Minutes for FUG Meeting, Feb. 6, 2009, NASA GSFC bldg. 26/rm 212

In attendance: FUG Members: Josh Grindlay (Chair), Scott Ransom, Jim Ulvestad, Reshmi Mukherjee, Alicia Soderberg, Pat Slane, Alan Marscher; Ex-officio: Steve Ritz, Bill Paciesas, Lynn Cominsky, Peter Michelson, Chris Shrader, Julie McEnery; phone in: (members) Don Kniffen, Matthew Baring, Luigi Piro, Henric Krawczyinski, Buell Jannuzi, (ex-officio) Ilana Harrus

Josh opened the meeting with introductory comments and goals, which included finishing all remaining Open Action items, for this, his last FUG meeting.

Ilana Harrus: Noted that Alan Marscher will take over for Josh as FUG chair starting with the next meeting. Thanks, Alan! She also discussed the general issue of membership; Reshmi will cycle off after this meeting, and recommendations for her replacement can be e-mailed. The group gratefully acknowledged the extended and excellent service (since 2003) of Josh and Reshmi (since 2006).

The timeline for Einstein fellowship selections was briefly discussed. A March announcement is anticipated.

Steve Ritz presented a report on the mission status. The rather remarkable agreement between the planned operations timeline and actual milestones was noted, and accolades to the FOT, the international instrument teams, discipline engineers and transition team (pre- to post-launch) were made. Smooth implementation of routine FSW updates and the attention to battery management were noted, among other sustaining engineering functions. Fermi presence at the January AAS (with approximately two dozen scientific contributions), including the use of the LAT public high-level data was noted, as were the plans for 3 additional Cycle-2 proposal workshops. [Workshops were held in the Boston area (at CfA), Bay area (at Berkeley), the DC area (at GSFC), and at the University of Chicago.]

Julie McEnery discussed GRBS and autonomous repoints (ARRs). 140 GRBs have been recorded by the GBM, plus 8 ARRs (4 from GRBs) and a recent abundance of AXP 1E1547 triggers. ARRs were temporarily disabled during the flurry of AXP triggers, and then re-enabled with increased thresholds. Josh asked if position information alone was in general sufficient to screen SGR triggers: Bill responded, noting that this is generally not the case. The (soft) nature of the spectrum results in diminished atmospheric scattering effects.

Julie also discussed the LAT ASP data products being released by the FSSC. Upper limits are now included, and the definition of when a transient reverts to sub-threshold intensity (and is thus removed from the list) has been modified: a 1-week average of 2e-7 is the new criterion. Requests to lower the transient threshold are under consideration, but significant issues were noted: “steady” sources can often exceed the reduced threshold values, taking absolute calibration uncertainties into account.

Luigi inquired about the possibility of expanding the contents of the LAT GRB table. Could for example, upper limits be included? Could this information be released promptly?

Complications were noted: the upper limits may not be able to be produced quickly. LAT upper limits are entries in Fermi GRB catalog; there are no current plans for making catalog in real time, rather it will be produced using knowledge gained over the next few months.

Luigi suggested that in cases where the LAT observes a GRB FOV for 1000's of seconds a good UL should be obtainable. Julie: is that a really a search for afterglow emission? Peter stated that the team's first priority is to get what information is known accurately out to the public promptly, and that upper limits may not usefully facilitate observations. Josh cited the case of TeV observations as a possible counter example.
Julie: In any case, ULs will be close to the instrument sensitivity for the parameters of the particular observation, so a reference to the sensitivity documents would satisfy most needs. It was suggested that the LAT sensitivity for a particular integration time (e.g. 100sec) be posted on the Fermi web pages (or LAT pages) as a link that might be referenced for some GBM triggers (e.g. particularly bright ones), at small off-axis angles, if there were no LAT trigger.

Peter reviewed the LAT status and science highlights. There have been no significant operational issues, and on-orbit calibrations are progressing well. The year one data release is on track for the mid-August to early September 2009 timeframe. He briefly reviewed optimization strategies, noting the possible event class selections and performance trade offs involved. Ghost tracks must be accounted for but this is an understood problem. Early science results were summarized, and a three-month sky animation (1-day frames) was shown. All were impressed. Prospects for future scientific endeavors were enumerated. Neil asked about the source of the GeV excess in EGRET and the obvious discrepancy with Fermi LAT. Peter demurred; the answer is not really known but he noted that the availability of detailed instrument model MC calculations provide an invaluable tool, for which EGRET had no analog.

Bill presented a summary of the GBM performance and early results. He noted that there had been 315 triggers in 208 days. A bar chart illustrated the recent preponderance of SGR triggers. 144 triggers are attributed to GRBs, 18 of which have independently determined positions. He showed a table of position uncertainties for FSW determinations, and for different degrees of (on the ground) automation. The range was from $\sim 10^{o}$-4^{o}. Alicia inquired as to what fraction of those 18 bursts have published coordinates.

