

Overview

The Spitzer Science Users Panel convened for its 17th meeting at the SSC on May 2/3, 2006 just a few days after the mission had passed the critical milestone of 2.5 years of science observations following in-orbit checkout. The fact that the Spitzer mission has been honored via the selection of Dr. Michael Werner to deliver the George Darwin lecture of the Royal Astronomical Society underscores the success realized during the first years of the mission.

Overall, many, if not most, facets of the SSC operation are performing remarkably well.

- The observatory continues to be scheduled at peak efficiency, populating a smoothly operating archive with data that observers can manipulate with an ever increasing suite of in-house and contributed post-BCD software.
- New capabilities, such as multi-hour IRS integrations, are being demonstrated and made available to users with commensurate expansion of scientific opportunity.
- The Cycle 3 call for proposals, proposal submission, and review have proceeded smoothly. The process dealt with the first round of GTO proposals effectively and user demand has increased to an oversubscription of nearly 4:1. The results of the Cycle 3 selection had not been announced at the time of the SUP meeting.
- Data workshops continue to produce enthusiastic responses from attendees.
- Working with a lean staff and limited resources the Spitzer public affairs office has produced a steady stream of press releases of consistently high quality. In recent months several have been picked up by the mainstream media as significant stories. Public affairs at SSC can be regarded as having equal stature with public affairs at the other great observatories.

At this meeting SSC announced a re-organization that would split the user support functions at SSC into ``community affairs'' and ``science user support''. This new structure reflects a natural division of effort and will lead to more efficiency overall. The SUP endorses this new structure.

Specifics

1) The declining SSC budget

The high standard of achievement at SSC is at risk given the trends in funding for the SSC. Recently the organization absorbed a 5% decrease in operating funds, which follows upon a similar recision the previous year. The organization has been resilient to these cuts, managing to maintain efficient observatory operations and a high level of user support thanks to the dedication and productivity of the remaining staff. SSC is an efficient close-knit team at this point and, being so lean, it is apparent to the committee that further cuts will impact on the ability of SSC to serve its community and thus make the most effective use of this Great Observatory during the limited time remaining in the cryogenic mission.

2) Responsiveness to the SUP

SSC presented a detailed response to previous SUP meeting report (#16). The SSC reply directly addressed all of the issues raised in the previous meeting. While being responsive, SSC made it clear that most of these actions are in progress and/or limited by available resources. As a result, some of the specific comments that follow are reiterations of issues raised in the previous SUP report. The committee appreciated the attention paid by SSC to the previous report and the candor in reporting the status of addressing the items.

3) Data Pipeline Caveats and Pending Improvements

- a) Data caveats - SSC has made an effort to respond to the SUP request for explicit advertisement of data anomalies by collecting reports of data quirks and caveats on their web pages. This organization is a good first step toward making an accessible structured listing of potential data quirks but falls short of the SUP's desire to put characterization of data anomalies at the user's ``fingertips''. The NICMOS (<http://www.stsci.edu/hst/nicmos/performance/anomalies>) and 2MASS (http://www.ipac.caltech.edu/2mass/releases/allsky/doc/sec1_6b.html) projects both maintain data caveat pages that provide examples of how such information can be organized in a readily accessible manner. The SUP urges SSC to continue to make this critical information as transparent to users as possible.

b) Pending pipeline improvements - The previous SUP report requested that SSC keep a user accessible listing of pending improvements to data pipelines. From the discussion at this meeting it is evident that such listings are kept internally by the pipeline teams, but this information is not yet readily accessible to the users. As discussed in the next item, access to this information is important to users planning their data reduction strategies.

4) Data processing priorities

Not only should SSC maintain a list of open software issues that is accessible to users, it should make the priorities for addressing these issues apparent. This was a primary recommendation from the previous SUP report and we reiterate it here.

- a) Doing so enhances the planning process at SSC and guides resource allocation.
- b) Prioritizing pipeline modifications also sends a message to users as to the most critical shortcomings of the current pipelines while at the same time provides a means of anticipating the most likely near-term improvements.

