

**Minutes of the
GLAST International Finance Committee Meeting
11-12 March 2005**

The GLAST International Finance Committee met 11-12 March 2005 at SLAC

In Attendance:

France - CEA

Pierre-Olivier Lagage

France - IN2P3

Stavros Katsanevas

Italy - ASI

Fabio Bracciaferri, Elisabetta Cavazutti

Italy - INFN

Benedetto D'ettorre

Japan - Hiroshima

Takashi Ohsugi

Sweden - KTH

Per Carlson

USA - DOE

Kathy Turner

USA - NASA

F. Rick Harnden, Steve Ritz

USA - SLAC

Jonathan Dorfman, Persis Drell, Rob Cameron, Charlotte Chang,

Lowell Klaisner, Harvey Lynch

USA - Stanford University

Peter Michelson

Minutes 11 - 12 March 2005

Jonathan Dorfman - Welcome

Jonathan thanked the IFC for coming and emphasized that the international cooperation was essential for the success of the project. He noted that much progress has been made, and that is very satisfying. He assured the IFC that particle astrophysics is a central part of the lab and that GLAST has SLAC's highest support. As part of that support, some SLAC's best people have been brought into GLAST to help with problem solving.

Persis Drell - Update and Meeting Goals

http://www-glast.slac.stanford.edu/LAT-Details/IFC/3_05/GLAST%20IFC_Mar_05.pdf

Persis noted that particle astrophysics is blossoming, and GLAST is the first bloom at SLAC. She gave a high-level overview of physics besides GLAST at SLAC, including high energy physics, particle astrophysics, and photon science (synchrotron radiation physics). The LCLS x-ray free electron laser is moving ahead, and it will become a major part of the Lab. She also gave a timeline for the various parts of the physics programs. In particular, it is expected that BaBar will be turning off in 2008, about the same time that LCLS will begin physics. The KIPAC is growing rapidly, and it is expected to play a major role. The future of particle physics involvement of SLAC will be focused in the International Linear Collider, but that is long term, having a time-early start of physics of 2016. There has been tremendous progress in GLAST over the past six months, and all can be proud of these accomplishments.

The past six months have also been a major challenge to the Lab. The fiscal year 2005 budget in addition to a very large increase in electric power cost beginning this year has stressed the Lab considerably. As a result it has been necessary to lay off about 60 employees in order to continue the physics program in an effective manner.

There was an electrical accident in October 2004 in which a worker was severely burned, and as a result the Lab has severely curtailed and/or delayed activities in many areas as it examines how to assure overall Lab safety.

GLAST itself has faced a major financial challenge, and the project was re-baselined, with substantial amounts of new money being infused by NASA and DOE.

In response to her query, the IFC approved the minutes of the October 2004 IFC meeting without amendment.

Peter Michelson - Project Overview and Collaboration Status

http://www-glast.slac.stanford.edu/LAT-Details/IFC/3_05/LAT%20Project%20and%20Collaboration%20Status.pdf

Peter gave an overview of the project's status. Flight hardware is arriving at SLAC and integration is taking place. Nice results using cosmic rays have been achieved "out of the box", thanks to the excellent preparation and testing done beforehand.

Science analysis planning is under way, and there are 11 working groups. He expects these to be up and running by September 2005.

The cost growth and schedule concerns for the LAT raised concerns at NASA, and a review was undertaken to examine the consequences to the physics capabilities of a de-scope of the LAT. In particular, the consequence of reducing the number of tracker towers from 16 to 12 was to be analyzed. This review took place on 24 February. It was found that in some respects the 25% reduction of calorimeter coverage had a commensurate effect on the physics, but in regard to the backgrounds from charged particles, they were greatly increased, substantially compromising the mission. It was concluded that no scope reduction would be pursued at this time.

Lowell Klaisner - Project Status

<http://www-glast.slac.stanford.edu/LAT-Details/IFC/050309%20Project%20status.pdf>

Lowell summarized the hardware status. See his presentation for much more information than what is summarized here.

The LAT should be complete and tested by December 2005, and delivery to Observatory Integration is expected in April 2006. The projected launch date is May 2007.

He reviewed the progress of all the major components and noted that they were all proceeding well. Integration and Test have begun and are on track.

In response to a question about the problem of the MCMs, Lowell described the problems with cracking, and bonding breakage. The cracking was the result of a change of the process by the vendor. Charlie Young was brought in, and after working with the vendor, the problem has been solved. The bonding problem was solved by new tape. Now, MCMs received have 100% acceptance.

