

The 19th meeting of the Spitzer User's Panel was held March 4/5, 2007 in Pasadena. This meeting followed the last SUP meeting by only three months, thus the opportunity to address new topics was more limited than at previous meetings. Nevertheless, significant progress has occurred in several areas. As has been consistently the case, the SSC continues to execute an outstanding program of spacecraft, instrument, and user support while advancing the public awareness of the significance of Spitzer's achievements. Specific areas of discussion were:

#### Personnel

At the last SUP meeting there was concern expressed over the departure of key staff, particularly in the area of instrument support. Losses were less apparent at this meeting and excellent replacement candidates for the prior open positions had been identified. The SSC's effective advocacy for the future - particularly for the "warm" Spitzer mission and an increasing focus on the Spitzer archive - contributes to a positive atmosphere at the Center that should aid in retaining and recruiting near-term. The issue of retention at this stage in the project remains, however, and the SSC should continue to take steps to secure and entice the most critical staff who carry significant corporate knowledge.

#### Archive

The SUP applauds the creation of the "Integrated Products Team" charged with guiding the development and delivery of the Spitzer archive, ultimately handing its curation to the Infrared Science Archive (IRSA). This focus on Spitzer's ultimate products is responsive to the SUP's prior concerns about the nature of final products and integration into an NVO-like environment and will serve the community most effectively in the long term. The SUP looks forward to the first reports from this particular group.

The SUP noted that, given the need for integration of the archive into the larger community environment, the Integrated Products Team might benefit from having an ex officio member selected from an external large archiving enterprise. Such hybridization can foster new ideas and approaches as well as better facilitate the integration of the archive with the outside world.

#### Instrument Caveats Pages

The SSC has responded to the SUP's request for web pages that outline specific data caveats instrument by instrument. These pages

do an excellent job of addressing the desire to see instrument quirks and potential pitfalls outlined explicitly for the users. We hope that the SSC instrument teams continue to expand upon these pages and keep them up to date with the latest knowledge of instrument behavior. To that end, the SUP urges the SSC to pursue all means to make these pages more inclusive and complete. Help desk requests should be filtered to identify additional caveats. The caveats pages should be reviewed for completeness by the instrument teams (and potentially legacy project teams). On a more specific note, the pages would benefit from an indexed and linked list of the topics that follow at the top of each caveats page.

The SUP also suggests that these caveat pages be highlighted at the top of each instrument page, rather than being among a general list of links of varied importance.

Overall, the SUP is please to see the continuing refinement and resulting improved navigability and accessibility of the SSC's web pages.

#### APEX and Source Extraction

The SUP heard of substantial progress in validating/characterizing the behavior of the APEX source extraction utility at this meeting. The assignment of an FTE to this problem is particularly encouraging. As more details are understood about the behavior and limitations of APEX it is keenly important that the information be placed prominently for the users. Many of the issues and analyses described to the SUP should be made available to users of the APEX package. This package has been in the public domain for some time and users should be warned of any known shortcomings.

As source extraction within the SSC environment becomes better characterized, the population of the final Spitzer archive with reliable source extractions becomes all the more feasible. The SUP reiterates that the long term utility of the archive will be substantially enhanced with the availability of source extractions and urges the SSC to define specific plans for archive source tables as soon as possible. Presumably this issue will be addressed by the newly formed Integrated Products Team.

#### Need for Photometry Cookbook(s)

Users have expressed a desire for step-by-step instructions leading them through the photometric extraction and calibration process and incorporating many of the insights and techniques presented at the data analysis workshops.

The SSC has begun the development of

cookbook web pages and the SUP encourages the SSC to place some priority in advancing these pages from the current "beta" level.

In particular, in addition to the MOPEX cookbooks, a more general "best practices for photometry" that discusses the best way to get "good" photometry (including, e.g., the conversion factor for Mjy/sr to mJy/sq arcsec), and that provides links to the various aperture correction pages, would be very useful.

#### Reference Material for Spitzer Astrometry

At this meeting it became apparent that the Spitzer astrometric reference frame and access to it through FITS data headers is, in some cases ambiguous and certainly in need of formal definition. The SUP urges the SSC to develop a Spitzer Astrometric Reference document so that users have a definitive reference as well as reference frame for interpreting source positions.

#### IRAC

The primary current outstanding issue for IRAC is calibration of diffuse sources in Band 4. The SUP was encouraged by the report that the recent recognition of the role a droop component in biasing extended source photometry (in addition to the scattered light within the substrate) is leading toward convergence in understanding this issue. Beyond this long-standing issue, the remaining IRAC characterizations are focused on low-level effects such as the sub-pixel response - an issue that the SUP would like to highlight in Bands 1 and 2 to be addressed as resources permit.

