

Space Telescope Users Committee (STUC) Report Oct 2022 Meeting, submitted Nov 16th, 2022

STUC Membership

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Meeting summary

For the second time in 2022, the STUC were able to meet in person at the Space Telescope Science Institute (STScI). The meeting was held over two days, Oct 20th and 21st. The STUC heard presentations from the new Interim Director of STScI, Nancy Levenson; updates from the HST Mission Office, ESA and the EPO office, an update on the “Hubble UV Legacy Library of Young Stars as Essential Standards” (ULLYSES) project, discussion on issues surrounding grant reporting, and summary of Hubble Cycle 30 and plans for Cycle 31. At the end of the 2-day meeting the STUC presented their conclusions in a 1 hour debrief to STScI and NASA. 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>

Space Telescope Science Institute Updates

The STUC was given a briefing by the new Interim Director at STScI, Nancy Levenson, who spoke to how Hubble remains vital and innovative, and how it is not replaced by JWST; and how HST enhances and adds scientific value to JWST. She predicted that demand for Hubble observations will increase in the next cycle, particularly for complementary UV data to JWST IR observations. [The potential concern that JWST would divert attention from HST at STScI has not materialized.](#) Indeed, as STScI becomes multi-mission (including with Roman in the near future), it is an opportunity to leverage expertise across the different observatories.

Looking to that future leads to a few questions for HST now: e.g., what can HST be doing to enhance the science from The Nancy Grace Roman Space Telescope? On a similar note, with the completion of the ULLYSES strategic Director’s Discretionary (DD) Program on the horizon, the time is right to consider what comes next. Such a program should follow the established model of not duplicating proposals from the user community and engage the broad community, including synergy with independent observations and theory. Brainstorming of topics has begun at STScI. There is the potential for a joint HST + JWST strategic DD program, but they may also be separate. The STUC appreciated that the Interim Director was taking charge of moving forward with this topic, as it was a major recommendation of the May 2022 STUC report.

Molly Peeples followed this by introducing a new (and planned to be recurring) update on actions taken at STScI based on previous STUC recommendations. After this there was a brief discussion of new program completion requirements likely to be enforced by STScI. The goal is to avoid programs lingering in the HST schedule in cycles well after they were originally approved. This

is not common, but some programs with difficult scheduling constraints may be affected. STScI envisions communicating with proposers and being flexible to resolve such issues as much as possible. [The STUC noted that although this may result in some programs not completing, the issue of lingering unfinished programs causes undue complication, and therefore a defined cut-off for completion seems reasonable.](#)

The STUC and HST Mission Policy

The STUC heard a presentation from Jennifer Wiseman, the HST Project Scientist, explaining the structure of the STUC and the mandate issued in our charter. In brief, the STUC is established in the NASA Contract “Statement of Work” for AURA/STScI. Members are appointed jointly by the STScI Director and HST Project Scientist at Goddard, and the STUC serves as the liaison between the community and both STScI and NASA Goddard. When policy changes are made, they are recommended by STScI and then proposed to NASA Headquarters by NASA Goddard. Examples of this in the past have included the transition to dual anonymous review. She encourages members of the STUC to read the charter. [Given the presence of two new members of the STUC at this meeting, this presentation was both a welcome introduction and a good reminder of the STUC’s role.](#)

Observatory status update from HST Mission Office

The STUC heard a presentation from Tom Brown and other members of the HST Mission Office on the status of Hubble and its instruments. We heard how, despite concerns of the additional burden of running two missions, HST and JWST are working well together, and there has been a smooth transition at STScI from operating one space telescope to operating two. The STUC commends the institute staff on their hard work during this transition.

The STUC was presented with updates on ACS, COS, STIS, and WFC3. All are operating nominally. [There are no significant issues of long-term concern related to increased solar activity or the lower orbital altitude of HST.](#) The STUC expresses our appreciation to the instrument teams for their continued outstanding efforts to maintain and even extend these instruments’ capabilities.

HST Cycle 31 will be a shortened, 10-month cycle (December 1, 2023 through September 30, 2024) and there will be only one midcycle call for proposals. Cycle 31 will include a newly supported ACS spectropolarimetry mode. It will also include a new, once-a-month Target of Opportunity (ToO) Thursday, with a flexible schedule to accommodate an increasing number of ToO requests. The STUC supports this plan for Cycle 31 and the exploration of new innovative observing modes, such as these, with HST.

The STUC was presented with summaries of the NASA Senior Review and STScI’s Long-Range Plan for HST science operations. The NASA Senior Review was overall positive for HST. The full over budget request was not granted, and the annual budget remains flat at \$98.3M. However, the lack of budget increase is offset by the removal of the NASA Hubble Fellowship Program from this budget, which accounts for approximately \$7M per year. This will be drawn from a different line of funding beginning in FY24, providing some relief to account for inflation in other areas (e.g., the HST grants program). [Some large/treasury science programs, particularly related to](#)

[exoplanets, have proven difficult to schedule.](#) STScI has a viable plan to finish the few remaining observations from Cycle 27 and avoid future programs from extending over too many more cycles than initially recommended by the TAC. There is also a plan to complete the DDT ULLYSES program by the end of 2023. The STUC is satisfied with these plans.

