Fermi User's Group (FUG) Meeting

September 26, 2008
Goddard Space Flight Center, Bldg. 2, Rm. 8

Present: Josh Grindlay (chair), Matthew Baring, Mitch Begelman (by phone), Buell Jannuzi, Don Kniffen, Henric Krawczynski, Reshmi Mukherjee, Luigi Piro, Scott Ransom, Pat Slane, Alicia Soderberg, Jim Ulvestad

Ex Officio Members: David Band, Lynn Cominsky, Neil Gehrels, Rick Harnden, Ilana Harrus, Julie McEnery, Chip Meegan, Peter Michelson, Steve Ritz, Chris Shrader, Dave Thompson, Kathy Turner

Colleagues: Mike Corcoran, Dave Davis

Staff: Sandy Barnes

Meeting called to order at 9 am

Introductions & goals for meeting—Josh

The main goal of the meeting is providing input to Ilana, Rick and David on the ROSES text for Cycle 2.

News from HQ—Rick, Ilana

Rick introduced Ilana, who is taking over as NASA Program Scientist on 10/1. The transition between the pre-launch and post-launch governance is in progress. Ground-based activities are no long supported through APRA but through the missions; Fermi and Swift are taking over two programs.

Mission status—Steve

Steve reviewed the launch; the result was insertion into the desired orbit. Steve commented on the careful attention by NASA, all the partners, and launch crew to protecting the science mission, especially in the challenging months prior to launch. The 60-day checkout period went extraordinarily well. Some minor operating constraints have been understood post-launch, which Julie will present later in the meeting. The propulsion system was not tested, as planned, but the spacecraft was re-oriented as if the propulsion system would be fired. In this orientation there was an anomalous event (spurious low-temperature readings), and the spacecraft and LAT went into a safe mode. Recovery went smoothly, and a subsequent flight parameter change should prevent turning the LAT off unnecessarily if the same thing happens again.

There have been a number of instrument and spacecraft flight software patches. GSFC is maintaining the spacecraft flight software, and has updated the software once with General Dynamics' oversight. All went smoothly.

Fermi is in survey mode.

As previously reported, reaction wheels of the same family as Fermi's have failed in space. There has been another failure on another spacecraft since Fermi's launch. The recent failure occurred at the equivalent of 1 year of Fermi's operation, but the bearings of the wheel that failed had been reworked. Pre-launch testing by the Fermi mission of a reworked flight space bearing also failed, suggesting that reworking the bearings compromises the reaction wheels. Fermi's flight wheels were not reworked.

There has been a dry run of the decision sequence for a possible short (~1-second) firing of the thrusters to move Fermi to avoid space junk. The probability of such a maneuver is not very small (could be ~50%) over 5 years.

The pre-launch Project is transitioning into the post-launch mission. Bob Sodano is now the Mission Director. Decisions about the mission are primarily in the hands of the Project Scientist office. The handover of the mission from General Dynamics to NASA has occurred. The Flight Operations Team is doing a spectacular job. The change control processes are in place and working well.

The Fermi and Chandra Fellowships have been merged into Einstein Fellowships, and will be administered by CXC at CfA. We need to provide input on the peer panel that will select the fellows (and see Agenda item below). PLEASE provide suggestions for candidate names for the Panel to Josh, who will pass them on to Nancy Evans at CfA who organizes the Panels.

We are on schedule as far as data release and GI funds disbursement. The second Fermi symposium is planned for the first week of November, 2009, in the Washington area; the FUG will have a calendar exercise later.

Mission status (cont.) --- Julie

Henric asked whether users know exactly where Fermi is looking. Julie answered that the prospective files are not yet been produced correctly. David said that they will be posted, and there are tools planned and partially-developed. The FUG is in violent agreement that providing users with Fermi's pointing should be implemented. [Update: the spacecraft files predicting where the LAT will be pointed are now available at http://fermi.gsfc.nasa.gov/ssc/resources/timeline/ft2/; a graphic interface is under development.]

