

# **Report of the Space Telescope Users' Committee (STUC) Meeting, November 1998**

The Space Telescope Users Committee (STUC) met in open session on 9-10 November 1998, in the Board Room of the Space Telescope Science Institute. Committee members in attendance were: B. Balick, J. Bally, J. Clarke, R. Fosbury, J. Frogel, L. Kay, P. McCarthy, F. Mirabel, S. Ortolani, S. Terebey, R. Thompson, F. Walter (Chair), H. Weaver, and B. Woodgate. R. Schulte-Ladbeck was absent.

Minutes of the meeting are reported elsewhere.

Readers should note that this report is based on information presented to the STUC in November 1998, and may be superseded by later developments. Readers are urged to refer to the STScI web pages for up-to-date information. Background material is available through the minutes.

## **Executive Summary**

This meeting of the STUC occurred at a relatively tranquil time. The spacecraft is operating well, and the main concerns are with the future. Operating costs for the HST are projected to decrease by about 30% by the year 2010. The STScI is beginning a serious examine of its operations, and this will have some effect upon the users. The SM4 instrument WFC-3, which was envisioned to be a backup camera, has attracted some attention. There are moves afoot to add an IR channel, which will increase its scientific capabilities. However, the source of funding for any additions to the baseline instrument is yet to be identified. Closer to our time, NICMOS is about to run out of cryogen, and the decision on whether or not to fly the NCS will be made in the next few months.

## **New Director**

The STUC welcomes the new director, Steve Beckwith. We look forward to working with him in our capacity as representatives of the users of the HST, to maximize the scientific return of the HST while maintaining acceptable levels of user support.

## **HST Scheduling**

The STUC applauds the efforts of the STScI scheduling team, lead by Peggy Stanley, to clear up the backlog of cycle 4 and 5 proposals and to achieve the mandated level of NICMOS science. They have succeeded in this demanding task while keeping the observing efficiency of the HST high.

## **"Cheap-Ops"**

The STUC applauds the direct approach the STScI is taking with respect to "Cheap-Ops", and looks forward to working closely with the Director's office to identify ways to decrease operating costs. It is in everyone's interests to reduce costs in such a way as to minimize direct impacts on the users of the HST.

## **The User Survey**

The STUC applauds the User Support Assessment Group for its User Survey, and thanks all users who responded. As the available resources decrease, it is inevitable that some user support will be

affected, and the best way to determine those cuts which will hurt the least is to ask the users. We further thank those users who have volunteered to serve on the focus groups.

## **Community Parallels**

The committee is pleased to see the high level of use of the community parallel data, and urges that the program be continued.

## **Moving Target Issues**

The STUC strongly supports the STScI's plan to produce finder charts for Moving Target observations in time to support Cycle 8 Solar System programs, if not earlier. The STUC encourages the STScI to continue its investigation of the problem of the large pixel shifts seen in adjacent STIS images, and to implement corrective action if analysis identifies a feasible solution.

## **NICMOS Calibration**

The shortened lifetime of NICMOS posed a significant challenge, to which the Institute responded capably and successfully. STScI has achieved its goal of maximizing science data taken with NICMOS and provided rapid preliminary calibration and distribution of pipeline software CALNICA and CALNICB.

However the STUC has a serious concern with the slow progress made on NICMOS calibration and characterization during the past year. The situation remains essentially unchanged from that of the September 1997 HST Calibration Workshop. Results of the recent User Survey show a high level of dissatisfaction with NICMOS calibration.

NICMOS is the first near-infrared instrument for STScI, and represents an important opportunity to develop in-house NIR expertise as well as to demonstrate to the astronomical community that STScI will capably handle its transition to NGST.

Given budget and staffing realities this may be the time to consider a more flexible approach to NICMOS support. The pipeline paradigm does not easily accommodate the interactive approach that NICMOS users have found necessary to reduce their data.