NASA, STScI, and SpaceX are performing a feasibility study to assess the possibility of sending a mission to boost Hubble's orbit and possibly attach new hardware onto the exterior of the spacecraft (including, for example, a new pointing control system). This action would forestall HST's slowly decaying orbit and potentially extend its productive lifetime. The STUC expressed mild concern about this mission potentially damaging HST prematurely but was assured that the first rule of the mission would be "to do no harm." The feasibility study will likely be complete in 3 months, although the agreement between NASA and SpaceX allows up to 6 months for study. [The STUC is supportive of these efforts and strongly encourages continued exploration of this exciting possibility.](#)

Hubble Project Update

The STUC heard a report on the Hubble project status from Jennifer Wiseman and Pat Crouse. Hubble is still producing impressive science, and Jennifer Wiseman presented a few examples, including HST images of the DART impact, showing the development of two tails over multi-day observations, and the determination of the mass of a stellar black hole using gravitational microlensing observations. [Comments from the NASA Senior Review panel on the HST report submitted by the HST project are now available and are overwhelmingly positive.](#) The panel found that Hubble is operating at top efficiency and will continue to produce world-class science.

HST continues to operate smoothly with a few notable technical glitches. The Solar Array Drive Electronics (SADE) experienced two safhold events -- one on 30 August, and one on 17 October, possibly relating to Single Bit Events. The HST project is in discussion with ESA about the two SADE arrays, particularly regarding how SADE-1 is responding. Some flight spares are available, so the possibility exists to perform more tests on flight spares at Goddard. Fine Guidance Sensor 2 (FGS-2) experienced a period of voltage saturation effects from 30 April to 22 September. [Hence, for the moment HST will use FGS-3 instead of FGS-2 for moving targets and spatial scanning observations.](#) The team is also incorporating spiral maintenance slews to address Servo-B trends. STUC members were concerned that the lack of FGS-2 for moving targets reduces the number of guide stars available and affects schedulability, and hence inquired if there was a plan to use FGS-2 for moving targets again. According to the project team, FGS-2 will be used for moving targets again when possible, once the source of the voltage saturation effects is resolved. [The STUC continues to be impressed by the rapid response, diagnosis and mitigation of Hubble issues, which helps preserve observing efficiency and guarantee maximum science return.](#)

ESA update

The STUC was given a presentation by Chris Evans (ESA HST Project Scientist), providing a top level assessment that everything on the ESA side of things is going well and there were no particular issues to address. The update began with a summary of the ESA contribution to the 3 decades long Hubble project collaboration, which in the current Memorandum of Understanding

(MOU), which is valid through December 2024, provides support for 13 ESA-funded Hubble personnel. A similar MOU exists for JWST, supporting 15 personnel, and in October the ESA development of NIRSpec and MIRI were officially handed over to STScI for science operations. ESA leads the European outreach for both telescopes (esawebb.org and esahubble.org) and coordinates activities with STScI's OPO and NASA. These activities include the long running Picture of the Week series and the new JWST Picture of the Month series; both series now include links to ESASky with images embedded and displayed in context with their environments. In terms of community engagement, ESA sponsored the recent (July 2022) HST/JWST conference held in Stockholm, which had an in-person attendance of 100 and a remote attendance of 20. The ESA HST archive (<https://hst.esac.esa.int/ehst>), which is housed in Spain and mirrors MAST, will soon feature upgrades such as providing ESASky visuals with image footprints and other information for archived data. [The STUC appreciates the update from ESA, who remain a key partner in Hubble mission success.](#)

Updates from the Office of Public Outreach

The STUC heard a presentation from Christine Pulliam and Brandon Lawton from the Office of Public Outreach (OPO). In 2022, the 17 Hubble Science Releases had resulted in 3,767 articles written, which reached 15.9 billion views. There was a very large bump associated with the release of JWST's first science images. [Therefore, JWST, rather than stealing the thunder of Hubble, is in fact driving engagement with Hubble.](#) The breakdown of release topics is designed for balance between 7 areas, with "Stars" generating the most articles, but "Solar System" has a reach 2x greater than for other topics, and is the topic with the leading reach in a typical year. It was noted that Hubble compliments JWST very well, with results shown on composite images of interacting galaxies VV 191 and the observations of the DART impact. No HST news items have been rejected because OPO was too busy with JWST. OPO has a website section focused on collaborating missions, which will include both STScI missions (HST, JWST, Roman) as well as ground-based telescopes and NASA spacecraft.

