 15h small proposals being reviewed by external reviewers and 15-25h small proposals being reviewed by the regular TAC process is not stated in the Call for Proposals (CfP). **We ask that any such boundaries be clearly defined in the CfP and on the associated JDOx site.**

Instrument Updates

Now that the regular telescope science operations are underway, the JSTUC was given performance updates on each instrument. All instruments are performing well, and anomalies that have occurred so far have been addressed. STScI staff continue to work on improving calibrations and pipelines. **The JSTUC commends STScI staff and instrument teams for the work they are doing and thanks them for their efforts and dedication to make science with the observatory possible.** We also thank STScI for promptly notifying users about recent instrument performance anomalies and their status.

User, Documentation, Archive, and Pipeline Tools

In the previous meeting, the JSTUC was presented with a summary of the JDox documentation and user support website updates. We were also presented with updates on Data Analysis Tools and Webinars, as well as JWST Outreach and News efforts. The JSTUC recommended that STScI continue surveying the community about their performance satisfaction with all these resources. Members of the JSTUC reported a number of comments and requests related to JDox, JIST, and the ETC that will be sent separately to STScI. **The JSTUC recommends STScI to look into those comments and requests.**

The JSTUC was also informed of the ongoing efforts to reprocess all the JWST data when new reference files are delivered or new software is installed. We were also presented with the description of the work being done to re-design the MAST subscription and data search systems. STScI plans to release the new data search system by the end of the summer. **The JSTUC very much appreciates these efforts and requests that, as part of the new subscription system, information gets added to the user notification emails about the specific changes in newly processed data.** Currently, notifications only state that the data were reprocessed with no information on what has changed.

The JSTUC recommends that STScI continue surveying the community about their performance satisfaction with all user resources.

Grants Update

The JSTUC was informed that STScI has rolled out a small pilot program using Cycle 1 DDT proposals to test if a budget pre-allocation system would work to ease the current budget proposals burdens. The pilot program consists of allocating \$50K per approved DDT program, with no FRC review necessary. If a program requests > \$50K in funding, the budget is reviewed by the JWST FRC and a funding recommendation is submitted to the DO.

The Cycle 2 GO budgets will follow the FRC review process currently in place. To help users, STScI will run informal webinars 1-2 weeks before the budget submission deadline. STScI requests feedback from the JSTUC about topics to include in these webinars.

The JSTUC thanks STScI for the continued efforts to ease the budget process and for following our recommendation to implement webinars to help the community write a successful budget proposal. **The JSTUC requests to be presented in the next meeting with a summary of the outcome of the DDT pilot program described above, so we can provide feedback.**

We recommend that the webinars include explanation of the budget narrative template (with specific examples for each section), indication of what would be considered unreasonable requests, and formulaic guidance (e.g. reasonable amount of support for students, postdocs, advisors, travel, etc). **The JSTUC also encourages STScI to ask FRC members to provide feedback on useful content for the webinars.**

We also thank STScI for adding some advisory text to JDox regarding budget proposals. **We ask for some more information to be added, including a budget evaluation criteria rubric and information about the range of outcomes from previous cycles,** e.g. the total budget available, number of cycle hours, and range of budget allocations for different proposal categories.

Calibrations

The JSTUC was informed of the JWST calibration plan, now that the telescope has reached the normal operations phase. The plan includes generation and improvement of calibration data products that serve as input for the JWST pipeline, quantifying performance of the telescope, instruments, and detectors, monitoring instrument health, and obtaining reference data needed to troubleshoot potential challenges. Most calibrations have been completed for Cycle 1, although most available reference files are still the ones collected during Commissioning. Cross-instrument calibrations are underway using common standards. The plan for Cycle 2 is to assess Cycle 1 calibrations and to apply lessons learned from those calibrations, including discontinuing some calibration programs if they are found to not be needed and identifying new issues that require calibration observations.

The JSTUC thanks the calibrations coordination team for all the work they have done so far and supports their plans for Cycle 2, in particular doing as many calibrations in parallel to prime observations as possible. In addition to the current plans, **the JSTUC encourages the team to keep users informed about calibration related open issues and approximate priorities and timelines for addressing them, and to request feedback from users about issues holding back their science.**

Additional Capabilities for Cycles 2 and 3

The JSTUC was asked to provide feedback on implementation priorities for a list of proposed additional instrument capabilities for Cycles 2 and 3. While we are excited about many of these possible capabilities, we are concerned that we do not have enough information to make a recommendation. **The JSTUC asks STScI to provide a complete list of all the additional capabilities being considered, with technical reports (when available), and with quantified impact statements.** With that information in hand, the JSTUC will be able to make a more educated evaluation and better help guide STScI's long term upgrade strategy.

Citizen Science with JWST

Finally, the JSTUC listened to a presentation by Marc Kuchner about possible Citizen Science projects with JWST. The JSTUC welcomed this presentation and discussed whether some Citizen Science projects could be treated in a similar way to Joint Programs or Ground-based Observations support, or included as part of Archival or Legacy Proposals. **The JSTUC suggests looking into these possibilities.**