5) Pixel response functions (PRFs)

With the exceptional stability and overall performance of Spitzer now well established, there is an ever increasing need by the community to have well defined and highly accurate representations of the point response functions (PRFs) for each instrument. Three primary issues are of concern:

- a) Continued support of the STinyTIM simulation package. The SUP was informed that John Krist has indeed been retained for this effort. We are concerned that John is a single point failure (as he is for the HST version of TinyTIM from which the STinyTIM package was adapted).
- b) Updated PRFs, particularly for IRAC, but also for MIPS and the IRS. The SUP was informed that the IRAC PRF simulator developed by Bill Hoffmann has been improved and that the necessary description could be incorporated into STinyTIM. For the IRS, the point-source slit loss profiles are of great interest.
- c) The community also showed interest in the best available PRFs derived from real data. Of particular interest are PRFs

sampling a range of spectral slopes, which is important for matching observations on a diffraction limited system. Also, simple 1D radial profiles were desired (although these are easily made directly from the 2D images).

6) CUBISM and IRS extended source slit mapping

As outlined in previous SUP reports, users are finding the reduction of extended source IRS data particularly difficult. At this meeting the SUP heard two reports which substantially address this issue. SPICE now has tools to better address extended source spectral extraction. Members of the SUP were also impressed with the versatility of the contributed CUBISM software. CUBISM promises to aid substantially in the reduction and analysis of IRS mapping of extended sources. In order to provide this vitally needed tool to the users as soon as possible the SUP suggests the following actions.

- 1) SSC provide a clear illustrated advertisement of the capabilities of CUBISM as soon as is feasible. Users need to see what they can accomplish with this software in order to plan the level of effort they might wish to invest with current tools prior to CUBISM's availability.
- 2) As soon as sufficient documentation can be developed, provide a "beta" version of CUBISM so that users can begin to train themselves in the operation of CUBISM and experiment with the data they have in hand.
- 3) Advertise a schedule for the availability of the items above as well as a formal release date for the operational version of the software.

7) SPICE vs. SMART

Users remain confused about the IRS tools SPICE and SMART. Seen by some users as distinct alternatives these tools have complimentary functions. Although this may be obvious to many, many also remain baffled. Given the recent improvements in SPICE which permit ``optimal extraction'' of spectra and analysis of extended sources, it is even more true that SPICE can be viewed as a necessary front end to SMART analysis. SSC should aid users by explicitly describing how these tools can be used jointly to advantage.

7) 160um optimization

The SUP feels that the continued refinement of the 160um pipeline and observing mode should be pursued vigorously. It was noted

that the 160um channel provides a crucial link between the mid-IR and the sub-millimeter and its importance and performance should not be compromised. The SUP was encouraged by reports that the MIPS IST is pursuing a revised observing strategy that will allow improved performance for faint objects.

8) APEX validation

Although the SUP has agreed with SSC's desire not to deliver source extractions with BCD data, the previous SUP report stressed that the source extraction tools, nevertheless, needed proper characterization and validation. This software has been available to users for some time. At the next SUP meeting the panel would like to see a presentation of the status of APEX validation - which we understand is in progress. In the meantime the SUP urges SSC to provide as much source extraction validation information to users as possible - drawing particularly on and comparing with the datasets delivered by the Legacy teams for fiducial reference.

9) Providing compiled versions of IDL dependent tools

There is some concern about the use of IDL as the primary language for software tools developed and distributed by the SSC, because of the high price for licensing, especially for non-academic entities. There was also some worry about longevity, but it was also noted that the IDL environment has existed for at least 20 years and is likely to continue. No obvious solution to the problem exists currently, as IDL is widely accepted by the astronomical community and is cross-platform.

The SUP recommends that the SSC look into distributing IDL programs as both code and as compiled runtime packages using the freely distributable IDL Virtual Machine. The latter eliminates the need for users to buy the entire IDL environment to run the SSC software.