A discussion on using the LAT (solely) as a calorimeter ensued. Could additional useful information be obtained for GRBs where the observatory didn't repoint? Josh: could events in calorimeter have been recognized automatically. This was prompted by discussion of GRB081215A which was detected in the LAT tracker but was 90deg off axis from the LAT, so that no re-pointing was done. Gamma rays could potentially be detected from this event using the calorimeter alone, but only at high energies (>20 GeV).

Bill also showed progress on efforts to use the GBM to monitor accretion-powered pulsars. He presented a pulse-period history of GX 1+4. The frequency decrease was very linear, with hint of a minor inflection associated with an intensity rise. The data were also

presented with historical data, which illustrated a decades-long linear decreasing trend. Plans for FSW revisions to improve trigger classifications were noted as was ongoing work on improving calibrations.

Dave Thompson presented the LAT bright source list, a great achievement and an important milestone that was reached during this meeting. The rationale for choosing a significance cut instead of a flux limited catalog was noted: less dependence on detailed calibrations and background models. It is intended as an immediate resource to proposers and other astronomers, and serves as a first step towards a full catalog. Details of the list were presented; fluxes, basic spectral information, variability flag (no light curves, other than what is already released by the FSSC for monitored sources), and cross-catalog associations. Don noted that the image resembled IR maps of the Galaxy. Josh: Is the map part of the release? Dave responded that many of the plots he showed (including the map) are in the paper. In response to a question about localization accuracy, Julie noted that the pre-launch IRFs have been used for this analysis, and that improvements are anticipated; the 1-arcminute limit could be improved. Jim asked about 5-10-sigma sources; what fraction are blazars? Dave responded that at lower confidence levels the resulting larger error boxes will require more effort to address questions about population statistics.

Henric expressed a wish to get more frequent alerts for TeV to follow-up on. Discussion on the possibility of lowering the threshold followed. Steve noted that this is already being pursued by the LAT team, and ATels are also frequently issued at lower flux levels. Peter suggested making it lower by factor of order 2. Josh suggests following such a strategy then seeing if that gives more alerts. This could then be revisited at the next meeting. Josh noted, with a hint of glee (or was it remorse?), that he would not be attending the next meeting.

Chris summarized FSSC activities. Two staffing changes were noted. The current archive status was summarized, and screen shots illustrating the Science Tools release and LAT bright source list were shown. FSSC preparations for Fermi Cycle 2 were discussed. It was noted that 66 NOIs have been received. Pat asked how many were received for cycle 1? (About 1/3 of the eventual total, the current number is not a source of concern). Lynn asked if graphics, e.g. light curves for individual detectors, could be included as part of the GBM database. Chris noted that sample plots had already been developed in Huntsville, and discussed with the FSSC as an archive product. Implementation is expected to be in the near future.

Robin reported on FSSC operations support activities. He pointed out that schedule deliveries for the predominant survey mode operations have become straightforward. A few other activities, including 10-minute ‘freeze’ pointings each week as part of routine sky survey operations, and a LAT calibration observation, have been supported without difficulty. RPS driven database changes have been implemented.

Alan asked how long of a delay typically occurs between the LAT recording a photon and its appearance in the archive? Steve noted that the requirement is 2 days, but that experience has been less than a day.

Alicia asked about ToO response. Steve described the process, and cited the long-standing requirement of 6- hours post approval. Robin and Steve noted however that

communications with MOC followed by MOC activities may are the primary contributions to the time taken to execute a TOO once it is approved. Given the effectiveness of sky survey, we don't expect many successful ToO requests, but the possibility has been designed into the system to support unanticipated science.

Julie presented the White Paper on pointing versus survey mode. The document was just posted on the FSSC web site and the AI to do so is considered closed. The conclusion was that pointed mode observations would need very strong justification. Perhaps for highly time-critical targets? While improvements in exposure of ~3X can be typically achieved, Earth limb avoidance must be taken into account so the gain in sensitivity may be affected. A movie clip indicating the (large) size of the Earth avoidance region was shown.

Peter presented the year-1 data release plans. All (reprocessed) level-1 LAT data would be transferred to the FSSC starting on August 11, 2009, to be completed within not longer than a month. Julie noted that if the diffuse model changes for example, it could be desirable to delay data release, i.e. to use the one month as contingency.

The event data proposal was presented and discussed. Not all information will be available to the end users. For example, Steve pointed out that there are several ways to measure energy. We plan to release the best combination, rather than its individual components, since users would have no practical means to understand the complex error functions of the components. He further noted that there is additional data not utilized by the current Science Tools. For example, the covariance matrix elements from an event reconstruction procedure are included. Though not used now, they could conceivably be used in the future; err on the side of more information rather than too little.

