Transcript of GLAST First Light and Renaming Telecon 8/26/08

Carol:
Good afternoon and thank you for all parties for standing by. Your lines will be on a listen only until the question and answer session of today's call. The conference is being recorded, if you have any objections you may disconnect at this time. I would now like to turn today's conference over to Mr. J.D Harrington, thank you sir, you may begin.

J.D. Harrington:
Thanks Carol, good afternoon I'm J.D Harrington, public affairs officer of NASA's Science Mission directorate I would like to welcome you today to today's media teleconference where we will discuss the first results from NASA's Gamma Ray Large Area Space Telescope. Later on we will announce the observatory's new name. Before we get started however, I need to take care of a few house keeping duties. First, we have a website available where you can find the panelists' bios as well as the briefing materials the panelists will use during their discussion. You can open the link and follow along. The web address is www.nasa.gov/glast G-L-A-S-T. I'll give that address once again in just a moment. This is a media telecon, we have five panelists with us today, each will give a short two to five minute briefing on their specific topics. Next we'll announce the observatory's new name and how that name came about. We'll then open the phone lines for questions and answers. This telecon will be limited to one hour, it is also being recorded. Media representatives can dial in anytime in the next seven days to listen to the telecon again. I'll provide the specific dial-in information at the end of the telecon. Because we have a large number of people joining us today, reporters will be limited to one question with one follow up. Once everyone has had a chance to ask a question and if time permits, we will start another round, starting at the top of the list. As the operator said, phone lines will be muted, if you want to ask a question you must press the star 1 key to signal us that you have a question. We will then call on you in turn. Finally, the dial in numbers are for media's use in asking questions. If you are not a media representative please hang up. You can listen to the telecon online at www.nasa.gov/newsaudio. And again as promised, here is the web link for the telecon's briefing materials to help you follow along. www.nasa.gov/glast. Today's panelists include Jon Morse, director of the Astrophysics Division at NASA Headquarters in Washington DC. Dennis Kovar, the Associate Director of Science for High Energy Physics at the US Department of Energy in Germantown, Maryland. We have Steve Ritz, the GLAST project scientist at NASA's Goddard Space Flight Center at Greenbelt, Maryland. Peter Michelson, Large Area Telescope Principal Investigator at Stanford University, Palo Alto California. Chip Meegan is also online, he is the GLAST Burst Monitor Principal Investigator at NASA's Marshall Space Flight Center, Huntsville Alabama. And just for info, we also have online a distinguished panel of experts on GLAST instruments, people that will be called upon if necessary to answer specific questions. And with that I would like to hand the mic over to Jon Morse, NASA's Astrophysics Division director, Jon.

Jon Morse:
Thanks J.D. Good afternoon and welcome to today's event designed to highlight NASA's Gamma Ray Large Area Space Telescope, otherwise known as GLAST. Later on we will announce its new name. First however I'd like to talk about the team that's helped bring GLAST to life. As you know, GLAST is a powerful space observatory and will explore the most extreme environments in the universe where nature harnesses energies far beyond anything possible on Earth. I call it our "extreme machine." It will search for new signs of laws of physics and what composes the mysterious dark matter. GLAST will explain how black holes accelerate immense jets of material to nearly the speed of light, and it will help crack the mysteries of the enormously powerful explosions known as gamma-ray bursts. Finally, GLAST will answer some of the long standing questions the scientific community has had about solar flares, pulsars, and the origin of cosmic rays. Since GLAST launched on June 11th, the project team has been busy turning on the spacecraft's various subsystems and calibrating its onboard instruments. Though this team is distributed around the globe, it has already proven itself highly productive in meeting the projects many objectives. GLAST was developed in collaboration with the US Department of Energy and our international partners in France, Germany, Italy, Japan, and Sweden. NASA's Goddard Space Flight Center in Greenbelt, Maryland has overall responsibility for the project, while NASA's Marshall Space Flight Center in Huntsville, Alabama is responsible for one of the two instruments onboard. General Dynamics Advanced Information Systems was responsible for building and integrating the space craft. GLAST's primary instrument, the Large Area Space Telescope was spearheaded by principal investigator Professor Peter Michelson and his institution Stanford University and the Department of Energy's Stanford Linear Accelerator Center. They didn't do this by themselves though. Michelson forged an international collaboration encompassing over one-hundred scientists from several other countries in addition to those I just mentioned. The second instrument, the GLAST Burst Monitor whose principal investigator is Dr. Charles Meegan of NASA's Marshall Space Flight Center, was provided through a collaboration between NASA Marshall, the University of Alabama, in Huntsville, and colleagues in Germany. I'm extremely pleased with the progress GLAST has made in commencing its science operation and the pace of new discoveries will be very exciting in the days and years ahead. And with that I'd like to hand the mic off to my friend and colleague from the Department of Energy Dr. Dennis Kovar, associate director of science for high energy physics US department of energy. Dennis.

