

Space Telescope Users Committee (STUC) Report:

Fall 2021 Meeting, submitted December 8, 2021

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Meeting summary:

Due to the ongoing COVID-19 pandemic, this was the fourth virtual STUC meeting. Presentations were made available ahead of time in order to focus meeting time on questions and discussion. The meeting consisted of approximately 3.5 hours of presentations plus 30 minutes of executive session discussion on Thursday, October 7, 2021 and 1.5 hours of executive committee discussion and 3 hours of presentations and discussion on Friday, October 8 2021. The committee concluded their work with a 1 hour debrief to STScI and NASA on Tuesday, October 12, 2021. Presentations on the following topics were made available to the STUC: reports from the HST project and mission status; statistics, results, and panelist feedback from the Cycle 29 and 30 reviews; updates on the ULLYSES Director's Discretionary Time program, a recap of recent ESA activities related to Hubble and an update from NASA HQ, discussions of how to optimize HST's unique capabilities moving into the 2020s and new opportunities for joint HST/JWST programs beyond JWST Cycle 1. This report summarizes the key issues that were discussed and the resulting recommendations. For a full account, the community is encouraged to review the STUC meeting presentations, accessible through <https://www.stsci.edu/hst/about/space-telescope-users-committee>.

Mission overview, GSFC update, and instrument status:

The STUC heard briefings on the status of the HST observatory, preparations for the 2022 NASA Senior Review, HST observatory and instrument status, and recent science mission highlights. Taken together, the reports speak strongly to NASA's commitment to continued scientific operations with HST through the end of the current decade (and hopefully beyond). The STUC in particular appreciates the efforts of the HST teams at STScI and GSFC during the recovery from the June 2021 SIC&DH-side B failure. The science and data handling computer recovery involved moving from the side B electronics to the side A electronics, leaving HST without redundant capability in its ability for the spacecraft to communicate with the science instruments. The GSFC team described initial steps towards recovering side B and restoring the redundancy of the SIC&DH system; [the STUC encourages the mission to accelerate these activities in support of HST's continued science production in the 2020s](#). The STUC considers investment in the

recovery of SIC&DH-side B, to prevent the complete loss of science observing if a problem arises with side A, as a high priority for the mission.

The STUC requested that updated documentation be released to the user community describing plans for (and capabilities of) reduced gyro modes that may be adopted if the observatory is reduced to less than three functioning gyro units.

During the STScI Director's state-of-the-mission discussion with the STUC, he requested the STUC's feedback on the possibility of removing the default 6 month proprietary data rights period for all observations (already the default for large GO programs). The STUC discussed this topic with Dr. Sembach, Dr. Wiseman, and the HST Mission Office, noting several advantages to increased access to data for all potential users of HST, but noting that any changes in the proprietary period should include provisions to protect early-career researchers and the scientific integrity of programs requiring multi-epochs to complete the proposed science. The STUC plans to deliberate on this topic and present a formal recommendation in the Spring 2022 report.

Several of the other topics covered in the mission overview presentations (planning for HST+JWST synergy, preparation for the Senior Review, plans for HST cycle 30) are summarized in subsequent sections of the Fall 2021 report.

ESA and NASA HQ updates:

The ESA/HST program office (led by Dr. Antonella Nota) briefed the STUC on European community engagement with HST, noting 5.8 million people viewed the Hubble-related online media for the 31st anniversary. Dr. Nota updated the STUC on the plans for the HST/JWST science celebration in 2022, to be held in-person in Stockholm. Dr. Nota concluded by describing the new Chrome plug-in for HST image backgrounds and the popularity of the 'Word Bank', where astronomical concepts and how Hubble has contributed to them are presented in plain language. Dr. Michael Garcia presented the NASA HQ overview, focusing on the wide range of astrophysics missions launching in the second half of 2021, culminating with JWST in December. Dr. Garcia presented the president's budget request for FY22, noting that astrophysics research and analysis programs remain healthy and that the NASA budget "sand chart" includes a wedge for decadal survey priorities in the mid-2020s.

ULLYSES:

The STUC was excited to learn about the progress of the observing program and data releases from ULLYSES. The team shared that the 3rd data release in August included T Tauri stars for the first time, and the next data release is planned for mid-December. The observations are now 50% complete and 2 peer-reviewed publications have been released so far based on the data. The ULLYSES team will host a Special Session at the AAS meeting in Salt Lake City this January. The team provided technical observing updates to share the progress in observing both massive stars and T Tauri stars, including spectroscopic monitoring campaigns and coordinated observations with other facilities. One complication so far is that some M dwarfs are much fainter

in the FUV lines tracing mass accretion than expected based on their X-Shooter-derived accretion rates; it appears from their analysis that the accretion rates have indeed decreased in the years since the X-Shooter data was taken. They are currently discussing how to proceed with these observations with the Science Advising Committee.