10) Extended mission planning

The SUP heard more detailed plans for an extended Spitzer mission which entails both mining of the archive as well as continuing observations in IRAC bands 1 and 2 following the exhaustion of cryogen. The scientific case for both aspects of this extended mission are compelling. The SUP will generate a letter of support expressing the Spitzer community's endorsement of the extended mission strategy, highlighting the cost effectiveness of both components of the extended mission.

SSC Response to SUP-17 Report

Gordon K. Squires and John Stauffer
Spitzer Science Center

September 19, 2006

- *Current*
 - Pauline Barmby (Mar 04) GTO
 - Nuria Calvet (Mar 05) GO
 - James Graham (Sep 04) GO
 - Dean Hines (Oct 05) GTO
 - Jill Knapp (May 06) GO
 - Richard Kron (Mar 04) GO
 - Carey Lisse (Mar 05) GO
 - Mike Skrutskie, Chair (Mar 04)
 - Eckhard Sturm (Sep 04) GO
 - M. W. Werner, ex officio
- *Advisors*
 - B. Whitmore (Mar 05) Hubble
 - A. Siemiginowska (Sep 04) Chandra
 - IPAC Users Group Chair, ex officio
- *Retired*
 - M. A'Hearn (Nov 98 - May 01)
 - J. Frogel (Nov 98 - May 01)
 - J. Gallagher
 - R. Gehrz (Nov 98 – Nov 01)
 - M. Greenhouse (Nov 98 – May 02)
 - C. Woodward (Nov 98 – May 02)
 - C. Cesarsky (Nov 98-01) ISO Adv
 - D. Weedman, (Nov 98 –Dec 03) GTO
 - B. Wilkes (Nov 98-Mar 04) Adv
 - B. Jannuzi (Nov 98-Mar 04)
 - D. Clemens (May 01-Sep 04) LST
 - D. Calzetti (May 01-Sep 04) LST
 - K. Noll (May 01-Sep 04)
 - K. Long (Nov 98-Sep 04) Hubble
 - S. Strom, (Nov 98-Mar 04) Chair
 - L. Mundy (Mar 05-Oct 05) LST
 - M. Rieke (May 02-Oct 05) GTO
- *Next rotations in 2007*

SUP comment: “The SSC presented a detailed response to previous SUP meeting report (#16). The SSC reply directly addressed all of the issues raised in the previous meeting. While being responsive, SSC made it clear that most of these actions are in progress and/or limited by available resources. As a result, some of the specific comments that follow are reiterations of issues raised in the previous SUP report. The committee appreciated the attention paid by SSC to the previous report and the candor in reporting the status of addressing the items.”

RESPONSE: The SSC staff and management thank the committee for the kind words.



Issue: In the previous SUP report, the SUP had requested that the SSC make information on “data caveats” more readily accessible. The SSC response was to put links on the homepage to a couple places where the data caveats are discussed (see supplemental slides at the end of this document, repeated from the response to SUP16). However, the SUP reiterated that it believed a higher visibility, more compact means of making this information easily available to the user is important. They noted that the NICMOS and 2MASS homepages do this task well.

Response: We believe that we do provide all of the necessary information to users via the instrument handbooks, the Spitzer Observers Manual, and via the instrument data caveats webpage. However, we acknowledge the request of the SUP and our Science User Support team is working to create dedicated data caveat pages for each instrument, with a goal of having an initial version of this ready before the end of the year.



Issue: The previous SUP report requested that the SSC keep a user accessible listing of pending improvements to data pipelines. Such lists are kept internally by the pipeline developers, but this information is not readily accessible to users. The SUP believes that such lists should be made available to users, and the priorities should be indicated.

Response: In Spring 2006, the SSC began a process of creating a list of all software development efforts that are envisioned to be needed in the next several years. We are working to prioritize that list and determine the needed workforce level to implement all of the high and medium priority tasks. As noted by the SUP, this will help the SSC to allocate our resources in order to make sure this work gets done on time. We will create a web page which describes the pipeline and tool upgrades that are under development in the current S-build of our software. We do not want to put predictions of our software efforts further into the future on that site because it is too difficult to forecast accurately.



