

# Space Telescope Users Committee (STUC) Report: November 6-7, 2017

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## **\*Meeting Summary:**

The STUC is pleased to hear that the observatory continues to be in good shape. It is greatly appreciated that the instrument teams, operations office, and leadership, continue their proactive approach to anticipate and prevent problems before they occur, thus enabling an efficient use of the observatory by the community, which maximizes its scientific return. We are delighted to see that Hubble-based publication rate is stronger than ever, with more than half of the publications based on archival data.

The STUC saw presentations on the following topics: STScI outlook (Levenson), HST Mission Office Report and instrument status report (Mackenty), HST Project Update (Wiseman, Crouse), HST Senior Review Preparation (Osten), NASA HQ Perspective (Garcia), HST TAC - Cycle 25 results, plan for Cycle 26 (Leitherer), ESA (Nota), ACS Gap Program (Mackenty), E/PO (Villard), HST review process (Johnson), and Advisory reports - Europa, Fundamental physics (Reid). This report summarizes the key issues that were discussed, and recommendations of the STUC. [For a full account, the community is encouraged to review the STUC meeting presentations, accessible through <http://www.stsci.edu/institute/stuc>.](http://www.stsci.edu/institute/stuc)

## **\*HST and Instrument Status:**

**GYROS:** The STUC commends the continued effort to monitor the performance of the gyros and the development of improved software solutions to compensate for the increased noise in Gyro 2 bias. The performance of Gyro 2 resulted in few failed acquisitions; [the STUC encourages the team to present a specific metric to decide when gyro 2 \(or any failing gyro\) should be deliberately turned off.](#)

**ACS:** Pipeline software previously written in IRAF is being converted to Python, and new, improved CTE corrections are now being implemented. The ACS team is now tracking “sink” pixels, ~1-2% of pixels that suck up charge. The STUC commends the team for an excellent achievement of improving the UVIS - ACS cross calibration to <0.01 mag.

**COS:** The move to lifetime position 4 was successfully enacted in October 2017, in large part because of the careful and thorough preparation on the part of the COS team.

The STUC thanks the team for their efforts as well as the development of tools to help observers select the COS modes best suited for their science observations.

**STIS:** The STUC commends the continued efforts to populate the Hubble Spectroscopic Legacy Archive (HSLA) and the current incorporation of STIS data into the HSLA with revisited and improved dispersion solutions.

**WFC3:** The WFC3 team has provided new corrections for the geometric corrections in a number of filters, and new, separate photometric calibrations for the two different UV CCDs. The team also continues to investigate means of mitigating the effects of detector persistence. With the continued demand for observing time-variable events (such as exoplanet transits) where persistence can cause loss of observing efficiency (e.g., throwing away the first orbit of every visit when analyzing transits) this work is valuable and welcome for improving the science return of WFC3. The STUC was happy to learn of a new IDL tool to extract grism spectra in crowded fields; [We encourage the Institute to work to convert it to Python for more generalized community use.](#)

### **Senior review preparation**

STScI is due for a senior review in 2019. The STUC will be asked to assist in preparation for the review, in particular, “*review prioritized mission objectives*” (planned for Spring 2018 meeting). [The STUC endorses including a current or former STUC member on the “Red Team”;](#) we ask STScI to identify a member who has previous experience with serving on a senior review and/or a large red team review.

### **\*Streamlining future operations with flat/lean future budgets:**

From HST Senior Review Preparation presentation: “*Science operations area is already lean, from many years in orbit, long-standing flat budgets. We are currently looking across all sectors of science operations; no one obvious area (lots of small epsilons)*”

[The STUC supports the efforts to reduce costs by identifying processes that could be done more efficiently. In particular, the STUC fully endorses holding the PIs to higher standards in preparing their programs for observation. We empower STScI to enforce the submission policies:](#)

- [Phase II submission deadline should be enforced.](#)
- [Scheduling and observational constraints should be clearly identified and justified in Phase I \(e.g., in the “Special Requirements” section\). We support allowing for some flexibility \*if new information emerges\* that may not have been available to the program at the time of Phase I prep.](#)

### **\*Cycle 25-26 long range plan**

Stretching the observations of cycle 25-26 improved the scheduling efficiency (measured in orbits per week) and helped avoid problems related to the HST/JWST overlap in first JWST cycle.

The scheduling of C25 proposals into C26 has an effect on the science for programs that are scheduled very late. If this is a mode we'll be seeing in the future (since the long tail is good for scheduling efficiency), [the STUC encourages the scheduling team to add criteria \(with small weight\) based on the TAC ranking into the target selection algorithm, and compliance with Phase II submission deadlines.](#)

[We also recommend relaxation of the budget time restrictions to allow extended performance period for programs with extended observing windows.](#)

### **\*Hubble focus:**

"Hubble Focus" e-publications replace the former "Year in Review" format. [The STUC recommends incorporation of scientists' biographies and pictures as was done in the previous format of "Year in Review", with emphasis on diverse representation of scientists.](#) As this is an E/PO resource, we believe it would have a positive impact, especially on young generation.

