

Report of the Space Telescope Users' Committee (STUC) Meeting, November 1999

The Space Telescope Users Committee (STUC) met on 4th and 5th November 1999 at the Space Telescope Science Institute.

Attended: Bruce Balick, Chris Impey, Jay Frogel, George Miley (Chair), Felix Mirabel, Sergio Ortolani, Dave Sanders, Susan Terebey, Hal Weaver, Bruce Woodgate.

Unable to attend: Debra Elmegreen, Pat McCarthy

1. GENERAL

The ST Users Committee congratulates the Institute and NASA for the manner in which they have dealt with the need to operate the HST while simultaneously developing the NGST. It is apparent that satisfying the needs of HST users has been one of the most important drivers in the planning process that has taken place during the past year.

2. STATUS OF THE PROJECT

STUC recognizes the problems caused for the HST Project by the delay in scheduling the SM3A service mission and encourage all efforts to minimize delays in carrying out the subsequent SM3B and SM4 missions.

We compliment the HST Project for their decision to implement a near-IR capability on WFC3 without seriously impacting funding for the user science programs. The resultant enhancement of the wide-field imaging capability of HST should ensure that the HST continues to produce fundamental discoveries and continue to inspire the general public until the end of its life. The unique scientific opportunities afforded by such an infrared channel will benefit a large range of astronomical projects, including studies of the early Universe and the Origins Program.

3. REORGANIZATION OF THE INSTITUTE AND LONG-TERM COST REDUCTIONS

STScI is adapting from being an institute devoted to a single mission (HST) to one that can take simultaneous responsibility for several facilities (e.g. HST and NGST) in a period of constant funding. A necessary reorganization is underway to prepare for this changing role. STUC was impressed by the careful argumentation and wide consultation at all levels of the Institute that formed the basis for the reorganization plans.

The new obligations coupled with the budget cap has forced the STScI to embark on a cost-cutting exercise with respect to future HST operations ("Cheap-ops"), which will be finalized during the next several months. STUC is encouraged that the various options now being considered are sensitive to the needs of the HST user community and will preserve the excellent STScI support for observing programs that we have long enjoyed.

We encourage the pursuit of a planned pilot project that will outsource to the community a limited number of calibration tasks that have traditionally been the responsibility of the Institute. This is a reasonable way of (i) ensuring that certain little-used observing modes can continue to be offered (ii) harnessing technical expertise within the community in optimizing the scientific exploitation of the telescope and (iii) facilitating the development of possible new observing modes. We therefore

consider it appropriate to devote a small part of GO funding in support of such activities. Particular candidates for outsourcing are (i) calibration activities for which major expertise already resides outside STScI, and (ii) rarely-used observing modes for which calibration can be more efficiently conducted by the allocation of additional orbits and funding to the GO program requesting such modes. In the latter case, the total cost in spacecraft time and resources should of course be made clear to the TAC before allocation.

It is desirable that proposals for outsourcing undergo some form of peer review, but this should be done in an efficient and inexpensive a manner as possible. We look forward to evaluating the success of the pilot project that the Institute has begun in Cycle 9. At this stage we do not envisage calibration outsourcing as comprising more than a very small part of the HST calibration activities. However, we recommend that the Institute consider the effectiveness of outsourcing the development of software to carry out data reduction tasks, for which appropriate expertise exists in the community.

Considerable technical expertise on the use of Hubble exists outside the United States and it is desirable that ways be found to ensure participation of non-US astronomers in such programs. In particular, we hope that the European Space Agency can provide a small amount of funding to permit a similar program to be funded in Europe, thereby involving European astronomers in efforts to enhance the performance of the HST.

The STUC was impressed with the care with which the STScI staff is streamlining the user support functions at the Institute. Plans to provide Contact Scientists only at request of a project PI, while augmenting resources of the Help Desk appear reasonable, but continued evaluation is needed to monitor possible effects of such measures on user support. The STUC looks forward to receiving feedback on the effectiveness of the new Contact Support procedures.