Issue: The SUP expressed concern re: STinyTIM and its status and that of John Krist; a desire for updated model PRFS – particularly for IRAC; and PRF's derived from real data.

Response: We contracted with John Krist to update STinyTIM, and that task was completed and the new version of it posted on our website at the end of July (see <http://ssc.spitzer.caltech.edu/archanly/contributed>). New empirical IRAC PRF's are expected to be posted in November 2006, and they will be provided on our website.

CUBISM



ISSUE: SSC should provide a clear advertisement of the capabilities of CUBISM, and as soon as possible provide a beta version of it so that users can begin to experiment.

RESPONSE: CUBISM was released to the community for use on Aug. 18, 2006 as part of our “contributed software” suite. The SSC put considerable effort into writing both on-line and PDF documentation for CUBISM, and there is also a test data set provided so that anyone can step through the capabilities of CUBISM with real data. A presentation on CUBISM was made at the August Spitzer data workshop. That presentation and selected clips from a videotape of the presentation will be made available on our website in the near future.

SPICE vs. SMART



ISSUE: The SUP believes that users remain confused as to whether these tools are interchangeable, or if one tool is required for some steps and other steps are best addressed by the 2nd tool. “The SSC should aid users by explicitly describing how these tools can be used jointly to best advantage.”

RESPONSE: SPICE allows spectral extractions using standard SSC pipeline modules via a simple GUI. Output spectra are in IPAC table format, matching the pipeline output. SPICE is not designed for spectral analysis. The IRS IST recommends SPICE to users who wish to obtain spectral extractions from their data “straight out of the box” (SPICE also includes extended source and optimal extraction). SMART, which provides more tailored calibration and spectral response function determination, along with more flexible extraction, is recommended for more “confident” users. Since SMART can directly read IRS pipeline or SPICE output tables, SMART also provides to all IRS users its unique spectral feature measurement/line-fitting capabilities, through its ISAP-derived interface, to measure scientifically useful parameters.

160 Micron Optimization



ISSUE: “The SUP feels that the continued refinement of the 160 micron pipeline and observing mode should be pursued vigorously. The SUP was encouraged by reports that the MIPS IST is pursuing a revised observing strategy that will allow improved performance for faint objects.”

RESPONSE: The MIPS IST is indeed implementing a new photometry AOT for 160 microns, providing a wider and more uniform coverage of the field of view than the “small field” photometry AOT, but not as expensive in time as the “large field” AOT. Preliminary tests have shown that the observations obtained in this way can help to reduce the noise, improve the background subtraction in aperture photometry, and provide enough DCE’s to attempt a time filtering to remove the pixel-to-pixel response variations, as one does in scan map mode. The new AOT is part of our S16 software build, and is expected to be available for use as part of Cycle 4.

APEX Validation



ISSUE: “At the next SUP meeting the panel would like to see a presentation on the status of APEX validation – which we understand is in progress.”

RESPONSE: We are working on this, and will provide a report to the SUP at the next meeting. We intend to update our web documentation of APEX with the new information, and use the validation effort to provide better advice to users as to exactly how to obtain best results with APEX.

IDL Compiled Code



ISSUE: “The SUP recommends that the SSC look into distributing IDL programs as both code and as compiled runtime packages using the freely distributable IDL Virtual Machine. The latter eliminates the need for users to buy the entire IDL environment to run the SSC software.”

RESPONSE: The released version of CUBISM for the Macintosh operating system does follow this recommendation. However, in general the SSC does not have the expertise and/or available manpower to support this request for all of our IDL tools. We will put this on our wish list, but it will definitely be on a best-effort basis. We note that via our grants program we provide funding for GO, GTO and archival users to obtain IDL licenses.



