

# Report of the Space Telescope Users' Committee (STUC) Meeting, May 1996

Report prepared by T. P. Snow

Members present: John Bally, John Clarke, Alex Filippenko, Bob Fosbury, Laura Kay, Ted Snow, Rodger Thompson, John Trauger, Wil Van Breugel, and Fred Walter. (Absent: Marijn Franx, Regina Schulte-Ladbeck.)

This report will be presented in two parts:

- a brief summary, in the general spirit of meeting minutes; and
- a list of recommendations and resolutions of the STUC which resulted from our discussions.

## I. Summary of the meeting of May 16 and 17, 1996.

### A. Institute report.

Bob Williams, STScI Director, made an opening presentation on the status of HST user support at the Institute. He reviewed the four main components of the STScI strategic plan: (1) service to users; (2) prolongation of the HST mission; (3) outreach; and (4) long-range planning for U.S. programs in UV/optical/IR space astronomy. The message was generally upbeat, including the report that funding has been added to UPN 459 (the NASA budget line that supports GO and GTO research) at least partially offsetting cuts that had been made during the previous 18 months as a result of mandated reductions to the Project, Congressional rescissions, etc.

### B. New Chair of the STUC.

As previous Chair Tod Lauer was rotating off of the STUC, the next order of business was to elect a new Chair. After a brief discussion, Ted Snow was elected unanimously, with John Bally as Associate Chair (also unanimous). Snow immediately took office and chaired the remainder of the meeting. It was noted for the record that Snow's term on the STUC expires with the Spring '97 meeting, and that a new Chair should be elected during the Fall '96 meeting upcoming.

### C. Report of Project Scientist.

Mal Niedner, HST Deputy Senior Project Scientist, then gave a summary of the 1997 servicing mission status. NICMOS has been delivered to GSFC for acoustic and functional testing, later to be shipped back to Ball Aerospace for thermal vac and science calibration. STIS is to arrive at GSFC for its acoustics/functional testing late in June. The servicing mission will involve fewer astronaut sorties and instrument change-outs than the first servicing mission in late 1993. There will be no reboost test in '97 using the main thrusters. Instead a very gentle reboost will be carried out using the vernier thrusters. There will be new solar arrays for installation during the '99 servicing mission, of a new design that is more compact, more efficient, and sturdier than the original design. Niedner reported on recent (March 1996) discussions revisiting the question of which instruments should be replaced by STIS and NICMOS in '97. The technical issues that arose during 1995 have been isolated to low-tech subsystems such as the MAMA power supplies and have been corrected, but some concern remains over the lack of spectroscopic back-up for the STIS when both the GHRS and the FOS are removed. For a variety of reasons, including prominently the immense impact on the flight and ground software, and particularly on the schedule for testing and preparation for

launch, the original decision to insert STIS in the GHRS bay and the NICMOS in the FOS bay was reaffirmed. One change to STIS was made as a precaution aimed at preserving UV spectroscopy on the HST: an external shutter was added to STIS for protection against pointing at bright sources such as the bright earth (this had been in the original STIS design but had been dropped for cost reasons). Also, at a very low level, studies are being conducted to investigate options if STIS fails following its installation on the HST in '97. Niedner also reported on a thermal issue which affects STIS and NICMOS: the aft shroud covering the instrument bays on HST is heating up faster than predicted, meaning that STIS and NICMOS will have to operate in a slightly warmer environment than originally projected. A metal plate has been installed on STIS to counteract this by radiative cooling, and additional heat pipes have been added to the MAMAs. For NICMOS, the potential reduction of cryogen lifetime due to increased temperature is estimated at four weeks, but this is being offset by changes in the insulation and in the heater settings. Niedner reported on plans for the new Science Instrument (SI) for 2002, the AO for which is due out soon. The AO will be open to any kind of instrument from any source (including ESA, although only U.S. PIs will be eligible for NASA funding), in part because previous expectations that ESA might be able to commit funds for a primarily-European instrument have not materialized. The funding for the new SI is expected to be about \$50 M, and cost-sharing or outside contributions are being encouraged in order to raise the available level of funding. According to the current schedule, the AO will be released on October 1, 1996; letters of intent will be due on November 1; proposals will be due on January 17, 1997; and selections will be announced on April 17. Finally, Niedner reported that the Advanced Camera, under development for the '99 servicing mission, is meeting schedule and cost requirements to date.