We understand the need to reduce the cost of user visits, by critically evaluating the need for such a visit and reducing the default period of full-time support by research assistants. However, when evaluating the need for such visits we urge the institute to take into account the (often intangible) role that such visits play in directly involving the community with the project and in particular in training young astronomers to be sophisticated users. In addition, the STUC encourages STScI to pay more attention to providing cookbooks, scripts and example files. Provision of such aids could improve the efficiency of data reduction and greatly reduce the time and effort spent by Institute support staff in training users to carry out basic reduction tasks.

An important part of any cost-cutting exercise is to evaluate total costs. We therefore support efforts by the institute to review all aspects of the step by step process by which science is produced and the importance of the various ingredients in determining the total cost of a project. We look forward to working with the Institute on a more detailed analysis of such matters in time for the next STUC meeting.

4. WFC3: SIMULTANEOUS IR/OPTICAL OBSERVATIONS

STUC received a request by the WFC3 Science Oversight Committee and the Project to evaluate the scientific importance of a proposed WFC3 option that would permit simultaneous observations with the optical and infrared channels of WFC3. After receiving written and oral presentations on the technical and scientific aspects, we considered this matter at length. Implementation of a "simultaneous operations" option for WFC3, would add to the rapidity with which Hubble can gather data. However, we were presented with no compelling programs for which the ability to observe simultaneously in the optical and near-infrared would produce unique HST science, that could not be attained from the ground.

There is a "downside" to including the simultaneous observation option in WFC3, as it is presently conceived. Since the performance of the CCD detectors in the HST instruments is expected to decay over time, it is critical that the ability of the IR detectors in WFC3 to operate at as short a wavelength as possible should not be compromised. The dichroic optical element necessary for simultaneous operations would not allow the IR channel to operate below about 8500 Angstroms. The proposed option would therefore (i) reduce the redundancy in HST optical imaging capabilities and (ii) result in possibly reduced sensitivity in the wavelength region near 8000 Angstrom. We regard optimization of the efficiency of both presently planned channels and the preservation of redundancy to be more important than the ability to observe simultaneously in the infrared and optical.

The improvement in observing efficiency achieved by the simultaneous observing option would produce some enhancement in the scientific productivity of Hubble. However, in view of the above arguments and the tight budget constraints on WFC3 and the HST project as a whole, we cannot recommend implementation of the simultaneous operations option as presently envisaged.

5. SOFTWARE TOOLS

5.1 STSDAS. We are extremely enthusiastic about the innovative work of the STSDAS group in developing the use of Python as a command language interface to IRAF. As well as providing a modern platform for developing astronomical image processing software, this project holds out the promise for significantly improving users' ability to reduce and analyze data. The new (backwards-compatible) IRAF platform could be an important element of the "Cheap-ops" mode of operation at STScI. In view of its promise for reducing the time and effort needed to create application software, it could improve the productivity of STScI's software programmers considerably and greatly expand the pool of potential contributors to HST's data analysis tools. We also note the tremendous potential that this new STScI project might have for future missions and general astronomical data analysis. We are impressed by the relatively small effort that has so far been required to reach the present stage of the project. However, as the project progresses, it is important to have clearly defined milestones for the software developers and careful reviews by Institute staff and outside users who will be making use of Python. Several STUC members have volunteered to participate in this process.

5.2 SEA/APT. During the last meeting STUC was introduced to a prototype of the Science Expert Assistant (SEA), a program that is being developed mainly as a replacement for RPS2. It was clear that the enhanced scheduling capabilities of SEA with respect to RPS2 could effect qualitatively the scientific use of HST. A sub-group of STUC (Impey, Sanders and Woodgate) was set up to conduct a more detailed evaluation the SEA. At the present meeting we considered the present status of the project, which has since been renamed the "Astronomer Proposal Tools" (APT).