The minimum angle between the Earth's limb and the center of the LAT's FOV (the Earth Avoidance Angle—EAA) is now 20 degrees. The angle is relevant to limb tracing, which will be used for Autonomous Repoints and ToOs; pointed observations in the weekly timeline will have earth avoidance built into the schedule. The spacecraft will not start slewing to a target until the target is greater than the EAA from the limb. An EAA greater than 23 degrees keeps the orbit pole from being observable. Thus the EAA has been reduced to 20 degrees, and the FSSC uses an intermediate target to get the slew started.

Data on the detected sources of the 23 monitored source list have been released. Fluxes are provided in 3 energy bands (300 MeV-1 GeV; 1-300 GeV; and >100 MeV). Upper limits will be provided in the future, but because of uncertainties in the absolute flux calibration are not posted yet. The fluxes result from automated analysis, and can result in an occasional spurious result. Henric commented that there is no way of knowing that one of the monitored sources has not been detected; the source is just missing from the posted data. Josh suggests there should be a link from each source

name to the data. Flaring sources meeting the transient criterion (fluxes >2 x 10^{-6} photons cm^{-2} s^{-1} above 100 MeV) have been detected and announced in ATELs, but are not being posted yet because of uncertainties in the pipeline processing: some Galactic sources that are expected to be constant have flux fluctuations. GCN Notices for bursts are not yet being released. The onboard GBM trigger is currently running; the LAT trigger software will be turned on in October but will not initially send out GCN notices autonomously.

LAT update—Peter

A collaboration meeting was held in SLAC last week. Scientific papers are already being written about the LAT data. The LAT has detected two bursts, both first detected by the GBM. Pulsars have also been detected. ATELs have been sent out for flaring blazars. The team is working very well together, across the mission.

GBM update—Chip

The GBM team has been working on tuning the instrument (e.g., loading more accurate location tables). New flight software will be uploaded in the next ~2 weeks. This patch will handle single event upsets. The location uncertainty calculation onboard will be corrected; the uncertainty is important for event classification. Automatic submission of GCN notices and Autonomous Repoints will start when the uncertainty is improved.

FSSC news (general)—Chris

The FSSC is fully integrated into the mission planning process. The LAT monitored source and GBM databases have been released. Some FUG members are finding the data access to be difficult.

GLAST -> Fermi -> Einstein Fellows—Steve, Rick, Josh

The merger of the GLAST/Fermi Fellows program into the Einstein Fellows makes it important for the FUG to recommend members of the fellow selection panel. The FUG can still recommend panel members for the 2009 review. For the one cycle of GLAST Fellows there was an attempt to get specialists in different fields. Ten fellows will be selected. Steve (and/or others in the Project Scientist office) and Ilana will represent Fermi's interests, and may be at the meeting of the panels. Josh recommends that ~1/3 or more of the selection panel should be Fermi-oriented. Panelists should not be viewed as advocates for Fermi, but the final selection should have a reasonable number of Fermi-oriented fellows. Harvey Tananbaum is the final selection official, and gives a 'charge' to the panel. Buell said that a good postdoc application should convey the importance of the proposed research to non-experts, while Scott pointed out that expert reviewers are required for some niche fields. Last year scientists tied to the mission were not panelists for the GLAST fellows program. Finally, Steve is concerned that attempts that have been made to form links between the fellows and missions may not occur as readily in the new program.

Status of ongoing/planned MW campaigns—Dave T., Buell, Jim

Dave: The pulsar community is monitoring pulsars, but not all pulsar ephemerides are public yet. There is a webform to report Fermi-relevant observations that are planned.

Buell: The Fermi Cycle 1 program accepted 3 NOAO-Fermi proposals. The Romani and Bailyn observations are being planned. Romani asked for an instrument that no longer exists, and NOAO staff had to work with him on planning to use the replacement detector.

Jim: Some radio observations have already been taken, or will start soon. Observations that require a trigger have not yet occurred, but NRAO is ready. The VLBA has been recommended for closure, unless there are partnerships. NASA may help fund the VLBA to track spacecraft, but interest for astrophysical uses might help convince NASA to fund it.

Neil: 10% of Swift time is spent following Fermi sources, including the 23 monitored sources. Swift intends to follow-up LAT burst detections. Alicia pointed out the need for rapid dissemination of burst localizations.