#### IRS

There is some user concern that SPEC-PET sensitivities do not match with actual performance. SSC should provide some reassurance that the sensitivity calculator is a reliable gauge of real performance (for SENS-PET as well).

Order mismatch and wavelength-dependent slitloss corrections in IRS continue to be user concerns. The SUP encourages the SSC to place some priority on improving the characterization and calibration of the IRS order overlaps.

#### MIPS

This meeting demonstrated wonderful progress in producing appropriate calibration for bright ( $> 2\text{Jy}$ ) sources and high surface

brightness ( $> 500$  MJy/sr) regions in the S15.3 updated pipeline. The results are now in line with the Arizona instrument teams data analysis tool. The SUP looks forward to seeing the archive reprocessed with the corrected extraction algorithms. In the meantime it is important that SSC advertise the shortcomings of pre S15.3 photometry for bright sources to the user community.

The SUP was encouraged by the continued active support of the GeRT, and by the attention being paid to scan-mirror dependent flats and pleased to see the strong efforts to continue improvement of the MIPS products across the board, and in particular to address the specific concerns from the SUP 18 report. The publication of the two calibration papers co-authored by the SSC and Arizona teams will prove to be invaluable not only as a reference and guide to the instrument, but also to help inform the community about the coordinated efforts between the two groups. This answers (and dispels) one of the biggest concerns from SUP 18, namely that the user community may have misperceptions about products produced by Arizona and the SSC.

#### Proposal process

As the exhaustion of cryogen approaches, users may find that their approved programs may not ultimately be scheduled for observation. Successful proposers should be informed of their priority ranking so that they will better understand the scheduling prospects for their proposals (The SUP observes that this procedure was implemented in Cycle 4 notifications).

The Spitzer proposal process remains renowned for its robustness and relative ease. One frequently repeated user complaint concerns the observations summary table required as part of the process. Since small proposals must submit full AOR's, the process of manually typing out a formatted LaTeX table with ambiguous column requirements is redundant, time consuming, and thus frustrating. SSC should examine ways to generate the summary table automatically from the AOR's enabling proposers to spend more time developing their scientific arguments.

#### The Long Term Perspective

Overall the SUP commends the SSC on its approach to long term planning. The approach to the end of the cryogenic era is robust and well considered. The Warm Mission Workshop (and the exercise to generate topical white papers in advance of the workshop) will provide extensive community input in support of the warm mission.

With the end of the cryogenic mission approaching, the SSC should be more aggressive in advertising the implications for users and their proposals - in particular the shortened schedule for proposals and unique nature of Cycle 5 (specifically that approved proposal may not receive time depending on the date of cryogen exhaustion). The SUP raises this issue because random polling of our constituents resulted in a significant fraction of surprised responses concerning the non-standard nature of Cycle 5. We recommend that SSC advertise the specifics of the timeline of the end of the cryogenic mission and the "non-guaranteed" nature of Cycle-5 (and to some extent Cycle-4) "approved" programs at or near the top of the front web page .

The SUP also raised the issue of the "completeness" of the final science legacy of the Spitzer mission. Although the peer-reviewed proposal process is likely a scientifically efficient means of ensuring that Spitzer's full potential has been exploited during the cryogenic mission, the SUP asked whether there had been formal discussions of science or calibrations that might have been missed by the ordinary review process. The Panel heard about a planning exercise to address this issue that involved a modest number of scientists informed by the recent Great Observatories meeting. The SUP urges SSC to make the objectives and results of this process available to the community and provide a means for community response.

The SSC has stated explicitly that it plans not to provide guaranteed observing time for any of the instrument teams during the warm mission. Ultimately, this is an issue to be resolved between the SSC, the instrument team leads, and NASA headquarters. The SUP does not wish to insert itself directly in this discussion with the exception of providing any insight, provided by users, into potential value added resulting from the direct scientific exercise of the warm instrument configuration by the GTO team.

## Public Affairs

A report from public affairs was not a part of this meeting, however the presence and effectiveness of the Spitzer public affairs group could not be missed given a number of press releases that preceded the meeting. These releases included one, regarding spectroscopy of extra-solar planet atmospheres with the Spitzer Infrared Spectrograph, that garnered more attention than any release since the initial Spitzer post-launch briefings. The SUP was particularly heartened to hear that, since the last meeting, substantial progress has been made in easing and speeding the NASA/JPL approval of public outreach products so that the Spitzer public presence can be all the more effective.



## SSC Response to SUP-19 Report

**John Stauffer**  
*Spitzer Science Center*

Sept. 19, 2007

### Staff Retention

SUP comment: At the 18<sup>th</sup> meeting of the SUP, the SUP expressed concern that a number of key science staff members had left recently, and that was worrisome. At SUP 19, it was noted that this issue seemed less apparent now, and that the SSC was taking effective steps to retain staff. However, your report still asked that we continue to keep this in mind and to maintain vigilance.