The STUC is looking forward to the future data releases, which will include data as well as a searchable catalog with a user-interface built using Missions-MAST in Data Release 4, and the source code for providing high-level data products in Data Release 5. The STUC has received no additional community feedback about the handful of stars affected by the bright object rules, which was brought to the attention of STScI at the prior STUC meeting.

Cycle 29 scientific and process results, plans for Cycle 30:

The Cycle 29 proposal review process took place in Summer 2021. Like the cycle 28 process, it was a mix of external panelists reviewing small (<16 orbit) proposals, including snapshot and archival proposals and virtual panels reviewing the remaining small GO, medium, archival legacy, large and treasury proposals. The smaller number of proposals received for Solar System science meant that these proposals were all reviewed by the virtual panel; pressure to find reviewers for both HST and JWST proposal review processes in coming years means that the current setup with a split between external and virtual panels is necessary to ensure enough reviewers for both processes. There were 8 virtual panels in total, with 10-12 members, including a chair and vice-chair. Of proposals received, 14% GO were approved and 30% of snapshot and archival proposals were approved, for an overall approval rate of 16% across all proposal categories.

Acceptance rates for cycle 29 follows the trend observed in previous cycles. In general, the acceptance fraction in recent cycles has been a little lower as fewer orbits were available to award. Statistics based on "estimated" gender showed that overall, 30% of proposals were female-led. Dual anonymous review has not eliminated the bias in acceptance rate between female and male-led proposals, but this gap has definitely decreased. In earlier cycles, the gap in acceptance rate was ~5%; this has now decreased to ~1%. More female PIs are submitting proposals. The evaluation of proposer statistics also indicates that proposers tend to be more junior and have been having more success getting proposals accepted -- with many more first time PIs receiving time. For example, in Cycle 24, 5 PIs were awarded programs for their first time, vs. in Cycle 28, in which 55 PIs were awarded programs for the first time.

Cycle 30 will start on 10/22 and end on 9/30/23. The Cycle 30 proposal review will have the same hybrid structure as Cycle 29, with one change: all small and SNAP proposals in CGM/IGM and LSS will be reviewed in virtual panels (and archival proposals reviewed by external panels). The solar system panel will continue to have a virtual panel only, reviewing all GO, SNAP, and archive proposals. ~3000 orbits will be available for Cycle 30 GOs, which is an increase over recent previous cycles. The call for proposals is expected in early January 2022; the TAC executive committee chair is Boris Gänsicke.

The STUC requested a report on the feedback received by HST from external and virtual reviewers for Cycle 29. Compared to previous cycles, panelists felt the online documentation was improved and that it was clearer which proposals required preliminary grades versus which needed a review. However, the feedback indicated that the workloads were considered too high for some panels. STScI had anticipated this and tried to reduce the workload by having more panelists on oversubscribed panels, but the reviewers did not consider this sufficient. Virtual reviewers expressed concern over the science balance of accepted proposals as small GO (<16 orbits), SNAP, and archive proposals were reviewed by the External reviewers. The External reviewers had concerns over relative grading and how their comments/grades compared to other reviewers. External reviewers have requested to see comments from other reviewers before submitting final grades/comments. In the section below on [“Cycle 29 panel and evaluation process”](#), we describe some related user concerns received by the STUC and specific suggestions to alleviate these concerns.

HST’s unique capabilities:

The STUC discussed Hubble’s unique capabilities, and their complementarity to major facilities coming online in the 2020s and particularly in the JWST era. Hubble’s clear unique capability is in UV, where no major mission has similar capabilities, either flying or in preparation. Astro2020 recommended a flagship UV mission, however, it will not fly until the late-2030s or later, so it is clear that in the 2020s, Hubble will be the only mission allowing for high-resolution UV imaging and spectroscopy. In addition, although great strides have been made in IR adaptive optics, in the visible bands Hubble is the only telescope capable of diffraction-limited imaging. In the era of JWST, the high resolution optical and UV capabilities of Hubble will be unique and crucial to JWST science.

Regarding highly constrained observations such as exoplanet transient observations or high cadence monitoring such as those performed for reverberation mapping, these were also considered unique capabilities and whether to perform more of these programs should be considered. On the other hand, ultra-rapid and other TOO, which are highly disruptive to the Hubble schedule, will have to be limited if Hubble continues to accommodate highly constrained observations.

