Space Telescope User's Committee Report: May 2014

STUC Attendees: Marc Buie; Jane Charlton (remote); Michael Cushing; Yo-Hua Chu; Annette Ferguson (Chair); Chris Howk; Giampaolo Piotto; Andrea Prestwich; Brian Siana; David Sing; Ann Zabludoff

Meeting Dates: May 8/9 2014

Preamble: The STUC was pleased to hear that this continues to be an excellent period for the observatory, with instruments and operations performing optimally. The STUC was happy to see that HST continues to be a much sought-after resource within the community, as demonstrated by near record demand in Cycle 22. Shortly after the STUC meeting, the results of the NASA Senior Review were announced and the STUC was delighted to hear of the strong endorsement that Hubble has received. It is very much hoped that this furthers the case for continuing to fund HST operations through 2020---strongly supported by the STUC---as it is sure to remain a highly productive and in demand resource over this timescale, and the overlap with *JWST* will greatly enhance the scientific productivity of both flagship facilities.

HST and The New Horizons Program:

At the October 2013 meeting, the STUC heard a presentation by Hal Weaver concerning the role HST might play in supporting the *New Horizons* (NH) mission to Pluto but there were no concrete ideas or requests put forward at that time. The STUC heard that the NH team subsequently requested consideration of a large HST allocation (~400 orbits) to augment their extensive---yet so far unsuccessful---ground-based efforts to search for a suitable KBO flyby. Their proposal entails very wide area WFC3/ACS mapping of a region around the NH flight path; depending on predictions, this could result in 1-2 detections of suitable KBO objects. The NH team were given feedback from expert reviewers and invited to submit a full proposal for this program by the Cycle 22 deadline. A subsidy of 40 orbits of DD time has been made available to the team for pilot observations, contingent on the main program being approved via the normal TAC process. In addition, a set of criteria are being defined on which to assess the likelihood of success of the program based on these initial observations---the outcome of which will determine whether or not to proceed. The STUC commends STScI for their efforts to support this important (yet high-risk) science while at the same time preserving the integrity of the HST peer review process and acknowledging the precious nature of observing time on an ageing telescope. The STUC notes the media campaign being conducted by the NH team in advance of the Cycle 22 TAC and considers this potentially damaging to the peer review process and overall credibility of the community.

Report from The Solar System Advisory Committee:

The STUC heard a comprehensive report from Philip Nicholson, Chair of the HST Solar System (SS) Advisory Committee. This panel was tasked with reviewing

the evolution of HST usage by the SS community, including investigating long-term trends in allocation statistics. A summary of SS proposal success rates over all 21 HST cycles was presented. While it was reassuring that the overall success rate (as judged by number of proposals (orbits) requested/awarded) is favorable for SS proposals, the average size of proposals was notably smaller than in the past and the total number of SS proposals submitted each cycle has also declined. Additionally, few medium and large programs for SS science have been submitted in recent years. The STUC noted that rather than a smooth decline over time, these trends may more reflect a step function in SS requests after Cycle 7, though the reasons for this were unclear. The SS Advisory panel offered interesting insight into their findings and suggested a number of proposals to increase SS participation in HST science and improve the TAC process in general. The STUC was pleased to note that most of the suggestions for the TAC process have already been implemented for the Cycle 22 review. The STUC was supportive of the idea of 'serendipity' proposals where an allocation is weighted by the probability of occurrence and felt these could appeal to a number of HST communities. However, rather than introduce this as a new class of proposal, the STUC recommended exploring whether such proposals could be accommodated within the existing ToO category. The STUC also recommends that the SS Advisory Committee strive to disseminate their findings widely to their community as it may help dispel the notion of bias and trigger renewed interest in applying for time.

