The Spitzer User's Panel (SUP) held its 23rd meeting in Pasadena September 22-23, 2009, approximately 4 months after the end of Spitzer's cryogenic mission on May 15. The Spitzer Science Center has been in the midst of transitions associated with both the conversion of Spitzer to a "warm" observatory as well as the finalization of the Spitzer cryogenic mission data products and transfer of those products to long-term curation at the Infrared Science Archive (IRSA). Despite these complexities and a declining staffing profile progress has been impressively smooth and exceptionally well planned.

Transition to Warm Mission

The SUP was impressed with the excellent planning and execution of the IRAC transition from cryogenic to warm operation. The task proved more daunting that anticipated, but the Spitzer/SSC team was quick to respond to the unexpected warm behavior of the focal plane temperature sensor and subsequently quickly characterized the behavior of the arrays at their new operating temperature. Even this characterization was not simple as the array behavior and quirks are quite sensitive to temperature and bias settings. Most interesting is that the latent image behavior is substantially different than at cryogenic temperatures, column pulldown is more complex, linearity corrections are more significant, saturation thresholds are lower, pixel phase effects have changed, and muxbleed has diminished. Given all of these new characterization tasks it is impressive that within two months of cryogen exhaustion formal warm mission observations were in progress with demonstrably good calibration.

Given all of the changes in behavior, the SUP considers it important that the IRAC caveats page be updated to include these Warm Mission characteristics, particularly in support of the Cycle 7 call for proposals.

The Warm Mission queue is now filled and executing Cycle 6 and Exploration Science observations. Both GO and Exploration Science included more highly constrained observations than originally anticipated. Flexibly scheduled observations are a commodity and the SSC has been forced to schedule a significant number of these more flexible observations at the start of the Warm Mission. The SUP is concerned that the limited number of flexible observations will lead to a scheduling bind later in the year and recommends two actions. First, the current scheduling plan/simulations extend only a couple of months into the future. Some work should be done to simulating then entire year's campaign in order to understand whether scheduling may become so tight at year's end to lead to significant inefficiency. Second, SSC should consider soliciting (or accepting from the proposal pool) less-constrained filler/snapshot observations that ease the demands on scheduling due

to an excess of constrained observations.

Cryo closeout, Archive population and IRSA transition

The SUP was particularly impressed with the progress toward and management of the final processing of the cryogenic mission data, population of the archive, development of archive access tools, and planning for the ultimate handover of archive responsibility to the Infrared Science Archive at IPAC in April 2011. The plan and schedule for getting to this date is well established and documented. A second reprocessing for each instrument was dropped because it was incompatible with the schedule. Doing so also provides sufficient time for data review prior to release.

Reprocessing of the cryogenic IRAC data lies on the critical path for delivery. The reason lies in the need to incorporate the 5th year of calibration into the reprocessing. The SUP fears that including this potentially incremental calibration pushes delivery of the IRAC products too late for sufficient examination prior to release. The SSC should re-examine the reasons that including the 5th year processing merits stretching the schedule for the delivery of the IRAC products.

The SUP is looking forward to the transition for archive access via Leopard to archive availability through IRSA. Current plans provide for a 6-month period where the IRSA archive is partially populated while Leopard is still available. The somewhat undesirable timing is dictated by the realities of the funding and staffing profiles at that point in the project. Current plans are to call the IRSA archive Version 1 upon release. The SUP recommends that archive users be explicitly made aware of the partial population of the IRSA archive and given some guidance/timeline for complete population, possibly referring to the period of archive population as a "beta" version.

The SUP was impressed with a demonstration of the features available with the archive query tools. Always seeking more capability, the SUP noted that having color images available may be of great aid to users. Overall, the SUP wishes to underscore the importance of interoperability between archive datasets across platforms and encourages the SSC/IRSA to ensure that sufficient metadata enables this approach.

The "archive era" for Spitzer really began last year when Spitzer became available for NASA ADP proposals. The SUP wishes to note total proposals received by the ADP increased 76% with this call with 69 of 163 proposals incorporating Spitzer data. The SUP expects this sort of Spitzer-oriented demand on the ADP will be

long-lived and likely will increase and hopes that NASA will maintain sufficient ADP funding to accommodate this continuing Spitzer demand.