For TOO observations, it was noted that with the era of Rubin arriving soon, and LIGO O4, there may be more requests for ultrafast TOOs. However, these TOOs remain very difficult to schedule, due to the aging Hubble ground system and the impact on other observing programs, especially constrained observations. However, the large number of transient triggers for Rubin may open an opportunity to upload TOOs when they are least disruptive to the Hubble schedule, or maybe to assign a period of each HST cycle devoted to Rubin follow-up.

In order to best decide what the balance of usage of these unique capabilities were, it was suggested that a community survey, in the form of a Google form, be sent out. This will help inform the future balance of observations performed by Hubble. [The STUC also recommends that STScI explore the schedule costs of accepting additional disruptive target events](#), including the

possibility of dedicating a portion of each cycle to rapid response observations (e.g., one week or one month per cycle dedicated to rapid response observations).

Finally, the MAST archive was called out as a unique Hubble resource. The archive is seen as a gateway for young scientists into Hubble data, eventually leading to them becoming PIs on Hubble proposals. The STUC discussed possible citizen science projects utilizing the MAST archive, although it was not clear due to changes in NASA's EPO if this could be done as part of the Senior Review.

HST joint programs in the 2020s:

Joint programs with HST have been offered since Cycle 9 (in 2000) with the goal of encouraging the astronomical community to consider synergies between different observatories and submit ambitious proposals. It also alleviates the need for proposers to apply to multiple observatories for the same project. So far, 350 joint programs totaling more than 4000 orbits have been awarded with Chandra, XMM-Newton, NOIRLab/NOAO, NRAO, TESS and Spitzer. The STUC was happy to hear that a joint program with SOFIA is being considered. Two director's discretionary pilot programs with SOFIA recently executed with all data being non-proprietary. Further discussions are ongoing and a joint call will take place in cycle 31 at the earliest.

A joint program with HST was offered during JWST cycle 1. However, the total cap of 100 orbits for all proposals limited participation based on user feedback. From JWST cycle 2/HST cycle 31, no caps will be placed on joint HST-JWST programs to enable synergistic and ambitious proposals. HST cycle 30 will not have a joint call with JWST. [The STUC is in favor of the removal of the joint time cap and the proposed allocation of joint proposals to either the HST or JWST TAC based on the relative time being requested on each telescope. The STUC feels this should also be the case with all large proposals requesting >75 orbits on both JWST and HST, as opposed to the current plan to only have the JWST TAC evaluate such large proposals.](#)

STUC feedback on the HST 2022 Senior Review inputs:

During the update from the HST Mission Office, there was a discussion of the programmatic and scientific objectives for the mission in the 2022 - 2025 timeframe. The STUC is strongly supportive of the programmatic goals for the mission and their proposal to the 2022 NASA Senior Review. [The STUC recommends adding explicit words on improving diversity, equity, and inclusion to either the programmatic or the scientific objectives for the mission.](#) It is the STUC's understanding that NASA has requested specifics of the mission's plans to increase the diversity of thought and create inclusionary environments across the project, including within project leadership as well as across the project and the scientific community. While the details would be developed in the body of the senior review document, the STUC recommends that STScI explicitly acknowledge this as a priority for the project in the summary of objectives.

The STUC endorses the primary scientific objectives and offers the following recommendation for their revision and augmentation:

- 1) The STUC suggests the Scientific Mission Objective 1 include references to topics to be announced in the Astro 2020 Decadal Survey and the Planetary Science and Astrobiology Decadal Survey 2023-2032. In a 31.5-year-old observatory, the STUC considers it important to demonstrate continued relevance to community-driven science topics.
- 2) The STUC suggests that Scientific Mission Objective 2 include specific enhancements to the archive. The STUC suggests that these may be more impactful than the somewhat generic words “with a recognition of its heterogeneous holdings, broad wavelength coverage...”.
- 3) The STUC suggests that Scientific Mission Objective 3 specify “short-wavelength imaging and spectroscopic capabilities (especially ultraviolet)” to emphasize the importance of diffraction limited imaging in the blue/optical.

Community input to STUC:

Cycle 29 panel and evaluation process: The STUC members have noted that post-review survey results of panelists indicate that overall they are happy with the review process. However, some panelists and community users feedback has been provided to the STUC suggesting that there continues to be room for improvement to the current virtual/external panel split. The general feedback from members of the external review panels is that the connection between the expertise of the panelist and the topic of the proposal continues to be a source of community concern. There is ongoing concern that panels without mirror panels means that experts on a given panel are often conflicted on the proposal topics to which their scientific expertise is most relevant. This is in addition to concerns about too high workloads for some panels.