To improve accessibility to a wider range of users and improve the scientific return of NICMOS data, enough information should be provided with the standard data products so that capable observers without NIR experience can diagnose problems and identify proven solutions. To achieve this goal we encourage STScI to mine the knowledge and existing software of the NICMOS Instrument Team as well as experienced NICMOS users.

## **The WFC-3**

STUC strongly supports the stretch concept of extending the wavelength range of WFC-3 to 1.9 microns by the addition of a near-IR channel. This concept would provide major and exciting new scientific opportunities for the 2nd decade of HST observations. In addition, such a near-IR capability would be a valuable link to and complement for observations with NGST. It will also provide an important complement to SIRTf observations. We recognize that the window of opportunity for initiating this stretch concept is narrow and urge that engineering development studies proceed with all due haste. We look forward to working with STScI and the HST project to develop innovative ways to begin funding this stretch concept.

The inclusion of a near-IR channel on WFC-3 must not compromise the baseline UV/optical camera, and must not delay the scheduled launch of the SM4 mission.

The STUC has created a subcommittee, consisting of B. Balick, J. Frogel, P. McCarthy, and S. Terebey, to investigate the scientific case for the IR channel, and to examine ways of funding this option. The subcommittee shall report its findings and recommendations to STUC for further action.

The STUC strongly recommends that the HST project appoint a prominent and influential scientist to be scientific advocate for the IR channel on the WFC-3.

## The Hubble Fellowship Program

The Hubble Fellowship is an extremely successful program, whose success can be measured by the number of imitative fellowship programs that now exist. However, the committee suggests that there are too many Hubble Fellowships being awarded each year. With 45 Hubble fellows at any one time, the fellowship is not as prestigious as it once was. The STUC recommends that the STScI and the HST project reduce the number of Hubble fellows to no more than 10 per year.

The STUC is extremely hesitant to recommend decreases in GO support, without assurance that these funds will revert to the user community. We recommend that all savings made by reducing the number of Hubble Fellows be returned to the user community, either by increasing the pools of funds available for GO use, or by earmarking these funds to support development of the WFC-3 IR-stretch concept.

This report submitted by Frederick M. Walter on behalf of the Space Telescope Users Committee  
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# Minutes of the Space Telescope Users' Committee (STUC) Meeting, November 1998

The Space Telescope Users Committee met in open session on 9-10 November 1998, in the Board Room of the Space Telescope Science Institute. Committee members in attendance were: B. Balick, J. Bally, J. Clarke, R. Fosbury, J. Frogel, L. Kay, P. McCarthy, F. Mirabel, S. Ortolani, S. Terebey, R. Thompson, F. Walter (Chair), H. Weaver, and B. Woodgate. R. Schulte-Ladbeck was absent.

## Monday 9 November

**S. Beckwith**, director of the STScI, welcomed the committee. He provided an overview of the main tasks to be confronted in the years ahead.

The HST budget is currently projected to decrease by about 30% through the year 2010. Much but not all of this decrease will be due to the end of costs associated with servicing missions. Future operations must be streamlined and made more cost-efficient. The STScI has begun a program, Cheap-Ops, to identify those costs which could be significantly reduced. This may impact some user support activities.

However, the director stressed that the HST will remain in the forefront of scientific progress, and that the STScI would continue to support unique and novel uses of the HST.

\* **D. Leckrone** provided the HST Project Scientist's Report.

The expiration of the NICMOS cryogen is imminent. Most planned observations were completed by November 14. During cycle 7, 51% of the prime science orbits were used for NICMOS observations.

Despite a shorter than expected life, NICMOS has yielded a rich record of major scientific achievements. The NICMOS scientific and performance assessment committee, led by M. Fall, concluded that NICMOS is a scientific success.

The NICMOS Cooling System (NCS) was tested on STS-95. Preliminary reports are that the NCS achieved the desired temperatures and thermal and mechanical stability, but drew more power than anticipated. The full HOST report will be made on December 3. There will be a major engineering review of NCS and the Aft Shroud Cooling System (ASCS) on January 12-13. The Harwit Independent Science Review (ISR) committee will reconvene on February 24-25. Any decision to include NCS in the Servicing Mission 3 (SM3) manifest will be made subsequent to these meetings by NASA Code S.