#### D. HST and Beyond report.

Mike Hauser, new Deputy Director of the STScI, reported on the study done by the committee charged with making recommendations for space astronomy beyond the nominal mission of the HST. This committee was chaired by Alan Dressler and co-chaired by John Mather and Pete Stockman, and its report has been widely cited despite the fact that it has not yet been officially finalized. Among the key recommendations: (1) operate the HST beyond the year 2005; (2) develop a successor space observatory with an aperture of at least 4 m, optimized for 1-5 micron imaging and spectroscopy; and (3) develop capabilities for space interferometry. A study of the successor space telescope (the Next Generation Space Telescope, or NGST) is being headed up by John Mather of GSFC, and the SIMS project at JPL is already underway to develop the first space interferometer. Hauser also reported that, at NASA's request, the National Academy is updating the 1990 Bahcall report in the area of space astronomy recommendations, in order to help define priorities in time for FY '98 planning. Pat Thaddeus is heading up this study, as Chair of a task group of the Academy's Space Astronomy and Astrophysics subcommittee (the SAA). Activities of this committee can be found described on the www at: <http://www.nas.edu/ssb/tgsaa1.html>.

#### E. HST press releases.

STUC member Tod Lauer raised questions regarding the procedures used by NASA to select and disseminate information on HST research news. Lauer noted that on some occasions either false information, or information failing to credit associated work by others, is released. Ed Weiler (NASA HQ Mission Scientist for HST) replied that these decisions are ultimately his, and that the primary responsibility for content of HST press releases resides with the Principal Investigator whose work is reported. Weiler also commented that despite the concerns of HST astronomers, the mass media do not care about and will not take pains to clarify details such as competing work or prior knowledge of the reported phenomena. Weiler went on to explain the various levels of publicity his office creates, based on his judgement about the impact of the research: the highest level release is called a Space Astronomy Update, and involves a panel discussion, in real time and broadcast on NASA TV, with the PI and other knowledgeable scientists; the next level is a Press Release, which is announced and circulated from NASA HQ; the next is a Photo Release, involving the dissemination of recent

images (usually from the STScI directly), without accompanying text; and the next level is a WWW news item.

## F. PRESTO report.

PRESTO is the acronym for "Program to Re-Engineer Space Telescope Observing", which was implemented within the past two years as part of an Institute reorganization aimed at streamlining and improving user support services. Peg Stanley reported on recent developments. A recent survey of HST Phase II proposers showed that most PIs did not encounter major difficulties; the average time required for preparation of a Phase II proposal was 5.67 days; on a scale of 1 (poor) to 6 (excellent) for level of difficulty in preparing Phase II proposals using the Phase II template, the average score was 2.9; the usefulness of documentation (instrument handbooks and proposal instructions) was rated at about 4.5 (same scale) on average; and a large majority of Phase II proposers thought that the personal contacts with the STScI for help were beneficial ("helpfulness" was rated at 5.1 on the same scale, where 6 is excellent). The questionnaires also showed that the Proposal Editor (PED), a graphical interface for completing Phase II proposals that was in a developmental state a year ago, was nevertheless widely used by Cycle 6 PIs. The complexities of NICMOS and STIS suggest that PED will be even more useful for Cycle 7 proposers. Priorities for further improvements, based on the questionnaire and planned for implementation for the Cycle 7 proposal review and implementation, include: improving the operating speed of RPS2; the development of graphical tools to help NICMOS and STIS proposers; a new scheme for handling multi-layers of coordinated parallel observations; further improvement to PED; and improvements to the WWW interface for target coordinate measurement. Stanley also reported on statistics related to HST operational performance. There has been a general, almost monotonic increase in observing efficiency (defined as on-target time as a fraction of total time), with a recent average of over 50 percent (compared with less than 30 percent during the first two years of HST operations). During Stanley's presentation some discussion arose of snapshot proposals. It has developed that more snapshots were executed during the past year than anticipated, because there are often orbits than expected that cannot be completely filled by regular GO or GTO programs, leaving small amounts of time available. Van Breugel commented that: (a) the wider availability of snapshot opportunities should be made known to the broad community in time for the Cycle 7 proposals; and (b) some proposers in the past have promised to relinquish proprietary rights to snapshot images, but in some cases this release has not occurred and the data are not yet accessible through the archive. Williams and Macchetto promised to rectify this immediately.