Lowell Klaisner - Cost and Schedule Re-baseline

http://www-glast.slac.stanford.edu/LAT-Details/IFC/3_05/050310%20cost%20and%20schedule.pdf

Lowell discussed the schedule of events until shipping the LAT on 23 April 2006. He also discussed how the management responded to NASA's request to consider de-scoping to control the cost growth. The need for the new baseline is the result of three problems. Early in the project the amount engineering required was underestimated. This resulted in more anomalies in engineering model and flight model testing than expected. The required re-design and re-test was greater than expected. Finally, the expectations of vendor performance were greater than what was experienced once flight production started. The reduction from 16 towers to 12 towers would save about 1 month of the schedule.

In response to the question "Could the last part of the schedule be compressed?", Lowell responded that people are working to seek time-saving measures, but it would be unwise to compromise the testing phase. The schedule as presented already assumes successes.

In the end NASA offered \$17M and DOE offered \$3 M to keep the project on track. This level of support will cause pain elsewhere in both agencies.

Lowell responded to the question, "What happens next with respect to the new baseline?", by saying that we shall stay on top of the vendors. The I & T people have done a lot to be ready for that phase.

At this point we have an estimated \$27 M to go to complete the fabrication, of the new baseline budget of \$156 M.

Steve Ritz - Mission Status

http://www-glast.slac.stanford.edu/LAT-Details/IFC/3_05/IFC-2005March11-Ritz-post.pdf

Steve discussed the mission and science status. He discussed the Science Working Groups, the Users Committee, and the GLAST Scientific Support Center.

He described the plan of the first year of science observations as an "all-sky" survey. Part of that plan, however, explicitly provides for prompt release of transients recorded and the ability to re-point to bright bursts that may be discovered by GLAST or others. Subsequent years' operations will be driven by a "guest-observer" proposals.

Several questions and answers follow:

Q: How will a "re-point" be decided? A: This is being discussed now. The re-point is an autonomous operation conditioned on thresholds that are set by commands.

Q: What is slew time? A: 10 minutes for 75°.

Q: Where do you get momentum for slew? A: Momentum wheels are used; there are no thrusters or expendables.

Q: What limits the lifetime? A: Since there are no expendables, the most likely hardware limitation is due to damage by micro-meteorites. There is no credible single point failure that would end the mission. The ultimate limit may be set by part failures. The most likely limit will be a bureaucratic decision to de-orbit.

Peter Michelson - Mission Impacts of LAT De-scope

[http://www-glast.slac.stanford.edu/LAT-Details/IFC/3_05/LAT%20Descope%20Impact%20%20Briefing%20\(02_24_05\).pdf](http://www-glast.slac.stanford.edu/LAT-Details/IFC/3_05/LAT%20Descope%20Impact%20%20Briefing%20(02_24_05).pdf)

Peter discussed at greater length the mandate by NASA to study the consequences of a possible de-scope operation. In particular, the charge was to look at a system reduced from 16 towers to 12 tracker towers in the LAT. In general, such a reduction would result in (a) 15% poorer sensitivity for discovery of new, faint source classes, (b) reduction of the point source survey sensitivity such that 40% fewer AGN and 30% fewer pulsars and galactic sources could be detected, (c) 30% fewer photons could be detected for time-limited observations, and (d) a large increase in charged particle background that seriously compromise the discovery space involving photons in the energy range 100 MeV to 1 GeV.

Persis Drell - Working Agreement and Proposed Operating Common Fund Budget

http://www-glast.slac.stanford.edu/LAT-Details/IFC/3_05/Glast%20Draft%20Mod11.pdf
http://www-glast.slac.stanford.edu/LAT-Details/IFC/3_05/Annex_Budget%20Category%20Details%20and%20OCF%20Shares.PDF

Persis led a discussion of the draft working agreement concerning the operating common fund.

Some general questions were addressed:

1. Who would sign the document? At first the response was “the people at the table”. We should not go higher or the “lawyers” will become involved. Upon reflection, several members felt they needed to consult further at home.
2. We need to preserve some flexibility in how contributions are made, for example in kind, by credit, or by cash.
3. Does the IFC still support the project after the first year when the data go public?
 - a. The main driver is the expertise to do complex analyses, and this should be a motivation to keep the collaboration together.
 - b. GLAST is a “paper-writing” machine. The collaboration is an asset to do science.