The top science concern is the [ACS \(Advanced Camera for Surveys\)](#). While the latest lot (#7) of CCD detectors appears to have achieved the required QE and CTE, there are questions about radiation-hardness. In addition, the thermo-electric coolers have debonded in the WFC subsystem, and there are higher-than-expected levels of stray light from internal reflections. NASA is confident that these problems will be solved with build 3 of the detectors, and that there will be no impact on ACS delivery.

Work continues on the SM4 instruments. The [Cosmic Origins Spectrograph \(COS\)](#) design concept is now baselined.

[§ WFC-3](#) baseline design is now underway. The WFC-3 Scientific Oversight Committee (SOC), chaired by Bob O'Connell, has met twice. Both the [HST Second Decade Study](#) committee and the WFC-3 SOC have examined 3 options for extending the capabilities of the baseline WFC. These include the **IR-stretch**, a 0.8-1.9 micron channel, including dual channel capability using dichroic filters, and a basic **coronographic capability**. These options are feasible and scientifically exciting, but funding sources have yet to be identified. The estimated cost for the IR-stretch option is about \$30 million (including contingency and operations).

**J. Campbell** discussed the HST project status.

The recently completed HOST experiment aboard STS-95 tested three items which may fly on the SM3 mission: the advanced computer, SSR2 (second solid state recorder), and the NCS (Nicmos Cooling System). The computer appeared to work as expected. NCS was able to achieve a stable temperatures 72.9+/-0.1K (the target was 72K). The temperature regulation is very stable. There are vibrations as the system cools to 120K, but below that the system appears mechanically stable. However, the NCS draws 20% more power than expected, and because of available power concerns, will not fly unless the power use can be reduced.

Aside from the loss of gyro #6 (leaving 4 working gyros), there are no new hardware problems.

The major concern now is the timing of the SM3 mission (STS-103). It was originally scheduled for December 1999. Because of delays with AXAF, the launch date for STS-103 has slipped until June 8, 2000, and may slide still further. The slips have arisen because the STS manifest shows Columbia returning to Palmdale for a 16 month refurbishment between the AXAF (STS-93) and SM3 missions. Only Columbia is able to launch AXAF, or to carry the SM3 payload, because the other 3 shuttles are all equipped with airlocks for Space Station construction. The longer this delay, the

greater the likelihood of another gyro failure. HST currently has 4 operational gyros, and can operate with 3. If 2 more fail, HST must enter safemode until the gyros can be replaced. Recently, the mean time between gyro failures has been about 1 year.

J. Green reported on the status of the [Cosmic Origins Spectrograph \(COS\)](#). COS is scheduled for launch on SM4, 34 months after SM3. At this early stage, the development is on schedule and no problems have been identified.

\* **K. Long** presented the status of the current scientific instruments.

[WFPC-II](#) is stable and functioning normally. Bright targets are stable, with 2% peak-to-peak fluctuations over 4 years. Faint target photometry is affected by the CTE problem and the "long vs. short" effect, but is correctable to 5% (generally to better than photon noise).

[STIS](#) is also operating stably. The only significant problem is the growth of hot CCD pixels. About 1% of the CCS pixels are hot at the 0.1 e/s level, and about 200 pixels exceed 10 e/s, and cause dark trails and ringing. All supported STIS modes now have sensitivity calibration. A 25% improvement in on-target observing efficiency is expected during cycle 8, because WAVECAL exposures will be undertaken in occultation and local rate check images will not be saved. In addition, 25% more time will be available for MAMA observations due to refining of the SAA contours. A number of other enhancements were reported. With the installation of the ASCS in SM3, the STIS operating temperature will decrease, and the NUV-MAMA dark current should drop by a factor of 2-3.