## G. User support at the STScI.

Knox Long reported on the status of various user support functions at the Institute. Under the recently-modified operating plan of the Institute, there are three main elements of user support: the Contact Scientist (CS), the Program Coordinator (PC), and the Help Desk (HD; reached at "[help@stsci.edu](mailto:help@stsci.edu)"). Each GO program in Cycle 6 was assigned a CS and a PC, and was made aware of the HD. All three elements were well-received and widely utilized during Cycle 6. The role of the CS is to advise GOs on instrumental and data analysis issues that impact science goals; the role of the PC is to assist GOs in the preparation of Phase II proposals; and the role of the HD is to handle all requests for help in timely fashion, either by direct response or by ensuring that the appropriate person at the STScI is made aware of the questions and responds quickly. The STScI is also working to improve and streamline the documentation needed to support Phase I and II proposals. Instrument handbooks have been updated or created anew in preparation for Cycle 7; data handbooks and archive analysis guides have been published in the past two years; and instrument reports are issued periodically to provide technical information on specific issues.

## H. Instrument status.

Long continued his presentation by updating the STUC on the current status of the Science Instruments on the HST. The general message is that all SIs are operating normally and appear to be stable. WFPC2 has now obtained over 23,000 images (compared to 16,000 for WFPC1); the FOC is operating nominally in both focal modes; the FOS has been operating nominally; and the GHRS is operating normally as well, although there continues to be some degradation in sensitivity below 1200\*. There is a zero-point calibration problem in WFPC2 that has yet to be resolved, and the UV flat field is degrading with time. In addition, the flatfield calibrations needed to analyze WFPC2 imaging polarimetry data are not yet available, despite the fact that some GOs have had data since Cycle 4.

## I. HST Archives.

Marc Postman reported on the status of archival management and usage at the STScI. Archival accessibility and usage have increased during the past year, and are working smoothly. The DADS and Starview platforms are stable, with minimal downtime. A survey of archive users showed that a majority desire magnetic tapes as back-ups, even if their primary data retrieval is done by ftp (there is interest in both CD-ROMs and DATs as alternative data media); most (63 percent) perform recalibrations of their archival data; and the majority of users would also use a WWW-based archive interface. The four most-used archival services are (1) StarView; (2) Data Retrieval; (3) DSS access; and (4) the archive hotseat.

In response to the survey results, the STScI will: purchase two DAT drives; modify StarView to allow users to get the "best" reference files; and develop a WWW utility to access the archives. New StarView user services will include: immediate e-mail verification of data retrieval submissions; improved date/time qualification help text; support for both V3 and U3 orientations in HST-FOV overlay utility; and request for user feedback. Postman also reported that the Keyword Dictionary is now available on the WWW at <http://archive.stsci.edu/keyword/>.

## J. Cycle 7 proposals.

Meg Urry and Duccio Macchetto gave the STUC an update on plans for the Cycle 7 GO proposal cycle, beginning with a summary of Cycle 6 statistics. Among the more interesting outcomes were the fact that ESA proposers won 19 percent of the total GO time (safely above the guaranteed 15 percent level) and that the acceptance rate during Cycle 6 was nearly independent of discipline except that it was higher for planetary proposals than most other categories, and that it was lower for the AGN panel than for the others (the average acceptance rate was about 30 percent, except in planetary where it was closer to 40 percent and in the AGN panel where it was only slightly above 20 percent).

The Cycle 7 schedule is as follows: the call for proposals will be issued in early June; the deadline will be September 13; reviews will occur during late October and early November; notifications will be issued in December; and observations will begin in early summer of 1997. The mailed announcements will include the call for proposals and the Phase I instructions, but will not include printed copies of the instrument handbooks. These will be available on request through the STScI WWW site and through the Help Desk ( [help@stsci.edu](mailto:help@stsci.edu) or 800-544-8125 or 410-338-1082), and copies will be sent to astronomy libraries.