OPO described efforts to expand the outreach audience by increasing accessibility through tactile display projects with audio feedback (e.g., the pillars of creation), website accessibility features, and the addition of alt-text descriptions of images. Recent OPO activities included presentations at science and education meetings, and a public lecture series. [The STUC were impressed by the efforts of the outreach team.](#)

Surveying the Community regarding Hubble's Exclusive Access Period

The STUC continued the discussion on Exclusive Access Periods (EAP) that was brought up in October 2021 by the former STScI Director Kenneth Sembach, and again in May 2022 STUC meetings, where removal of EAP for Hubble was discussed in more detail, and the STUC recommended STScI reach out to the community for feedback. The purpose of the discussion in this meeting was to establish how best to poll/survey the wider community with regards to any potential changes to EAPs for Hubble programs, with note that this subject is also being discussed by the JSTUC.

The STUC was invited to provide comments on a draft community survey devised by the Science Policies Group (SPG) at STScI. The idea behind the survey is not to use it to decide at this time but instead to understand and gauge the impact that changes to EAP policy might have on the use of HST and the science being done. At the time, it was made clear by Jennifer Wiseman and other representatives that there were no policy changes being suggested or pushed by NASA or OSTP for HST or JWST. The STUC were asked to provide feedback and discuss the best way to share this survey with the community. As this survey will cover both HST and JWST the same conversation will take place in the JSTUC.

The audience for the survey was discussed and it was generally agreed that this should have a broad reach beyond just the current users of HST and JWST, as the broader community has experience with other instruments that we can draw from, and the survey results could benefit from the perspectives of individuals who could be interested in proposing but have not. It was suggested that the survey have a long open time that would close after the JWST Cycle 2 deadline and would be shared widely via mailing lists, at AAS town halls, on the MAST website, and potentially via social media and sites such as Astrobites to reach a wider community.

The aim of the survey is to invite the community to share their thoughts, opinions, feelings and experience associated with EAPs, increase awareness of current EAPs, and provide input to potential future policies. It was made clear that this was likely a polarizing issue but that there are no direct plans to change the EAPs at this time. However, if in the future changes are planned it would be good to have the information and data to show what the community wants from EAPs. The STUC pointed out that changes to EAPs will likely impact different demographics in the community in different ways but also different fields of science in different ways and that there may not be a single clear result from any community feedback. Concern was raised over the length of the survey where a long survey may result in people not completing due to 'survey fatigue'. It was appreciated that the survey will capture some demographic information and past experience with HST data to understand the different situations of the respondents and to correlate situation with perspectives. The space for free-form comments was also appreciated. [The STUC appreciates the effort to poll the community over this important topic.](#)

ULLYSES Update

The STUC heard a presentation by Julia Roman-Duval, Alex Fullerton, Jo Taylor, and Will Fischer reporting on the status of the ULLYSES project, the team's plan for creating new data products and future data releases, and its plan for close-out of the program. As of October 2022, observations for the project are 88% complete. Observations of massive stars in the LMC and SMC are 75% and 95% complete, respectively, and the S/N goals for these data have largely been achieved. Observations of T Tauri star targets are now fully complete, for a final sample of 56 stars, for which S/N goals have been met. The program is also monitoring four T Tauri targets over three consecutive rotation periods each. A first epoch for all four stars, and a second epoch for two of these stars, is now in hand.

The most recent data release was DR5, which included coadded spectra, FUSE spectra, and STIS spectra, plus spliced FUSE+HST and COS+STIS spectra. DR5b is planned for November 2022, and will include HST products for 17 additional T Tauri stars. DR6 is planned for March 2023,

and will be a full release that includes custom-calibrated STIS products as well as instructional Jupyter notebooks. To aid in data access, the team has also released a new ULLYSES catalog and search form which is fully integrated into MAST, and which allows for searches over both observational parameters and astrophysical parameters. The team has prepared one press release to date, and also organized a splinter session at AAS 240 to advertise their work. Six papers that include ULLYSES data have been published by community members to date.

The team plans to complete all work by the end of 2023. DR7 is being timed to include important instrument calibration updates for STIS and COS. They plan to make the ULLYSES database a “one-stop shop” for the program targets that includes data from other observatories, as well as optical and IR data from STIS. If time and resources are available, they will also include COS and FUSE data for single-night observations, implement visual selection of targets (using, e.g., H-R diagrams), and ingest STIS data for LMC and SMC stars observed by other programs. The STUC was impressed by the work completed so far for this important legacy program.