Dennis Kovar:
Thank you, I believe Jon has done a very good job in describing GLAST, its science, and where we are today. The Office of High Energy Physics and Department of Energy's Office of Science is very pleased with how successfully DOE and NASA collaborated in implementing the GLAST mission and how smoothly the GLAST check out and data taking after launch proceeded. DOE's focus has been on the Large Area Telescope which is basically a particle physics detector in space. The scientific communities of particle physicists and astrophysicists from research laboratories and universities each brought their area of expertise to the mission to produce the telescope. GLAST opens a new

window on the gamma-ray sky that has the potential for significant new discoveries. A particular interest to particle physics is a search for dark matter in the form of weakly interacting massive particles and exploring very high energy acceleration mechanisms in the universe. However, GLAST will provide new information on a broad range of astrophysics phenomena as Jon outlined previously, and hence make important and unique contributions to both of our fields. Again, we are very pleased at what the cooperation between DOE and NASA has accomplished and with the successful launch and start of data taking on GLAST, we are looking forward to future partnerships with NASA in areas of joint scientific interest. And with that, I'd like to hand off to Dr. Steve Ritz, the GLAST project scientist. Steve.

Steve Ritz:
Thanks very much Dennis and hello everyone, if you could all please open up my slides and jump to slide two. Scientists worldwide are very excited about the breakthrough capabilities that we now have at the extreme high energy end of the electromagnetic spectrum. As you've heard, in addition to answering key questions about a broad variety of known astrophysical systems from across the universe, GLAST has great discovery potential. We're expecting surprises. The observatory is working very well and after our initial checkout period we've already started the first year of science operations. If you can go to the next slide please. Here you see a picture of the observatory in the fairing, atop the rocket shortly before launch on June 11th. The observatory consists of the two instruments already mentioned, plus the spacecraft. A key point for today is the huge field of view of both instruments. In our standard operating mode the entire sky is viewed every two orbits or about three hours. This is especially important because the gamma-ray sky is constantly changing - a characteristic that is remarkably different from the impression we get when looking at the night sky with our own eyes and as you are about to see in the next presentation. With that, I now pass the phone to Professor Peter Michelson, the LAT Principal Investigator who will show the main results for today. Peter.

Peter Michelson:
Thanks Steve. Well first let me say I'm very happy to be here and reveal to you the first images from the large area telescope, and I do this on behalf of a large international team and also the GLAST mission team here in the states. As J.D. mentioned at the beginning, several team members of the LAT team are available for questions after all the presentations of the panel are finished. In particular I'd just want to highlight the contribution of one member of that team who's online: Bill Atwood of the University of California at Santa Cruz. Bill has been a collaborator ever since he was at the Department of Energy's SLAC laboratory, where he was when he came up with the conceptual design of the LAT instrument more than 16 years ago, and that's what we're flying today on GLAST. So with that, let me turn to the first light image of the gamma-ray sky that we've obtained with the Large Area Telescope. If you look at my presentation online, turn to slide number two. So the image you see here is a projection of the full sky onto a sphere, a so-called orthographic projection. A rotating version of this that reveals the entire sky is available on the website if you want to download it. If you download it, the full animation, it shows the entire gamma-ray sky with the northern galactic pole visible, and