The Cycle 7 call for proposals specifies three categories of proposals, according to the size of the request. These categories have been devised in order to address a concern that small proposals were being automatically favored for reasons other than scientific value. In the new scheme, small proposals will be those asking for less than 30 orbits, and will be permitted up to 3 pages of scientific

justification text. Medium proposals will request between 30 and 99 orbits, and will be allowed 5 pages. Large proposals, akin to the original Key Projects, will ask for 100 or more orbits and may provide up to 10 pages of scientific justification. The strategy is to allow the individual discipline review panels to assign a certain percentage of their fraction of the total available time, while reserving a list of proposals for disposition by the full TAC. Thus small proposals will for the most part be handled in the discipline review panels, medium proposals may be sent to the full TAC, and large proposals must go to the TAC. This avoids prejudice against medium proposals by providing them two chances of making the grade, either by being selected outright by the discipline panel or by being selected by the TAC.

In addition to these size categories, there will be time reserved for three orthogonal categories: long-term projects, "risky" projects, and surveys. Long-term projects are those requiring up to three cycles for completion, and they carry the implication that the Cycle 7 TAC can encumber time in subsequent cycles. Risky proposals are those with potential for null results but also reasonable potential for scientifically exciting results (risky in this case does not include spacecraft or instrument risk). Survey projects are those aimed at gathering generic data on a class of objects, and it is expected that GO proprietary rights will be waived.

During Urry's presentation, there was a discussion of the notes made by the review panels and/or the TAC and then sent back to GO proposers. Two questions were raised: (1) can these messages be improved, perhaps by making them more explanatory and, in some cases, more honest; and (2) is it appropriate for the TAC to make requirements that infringe on the proposer's freedom to make his or her own scientific choices regarding the use of the allocated time? On the first of these, there was general agreement among the STUC that the TAC should not invent spurious negative points in order to justify a low ranking for a proposal; rather, it would be more fair and informative to the proposer to say that the proposal, while strong, was simply not quite as good as others in the view of the TAC, and was ranked accordingly. On the second point, the issue arises in cases where the TAC states a requirement (as opposed to a recommendation) that the allotted time is to be used in certain ways (e.g. use certain filters but not others that were proposed). This is particularly unsettling when there is no explanation of the reasons for the requirement, as happened in at least one instance that was discussed. The STUC agreed that the TAC does and should have the authority to make scientific judgements and hence impose certain requirements on proposers as to how the allotted time should be used, but at the same time the TAC should explain exactly why it imposes such requirements, and it should be careful not to unduly restrict the proposer.

## K. HST Project status.

Project manager John Campbell reported to the STUC on the status of HST engineering and development activities and on the 1997 servicing mission. Spacecraft and instrument operations are for the most part nominal, with no major problems at present.

The '97 servicing mission will include installation of NICMOS and STIS, installation of a solid-state data recorder, installation of a new fine guidance sensor, replacement of a tape recorder, and installation of minor components such as missing screws from the solar array. The astronaut crew will require 4 EVAs to accomplish these tasks, which are considered complex but not as complex as those undertaken during the previous servicing mission.

Campbell mentioned that there is some potential for flying the '97 mission without the solid state recorder, due to technical delays. This would severely limit the on-board data storage capabilities of the HST, curtailing its ability to do parallel observations.

## L. NICMOS status.

Rodger Thompson reported on the current status of NICMOS. The instrument has been delivered to GSFC for further testing. All calibrations and tests done so far are looking nominal, although important hurdles are still to be surmounted. The instrument has been sealed and cooled, and will be kept cold from now on. Tests have shown that the planned operating temperature of 58 K for the detectors provides the best quantum efficiency. The on-orbit lifetime of the cryogen is expected to be 4.5 to 4.7 years. Phase I observing proposals by the SI team have been completed, and the information will be available to Cycle 7 GO proposers.

## M. STIS status.

Bruce Woodgate reported on STIS. Following some rework on the power supplies to the MAMA detectors, there has been some slippage in the original schedule, but the current plan has roughly three weeks' leeway in preparing for launch in February of 1997. Recent developments include the addition of radiating plates to carry off excess heat due to the temperature rise in the aft shroud, and the satisfactory completion of a number of optical tests. Spectroscopic resolution meets or exceeds specifications, and throughput is nominal in all modes (specification was to have FWHM of 2.46 pixels on the array; test results vary between 1.6 and 2.2 pixels FWHM).