RESPONSE: We agree this is an important issue, and that we are likely to continue to have science staff depart as we approach the end of the cryogenic mission. At some level, this is necessary because our staffing profile requires that we reduce to about half our current staff as the steady-state during the warm mission. However, we intend to work to insure that we keep critical staff, and that any departures do not result in a hole in our corporate knowledge.

SUP comment: The SUP applauds the creation of the Integrated Product Team charged with guiding the development and delivery of the Spitzer (final) archive, ultimately handing its curation to IRSA. This focus on Spitzer's ultimate products is responsive to the SUP's prior concerns about the nature of final products and integration into an NVO-like environment and will serve the community most effectively in the long term. The SUP looks forward to the first reports from this group.

RESPONSE: We will have this team report its progress at this and successive SUP meetings.

ISSUE: The SUP asked that we add an outside expert to the IPT working to design and implement the Spitzer final archive.

RESPONSE: We do not believe the value of adding an outsider to our IPT outweighs the cost – adding a remote member to the weekly and daily working teams would reduce the efficiency of the team.

We are, however, including some outside experts in the design and implementation process for the final archive via soliciting input both during formal reviews and via informal review of documents/decisions on an ad hoc basis. Specifically, John Carpenter (of the SUP and IRSA users group) and Jane Rigby (of the IRSA users group) attended the final archive design review on Sept. 12, and will be kept involved in the design and implementation of the archive.



SUP comment: Astrometry - or more generally positional accuracy - will likely become more important during the next few years as the time baseline becomes longer and it is possible to do useful proper motion studies. The SUP requests that the SSC provide a document describing the astrometric aspects of Spitzer, so that users have a definitive guide for interpreting source positions derived from Spitzer data.

RESPONSE: Mark Lacy is working on such a document. A draft is available now, and will be made available to the SUP. Mark hopes to finish the document by early Fall.

Issue: The SUP requests an update on the process of validating the MOPEX/APEX package. The SSC should prominently post results of our validation of APEX as we finish them, so that users are aware of the shortcomings (and good aspects) of the package. The SUP reiterates that they believe the long-term utility of the Spitzer archive will be enhanced if source tables are included, and urges the SSC to define specific plans leading up to this.

Response: We continue to work on this. This is Tim Brooke's primary job, and he is making steady progress. We are now confident that aperture photometry from APEX (at both the BCD and mosaic level) is good for both IRAC and MIPS. PSF photometry for MIPS24 is good. There are still problems with PSF photometry with IRAC, which we are working on. We have gone through all of the documentation for MOPEX in order to make it clearer. The MOPEX GUI is now available to the community, and initial response has been good. The pBCD talk earlier today covered these topics.

**Issues:** The SUP asks that we provide a photometry cookbook. Hints for what users need to do to get good photometry. When do you need to do your own additional processing to the images prior to extracting photometry? How do you convert from MJy/Sr to units daophot understands? A step-by-step guide, similar to the information now provided in the data analysis workshops, should be made available.

**Response:** We have had a “quick-photometry” guide on our website for some time. By SUP20, we expect to have a much improved version of this on our website – more details will be provided at the SUP meeting.

There is a high-level step-by-step guide to obtaining photometry for all three instruments at [ssc.spitzer.caltech.edu/postbcd/](http://ssc.spitzer.caltech.edu/postbcd/).

However, we agree that providing better, more complete step-by-step guidelines and cookbooks, and use cases, is very important and we will get to this as soon as we can.

**Issue:** The SUP noted that we had responded to their previous request for data caveats pages for each instrument, and that those pages were well done – but they had a few suggestions. The SUP requests that we provide an index to each of the data caveats pages. Also, that we assess the completeness of the data caveats pages (and use, for example, help desk questions to indicate additional needed topics).

**Response:** The user support team has added these indices. We discussed the requested assessment of completeness and ways to identify additional items to flag in the caveats pages, but the IST leads do not believe there are any large effects that are missing. The SUST will monitor these pages, and will update them as issues surface (and after consultation with the instrument support teams).

**Issue:** The SUP noted that the primary remaining IRAC issue is calibration of extended source photometry, particularly in Channel 4. They are encouraged by recent progress we have made. The SUP requests that the IRAC IST look again to see if it is possible to provide an improved algorithm to correct IRAC Ch. 1 and 2 photometry for pixel phase effects, as resources permit.

**Response:** The IRAC IST is working on these topics. The work to document the calibration of extended sources is nearly complete, and we expect to make this information available (and update our website) soon. The next most important topic to finish is characterization of the IRAC PSF and its affect on photometry. The IST will report on all these efforts at SUP20. see [ssc.spitzer.caltech.edu/irac/calib/extcal/](http://ssc.spitzer.caltech.edu/irac/calib/extcal/) for the initial memo on this topic.