then as it continues to rotate, it switches to highlight the southern galactic pole. The static image you see on the slide only shows the northern galactic pole as well as part of the plane of our galaxy which is the bright band across the image. Let me emphasize, this image is the cumulative exposure obtained after just 95 hours of observing with GLAST. GLAST was in its scanning sky survey mode when this was done, and this was obtained during the instruments initialization and check out phase. Indeed the GLAST LAT images the sky every 3 hours as Steve pointed out, and this is providing us with an unprecedented high energy imaging all sky monitor of the entire sky from 20 million electron volts to more than 300 billion electron volts. With just the 4 days of data you see here, the LAT has confirmed many of the discoveries of EGRET in the 1990s and more recently those of AGILE. If you turn now to the next slide you'll see the same all sky image projected onto a flat map of the sky, so this is slide number, uh, number 3. In this image you see the center of the Milky Way galaxy in fact at the center of the image. Again we see a bright band of diffuse emission from the Milky Way across the center of the map. This radiation is due mostly to gamma-rays generated by the collision of high energy cosmic rays with interstellar gas and radiation that's present in the disk of our own galaxy. Some of it may come from the annihilation of exotic particles that are thought to make up dark matter. The color scale you see corresponds to the intensity of the gamma rays with dark blue being the faintest emission and bright yellow being the most intense emission that you see along the galactic plane. As the LAT sky exposure builds up with time we are going to see deeper and deeper into our universe and will be able to study the low intensity diffuse emission with unprecedented detail and this may reveal the gamma-ray signatures of particle dark matter. As both Dennis and Jon mentioned earlier the search for dark matter is one of GLAST's major scientific objectives. So already with just 4 days of data we have seen many sources previously discovered by EGRET and a number of new sources as well. If you'll turn to slide number 4, you'll see some of these sources labeled. Let me start with the Vela pulsar which is a rotating neutron star that is the brightest persistent source in the gamma-ray sky. In the upper part of this slide you see a film strip of 5 images of the sky region around Vela. An animated version is available for download on the website. During this first light observation, the LAT in fact detected all of the gamma-ray pulsars seen by EGRET while it was operational for about 9 years. We are now poised to detect many more. The wide field of view and sensitivity of the LAT which Steve mentioned has also led to the detection of an active galaxy by the name of 3C454.3 that is located about 7 billion light years from earth. We detected it when it was in an extremely active state. You can see this source prominently in the lower left quadrant of this image. Now subsequent to this first light observation, 3C454.3 faded away in gamma-rays to be succeeded by yet another active galaxy at northern galactic latitudes. It has the name Parks 1502+106. This source is located almost 10 billion light years from Earth. In conclusion, the LAT collaboration and the entire GLAST team are just extraordinarily pleased with the on-orbit performance of the LAT , and I hope you get a sense of that from the first light images that we are sharing with you today, and we are really excited about beginning the first year's sky survey phase of the mission. We are observing the gamma-ray sky everyday, many times. This is like the night sky at a 4th of July celebration but we're seeing it on a cosmic scale, it's really exciting. You can expect to be hearing new results from GLAST very often in the future and we look forward to reporting those to you. Finally let me thank again the large international collaboration and the agencies from around the world that have supported the LAT instrument development and its operations, that have made all of this possible. For your reference, the last slide in the package on the website, is a list of the LAT collaboration institutions. So with that I hand this off now to Dr. Charles Meegan, Principle Investigator of the GLAST Burst Monitor.