Grant Allocation and Reporting Update

At the May STUC Meeting, two concerns were raised: 1) the incremental way grants are allocated can cause problems for recipients, and 2) that grant reporting can be onerous in some cases. The basic model for how grants are allocated was changed in 2017 in response to concern about the growing pool of uncosted carryover funds and how that might impact future budgets. This uncosted carryover is driven by there being a slower rate of expenditure than allocation. In 2017, STScI investigated possible solutions to this issue and determined that a model where the funds were allocated automatically based on the level of expenditures rather than all at once was the best way to reduce the uncosted carryover funds without impacting PI budgets.

The user community has expressed several concerns about this model, mostly based on how individual institutions manage grants. In some cases, PIs must submit internal budgets and obtain approvals for each increment received, leading to a lot of extra paperwork. In other cases, institutes refuse to spend into deficit, so PIs have a difficult time triggering the next increment without seeking special permissions each time. STScI has reiterated that exceptions to this policy can be granted on a case-by-case basis upon request, such that the next allotment of funds can be released before 90% expenditure is reached.

It was noted that performance reports required by STScI are the minimum for what is required for federal research money. These reports should not be onerous, and PIs should not spend a lot of time on them, for example discussing in detail scientific results, but rather a short summary of work done. STScI is looking into making some examples of what is expected available. The STUC has found that email reminders for these reports are very helpful.

The STUC recommends that STScI work with institutions to minimize the additional burden, possibly by updating the language in the award documents to make it clear that the full amount will be received (even if the word ‘obligated’ cannot be used).

Cycle 30 Summary and Cycle 31 Plans

The STUC heard a report on the Hubble TAC process from Claus Leitherer. The HST Cycle 30 TAC review process followed the same procedure as Cycle 29 with a mix of virtual and external panels. The oversubscription rate was ~6:1. The acceptance fraction (for all proposals) by size has been fairly constant. Women are still submitting fewer PI proposals. [However, the success rates are similar for men and women, an important measure of success for dual anonymous reviewing.](#)

[The Cycle 31 HST TAC Chair is Rupali Chandar \(University of Toledo\).](#) The Cycle 31 HST TAC will have the same hybrid structure as the Cycle 30 TAC, with external panelists reviewing Small (< 16 orbits), SNAP, and AR proposals. However, CGM/IGM and LSS panels will only have archival and theory proposals reviewed externally, and Solar System will not have any external review, as those panels are smaller. There will be no in-person panels. The virtual panels will meet for 4 days (instead of three) to facilitate more discussion time and reduce scheduling pressure. For Cycle 31, the HST Executive Committee will be meeting in-person. This mirrors the procedure of the JWST TAC. The in-person meeting is expected to facilitate more in-depth discussion of the large proposals.

Given the two JWST calls scheduled for 2023, HST Cycle 31 will be a shorter cycle. Around 2300 orbits are expected to be available for GO programs. The provisional breakdown is expected to be ~500 orbits for large + treasury proposals, ~600 orbits for medium proposals and ~1200 orbits for small proposals. An additional ~1000 orbits for snapshots and ~400 pure-parallel observations are expected to be allocated. This distribution of orbits by proposal size may be adjusted based on proposal pressure. The deadlines for HST Cycle 31 have been chosen to optimize overlap with JWST cycle 2 and cycle 3. The HST Cycle 31 call for proposals will be released on March 1st, 2023. The Phase 1 deadline will be on Wednesday, May 24th. The panels will meet in the first week of August 2023 with notifications sent out around August 18, 2023. JWST cycle 2 results are scheduled to be announced a few weeks before the HST Cycle 31 proposal deadline. The JWST cycle 3 deadline will be October 23, 2023. [Given the increased load caused by JWST, the STUC believes the plan for Cycle 31 is well considered.](#)

The Next Large Director's Discretionary Project

In the last STUC report, we noted the success of the ongoing ULLYSES project, and the strength of the legacy dataset that those data will provide for years to come. The STUC encouraged the STScI Director to start the process of definition of this future program by requesting community input on ideas for “The Next Large Director's Discretionary Project” to follow ULLYSES. [At this STUC meeting we were happy that the Interim Director announced plans to move forward with this recommendation.](#) As the next program is developed, STUC involvement in the definition may be a good way to ensure that this program is well defined and provides a strong legacy dataset for Hubble. [Therefore the STUC looks forward to continuing updates on the definition of this program.](#)

Expanding the Legacy of HST

During the STUC's discussion of Hubble's legacy, the question of additional opportunities for DDT-sized, community-led programs was raised. The current GO model of time allocation necessarily limits the scope of programs that can be pursued by the community. However, in Hubble's final years, there may be several such programs that the community would consider to have important and unique legacy value, and which cannot be pursued within the limits of DDT. The STUC recommends that STScI consider ways to reach out to the community to gauge their interest in pursuing programs with exceptional legacy value that would require either very large amounts of time, or another mode of observing that is not currently available to the general observer. The STUC also recommends that STScI consider the impact on overall scientific productivity that would result if there were a significant decrease in the number of GO orbits available to the community.