[NICMOS](#) performance remains stable as the exhaustion of its cryogen approaches. The current estimate is that the cryogen will be exhausted within 10 days of December 1. There are no scheduled NICMOS science observations after November 14. There have been problems in the NICMOS data processing. The pipeline does not yet correctly treat the floating bias levels, bias jumps, and cosmic ray persistence, so the NICMOS user must undertake a more interactive approach to data processing if the goal is to approach the ultimate instrumental sensitivities.

The [FGS](#) performance remains acceptable. FGS1R will be the Astrometer for cycle 8. It's interferograms are stable at the 1% level (compared to 7% for FGS3).

[K. Long](#) also addressed three outstanding Planetary and Moving Target (MT) issues.

1. Finder charts have been routinely provided for non-Solar System targets for at least 2 years, but are still not routinely available for moving targets. It was indicated that such charts would be available in time for cycle 8 GOs.
2. The STScI currently has no explanation for the large (~50 pixel) image shifts that are sometimes detected between consecutive STIS images of MTs. Similar shifts have never been reported for any fixed target programs. The source of the problem has yet to be identified.
3. An STScI analysis indicates that STIS MAMA observations of comets made under gyro tracking control (which would be needed for comets having poorly-determined ephemerides) were technically feasible but would require a significant investment of STScI resources. A decision on whether to execute such observations would have to be made on a case-by-case basis after performing a cost versus benefits analysis and after evaluating the likelihood that the observations could be successfully executed without endangering the MAMA detectors.

**K. Long** described the user support plan for cycle 8. In sum, it is very similar to the plan used during cycle 7. Most GOs will notice no changes. Larger changes are expected later, following the results of the user survey, and as Cheap-Ops are implemented.

**K. Long** also reported the decision to discontinue routine, systematic data quality checks. While this process has been time-consuming, it means that data will now go to users and to the archive without ever being seen by STScI staff. K. Long also reported the decision to discontinue routine, systematic

data quality checks. While this process has been time-consuming, it means that data will now go to users and to the archive without ever being seen by STScI staff.

§ **K. Long** discussed the utilization of the [community parallel data](#). At present, 20% of the requests for non-proprietary data are for community parallels. Based on this, the program seems to be a success.

§ **P. Stanley** presented the Planning and Scheduling Operations Status Report. Overall observing efficiency remain high (about 50%), despite the need to schedule all NICMOS observations prior to November 15. All Cycle 5 observations have now been completed; cycle 6 is 81% complete and cycle 7 is 68% complete. Because STIS-MAMA observations can only be scheduled during the 5-7 SAA-free orbits each day, scheduling the rest of cycle 7 will be difficult, but by increasing the flexibility of the CCD visits, it is expected that observing efficiency will remain high and that most of the remaining cycle 6 and 7 observations will be carried out before the end of cycle 7, 33 weeks from now.

\***R. van der Marel** presented a preview of cycle 8. As of the date of the STUC meeting, the panels had met, but the TAC had not.

1052 proposal were submitted (109 archive, 64 snapshot, 21 TOO, 3 pure parallel).

13,990 GO orbits were requested; 3300 are available

5339 SNAP targets were requested; 1000 will be scheduled.

Instrument demand: 56% STIS; 41% WFPC2; 3% FGS.

The cycle 8 requests are up 4% over the cycle 6 requests, but are down 18% (proposals) and 37% (orbits) with respect to cycle 7.

88% of the proposals are small (<30 orbits); 10% are medium (30-60 orbits)

The 16 review panels met 18-30 October (3 days per panel); the TAC met November 18-19.

Notifications will be sent no later than December 18.

§ **B. Whitmore** summarized the results of the [user survey](#). 349 current and former users responded to the e-mail and web-based survey. Three focus groups have been formed. These will examine the:

- Proposal Processing and Scheduling System. Chair: A. Koratkar
- Calibration, Analysis, and Archival Support. Chair: C. O'Dea
- Software Support for Users. Chair: D. Shaw.