The Frontier Fields Program:

The STUC heard of the excellent progress with early observations and science in the HST Frontier Fields (HFFs). In particular, the STUC is encouraged by the improved calibrations and persistence monitoring that has come from careful reduction and analysis of the HFF data, and acknowledges the widespread benefits this will have for HST science as a whole. The plans for convening an external science advisory committee to oversee progress and advise the Director were viewed positively. It is still rather early to evaluate the full impact of the HFF program although much will be learned in the next six months. That said, the STUC remains somewhat concerned about how easy it will be to make a well-informed decision on progression with the final two clusters by December. Where resources allow, the STUC also recommends efforts are made to better quantify the utility and accuracy of the various lensing models provided to STScI by the community, and ensure the interface/models can be easily accessed and utilised by non-lensing experts.

Cycle 22, Peer Review and the TAC Process:

The STUC applauds the focus placed on understanding the peer review process and improving the overall TAC procedures. Several changes in the Cycle 22 TAC process have the potential to reduce the workload on the panel members, a consistent problem in past cycles. Generally the STUC was in favor of the changes. In particular, we are encouraged to see that STScI recognizes the heavy burden on the reviewers and that it is actively trying to lower the workload of both the panelists and TAC members. The STUC supports reducing the number

of proposals that the panel members must initially read and restricting preliminary grading to a subset of the panelists, ideally those who are more expert on the proposal topic. The STUC had detailed discussions of other ways in which the pressure on the TAC process might be alleviated, including reducing the overall number of submitted proposals and obtaining a larger number of reviewers, but no clear consensus emerged. We felt the triage line should not be moved to the 50th percentile and perhaps should even be lowered to the 30th. The STUC did feel that the discussion phase of the panel reviews was critically important to the overall process. There was some concern that not having the panel chairs participate in the panel votes, but serving only as "managers" of the process, may have some negative effects. However, it was also seen as a good experiment that serves the important purpose of reducing the workload on the chairs. We are happy to see the improvement in acceptance rate for panel chair requests as a result of moving the review to a later date than previous cycles. Nonetheless, the difficulty in recruiting senior panelists remains and the STUC considered whether progress could be made by requiring PIs of successful proposals to serve in subsequent reviews. The STUC strongly supported the new approach of requesting written reviews of the large programs.

The STUC recognizes that the TAC process is and will need to be a continually-evolving one. We are very happy to see the Institute both modifying the existing approach in somewhat minor ways and considering what large-scale changes to the process may be needed in the future as proposal pressures continue to increase, especially with the *JWST* era approaching. Toward these ends, the STUC was pleased to hear the Institute would once again include a TAC Ombudsman as part of the process. We are also pleased to see efforts are continuing to track and address potential gender-bias in the review process.

Science Policies:

The STUC heard of various science policy questions currently under consideration. Concerning joint programs, the STUC supports the current level of the *HST-XMM* joint observing program (i.e. 30 orbits/150 ksec) given the over-subscription rate for this program and for HST in general. The joint program with *Spitzer* should be re-evaluated in the longer term given the outcome of the recent NASA Senior Review. The joint program with Chandra remains successful. The joint programs with national ground-based facilities, NOAO and NRAO (beginning this cycle), are also clearly enhancing the science return of both partners. Given the potential interest around the world in similar joint observing programs with HST, the STUC suggests the definition of a set of guidelines to consider before entering into partnership agreements with other ground-based facilities. These guidelines might include a) an analysis of the complementarity of the ground-based telescope and instrument package with HST science and instrumentation, b) a requirement that the ground-based observing time designated for the HST partnership be open access, as HST is, c) benchmarks to determine the success of the HST-partnership and when the partnership might end. Additionally, some thought should be given to an appropriate "exchange rate" of HST orbits swapped for the ground-based time.