Charles “Chip” Meegan:
Thank you Peter, and congratulations to you and your team for those truly impressive results. The mission of the GLAST burst monitor is to detect gamma-ray bursts, measure their positions in the sky and their energy spectra. We cover the traditional energy range as was pointed out before for gamma-ray burst studies about 10keV up to 30MeV which is the bottom of the LAT energy range. I am pleased to report that we are carrying out our tasks very well indeed. If you will please open up my PDF presentation and if you look at the second chart you’ll see a map of the sky similar to the map that Peter just showed, but these are showing the gamma-ray bursts that we’ve observed in the first month of operation. We see a gamma-ray burst about once a day and this is the highest rate of autonomous onboard burst detection of any satellite ever. What you see is something very different from Peter’s map, the gamma-ray bursts are arriving from random positions all over the sky, not in the plane of the Milky Way of our own galaxy - that was well known before this mission started. The background of that map shows over 2700 bursts that were observed by BATSE on the Gamma-Ray Observatory. So we are well on our way I think to even beating BATSE’s record for total amount of number of bursts detected. All 14 of our detectors are working just beautifully, the background rates are about as predicted and fairly stable and that’s important because the background limits our sensitivity to bursts so our threshold for detecting bursts is very close to what was predicted before launch. Four of our bursts have also been detected by NASA’s Swift observatory. This is important because it allows us to check our computed sky positions because Swift can do very accurate localizations. Our accuracy is typically 2 or 3 degrees which I think is quite good for a non-imaging instrument. The value of this capability is that the sensitivity of the LAT for detecting high energy emissions from GRBs can be improved significantly if GBM can tell where and when to look. The next chart shows a particularly nice burst that we detected on July 23rd. You see a steady background rate at a couple of hundred counts per second, and at about time zero is when the gamma-ray burst was detected on-board - the automatic software noticed an increase in the count rate, began to transmit high rate data. We are getting bursts like this every day. This is a particularly nice example that shows the high time structure, the flickering that is very common in gamma-ray bursts. So to conclude, GBM is performing very well, our team is very excited about the wealth of new information that will be pouring in for many years to come. With that I’ll hand it back to J.D.

J.D. Harrington:
Thanks Chip. And now it’s time to announce the new name for NASA’s Gamma Ray Large Area Space Telescope. Once again here is Jon Morse.

Jon Morse:
Thanks J.D. It is indeed my great pleasure to announce that GLAST will be renamed the Fermi Gamma Ray Space Telescope. Enrico Fermi, an Italian physicist who immigrated to the United States in the 30's was the first to suggest a viable mechanism for astrophysical particle acceleration. His work is the foundation for our understanding of many types of sources to be studied by the new satellite that now bears his name. Fermi is most noted for his work on the development of the first nuclear reactor and for his major contributions to the development of quantum theory, nuclear and particle physics, and statistical mechanics. He was awarded the Nobel Prize in physics in 1938 for his work on induced radioactivity and is today regarded as one of the top scientists of the 20th century. This new name was selected after NASA asked for suggestions from the public and received more than 12,000 entries. In addition to his direct connection to the science of our new gamma-ray mission, Fermi holds special significance to the US Department of Energy, the Italian space agency and the Italian particle physics agency, three of the major contributors to the mission. And I'll throw it back to J.D. and I think we are ready to field questions.

J.D. Harrington:
Absolutely, thanks Jon. And with that we will go into the question and answer session. Two reminders: if you just joined us the briefing materials can be found on www.nasa.gov/glast. Also you need to push the "star one" key on your telephone to let us know you have a question. We will then call on you in order. Finally, please direct your question to a specific panelist if possible to eliminate any confusion. And with that we will pass it to the operator. Carol.

Carol:
Thank you. Once again, that's "star one" for any questions. And our first question today will come from Seth Borenstein from the Associated Press, your line is open.