Results of Beta Test; S/W demos—Chris, David

Testing of the SAE was delayed by difficulties testers had installing the software. The portability issues resulted mainly from 3rd party packages such as ROOT. A ROOT-free distribution is under development, but this will eliminate some capabilities. Tutorial sessions are planned for the latter part of 2009, early in Cycle 2. Steve and Peter advocated tutorials at the tool release (planned for mid-February). Reshmi asked what data will be made available for users to practice using the software. The FUG consensus is that a month between the tool release (planned for mid-February) and proposal deadline (planned for mid-March) is insufficient. Julie is aiming to release the LAT source list in mid-January (5 months into Cycle 1); the list will be based on only ~3 months of data. Steve thinks that 6 weeks between the list release and the deadline is sufficient. Dave Davis stated that the software schedule is not very compressible, and low priority tasks will not be included in the release. On the other hand, the proposal deadline cannot be postponed because the Cycle 2 grants should get out in FY09. In addition, Chandra's deadline is usually March 15, and Fermi should avoid it by ~2 weeks. Perhaps the Chandra deadline can be moved by ~a week to get a sufficient separation.

Action Item 43 and White Paper on Pointing vs. Survey mode observations—Julie, All

The document that was produced is a good statement of the relative benefits of pointed and survey mode, and can be updated with the example of Week 7 that included pointed observations of one and two targets per orbit. A zenith cut of 105 degrees (i.e., eliminating photons that are more than 105 degrees from the zenith) reduces the sky exposure because the tools cannot handle zenith cuts that impinge on the region of interest, and the impact on non-target sources will be greater. A revised white paper will be released in two weeks. Steve asked in what cases would a pointed observation be justified; Scott finds pointed observations of a noisy pulsar would be useful. But in Cycle 2 proposers will not know which pulsars are noisy since they will not have had access to the LAT observations taken in Cycle 1. Perhaps Cycle 2 should not include pointed

observations? The review panel may not understand the impact of pointed observations, even though there will be technical reviews by the LAT team. But FUG members do not want to preclude proposals for original research programs. To give proposers the ability to justify a pointed observation, the simulation capabilities must be provided. Pointed observation proposals should be required to provide a quantitative justification. The white paper should be posted, and its comprehensibility tested by non-FUG scientists. Investigators should be encouraged to contact the FSSC when writing pointed observation proposals. The white paper should be out by the next FUG telecon. Scott brought up the impact on studying the rest of the sky. The ROSES text should make clear that proposers should justify their proposed observations.

Other Mission Planning issues relevant to ROSES 2008 (e.g., TOO's, etc.)—Steve, Julie, All

The current ROSES text allows triggered proposals, with money not released unless the trigger (e.g., flare or other transient) occurs. Steve would eliminate the contingent funding. Pat stated that narrow FOV instruments have TOOs resulting from both proposals and director's discretionary time. The FSSC built the TOO system to handle these two types of TOOs. The consensus is to keep the two types of TOOs (and also the ability to request that Fermi stay in survey mode at a given time in order to not undermine correlated observations ongoing).

Robin showed the TOO interfaces. The help text for the RPS form should explain the TOO urgency. The Project Scientist or deputy should 'sign' the rejection and acceptance e-mails, with an invitation for the proposers to contact the Project Scientist or deputy, if needed. In the acceptance letter 'observing mode' should be eliminated. The acceptance letter should state the applicable data policy, e.g., LAT event data are not public in Cycle 1. The information that Fermi is going to execute a TOO should be pushed to the community, perhaps through an ATEL, not just posted on the FSSC website. There should be language that details of the TOO will be public.

Proposed AI—the FSSC should develop a method to push the TOO occurrence to the community.

Lunch talk: LAT Results—Peter

A great deal of work went into verifying the timing on the ground, resulting in the early detecting of pulsars.

Lunch talk: GBM Results—Chip

Chip reported that GBM is performing very well and meeting pre-launch predictions. In addition to 55 GRBs, GBM has also triggered on bursts from SGR 0501+4516 and Terrestrial Gamma Flashes. The location accuracy for strong bursts is about 3 degrees. The rate of noise triggers is low.