One question raised by Woodgate is whether full-resolution (i.e. full detector read-out) data will be transmitted to the ground during normal operations, or whether binning in the on-board computer will take place first. Woodgate noted that full Nyquist sampling, hence maximum spectral resolution, can be maintained only if the full read-out is transmitted to the ground. Even with binning, the high-resolution mode will produce a resolving power of 140,000 using the 0.06" slit and about 95,000 using the 0.09" slit.

STIS is undergoing continued testing at Ball Aerospace, prior to shipping in the early fall to GSFC, thence to KSC.

## N. Planetary operations.

John Clarke reported on some issues and questions that have been raised by the planetary science HST users community. Further discussions are taking place, but at present the main issue is how tracking of moving targets will be implemented in the future. A command called Track 51, which does linear tracking, has been in use since HST was launched, and is successful for most applications. A polynomial tracking command, called Track 48, was planned originally but has never been implemented. For the most part linear tracking has been adequate, but in view of the upcoming servicing mission and the installation of two new science instruments, some questions need to be addressed.

Among these are: (1) whether procedures can be developed to allow a single Track 51 command (linear tracking) to be extended for a full visibility period, rather than being limited to 25 minutes' useful time; (2) whether the existing method for doing guide-star hand-offs can be preserved and improved, as required for extended linear tracking; (3) whether linear tracking is good enough for NICMOS observations (which will be done in a "point and shoot" mode), and whether longer exposures will be required with NICMOS, necessitating longer tracking; (4) what will be the requirements and complexities of tracking moving targets when using STIS (which will use internal target acquisition), with all of its complex modes; and (5) is it possible to develop an automated snapshot observing program (guided by gyros), including the linear motion appropriate to that time?

All of these questions are unresolved and will require further discussion among the planetary science community and with the STScl.

## O. STScI response to previous STUC report.

Duccio Macchetto gave a brief report on STScI responses to recommendations made in the report from the previous STUC meeting. The following itemization includes only those STUC issues that required some response. (1) To the STUC concern that no plans were being made to replace the solar panels during the 1999 servicing mission: now new panels are being acquired and will be installed; (2) to the STUC concern that the call for proposals for new science instruments for the 2002 servicing mission would not allow time for a response should there be failures in one of the new instruments in '97: the '97 mission will occur before the final announcement of the new instrument for '02, so it will be possible to modify the new selection on the basis of events that occur during the '97 mission or make other plans, perhaps to refurbish a failed STIS or NICMOS; (3) in response to the STUC's concern over cuts to the budget for GO and GTO data analysis: these cuts have been restored; (4) in response to STUC concern over the possible impact of the Advanced Camera on the data analysis budget: so far the AC is on schedule and budget, so at this time there is no reason for concern; (5) in response to STUC concern over a calibration problem with the WFPC2 (a zero-point difference between long and short exposures): the STScI is making all efforts possible to determine the cause, which is still unknown; and (6) in response to a STUC concern over the timing of calibration exposures needed in support of GO observations (sometimes the calibrations are not made until long after the science observations, thereby delaying the analysis and eating into the proprietary period): efforts are being made to schedule calibrations as closely as possible to the science operations; the only major slack at present exists for spectrophotopolarimetric observations with the FOS, and the required calibrations are being planned urgently (they must be done before the FOS is removed in early '97).

## P. WWW page for the STUC.

Ted Snow proposed that the STUC establish a home page as part of the STScI WWW site, and this was agreed to by the membership. This page will provide information on STUC members; access to current reports and recommendations; updates on issues, recent results, and decisions; and a forum for HST users to comment on issues of interest.

## Q. Next meeting.

The next meeting of the STUC should be held after the Cycle 7 proposals have been submitted, and also late enough in the fall so that we will have nearly-final information on the status of the new instruments. It was decided that we should meet during the interval between the panel reviews and the final TAC meeting; i.e. during the first week in November. Probable dates are November 7 and 8, but this is not firm as yet.

Agenda items anticipated at the present, in addition to the normal reports from the STScI and the HST Project, include: (1) science calibration and performance news on the two new instruments; (2) a briefing on the Advanced Camera, including schedule and budget information; (3) a review of the new GO proposal categories that are being implemented in Cycle 7; and (4) a review of the status of calibrations for all instruments.