**Issue:** The SUP indicated we had demonstrated wonderful progress in producing appropriate calibration for bright ( $>2$  Jy) sources and high surface brightness ( $> 500$  MJy/sr) regions in the S15.3 updated pipeline. These results are in agreement with the UA analysis. The SUP looks forward to seeing the archive reprocessed with the corrected extraction algorithms. In the meantime, it is important that SSC advertise the shortcomings of pre-S15.3 photometry for bright sources to the user community.

**Response:** We have done this. Reprocessing of the MIPS 24micron data with S16 started as soon as this version of the software was available. It is with S16 that we applied all of our corrections. The reprocessing started with those campaigns we know are/were more affected by these problems. As the data were reprocessed and archived, all the Spitzer observers get an email with a link to the changes that took place. All MIPS data have now been updated to S16. The pipeline history log describes the issue for  $<S16$ .

## Predicting S/N for IRS observations



**ISSUE:** A user reported his belief that the SPECPET tool is providing S/N estimates for IRS observations that do not agree with real data. The SUP asked that we make sure that SPECPET matches reality.

**RESPONSE:** This issue is to be discussed in more detail during the IRS presentation to the SUP. The bottom line is that there are systematic effects which come into play at the high S/N end (S/N > 50-100) which are not included in SPECPET, thus causing the actual S/N to be lower than the prediction in that regime. For the more typical case (S/N < 50), the predictions from SPECPET are believed to be reasonably accurate once bad pixels are removed, sky-subtraction is done, etc.

## Order Mismatch with IRS



**ISSUE:** Order mismatch in IRS continues to be a user concern. The SUP encourages the SSC to place some priority on improving the characterization of the IRS order overlaps.

**RESPONSE:** This topic is also covered in the IRS presentation to the SUP. The basic response is that the IST believes that things are actually in fairly good shape now for the low-resolution modules and for SH. There are some problems with LH, which the IST is trying to address.

**ISSUE:** As we approach the end of the cryo mission, users may find that their approved observations do not get scheduled. Successful proposers should be told of their priority ranking, so that they can better understand their scheduling prospects. Also, it would help proposers if the SSC provides software to fill out all or part of the observation summary table for proposals.

**RESPONSE:** We already tell observers their review result quartile and told Cycle 4 observers their scheduling priority. The scheduling priorities were explained in their award emails as well as posted in a memo on the SSC website. An AOR file parser (perl script) has recently been placed on our to help users fill out the observation summary table (see the “news” section accessible from the home page).

**ISSUE:** The SUP asks that we better advertise Cycle 5 and the plans for the Warm Mission call for proposals, and in particular emphasize how these calls will differ from previous ones (e.g. the “non-guaranteed nature of Cycle 5 approved programs) – and have this information prominently displayed on our website.

**RESPONSE:** We placed an announcement in the AAS newsletter alerting people about Cycle 5 and its special nature. We have already been including information on these topics in emails to the Spitzer user community. The planning for Cycle 5 and the warm mission was high-lighted at the Spitzer booth at the AAS in Honolulu, and will again be prominent at the AAS booth at the DPS in Orlando in October, and at the AAS in Austin. We held a Warm Mission workshop in Pasadena June 4-5, where plans for the warm mission were discussed extensively. White papers from the warm mission workshop are now posted on our website.

**ISSUE:** Has Spitzer’s full potential been realized during the cryogenic mission – are there any science topics or calibration observations that need to be obtained “before it is too late”. The SUP heard mention of a planned small workshop to be held at the SSC that would address this topic. The SUP urges the SSC to make the objectives and results of this process available to the community and provide a means for community response.

**RESPONSE:** The “cryogenic wrapup” meeting was held on July 26-27. No gaping holes were found. The committee recommended that priority be given (in Cycle 5) to observations that: (a) fill scientific gaps; (b) pursue follow-on observations of uniquely Spitzer discoveries; and (c) exploit the unique capabilities of Spitzer during the final cryogenic cycle. These words are incorporated in the CP. A letter describing these results of the workshop is posted on our website at [ssc.spitzer.caltech.edu/approvedprog/bts\\_letter.txt](http://ssc.spitzer.caltech.edu/approvedprog/bts_letter.txt)

**ISSUE:** The SSC does not plan to allocate guaranteed observing time to any of the instrument teams during the warm mission. The SUP is uncertain of its position on this, but plans to try to determine if the Spitzer user’s believe this is an issue that significantly could affect them – and if so, whether the SUP should advocate an alternative course on this topic.

**RESPONSE:** The SSC director will answer any questions the SUP has on this topic.