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Discuss ROSES 2008 text—David, Rick, Ilana

D. Band summarized the status of Cycle-1 and preparations for Cycle-2. It was noted that Cycle-1 Congressional Notification letters had been sent. The ROSES amendment text for the Cycle-2 was already distributed to the FUG. The Cycle-2 budget

allotment for GI grants was noted: $8M, which would comprise approximately 75 "regular" and 8 "large" proposals. Budget ceilings of $80k and $200k for regular and large were suggested.

Discussion regarding these numbers ensued. Steve Ritz noted that in Cycle 1 the $80k guideline represented a mean, and that now making it a cap represented a descope of the typical investigation. Rick Harnden noted that the new headquarters-adopted approach based on a "cost reasonableness" analysis would streamline the Phase 2 process, saving ~1 month.

Long discussions on whether this is an estimate or a cap. Peter Michelson expressed concern that proposers would "game" the system by effectively low-balling the initial cost estimate pushing final Phase 2 requests up to the $80k limit.

Rick Harnden asserted that irrespective of terminology, Phase 2 requests would not be permitted to exceed cap OR estimate.

Mathew Baring noted that the NRA text is vague on this point.

Mitch Begelman advocated calling it a cap, or e.g. "proposed maximum cost", and NOT an estimate. He further noted that his experiences suggest that too much cost (or work plan) detail in Phase 1 proposals does tend to shift the panel discussion away from science to a degree which should be a concern.

Steve Ritz asserted that the $80k figure should represent a median rather than a cap. In this context he posed the question to the committee: are the grant amounts about right? Some discussion of whether or not ~75:8 was the appropriate proportion of regular to large proposals then ensued. It was noted that a surprisingly large fraction of the large proposals were approved – however, it was argued that this should not be surprising, as they tend to be well-motivated team efforts, thus generally strong proposals in a scientific sense. No conclusions were discernable; i.e., the 75:8 guideline seemed to be acceptable.

The discussion reverted back to budget caps. Henric suggested that caps should be lower since the Phase 2 process was not highly scrutinizing. Jim Ulvestad noted that labor costs (as well as skill and experience levels) differ significantly for post-doc versus graduate students, and that Phase 1 committees should be cognizant of which is being proposed. Discussion ensued over whether or not budgets, work plans, cost caps (or estimates) should be visible to the Phase 1 panels. David Band noted that significant discrepancies between Phase 1 work plans and Phase 2 requests were evident in a number of Cycle-1 proposals .Rick insisted that it was a done deal in any case: panels will see a cap and NASA will evaluate Phase 2 requests.

Josh Grindlay noted that some institutions have historically been effectively penalized by higher than average overhead rates, and that that had been the primary motive behind the two phase approach in the first place. This argues for a range of allowable costs rather than a single cap.

Scott Ransom suggested that cost should be a legitimate consideration in the Phase 1 selection process.

Steve R. suggested citing $50K-$80K as an expected range, but capped at $100K. Large proposals: how to cap? $200K seemed to remain intact.

Steve R. brought up the issue of the large/regular gaming strategy employed by one group in Cycle 1: propose a large project, then hedge ones' bets by proposing in tandem a "de-scoped' version as a regular project. Discussion ensued, and the potential problems – an escalation of this strategy (given its Cycle-1 success) is a real possibility. However,

the conclusion was to leave things as they are, that no new NRA language to forbid (or discourage) this be adopted.

Back to money. Matthew: should Phase 1 panels be able to recommend reduced budgets (caps/estimates)? Mitch: It is better to have proposers descope than committees. Pat Slane noted the natural tendency of committees to trim individual programs in order to spread the resources around.

Rick (finally) was able to lead the discussion to a close by asserting that we retain the Cycle-1 language, except for the comments on the budget cap number (the Phase 2 budget cannot exceed the budget cap proposers provided in Phase 1).