The STUC is concerned about the uneven review in the selection of proposals that is dependent on science panels. For instance, the CGM/IGM and LSS panels reviewed small and SNAP proposals, but not archive, while the solar system panel reviewed all proposals and had no external panelist. All other panels had both external and virtual panelists.

User feedback also indicates concerns with the triaging process and a lack of transparency. The STUC recommends that STScI develop an updated set of slides for panelists and the user community that describe, for both virtual and external panels, what fraction of proposals fall into selected or triage categories, and what happens near the cut-off points. For community reference, we include a link to a detailed presentation from cycle 21. Anonymized examples could be a beneficial way of improving transparency of this important aspect of the proposal review process.

There are a number of potential solutions to the above challenges that the STUC discussed:

- 1) Add additional mirror panels and two executive committees to reduce the large effort required by the executive committee (EC) and panelists as well as mitigate conflicts. The STUC appreciates that this may not be possible given the strain it would place on the joint

HST+JWST panelist community, but we do feel it would mitigate some of the concerns noted above.

- 2) Explicit cross-reference of proposal-to-be-reviewed and a reviewer's previous HST proposals (PI and co-I) may improve connection of proposal and reviewer expertise. This may be accomplished with updates to the [STScI PACman program](#). In cases where a clear science expert cannot be assigned to a particular virtual or in-person panel, the STUC recommends that STScI request an external review to support the panel discussion.
- 3) Reduce the relative weight of the "out-of-field impact" to the proposal grading rubric. This sets up a potentially biased assessment of the relative importance of astronomical subfields and the STUC found it difficult to assess how far out of the specific subfield is the appropriate evaluation metric.
- 4) For hybrid proposal review cycles, have a virtual panel review borderline external-only proposals with high dispersion in their grades. The STUC learned that the standard deviation of the proposal is taken into account for proposals near the triage line for virtual panels, but the equivalent does not exist for proposals on external panels.

The STUC acknowledges that none of these options is easy, and we acknowledge the continued and substantial efforts made by STScI to improve the proposal review process. [The STUC recommends STScI solicit feedback from the proposer/user community about any concerns they have with the current review process.](#) This will enable ST to make informed decisions about review procedures for future cycles with HST and JWST.

Climate on in-person and virtual panels, and harassment reporting requirements for HST grant recipients: It has come to the attention of STUC that members of the community have previously experienced bullying and harassment during in-person panels. These events are thought to be rare, but the STUC emphasizes the importance of a respectful and collegial climate on future in-person and virtual panels. [The STUC recommends that panelists are reminded of both the AURA and STScI codes of conduct, as well as guidelines for what constitutes unacceptable behavior at the start of the review.](#) This reminder should include information on how panelists and panel support staff can report violations and whom to contact along with clear consequences for violators. [The STUC also recommends including a brief questionnaire about the panel climate as part of the post-TAC survey of panelists.](#) These responses can be collected and used to inform revisions to the panel format or process to maintain STScI's leadership in inclusive practices in the peer-review process.

In addition, [the STUC recommends that future 'Calls for Proposal' and STScI's general grant provisions document](#) should include clear instructions on formal reporting requirements for PIs or co-Is related to harassment, including the process to file complaints and the course of action which can be taken by AURA or NASA. For an example of a policy in place with the NSF, we include links to their [harassment policy](#) and [harassment notification form](#). In order to provide

transparency to the process and a metric for evaluation, yearly statistics on the number of complaints filed and their resolution should be made available to the community.

Funding of International co-Is who come to the US as postdocs: The STUC expressed concern over the policy of forbidding the hiring of postdocs at US institutions who have previously been co-Is at a foreign institution. This was brought to the attention of the STUC by the community, but members of the STUC have also been directly impacted by the policy in previous observing programs. In practice, this means either junior scientists have to be excluded from being involved in HST proposals, to the detriment of their career development, or that the US co-Is are unable to hire the most qualified postdoctoral personnel to work on the projects. This may result in suboptimal scientific return on HST observations. The STUC raised this issue to STScI and the NASA HQ personnel on the call, and the STUC learned that this is a GSFC rule that goes back many years; STScI then provided more specifics on this rule that can be found on the grants provision webpages. [The STUC recommends that STScI and GSFC review this policy and determine if there is a “workaround” that enables the career development of graduate students and early-career scientists that make strong contributions to successful HST proposals and support the most productive use of that data after it is acquired; if such a process is found to be viable, the STUC recommends including a link to the new process in subsequent Calls for Proposals.](#)