Seth Borenstein:
Yes, thank you - for Steve Ritz; looking at the images you have there they look an awful lot like EGRET, which I guess is to be expected, but when I look at this I'm trying to figure you know yes you've confirmed everything from EGRET, and maybe it's a little to much to ask in those first few days, but is there? I mean what new have you discovered about this mysterious gamma-ray world here. I mean universe here that we didn't know from GLAST and I guess I have a follow up.

Steve Ritz:
Ok, thanks for your question. I think there are two important take away messages and I'll also hand this over to Peter to comment as the LAT PI. First of all, we did this map in a very brief period of time, just in a matter of days, whereas the previous experiment, EGRET, took more than a year to make an equivalent map. That is an excellent, that holds a tremendous amount of promise of things to come. I think a very good example is 3C454.3 and actually the other blazar as well that GLAST saw, when the LAT turned on, it was just blazing, 3C454.3 was blazing, it was impossible to miss and it wasn't like that before. One of the key things that GLAST is going to do for us is that we're going to

learn when these blazars are in their flaring state and be able to alert the entire world's facilities with smaller fields of view to have a look at these objects and we expect this to be happening now quite frequently, and then in addition to that, we're able to monitor the flaring states of large groups of these objects over time, and that opens up a whole new field of study to understand how these objects work.

Seth Borenstein:
And did Peter have something else to say about this before my follow up?

Peter Michelson:
Just to assert what Steve said, I was on the EGRET team during that era, that was a highly successful mission, but one of the frustrations was every time we discovered an AGN, we typically would discover it after it flared, and with GLAST we have an all sky alert capability. When one of these things goes off, we see it coming, we see it peak, we see it go away and that will provide us tremendous insights into the physics of what's generating that emission.

Steve Ritz:
I guess maybe what I would say also is we're opening our eyes for the first time. Imagine you had just had Lasik surgery and you open your eyes and you see everything that you hadn't really seen before, you had understood it was there, and suddenly its there and to you it's a thing of great beauty, and it shows to us that enormous amount of promise in the future. Again this was just the first smallest taste of data.

Seth Borenstein:
Ok just a follow up on that; about 3C454.3, Once again, In addition to, now I think you said, it is 4.7 billion light years away? How long did it blaze for? How strong was it? When did it sort of fade away? And I guess what does that really mean except that is that the equivalent of seeing a fireworks go off and saying ooh ah or what does it tell us?

Steve Ritz:
Peter would you like to answer that one?

Peter Michelson:
Yeah I'll go ahead and take a shot at that. It actually was 3C454.3, we knew it was in an active state at the time we turned the instrument on, and it was of great interest of us to see it, and we did. So we didn't actually catch it going into the flaring state, but we certainly saw it fade away. Now to address why is that interesting; well we don't yet understand yet the mechanism in detail of how the particles that emit the gamma-rays, how they're accelerated in the vicinity of a black hole, and we're not even sure of what the nature of the particles are. It turns out that various theoretical models suggest scenarios that can be tested with observations, but one of the critical parts of that is to obtain multi-wave length spectra before, during, and after the outburst. And so with the GLAST capability and an armada of scientists addressing this problem, we're going to make tremendous progress on this in the next few years.

Steve Ritz:
And maybe to add to that, we've known that these objects shine incredibly brightly in gamma-rays, remember this is an object very far away and its power output is absolutely stupendous. What we don't know is where the gamma-rays are actually emitted, there are models for this to test, and we don't know where the gamma-rays are emitted. We don't know exactly how the power is released, and by studying large classes of these objects in their various flaring states and seeing the time characteristics, the structure over time, over the life-time of the mission, really that will give us key information for testing these models. And I'm sure bringing forward our understanding of how these incredible engines work.

Seth Borenstein:
Thank you.

Carol:
Our next question is from Robert Naeye, Sky and Telescope Magazine. Your line is open.

Robert Naeye:
Yes, hi this is a question for both mainly for Peter and Steve, and then I have a follow up question for Peter and Chip. The first question is; whether you've detected or failed to detect any EGRET sources, in other words EGRET sources that were active during the life time of the EGRET mission and where you should have seen them with LAT but did not maybe because they have turned off?