Next the issue of how to ensure that the necessary technical information for joint programs be included in Cycle-2 proposals. Scott asserted that we should require one page of (exclusively) technical justification (beyond the 4 page limit), distinct from simply offering an extra page. There was strong consensus for this. Jim seemed to advocate a form (e.g., specifying instrument, frequency, observation time, setup configuration, etc) in addition to the text page. Josh suggested including a sensitivity requirement. He further advocated that a form – not just a page of text – was needed to force novice radio/optical users to adequately think through and plan their requirements.

AI: Buell & Jim will draft a form, to be implemented by the FSSC.

On the NRA: Don Kniffen expressed concerns over the restriction on proposals to compile a "catalog of gamma-ray sources." The language is too broad and open ended. Josh posed the question: should GIs be supported in studies of diffuse emission models (not direct analysis of LAT data, since the LAT team was to supply a diffuse model also), which could potentially enhance the science? Henric suggested that catalogs predicated on certain energy cuts should perhaps be permissible.

Schedule: (this had already been discussed during the software status presentation).

AI: Ilana, David Chris will produce a revised NRA schedule.

The suggestion to move the Chandra deadline to accommodate Fermi was discussed, but in the end not considered as a viable option due to (Josh pointed out) the planning already underway for the next Chandra review. Chris conceded to accelerate the software release schedule, now targeting an early ST February release. Peter seemed OK with committing to an early February deadline for the source list as well.

Discuss/resolve remaining open AIs (36, 52) —All

AI#36: The Cycle 2 RPS forms are not ready. Remains open.

AI#52: The ROSES '08 draft includes acceptable text describing the GBM key projects. Closed.

EPO program news—Lynn

NASA's Education Framework has remained the same for the past year. In the past the emphasis was on 'high-leverage' projects—reaching many people, usually shallowly. Now projects with a higher impact on a smaller number of people are fostered, with an emphasis on encouraging professional training, particularly for minorities. Metrics are now important. NASA reviewers of our EPO programs have commented on stereotypical characterizations (e.g., white scientists).

New business for FUG? New AI's?—All

The 2nd Symposium will most likely be the week of November 2, 2009, and be held in the DC area.

Alicia stated that the ground GRB community feels a lack of contact with the Fermi GRB community. Thus the Fermi GRB Burst Advocates on duty need to be publicized.

Scott: The pulsar timing community is resisting releasing ephemerides. The MOU with this community states that ephemerides are to be included in the D4 pulsar ephemerides format and these D4 databases should be released (particularly for pulsars in papers). The pulsar community seems to consider the D4 database to be obscure, but there might be resistance in the future to releasing the full D4 database. The FUG consensus is that ephemerides should be released for each pulsar, and the pulsar community's efforts should be recognized. The LAT team should publish ephemerides in their papers.

Planning for next meeting—All

The next face-to-face FUG meeting will be held Friday, February 6, 2009. A telecon will be held on Friday, December 5, 2009, at 11am. The next draft of the ROSES text will be circulated in the next 10 days; a telecon will be held only if there are major issues regarding this draft.

The meeting adjourned at 5:30 pm.

Planned Agenda

8:30 Coffee, conversation

9:00 Introductions & goals for meeting—Josh

9:05 News from HQ—Rick, Ilana

9:10 Mission status—Steve, Kevin

9:40 LAT update—Peter

9:45 GBM update—Chip

9:50 FSSC news (general)—Chris

10:00 GLAST -> Fermi -> Einstein Fellows—Steve, Rick, Josh

10:20 Status of ongoing/planned MW campaigns—Dave T., Buell, Jim

10:30 Break

10:45 Results of Beta Test; S/W demos—Chris, David

11:30 Action Item 43 and White Paper on Pointing vs. Survey mode observations—Julie, All

12:00 Other Mission Planning issues relevant to ROSES 2008 (e.g., TOO's, etc.)—Steve, Julie, All

12:30 Lunch (and Science Talks by Peter and Chip based on First Light Release)

1:30 Visit MOC—All

2:30 Discuss ROSES 2008 text—David, Rick, Ilana

3:30 Break

3:50 Discuss/resolve remaining open AIs (36, 52) —All

4:00 EPO program news—Lynn

4:30 New business for FUG? New AI's?—All

5:00 Planning for next meeting—All

5:15 Adjourn