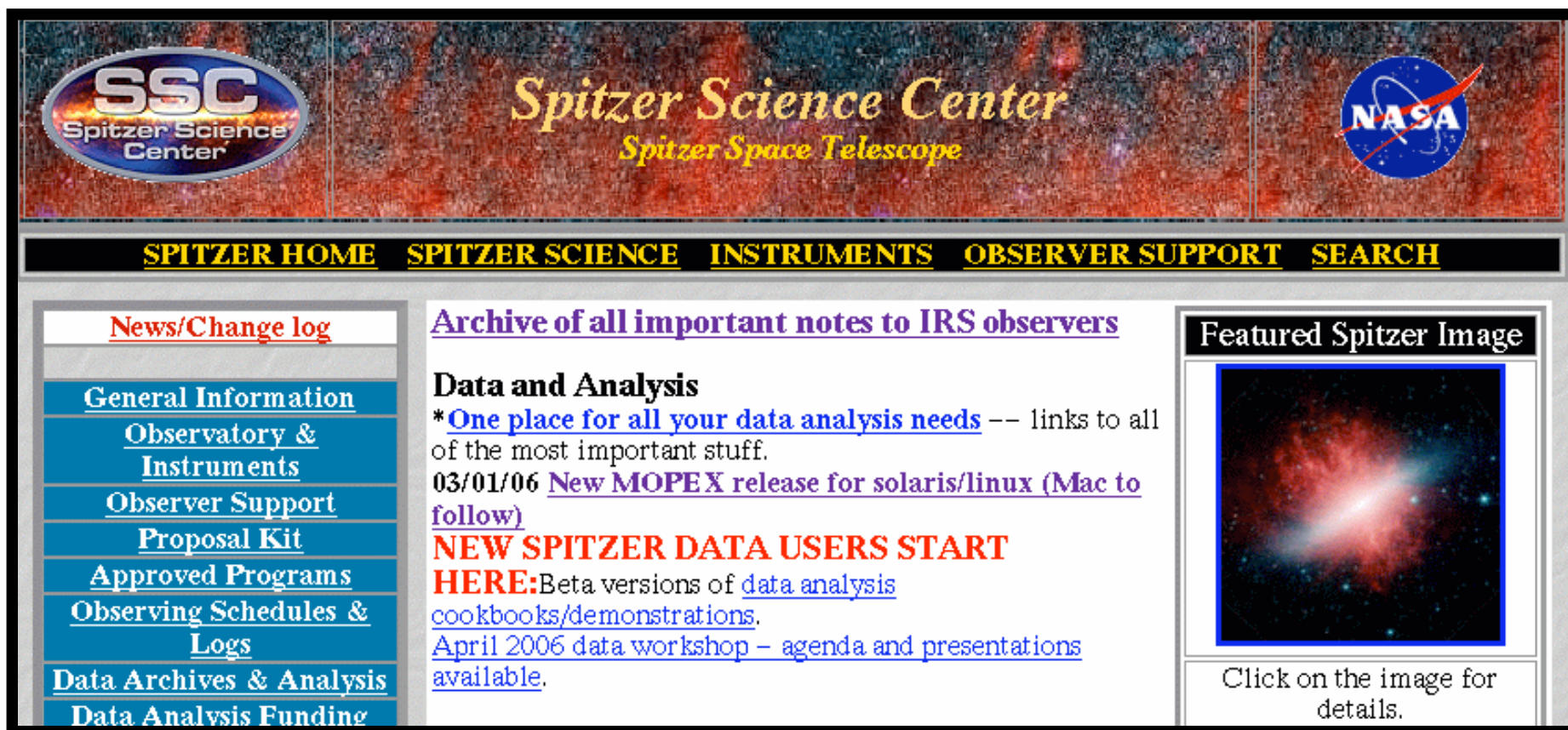
- *On the slides that follow, portions of the SSC response to the SUP-16 report are presented. These slides in particular address the manner in which we attempt to document instrument “caveats”.*