The pros and cons of another call for MCT/Very Large Programs were considered. The current demand for and distribution of small, medium, and large programs is very healthy. In particular, the interest in the recently-introduced "medium" proposal class is worth noting as this is allowing significant strides to be taken in a number of science areas; the total number of orbits allocated to this class (~600) is of order what a final MCT program would require. The interest in and success of the normal programs needs to be tensioned against the strong legacy science that has come from past MCTs and the ageing of HST, which means that delaying any call could prevent a future MCT from being completed. The STUC felt that there could be merit in releasing an additional MCT call as there are some key science areas where a large allocation of HST time could still have a unique and significant impact. The STUC agreed to hold a telecon to further discuss this when the Cycle 22 outcomes are known. In particular, we would like to revisit the need for and possible focus of a future MCT call in view of Large/Medium/Treasury allocations.

The ageing of HST also prompts consideration of a "rolling" TAC review like that recently implemented by the Gemini Observatory. The STUC is generally favorable towards experimenting with implementing this process in the next cycle, as long as it complements (instead of competes with) the normal TAC process, has a clearly defined, very high scientific bar that is separate from the time critical, target-of-opportunity observations already handled by the normal TAC and does not overly burden the community with additional refereeing. Such a rolling review should be reserved for small proposals, with the aim to fast-track important new discoveries that require follow-up observations before the regular proposal deadlines. The STUC had mixed opinions on whether it should also be used for pilot observations. The successful implementation of a rolling review now would also help with *JWST* TAC process planning.

HST Mission:

The excellent level of support being provided to HST is readily evident in the fast recovery from the Gyro 5 failure and the continued high-efficiency operation of the telescope. The STUC is pleased with the continued nominal operation of all of the instruments, and the continued efforts to mitigate degradation in performance (e.g. post-flash analyses, minimized usage of WFC3 channel select mechanism, future COS lifetime position modification).

Progress on understanding and correcting for WFC3/IR persistence is encouraging and should be continued. The STUC felt it would be useful if the persistence images could be more easily available to GOs, perhaps as an additional pipeline product that can be downloaded along with the primary data, rather than needing to do a special query for each and every exposure.

The STUC strongly supports the creation of a PSF library for WFC3. Such a library could potentially be useful to have for all imaging instruments but the need for WFC3 is particularly acute due to the difficulty of collecting the necessary optical prescription information for this instrument.

The STUC supports the development of the Hubble Source Catalog (HSC) and considers this an important step in ensuring the legacy value of HST data. Of particular value will be its potential for the easy construction of multi-visit mosaics. There were some concerns about incorrect uses of such a catalog by the community, given that the catalog will not be built from uniform survey data but a set of pointed observations with varying on-sky exposure times and constraints. For example, particular care should be taken to clearly delineate high S/N sources from confused and/or low S/N sources.

ESA Update:

Antonella Nota reported on the recent HST IV meeting in Rome. This was clearly a great success and the organizers are to be thanked for their efforts. A particular highlight of this meeting was the focus on future initiatives; several exciting prospects exist (e.g. *WFIRST, ATLAST*) and it is very much hoped that there will be opportunities for ESA collaboration on these missions.

The ESA Senior Review will take place during May-Nov 2014, and includes the confirmation of support to HST for the period 2015-2016, and an extension of the budget horizon for support to 2017-2018. The STUC strongly endorses the confirmation of the support to HST. We note that 229 proposals were submitted by ESA PIs in Cycle 22; this is the highest demand by European PIs in over a decade and continues the steadily increasing trend seen in recent years.

E/PO STATUS:

The E/PO office supporting the Hubble Space Telescope continues to do wonderful work, and the members of the STUC were impressed with the wide array of very high profile activities in both education and outreach. Clear impact at a global level, national level, and community level is evident among the wide array of activities from the E/PO. An update was given on the uncertain funding situation. The E/PO office was directed to continue funding in FY14, though on a severely reduced budget made up for using mainly reserve funds. FY15 funding was still uncertain as the budget and E/PO plans are being decided by the government. The committee had deep concerns that certain possible budget outcomes could be detrimental to the infrastructure of the E/PO office now in place, and large synergies between E, PO, and the scientists now being efficiently leveraged would be lost.