The focus groups will report back by December 15, and a joint report will be prepared for the director by the end of 1998. This report will be used to make recommendations on how user support can be modified to save costs in the future.

**H. Ford** discussed the current status of the ACS. The current lot of CCDs is the best yet, and preliminary indications are that they will meet the goals for QE and CTE. In testing, problems were discovered with internal scattered light and with the thermo-electric coolers debonding from their substrates. These problems can be fixed when the new detectors are installed.

\*§ **B. Balick** and **J. Frogel**, representing the WFC-3 SOC, discussed the state of the instrument, and presented the scientific rationale for the IR-stretch concept. This would be a large-format 0.8-1.9 micron wide-field camera, with a discovery space (area X QE) exceeding that of NICMOS by a factor of 10-20.

**J. MacKenty** reviewed the baseline instrument concept, and discussed the engineering aspects of the IR-stretch concept. One can reach 1.9 microns using only thermo-electric cooling.

R. Brown updated the committee on the status of the [Second Decade Study](#).

The committee was given a document summarizing the Y2K compliance activities at the STScl.

After an executive session, the committee adjourned for the night and were treated to dinner by S. Beckwith and D. Macchetto.

## Tuesday 10 November

The committee reconvened on Tuesday November 25 at 8:45 AM in executive session. The public session began at 9:00AM.

**R. Fosbury** reviewed the activities of the ST-ECF (European Coordinating Facility) in support of HST users, and described the new agreement between NASA and ESA to cover the next decade. ESA has agreed to allocate the funding equivalent of one "flexi-mission" (about \$200 M in FY96), principally in support of NGST activities. P. Jakobsen has been appointed NGST study scientist for a team which will, over the next 9 months, monitor and review studies of a 1-5 micron [integral-field spectrograph](#), a visible light camera/spectrograph, and appropriate telescope/payload technologies in Europe. Meanwhile, as part of the new ESA/NASA agreement, the ST-ECF has begun work on post-operational instrument calibration and archiving, GSC-II plate processing, and HST/NGST outreach.

In response to the article in the November issue of "Physics Today", **F. Walter** asked the Institute and the Project to review their policies on proprietary time. There are no changes planned in the current policy.

**J. Bally** asked for a clarification of NASA's policy on press releases. D. Leckrone stressed that the purpose of press releases is not to "promulgate officially-sanctioned final answers", but to inform the press and the public about the progress and achievements of the HST. The primary aim is to "engage the public in the scientific process". He noted that in a recent (unscientific) CNN poll, 97% of respondents rated HST favorably.

**A. Fruchter** presented an overview of the HDF-S campaign. The data were made public on November 23.

**L. Petro** and **A. Koratkar** reviewed the plans for protecting the HST during the Leonid meteor shower. The HST was pointed away from the expected radiant of the Leonids for a 10 hour period. The Director issued a call for ideas, which produced 27 proposals (3 engineering) to utilize these 10 hours. An advisory panel reviewed the proposals, and selected one to obtain CCD imaging and slitless spectroscopy of PKS2200-238. There are parallel WFPC-2 observations, but no NICMOS data. These data will be non-proprietary.

Nominations for the new chair were deferred by majority vote. A nominating committee consisting of F. Walter, B. Balick, J. Frogel, and P. McCarthy presented a slate of nominees, chosen both from within and without the committee, to the committee as a whole. A preference was made by e-mail ballot, and the names of two nominees have been presented to S. Beckwith and D. Leckrone for final selection.

Dates for next meeting of the STUC have not been scheduled, pending the selection of a new chair.

The STUC entered executive session, and adjourned at 3:00 PM.

DISCLAIMER: All technical details reported above are accurate as of 10 November 1998. For more details of items marked with \*, see the Space Telescope Science Institute Newsletter, Volume 15, Number 4 (October 1998). Readers should refer to the [STScl web site](#) for updated information.

Items preceded with § are commented on in the [Report of the STUC](#).

This report submitted by Frederick M. Walter

Chair, Space Telescope Users Committee

December 1998