Peter Michelson:
Yeah, again this is primarily related to active galaxies, so-called blazars. We know we did not expect to see all the blazars EGRET saw with first light. So that's not a surprise. Because they're time variable, and we may very well expect to see them sometime in the future if they flare again. So that's not a surprise. As far as other sources like the pulsars that I mentioned - in four days we saw every pulsar that EGRET saw. If you stay tuned I think you'll hear some new results in that area in the not-to-distant future.

Robert Naeye:
Great, and then a follow up question for Chip and Peter, is whether there have been any simultaneous gamma-ray burst detections so far with both the GBM instrument and the LAT instruments, since a certain subset of gamma-ray bursts should be in the LAT field of view where it happens to be looking?

Peter Michelson:
I'll take a shot at that first, we have not seen any gamma-ray bursts yet with the LAT, and that is in fact consistent with expectations from extrapolating EGRET, and as you know its extrapolations are extrapolations, but we expected to see of order one or two bursts in a couple of months, and its been a couple of months and we haven't seen any. Chip can address whether the GBM bursts were in the field of view of the LAT.

Charles “Chip” Meegan:
Okay, well there were some weak bursts in the field of view of the LAT, but nothing that we saw that looked like a really good candidate. I think there’s been a little bit of bad luck. The bursts haven’t been cooperating with us very much. Of course GBM sees bursts in the energy range where they’re brightest so we can see really faint bursts. There is no doubt were going to get some good ones. It’s just a matter of waiting.

Carol:
And our next question today will come from Carlos Martinho from O Estado Ge S. Paulo. Your line is open.

Carlos Martinho:
Hi, questions for Dennis Kovar? The GLAST is not only an astrophysical machine but a particle physics machine. And in next month in Europe the LHC will be online. Is there any superposition of discoveries that are expected from the Large Hadron Collider that GLAST could also do or are they complementary? How did the expectations for the LHC and the expectations for GLAST, now Fermi, how they add up?

Dennis Kovar:
So they really complement each other. I think you’ve heard some of the discussion here about the fact that one of the major thrusts of GLAST is to look for evidence of dark matter. At LHC if in fact one discovers super symmetry particles, the lowest state is going to be the candidate for dark matter and so these two instruments, this fantastic gamma-ray observatory, and this high-energy accelerator are both have the opportunities to make progress on the question of dark matter and so I think they complement each other very well.

Carlos Martinho:
Thank you.

Carol:
And as a reminder, if anyone else would like to ask a question please press star one…One moment please…And we have a question from Rachel Courtland, New Scientist, your line is open please.

Rachel Courtland:
Yeah hi I guess this is a question for Steve; I was wondering if you could explain what it is you are hoping to see as you’re looking towards the galactic center and what you see so far in terms of looking at like dark matter or possibly discerning dark matter halos.

Steve Ritz:
Well thanks for the question; the center of the galaxy is an incredibly busy place, very crowded place, therefore an incredibly interesting place, and one of the great things about GLAST with our large field of view is that we’re seeing that, along with the sky all the time, so it’s not like we have to concentrate only in the center. That’s one point. As you point out if ideas about particle dark matter are right, then we’d expect a large density or

concentration of those dark matter particles at the core of the galaxy and so that's a natural place to look for signatures of those processes going on. Being able to pull that signal out from all the other busy activity that's going on, all the other gamma-ray traffic - is going to take some time I think. It's not the kind of thing that we just turn on. I could be wrong, but I don't think it's going to be the kind of thing that we're going to see in just the first couple of months but rather it will take us a year or more of investigation before we're able to make meaningful statements about those signatures. That said, we know that there is a super massive black hole at the core of our galaxy as with most galaxies and quite a lot of high energy processes going on throughout the galaxy and at the center of the galaxy as well. Does that answer your question?