The group went through the document, section by section, and commented as appropriate:

2.3 “fractional share” -> “fractional shares”

2.7 Q: Why does ownership revert to DOE? A: This is a method to avoid having to pay sales tax on purchases.

3.4 Q: To whom does a country talk to discuss “in kind” contributions? A: Begin with bilateral discussion with the IFC chair (presently Persis), who then

takes it as a proposal to the IFC. Add a sentence in this section to this effect: *“A proposal should begin as a bilateral discussion with the chair of the IFC, and the IFC will be kept informed, and the value of the contribution will be reviewed and validated.”*

- 4 This section lists categories for which money may be spent, but the list by itself would greatly exceed the operating fund. There are many constraints to be satisfied. The reason for the form is to provide flexibility when needed, so that everyone can contribute according to their share.
- 4 (b) Institutions are looking for visibility of their contributions to computing, and there is a need to protect those resources from being “eaten” by LHC.
- 4 (d) “Analysis Working Group” -> “Analysis Science Group”.
- 5.2 * The Swedish money now comes from a foundation, but that money is coming to an end. It is hoped that the space agency will take over. That agency must appear as the signatory to the Approvals, not Per’s university, as presently shown.
 - * There are complications within Japan for universities that need to be discussed at home. For the time being, we can move ahead with Takashi for now, but this may change.
 - * The representatives from Italy (INFN), and France (IN2P3 and CEA) need to consult at home on who should sign for their agencies. Similarly, DOE and NASA need to define who will sign.

Annex 1 Notes:

- * The OCF does not cover all of these things.

Annex 2 Notes:

- * As printed the table is confusing. The intent is to show what the result for each country would be for a per-head share. Last time, we agreed on \$6,500 per head, and that translates into an estimated OCF budget of \$600 k. The IFC ratified today this figure of a target OCF budget of \$600 k and a \$6,500 per head. This initial per capita assessment is subject to change in the future, depending on the budget and the head count. The \$10,000 per head column should be ignored.
- * Germany appears in the table, but they are not on the signatory page. Q: Shouldn’t they be part of the agreement? A: Action Item to Peter: Talk with people in Germany. The amount of money is small, but if Germany is not part of the agreement there could be a problem in the future if the German participation increases. Similarly, if Germany is not part of the agreement, it could set a precedent for other countries that may wish to join.

IFC Roundtable

Per Carlson The present funding is from a foundation, and that funding will run out. Sweden is trying to get their space agency to provide future funding. Steve Ritz asked if there were anything “we” could do to help. The IFC itself can help by its support.

Rick Harnden The next NASA administrator will be Michael Griffin. There is an open question before NASA on whether the Hubble telescope will be serviced or not.

If a decision is made to do a service flight, that will be a big perturbation to NASA. Numbers should be out in 1 or 2 weeks on the re-baselining and the schedule implications. In any case, GLAST is a very high priority for NASA.

Takashi Ohsugi There is money from KEK, and more than half is being spent on GLAST. There is some question on the amount of US-Japan money that will be available.

Pierre-Olivier Lagage Some new physicists have joined the effort full time.

Kathy Turner DOE thanks all the partners for their contributions to GLAST. The DOE is very supportive of GLAST and looks forward to its science. Fiscal year 2005 has serious budget constraints, as does 2006. There have been layoffs at the national labs this year. In the context of the re-baseline, the Office of Management and Budget (OMB) looked at the budget and set a cap on the DOE additional money for GLAST.

Stavros Katsanevas People from Ecole Polytechnique are here at SLAC and working, and we intend to have at least one person here for the duration of the project.

Benedetto D'ettorre INFN is supporting other experiments, but GLAST is a very important project. Money is needed for the Gran Sasso project. INFN expresses appreciation for the efforts made to keep the GLAST schedule and looks forward to the physics.

Fabio Bracciaferri ASI was surprised by the problem with the question of de-scoping the project. He was assured by Rick and Steve that the considerations by NASA were for its own thought, but if a reduction were actually contemplated, all members of the collaboration would be brought into the loop.

Persis Drell There are severe budget pressures, but SLAC very strongly supports GLAST. We can offer some off-budget support. The OMB cap is a concern, because it ties our hands, but it is not as restrictive as it may appear. Although the science funding situation in the US is challenging, GLAST is doing very well in that context.

Rob Cameron - ISOC

http://www-glast.slac.stanford.edu/LAT-Details/IFC/3_05/ISOC-IFC-mtg-12-mar-2005.pdf

Rob described the Instrument Science Operations Center, and how it will develop in the near future. Organization, operation connection, and data flow charts were shown. Time lines for ISOC development and software releases, and ground system tests were presented.

One innovation is the application of a Tera-RAM computer, which is an initiative funded by DOE. This means a computer with a terabyte of memory in which data access is direct to the computer.

Next Meeting

The next collaboration meeting is 29 August to 3 September. This includes the Labor Day weekend. (Labor day is Monday 5 September.) Perhaps this choice of date should be revisited.

The next IFC meeting will be 17-18 October 2005.