Source list

The SUP was extremely pleased to hear that the generation of source lists from IRAC and MIPS image data was underway and that the review held earlier this year endorsed the population of the archive with high SNR, high quality source fluxes. This SUP agrees with this conservative approach, but does suggest that the SSC make available positional data for sources which fall below this "gold-standard" quality threshold. Users querying the database, particularly those making pan-chromatic queries across datasets, will find it valuable simply to know that the source list extraction procedure identified flux at a position of interest. The position-only record will serve as a pointer back to the images and encourage the user to extract their own fluxes for these more challenging sources.

Documentation

Papers

Although the project web pages, cookbooks, and instrument user's handbooks provide the most detailed information about the Spitzer instruments, the most durable record of of the Spitzer enterprise will be peer-reviewed publications. The SSC and instrument teams have indeed submitted a significant number of such publications to date. The SUP recommends that one person at the SSC be vested with the responsibility of documenting this set of descriptive materials and seeking out gaps in the description that ideally would be filled with additional submissions. The Space Telescope Science Institute follows a similar procedure identifying class 1, 2, and 3 references (with 3 being essential).

Software

The SUP has always strongly believed that, for archival purposes, pipeline source code should be made available, not however intending that future users should be able to recreate and run the pipelines. At this meeting the SUP heard approaches from IRS and MIPS on both sides of this goal. IRS plans to distribute the CUPID source code in a form where it can be compiled and the pipeline could be reconstructed and run by users, going beyond SUP expectations. MIPS plans to distribute documentation of the functional details of the code without distributing the source code. The SUP re-iterates that, for

the sake of complete documentation, it will be of value to have the source code, and thus algorithmic details, in the public domain.

Senior Review

Extending the Spitzer Warm Mission to the communications-limited end of life will be immensely scientifically productive. This statement is underscored by the fact that the WISE all-sky mid-infrared catalog will benefit substantially from follow-up with the higher spatial resolution and sensitivity of the warm Spitzer and only becomes generally available during this "second" Spitzer extended mission period. In order to secure this extension the SSC will propose to the upcoming Senior Review for support for the additional warm mission time. The SSC should appreciate that the success with the first warm mission proposal is likely to make this second iteration more challenging. The first warm mission proposal was the result of an extensive campaign that involved the broader community and culminated in a set of white papers and a well-attended workshop. Having put its best foot forward via this procedure the next SSC proposal must underscore success with the Warm Mission to date as well as highlight new opportunities enabled by the new extension. The Exploration Science teams should be canvassed for early significant science results and it may be worthwhile to re-convene the original warm mission white paper chairs along with Exploration Science PI's for further brainstorming. Among fundamentally new opportunities that have arisen in the meantime are synergy/followup with Herschel and WISE.

Public Affairs

As with every meeting, the presentation from Spitzer public affairs was a highlight. The modest staffing continues to promote imaginative, leadership examples of public outreach for a Great Observatory. Spitzer continues to garner headlines - combining of forefront science with a public affairs group that can package results with compelling artistry that improves public access and understanding and also draws press attention. This group also has been effectively reaching the population that doesn't garner its information from historically traditional news sources. These pod/vodcasts enjoy 200,000 subscribers at present. At the same time this group is actively reaching out to high school teachers via a teacher archival research program. These accomplishments and efforts speak for themselves.

Future of the committee

As observer interaction with SSC becomes focused around IRAC and a

limited number of observing modes, as the proposal/review process has been refined to a smoothly running cyclical process, and as reprocessing winds down and archive management transitions to IRSA the SUP has begun to consider its own mortality. The SSC staff already invests considerable time in review meetings for a variety of bodies. The investment of time could become more modest with a more streamlined review committee structure. SUP meetings have already become more infrequent in response to the end of the cryogenic mission. Now that the Warm Mission is well underway and the transition to an IRSA managed archive is on the horizon the SUP believes that now is a good time for the SSC to review its committee structure and, in particular the role of the SUP. One possible outcome is a merger with the IRSA user's group.