Rachel Courtland:
It does thanks.

Carol:
Our next question will come from Clara Moskowitz from Space.com. Your line is open.

Clara Moskowitz:
Hi, I think this is also for Steve or for anybody. I'm just wondering if there were any unexpected issues during the initially space and check out phase or did everything just work as expected?

Steve Ritz:
Well everything worked as expected and then some. I could, none of us could have actually asked for such a smooth turn on, and it's a credit to the world wide team of engineers, scientists, programmers and support people who all worked together as a seamless team for many years to make this thing turn on. It went like clockwork where we were actually ahead of the clock. There of course were little hiccups along the way and some challenges, little challenges, and problems to solve. But everything was so fundamentally sound, it was such a great platform on which to work, that I would characterize them as interesting exercises rather than enormous challenges and that doesn't happen by accident. It was due to all of this great preparation work, and the tight coupling I think between scientists and all the other people I think that I mentioned that enabled this to happen.

Clara Moskowitz:
Thanks.

Steve Ritz:
I'll just add; that we all just looked at each other in disbelief in the hallway all the time for how well things were going.

Clara Moskowitz:
Thanks.

Carol:
And our next question is from Raphael Jaffe, Aero Tech News and Review. Your line is open

Raphael Jaffe:
Okay, two questions; somebody mentioned that you can get multi-spectral information, do I gather that you are able to not only follow the time of these massive bursts but obtain the energy of the bursts? You know how many, what are they? BeV measurements for these? Next question. Okay, why don't we answer that and then I have a follow up.

Peter Michelson:
Yeah, this is Peter. I mentioned the energy range of the LAT, twenty MeV to greater than three hundred GeV or BeV if you want to put it that way, three hundred billion electron volt design. We measure the energy of each of those photons. The accuracy varies across that energy band, but it's an enormous energy band. So we obtain spectral information as well as the time of the arrival and direction of each and every photon that interacts in the instrument, with very high efficiency. In addition, when I was talking about the flaring active galaxies, and I said multi-wave length or multi-spectral, I was referring to the fact that these objects emit radiation from radio to ultra high energy gamma-rays, and to really understand what's going on we need to be able to see that object across as much of the electromagnetic spectrum as possible. That's not only GLAST, but involves other observatories, both ground and space-based.

Charles "Chip" Meegan:
And if I could add on - the gamma-ray bursts, which you may be referring to as well there, GBM contributes another three decades of energy below the LAT range

Steve Ritz:
So if I could just put that into perspective, the ratio of the high energy end to the low energy ends of the observatory with the GBM and LAT together, is more than a factor of ten million. Put another way, if GLAST were a piano, it would cover twenty-three octaves.

Raphael Jaffe:
Thank you, I was just curious about what the, I guess, this is for Mr., Dr. Morse, the cost of GLAST, Fermi, is it funded for how many further years? That's the question.

Jon Morse
Sure, the approximate U.S contribution to the Fermi gamma-ray space telescope, now named, is around six-hundred million dollars, and the primary mission is for five years with a goal of ten years of on-orbit operation.

Raphael Jaffe:
Okay, right and I'd have to go back to your presentations before launch, as to the engineering life and all that good stuff. But sometimes it seems the funding has been

turned off, especially on scientific types of projects while there is still data coming in? Would you like to comment on that?

Jon Morse:
Sure, I can make the comment that our resources are not limitless and we do need to prioritize within those existing resources. What we do is we engage the science community when we look at our portfolio of missions, and we call it the senior review of operating missions, we just conducted one of these this spring. And we look at the whole portfolio in how to achieve the best science for the resources we have. Sometimes it's necessary to make tough decisions and to terminate a mission even though it might still be able to send back data because our resources are prioritized towards prior priority scientific objective and facilities. We try not to do that, all of our missions provide unique capabilities in one way or another, and so we try to keep observatories that are bringing back data, try to keep them operating, and so right now for example I mentioned that senior review of operating missions. Our goal is to keep the nine operating missions that were included in that list viable, at least for another year, and for all of them. And we're going to try and see if we can get all of them into the next review which would happen two years, hence in 2010, and then go through that process again.