The visual windows-style interface, coupled with easy access to both NED and the digital sky survey are important and useful aspects of APT. In particular, the Visual Target Tuner (VTT) will allow proposers to optimize their observations and should facilitate significant gains in serendipitous and parallel science. While APT promises to be an important aid to astronomers in developing their proposals, the tools are not yet ready for general release.

One major concern is the slowness of the package, even when running on a Sun Sparc 10 workstation with 128 MB of memory. APT needs to operate efficiently on computer platforms typically used by the average university astronomer. There are still a substantial number of bugs and limitations in the pre-release version - no possibilities for local printing or import of text or RPS2 files, context-sensitive help and zoom functions that would not reactivate and details of the visual interface that are not intuitive. The RPS2 process is still time-consuming and cumbersome: APT should offer simpler (default) paths to optimizing observing strategy. In addition, it would be useful to have a

high-level "brainstorming" tool to allow potential proposers to test the feasibility of projects, without having a detailed knowledge of HST instrumentation.

STUC endorses the continued development of APT. If possible, the VTT should be made available as a prototype tool for Cycle 9 Phase II planning. Hopefully, a general release of APT that incorporates an exposure time calculator can be ready in time for Cycle 10. We look forward to continued involvement in setting priorities for APT development. STUC recommends that the APT effort should be re-evaluated when feedback is available from a larger set of users and in particular in the light of the experience of Cycle 9. Finally, we encourage the STScI to continue to improve the last stage of the Phase II process, in which various activities are laid down within each orbit, so that users do not waste time and effort trying to optimize their observing programs.

6. OTHER MATTERS.

At the end of the present Millennium Pat McCarthy, Susan Terebey and Bruce Woodgate will rotate off STUC. The Director of STScI and the Chairman of STUC thanked them for their contributions. The dates of the next STUC meeting will be 6th and 7th April 2000.

The Space Telescope Users Committee met in open session on 24-25 November 1997, in the Board Room of the Space Telescope Science Institute. Committee members in attendance were: W. van Breugel, J. Clarke, R. Fosbury, L. Kay, P. McCarthy, R. Schulte-Ladbeck, S. Terebey, R. Thompson, F. Walter (Chair), and B. Woodgate. Absent were J. Bally and M. Franx.

[Minutes of the meeting are reported elsewhere.](#)

This meeting featured no large crises, and hence our report has little coherence, but is rather a shopping list of concerns. Some of these are new, while others are carried over from previous meetings.

The role of the STUC is not to be critical, but rather to point out concerns which affect the users of the HST, its archival database, and its services. Although the meetings, and this report, tend to harp on what is wrong, or what could be better, we realize the sheer complexity of the HST and the efforts undertaken by the HST project and the STScI to keep everything functioning smoothly. We applaud everyone involved in this project for all the hard work they have put in, from those in the trenches, who are overworked and underappreciated, to those at the top who must bear the brunt of the criticisms. It continues to be astonishing how well such a complex operation as the HST functions.

STScI Manpower

The total investment in HST and its instrument suite is huge. The scientific value of the hardware is directly dependent on the quality and quantity of the instrument science effort which can be devoted to understanding, calibrating and enabling the operation of the many modes of these instruments. Given the complexity of operation of NICMOS and STIS, the STUC is concerned that insufficient resources may be available to fully exploit the capabilities of these instruments. It is understood that the commissioning of all the capabilities cannot take place immediately and it is appreciated that the quality of work and the dedication of the instrument scientists and supporting personnel is very high. It is apparent, however, that the number of highly skilled people working on STIS and, particularly, NICMOS is so small that the characterisation of the instruments is slower than desirable. STUC urges the STScI to make a critical appraisal of the balance of its resources devoted to instrument science relative to other areas in order to address these concerns.

Southern Deep Field

The STUC concurs with the plans for the southern deep field, and anticipates that it will prove as scientifically exciting as did the Hubble Deep Field.