### **\*GO funding**

NASA strives to set up a balanced strategic program for Astrophysics between missions in operation, missions under development, and support to the community in planning for the future. The reduction of the FY17 Consolidated Appropriation relative to the planned budget did not impact HST's budget, but NASA wants to regulate the \$40M un-costed amount of HST funding over the next few years.

The STUC was presented with a mechanism for maintaining Hubble's budget for FY18, FY19 and FY20 relative to FY17 by changing the grant funding profile and using un-costed carryovers to meet budget requirements, without impact on science.

[While the STUC acknowledges this short-term solution, it stresses the importance of maintaining sufficient HST GO and Archival funding in future years to ensure the most productive use of HST in entering the JWST era.](#)

We are pleased with the expectation that the process will be fast and efficient in moving the additional funds after each 90% was spent, including anticipated changes to STGMS.

The effect of budget change by using the uncosted carryover may have implications at the university/institution level. We were asked to provide feedback -- and already

received some: the flow of funding may affect hiring, and there may be issues related to added “red tape”, possibly resulting in increase of overhead costs.

### **\*Gap filler program decision**

The ACS Gap Filler Program was instituted to use small schedule gaps that cannot be used by other programs including SNAP, CAL, etc. The STUC recommendation (see report from November 2016), resulted in a call to the community for proposals in 2017. 53 proposals were received by the September deadline, and evaluated by an internal review committee at STScl. The STUC was asked to recommend up to three programs for implementation.

The STUC is pleased with the strong interest by the community, the broad distribution of science ideas, and the prospect of further increasing the scientific output of the observatory.

The STUC recommended three programs for implementation based on the science and legacy value.

To maintain a minimal impact on the extra work for both the scheduling team at STScl and the community, the STUC recommends use of the selected pool of Gap targets for 2-3 years followed by a re-evaluation of the program.

### **\*HST Panel and TAC Review process and gender bias**

The STUC is pleased to see that STScl has followed our recommendation from November 2016, to consult an external expert who specializes in issues of unconscious bias and stereotype threat in the continued effort to mitigate their effect on the proposal selection process. The external expert, Dr. Stefanie K. Johnson from the University of Colorado Boulder, gave a presentation detailing the process of this study to the STUC, and presented her findings and recommendations. Dr. Johnson’s assessment of the review process included examination and comparison of the initial and final scores in two cycles, C21 and C24, as well as observations of panel discussions in C25.

The STUC endorses the following recommendations immediately (we expand upon recommendations made by Dr. Johnson):

1. More training for panel chairs, e.g., workshop session aiming to develop strategies for facilitating an equitable discussion; including specific guidelines and strategies for dealing with difficult panel members, best practices like allowing space for individual panel members to give their opinions, etc, as well as issues related to bias.
2. More training for all panel members on use of the grading scale and how to focus discussion of proposals
3. Separate evaluation of science and management plans, in particular in the AR proposals

4. Clarify the author guideline
5. Continued external observing of panel discussion

Dr. Johnson's main recommendation is to implement a fully blind application process. The STUC acknowledges that the evidence presented by Dr. Johnson supports the hypothesis that a fully blind process may reduce biases related to the selection process. At the same time, we emphasize that a blind peer review is currently foreign to the culture in the Astronomical community and as such may have implications that we may not be thinking of. [We recommend that a committee consisting of astronomers from the community, including scientists who work with diagnosing and reducing biases, assess whether it is possible to move to a system where Hubble proposals are fully blinded.](#)

**\*Director's perspective:**

The STScI director, Ken Sembach, conducted an informal discussion with the STUC particularly focused on the strategic big picture motivations driving future directions for HST and completing Hubble's legacy. He noted that the six month delay on the JWST launch has renewed his interest in thinking of plans for Hubble and his Director's Discretionary time within the broader portfolio of current and future astronomical facilities. Options include focusing use on unique HST modes, providing key observations to support other missions (e.g., JWST, TESS, LIGO, LSST, Gaia, ALMA, etc.), and pursuing a transformational project that may not fit well within the standard peer review process.

The STUC did not identify any single observational program (or set of programs) to recommend to answer this call. In discussing options, there was a preference for projects that a) provide observations in modes unique to HST that will be important archival data in the future (e.g., UV spectroscopy, blue wide field imaging) and/or b) address high risk/high reward science. The STUC agreed that the Frontier Fields program was effectively run and facilitated broad community (observer and theorist) involvement, and provides a good model to replicate for the next DD project. We endorse the idea of forming an advisory committee to shape the direction of the project(s) going forward.