Raphael Jaffe:
Thank you; Is the results of that prioritization of that review of the nine missions, available on the web or something?

Jon Morse
It is publicly available, I don't have a URL off the top of my head but we could have J.D. provide that to you.

Raphael Jaffe:
Thank you very much. That is the end of my questions.

Carol:
And we do have a question from Seth Borenstein from the Associated Press, your line is open.

Seth Borenstein:
Yes, thank you for taking a second question here. I guess this would be for Chip; you talked about your averaging about one burst per day in your observations, what was the expected rate from past GRO or EGRET data? Is it fair to say that perhaps that the activity out there is far more than you expected or did you expect it to be this active?

Charles "Chip" Meegan"
Well it certainly hasn't changed, but it is higher than I expected because we're kind of opening up a new window as well. With BATSE, we didn't have sophisticated a trigger as we do now, we're triggering on different energy ranges, we're triggering on different time, integration times, so we're doing a better job at detecting these weaker bursts. It's

working better than I expected actually. I expected to get two or three hundred a year and it looks like it's going to be three hundred.

Seth Borenstein:
And how many were you getting on average before I guess?

Charles "Chip" Meegan:
Well with BATSE we got about three hundred a year.

Seth Borenstein:
So it really is not too dissimilar with what you got with BATSE? I guess what I'm getting at, and I don't mean to be a pain here, my editors don't want a story unless there is something new here and I'm trying to find out what really - this holds a lot of promise for what we're going to find in the future, but so far there is very little that you haven't found that you've shown us that you haven't shown us before with BATSE?

Charles "Chip" Meegan:
That's true, we've just started operations. We've just started this mission and it's going to be great. I guess that's the story, but you know we've got about forty bursts so far, and of course that's far short of the twenty seven hundred but give us ten years.

Seth Borenstein:
Okay.

Steve Ritz:
Let me perhaps add Chip, this is Steve. That it's the combination of the GBM together with the LAT. Once we start seeing the bursts in the high energy regime, the GBM is going to be vital to connect the frontier measurements that the LAT will make with the more traditionally studied and better understood at least phenomenologically, bursts. And we weren't looking for the GBM by itself to open up, make a huge leap in capabilities, but rather be an incredibly solid and important piece, partner, in the high energy exploration of gamma-ray bursts.

Charles "Chip" Meegan:
Absolutely, it's not getting a record number of bursts; it's the bursts that we'll see in common that will really advance our knowledge of what gamma-ray bursts are doing, yes.

Seth Borenstein:
Alright, thank you.

Carol:
And this concludes the question and answer session of today's conference; I would now like to turn the call back to Mr. J.D. Harrington.

J.D. Harrington:

Thanks Carol; and that's going to do it for today's Fermi first light telecon. I would like to thank the panelists for their time today, andjust a reminder and a heads up, on the GLAST website I provided earlier, www.nasa.gov/GLAST, if you refresh the page punching the F5 key, you'll find the link toward the bottom called GLAST new name. You can go there and view today's press release, information about the new name, Enrico Fermi's biography and the new Fermi logo. Don't forget that this telecon was recorded; you can dial in at 1-800-391-9845 any time day or night for the next seven days. That number once again is 1-800-391-9845. The telecon briefing materials as well as information about NASA's newest observatory, the Fermi Gamma-Ray Space Telescope, it's new logo, and Enrico Fermi's biography are all be available online, once again its www.nasa.gov/GLAST . Finally for more information about any of NASA's various projects, visit us on the web at www.nasa.gov. Again, thanks for joining us and have a great day.

Carol:
This concludes today's conference, you may disconnect at this time. Thank you.