Proposal review / TAC comments

The STUC appreciates the large effort by the STScI to conduct a cycle 7-delta review of proposals for NICMOS on a very short timescale. The STUC acknowledges that the special circumstances may have required a more austere review process to decrease the workload on the STScI staff in dealing with proposal evaluation and response to users in a timely manner. The STUC is concerned, based on feedback from the user community to STUC members, that the adopted philosophy for the cycle 7-delta review process of

1. minimizing feedback to users on proposal evaluation by using user "comment tables",
2. allowing TAC panels to provide only advisory proposal rankings to the super-TAC, and
3. prohibiting TAC-panels to adjust proposal requests when deemed appropriate, is not in the best general interest of users. The STUC therefore urges the STScI for future HST proposal cycles to let users (TAC-panels) be in more control of the proposal evaluation, and provide more useful feedback in the form of written comments to users afterwards.

Advanced Camera for Surveys

The STUC recommends that the HST Project support the efforts of the ACS Science Team to obtain an additional procurement of 2k x 4k CCDs, with the goal of acquiring high quality CCDs for the Advanced Camera. Because the ACS Science Team is presently exploring alternative ways to acquire high performance CCDs, we think it is imprudent to specify in detail how they should proceed. If the ACS team presents a convincing plan that balances cost against schedule, performance, and risk, we recommend that the project support the plan.

Scheduling

The STUC understands the difficulties faced by observers with deferred cycle 7 programs. The STUC wholeheartedly supports the efforts of the STScI to reduce the backlog of uncompleted cycle 5 and cycle 6 observations. We concur with the scheduling prioritization currently implemented.

Planetary Working Group

Knox Long observed that the Planetary Working Group (PWG) was completing work on the items that had earlier been raised by the STUC, and recommended that the group now be disbanded. Indeed, progress has been made on all fronts, and many tasks have been completed while in some areas the work is planned to be completed within the next few months. We applaud the personnel at STScI and on the instrument teams for their hard work and responsiveness on these issues. The STUC agrees to disbanding the committee subject to the completion of all action items, and we hope that this can happen at the next STUC meeting in May 1998 following a presentation and discussion among the committee members. At the same time, in the past there have been recurring needs for such a group to address new issues, which might again arise at some time in the future. The specific items not yet completed are 1) distributing planetary target "finding charts" to observers on a regular basis, 2) extension of track 51 segments to times longer than 33 minutes so that consecutive observations during the same visibility period can be related to each other in absolute pointing, and 3) any issues that arise from early observations with NICMOS and STIS.

One particular area to be watched will be the success rates of STIS and NICMOS observations of moving and planetary targets, for which statistics are now being accumulated. Specific questions for STIS and NICMOS observations will be 1) reasons for any failed observations, 2) accuracy of

pointing and acquisitions, and 3) accuracy of post-observation pointing and ancillary information. In particular, it remains to be seen how accurately the observer can register the pointing with STIS spectra either by target acquisition or following imaging. In the case of moving targets, the pointing with respect to the center of a planet between consecutive exposures is often not maintained, for example if the start times of linear track segments are not exactly what was planned, so that an image does not necessarily show where the aperture was pointed in a following spectrum. We hope that this issue can be addressed and put to rest at the May STUC meeting.

Archival CP

The STUC notes that the length of cycle 7 is nearly 2 years. Because the archival proposal process is tied to the observing cycle, users of the archive will not have had a recent opportunity to propose for support for their research. As grants are usually awarded on an annual basis, this has caused financial hardships. The STUC urges that an archival proposal opportunity be offered as soon as possible.

This special archival opportunity would follow the precedent set for the NICMOS delta-CP. As the observing cycle returns to an annual cycle, a single call for proposals would cover both archival and observing opportunities.

We note with satisfaction that NASA and the STScI have agreed to a special archival proposal opportunity to address this issue.