1. Informing users of data features and potential traps



- a) *“The SUP urges the SSC to make information about data “caveats” readily and visibly accessible, ideally at a single web location, and confront users with the availability of this information whenever possible.”*
- We have taken several steps to attempt to enable this useful suggestion from the SUP:
 - The top link off of the SSC astronomers’ homepage leads to information relevant to IRS (“Archive of all important notes to IRS observers”). The very latest understanding of IRS data is posted here, as well as links to the IRS interest group mailing list, and the data handbook.
 - The second link on the SSC astronomers’ homepage is “Data Analysis: One place for all of your data analysis needs.” On this page, we have added a section for “Data caveats”. Also, we’ve added links to the data handbooks and instrument interest group mailing lists.
 - The data handbooks are updated every ~6 months, with software releases.
 - Section 7.3.4 of the Spitzer Observer’s Manual also discusses known data caveats.
 - Separate pages are under construction for each instrument, listing and summarizing data caveats, and initial versions will be posted prominently on our website before the end of the year

The top 2 links on the astronomers' homepage lead to extensive information on “data caveats”:



The screenshot shows the Spitzer Science Center homepage. At the top, there is a banner with the SSC logo on the left, the text "Spitzer Science Center Spitzer Space Telescope" in the center, and the NASA logo on the right. Below the banner is a navigation bar with links: [SPITZER HOME](#), [SPITZER SCIENCE](#), [INSTRUMENTS](#), [OBSERVER SUPPORT](#), and [SEARCH](#). On the left side, there is a vertical menu with links: [News/Change log](#), [General Information](#), [Observatory & Instruments](#), [Observer Support](#), [Proposal Kit](#), [Approved Programs](#), [Observing Schedules & Logs](#), [Data Archives & Analysis](#), and [Data Analysis Funding](#). The main content area features a link to an [Archive of all important notes to IRS observers](#) and a section titled **Data and Analysis** with the text: ***One place for all your data analysis needs** -- links to all of the most important stuff. **03/01/06 New MOPEX release for solaris/linux (Mac to follow)** **NEW SPITZER DATA USERS START HERE:** Beta versions of [data analysis cookbooks/demonstrations](#). [April 2006 data workshop - agenda and presentations available.](#) On the right, there is a "Featured Spitzer Image" section with a photograph of a galaxy and the text "Click on the image for details."



- ▶ [Funding](#)
- ▶ [Information](#)
- [FAQ](#)
- ▶ [Search site](#)

■ Science Data Information and Filenaming Convention

- ◆ Data Handbooks
 - [IRAC](#)
 - [IRS](#)
 - [MIPS](#)
- ◆ Filenaming convention (a.k.a. What are all these files?)
 - [IRAC](#)
 - [IRS](#)
 - [MIPS-24](#)
 - [MIPS-70](#)
 - [MIPS-160](#)
- ◆ Data Caveats To be notified of these sorts of things as they occur, please subscribe to our [Instrument Interest Group mailing lists](#).
 - IRAC
 - [IRAC Data Handbook](#)
 - [IRAC IG archive](#)
 - IRS
 - [Archive of all IRS important notes](#)
 - [IRS IG archive](#)
 - [IRS Data Handbook](#)
 - MIPS
 - [MIPS Data Handbook](#)
 - [MIPS IG archive](#)
 - [DQA Status flag definitions](#) (from the "AOR Status" column)
 - [Pipeline History Log](#)

1. Informing users of data features and potential traps (con't)



- b) *“The existing instrument and general observers mailing lists should be kept active and updated regarding these issues.”*
- Agreed. For “minor” issues, a note is sent to the instrument interest groups mailing lists (and we have noted this on the “data caveats” area of the data analysis webpage). Also, all notes are logged on the interest group webpages, for any to read, at any time.
 - If the problem is serious, we notify either *all* of our observers and archive users, or all observers affected.
 - Mailings, with the latest news, are issued monthly to the interest groups.
- c) *“SSC might consider adding successful proposers to instrument mailing lists automatically based on AOR.”*
- We have considered this, but have not implemented this suggestion. We feel that it is not appropriate for us to generate any more unsolicited email. However, for serious problems, all observers will be notified. We encourage all observers to subscribe to the interest group mailing lists; a note to this effect is included occasionally in our emails to all observers.