## II. Recommendations and resolutions of the STUC.

1. The STUC commends the STScI for continued improvements in all aspects of user support and for continued improvement in operational efficiency of the HST. We were very favorably impressed by the efforts being made by Institute staff to respond to previous issues, and by the continuing good will and initiative being shown. We are delighted to have reached a point where there are no major issues or concerns, and where support services are in a mode of incrementally improving what is already quite good.

2. The STUC commends and thanks NASA HQ, the HST Project, and the Institute Director for their successful efforts to restore funding to the GO and GTO research support budgets that was lost during FY '96. It is gratifying to know that our previous concerns over this budget were heard and taken seriously.
3. The STUC commends the PI teams for both of the new instruments for their efforts to prepare for GO observations, and the STUC commends and thanks the STIS and NICMOS Instrument Scientists at the STScI for their successful efforts to produce detailed instrument handbooks in time for the Cycle 7 proposal preparation process.
4. During this and previous meetings, the STUC was presented with various decisions, already made by the HST Project, which potentially could impact the science and/or funding for the user community. An example was the review and decision-making process for the recent reconsideration of which instruments to replace during the '97 servicing mission; the STUC (and the user community) were poorly informed and confused about these decisions, whereas an early, broad discussion might have allowed for a more scientifically-based decision. There is a poorly-defined line between decisions that should involve the user community and those that need not. While the STUC lacks the expertise to interact usefully in engineering issues that may arise, we felt it important to be advised, in advance when possible, of decisions that could impact either science performance or data analysis funding. The STUC urges both the HST Project and the STScI to develop and maintain communications with the STUC to ensure that the community is both well-informed and able to respond in timely fashion when decisions with potential impact are being considered.
5. The STUC is concerned over the possibility, reported by the HST Project office, that delays in delivery of the new solid state data recorder could jeopardize its inclusion in the '97 servicing mission, and urges the Project to do everything possible to retain this key component in the mission plan.
6. The STUC recommends the formation of an ad hoc committee of planetary science users to review tracking and other issues related to moving targets, in preparation for the upcoming servicing mission. This is envisioned to be a small group, including STUC member John Clarke, which would meet (probably just once or twice) at the STScI to consider the various issues brought forth at this STUC meeting. The STUC urges the STScI to organize and support his effort.
7. The STUC urges the STScI to support, as soon after the 1997 servicing mission as possible, the routine transmission to the ground of STIS data with full spatial and spectral resolution. This would preserve the full information inherently available, so that aliasing can be avoided and the data analysis can be model-independent. The high-resolution, or "HI-RES" format should be the standard unless there are special difficulties, for example when STIS is observing in parallel mode. The STUC does not recommend that the pipeline data processing accommodate the data in HI-RES format, but only that it be made available to the user in raw form.
8. While the STUC recognizes and supports the authority of the TAC to make binding scientific judgements regarding GO proposals, and while recognizing the difficulty of the selection process, the STUC recommends some changes in the information fed back to proposers. First, faced with the necessity, due to oversubscription, of rejecting some excellent proposals, the TAC should not contrive negative comments, but instead should state honestly that other proposals simply ranked higher. Further, when the TAC adds recommendations or requirements as to how the allocated time is to be used, these requirements should be fully explained to the proposer.
9. The STUC is pleased that the Advanced Camera development is proceeding well, but continues to be concerned that potential cost increases may impact future funding for HST data analysis, and urges the HST Project office to do everything possible to avoid allowing such impacts to occur.

10. The STUC urges the STScI to see that all data for which proprietary rights have been waived in the past are immediately released, and to develop a procedure for future proposals to ensure that data are released immediately in such cases. This is particularly important for snapshot programs where data release was promised, and will be important for the new category of survey proposals that are being solicited in Cycle 7.
11. The STUC is concerned over the slowness of progress in calibrating the flat fields for imaging polarimetry with the WFPC2, and urges that all appropriate steps be taken to accelerate the process.
12. The STUC applauds the success of the STScI and of NASA Headquarters in publicizing new discoveries made with the HST, and recognizes that our entire community benefits when HST results are widely circulated to the general public. The STUC supports efforts made to ensure that press releases are accurate and fair to competing observers, and suggests that more detailed information be made available to those members of the press who want it, perhaps through the WWW.

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Last updated: 5 August 1996