Chris and Ilana discussed Cycle-2 GI program issues. Chris noted a few statistics for Cycle 1; 167 proposals submitted, 44 selected (including 8 multi-year awards). Expansion of the program by a factor or ~2 is anticipated, and LAT data analysis will be the predominant mode of participation. The two stage proposal process, NRA changes; the proposers-specified budget caps will be seen by reviewers this cycle, and the NRA imposes hard ceilings ($100k/$200k) on these. Some submission details, and changes motivated by previous FUG discussions regarding NOAO and NRAO observation requests, were presented.

Pat asked if the executive committee evaluation process of the large projects could be improved. In cycle 1 there was limited discussion, due largely to a lack of cross-committee communications and conflicts of interest. Possible solutions were discussed. A separate executive session for the large projects, immediately prior to or following the general merging session was one suggestion. Allowing multiple committees (or selected reviewers therein) to read the large proposals was also discussed. The Chandra approach, which involves a "pundit" panel who see the large proposals prior to merging, was also described. Ilana advocated waiting until we receive the proposals to finalize any strategy.

Ilana asked about feedback from large-project proposers in cycle 1. Chris noted that a large fraction (8/13) were accepted. There were no notable complaints from those not selected; in general, the level of negative feedback was low.

Jim cited a need to reword the NRAO agreement language regarding ToO programs. Fermi and NRAO define ToOs differently, and this led to some confusion in cycle 1. **Action Item**: Jim would review the language and recommend revisions.

Dave Davis presented the FSSC Science Tools release and support plans. The released version is one patch increment behind the most current SLAC version. The FSSC's automated testing procedure was described and a multi-platform summary chart presented. A few minor, known issues were enumerated. Scott asked about gcc4 support. Dave noted that the builds were made with gcc3 to support older systems, but that gcc4 has been successfully tested. Josh asked how many downloads had occurred? Dave: statistics are kept, but have not been compiled yet. Josh asked about the documentation and how hard it might be for a novice to get started. Chris described the hierarchical nature of the documentation, and recent efforts to refine and update it. The SLAC "workbook" has been excerpted and augmented as appropriate for the GI community needs, and installed at the FSSC as a NASA-compliant web service. The examples are "cookbook" like, and fairly easy for a novice to get started. A detailed overview document, and individual application references are also available.

Julie described the Cycle-2 GI workshops. Workshops were similar to those offered in cycle 1. The main goal is to help people write good proposals. Topics covered include instrument capabilities and GI program details. Early science results were reviewed as examples of what can do. Some science talks are also solicited from people in area. Regional venues were planned for Chicago, Boston, bay area, and DC. Chicago done was done last week, and UC Berkeley will be next week.

The AI list was reviewed: AI43 was closed with the release of the pointed-vs-survey mode white paper. AI52 is closed; NRA language was approved, and in any case this may be overtaken by events. AI36 was also closed. A **new Action Item** for the SSC to update the FAQ list was proposed. An **Additional new Action Item** to update the action item list was proposed. (By this point in the Meeting, 3 new AIs had been proposed).

Steve reviewed the plans for the First Fermi (or second GLAST?) Science Symposium, which is scheduled for November 2-5 in downtown Washington, D.C.. The website is up, the IOC is formed and will be meeting soon. Difficulties with contractual issues were noted, but these were ultimately resolved, and a contract has been signed. Steve queried the committee on the desire for a published proceedings, noting that it would add $60-$80 to the registration fee. The broad consensus was to forgo a printed proceedings volume and instead have a web posting of all the slides, posters, and papers. Pat noted that it's possible to index the table contents in ADS, so articles could come up on typical search operations. Peter noted that there would be a Fermi related concert at the Kennedy Center on the first night of the Symposium.

The narrow time interval between the LAT data release and the symposium abstract submission deadline was noted. The concern is that this could limit non-instrument team member participation. Steve asserted that this effect could be offset by conducting a data-analysis workshop prior to the abstract deadline. Fragmented discussion followed, eventually leading to a proposal to hold a 1.5-day workshop contiguous to the next FUG meeting in late August/Early September. (The topic of specific dates was revisited at the end of the meeting in the context of when subsequent meetings were to be held).

Lynn reviewed the Fermi EPO activities. A number of items and activities coupled to the International Year of Astronomy were described. These included a web video, a traveling exhibit, Fermi card game. She noted the striking effect of a shrinking scientific press, in tandem with an ever increasing number of science groups attempting to publicize their activities.

The dates for the next telecon were discussed. The optimal window appeared to be 5/26-28/09, with 5/27/09 11:00 EDT as the tentative date. The next meeting date was also discussed. The consensus seemed to be August 28, preceded (or perhaps followed by) a data analysis workshop.

Ilana again acknowledged NAS HQ's appreciation of Josh's service as GUC and FUG since 2003. All concurred that he had done an outstanding job. Sadly, a FedEx package containing a gift for Josh did not reach Goddard in time for the meeting, but will (then) be delivered later.

The meeting then adjourned.