Support for New Users

STScI does a thorough job providing documentation and support for users. However the system is very complex and time consuming to learn, and can be overwhelming for new users. New users have special needs to get them onboard quickly -- overviews, tips, and cookbook documentation. These need not be time consuming tasks for Institute Staff to be worthwhile.

These recommendations mainly concern a particular type of new user: those unaffiliated with institutions, or those at small institutions with limited institutional support. Efficient use of the phase II proposal preparation tools requires either a SUN workstation or access to a fast internet connection.

The kind of help which would prove would most useful includes:

Pre-phase II travel support to the STScI to learn how to use RPS2 and to generate the Phase II proposal. A user without a SUN workstation or a quality internet connection is at a particular disadvantage, and there is generally insufficient time between announcement of the Phase I results and the Phase II deadline to obtain funding to purchase and install appropriate hardware.

Special assistance provided by STScI staff to new users. This assistance would entail a greater greater level of effort (per GO) than is possible for the program coordinators or contact scientists.

New users also benefit from training in how to use the data reduction software. Please continue to encourage new user visits, and provide the staff needed to support those visits.

Software Support

The STUC appreciates the difficult job that the software support personnel have in attempting to keep STSDAS current, between the new instruments, upgrades of IRAF, and the multitude of platforms observers wish to use. Some of the recent difficulties in obtaining up-to-date versions of STSDAS are due to inevitable delays in porting IRAF 2.11 from SUNs to other platforms (over which

the STScI has no control). The STUC supports the decision to port the pipeline software to OpenIRAF (coded in C). The STUC admonishes the user community not to expect miracles.

STUC Membership

The STUC is comprised of 12 members, each of whom serves a 3 year term beginning with the Spring meeting. In principle, 4 new members are selected each year. The carryover of 8 members provides for a strong continuity to the committee. Due to three resignations, there were 7 new members selected in 1996. When these members rotate off in November 1998, there will be left only 5 members with experience. The STUC recommends that the two members rotating off this year be replaced with 4 members, and the 7 rotating off in 1998 be replaced with 5 members in 1999. The STUC will have 14 members for one year, and 7 returning members for 1999. The STUC recommends that, as policy, the PIs of newly installed instruments be voting members of the STUC for a normal 3 year term beginning near the time of instrument installation. The PI of the ACS should join the STUC in May 2000. This ensures a voice for the GTOs, as well as the GOs. The STUC recommends that the PIs of all instruments selected for future flight be non-voting members of the STUC, and be encouraged to attend the full meetings.

The NICMOS Cryocooler

The committee remains less than enthusiastic about the proposed NICMOS cryocooler. As we stated in our May 1997 report, "Any decision to fly a cryogenic cooler for NICMOS should be made only after due considerations of all potential impacts on the spacecraft and the other instruments, and on the financial resources of the project. Funding for the cryogenic cooler must not be taken from UPN 459, and must not decrease the funding available for the year 2002 instrument."

The committee is also concerned that, even if the cryocooler is proven a viable concept, the scientific return from NICMOS in the era of large ground-based IR-optimized telescopes, adaptive optics technology, and improved detector technology may not be cost-effective. We recommend that this matter be investigated further.

WF3

The STUC was informed that the HST project is considering building a spare camera (WF3) from parts available from WFPC1 and utilizing spare ACS detectors. The motivation is to provide backup imaging capability for the extended HST mission through 2010. The STUC is concerned about both how the decision to do this was arrived at, and how the new instrument will be funded.

There are concerns that this decision compromises the peer-review process. If the project sees a need to construct a facility instrument, it should convene an open panel to recommend an instrument design.

The STUC is concerned about the source of funding for this instrument. We strongly recommend against use of UPN459 funds, especially if this reduces the amount of funding available to the GOs.

This report submitted by Frederick M. Walter on behalf of the Space Telescope Users Committee
February 1998