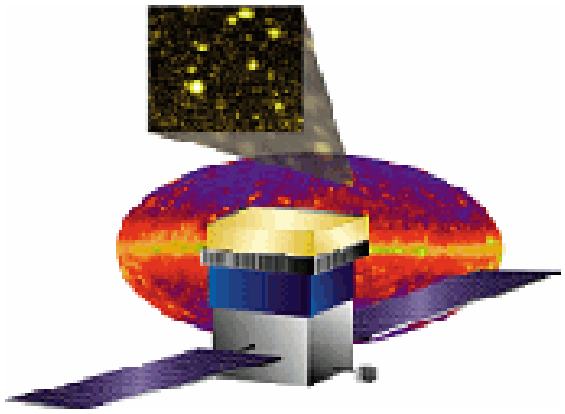
Monthly Progress Report

(Month Ending November 2004)

GLAST Large Area Telescope (LAT)



LAT-MR-05452-01

January 10, 2005

1.0 Introduction

This monthly progress report is submitted to the GLAST Project Office at the Goddard Space Flight Center and the Department of Energy SLAC Site Office. The report summarizes LAT project status as of the end of November, 2004.

2.0 Recent Progress and Status

4.1.4 Tracker

Flight tray production was resumed, and the first tower was assembled. New multichip module (MCM) bonding procedures were finalized, to ensure connector stay-clear. One hundred forty bare trays have been produced; thirty six trays have been completed with converter and bias circuits, and thermal-vacuum tested. Eighty one are ready for delivery, requiring MCM pocket rework. One failure has occurred due to bias circuit delamination early in production. Trapped air in the bias circuit lamination continues to be a problem, but is being addressed through process improvements and small cuts. Recent production shows significant improvement. Over 343 MCMs are through burn-in and final test. An issue was discovered concerning pitch adaptor delamination from the printed wiring board, and was resolved through inspection, rework, and process improvements. The anomaly discovered last period - missing multichip module (MCM) connections to the pitch adapter - is under investigation. Evidence points to wire bonds breaking at the pitch adapter to ASIC joint under black encapsulation due to delamination of the encapsulation. Existing MCM stock continues to be tested. MCM production has been halted pending a materials review board meeting. All MCMs for the first tower were 100% tested at SLAC, rejecting any with more than 15 disconnected channels. Nevertheless, two trays in Tower A each have 130 to 150 missing channels due to encapsulation delamination occurring after the testing, possibly during MCM mounting. They will be accepted to keep tower production on schedule. Issues with the flight cables are still under investigation; alternate sources are being developed, with prototypes due in December.

4.1.5 Calorimeter

Eight flight Calorimeter modules are completed. A preship review was conducted, and the first module is ready to ship. Two modules are in final preship testing, and are expected to ship after the holidays. Two have completed thermal vacuum testing, two are starting thermal vacuum testing, and initial performance testing has started for one. Approximately 100 cesium iodide crystals remain to be bonded. All flight composite structures have been manufactured. Two which were out of tolerance are complete. NRL has received 17 flight structures. Forty eight analog front-end electronics (AFEE) boards have completed burn in and temperature cycling. Inspections show that the AFEE board vendor is experiencing trouble cleaning the boards; 20 have been recleaned.

Figure 1: Eight completed Calorimeter modules.

4.1.6 Anticoincidence Detector

All top 25 tile detector assemblies (TDAs) have been installed. Installation of the side TDAs is underway. All qualification testing of the new photomultiplier tube (PMT) mounting design has been completed. Ten flight unit PMTs were assembled and successfully completed vibration and thermal vacuum testing. This enabled full flight PMT production to commence. Sixty PMTs are currently in flight production. Assembly and functional testing of all eight electronics chassis was completed (minus the PMTs). Electronics ground support equipment (EGSE) test stand upgrades were completed with the assistance of Electronics and I&T personnel. Test scripts are being completed; 25 are working and six are still in development.

Figure 2: Clear fiber routing and ribbon detectors under a bent TDA, before the last top tile was installed.

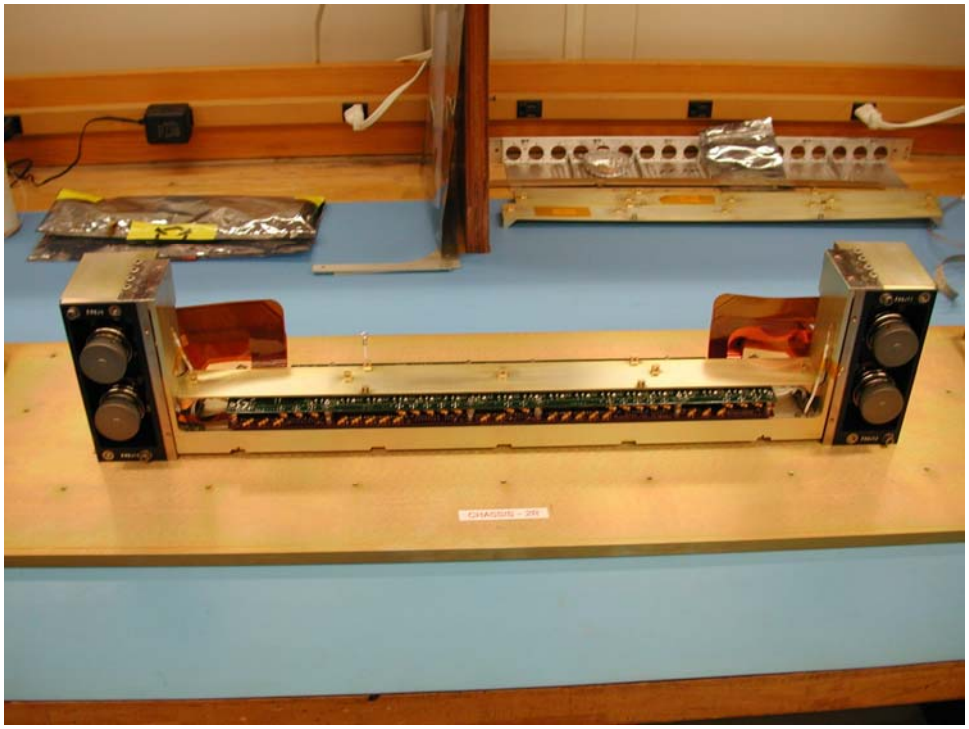


Figure 3: An ACD electronics chassis, without PMTs.

4.1.7 Electronics, Data Acquisition, and Flight Software

EGSE test stands for ACD were upgraded. LAT communications boards at NRL are being upgraded. All Tracker and Calorimeter cable controller tower electronics module (TEM) ASICs were screened. Three sets of FPGAs were assembled on TEM flight boards; they will be tested in early December. One set underwent destructive part analysis to address a possible bond lifting issue. Contamination was discovered on some bonding pads, and the lot is being rejected. Resolution of this problem is under discussion. The assembler dropped three TEM boards; initial inspection is positive, but assessment will not be finalized until board testing is complete. The procurement for the internal harness for the GASU, power distribution unit (PDU), and spacecraft interface unit (SIU) are out for bid. Enclosures for the GASU, PDU, and SIU are being fabricated. The PDU flight fabrication was received, but 75% failed coupon testing. The procurement for the LAT harness is out for bid.

All hardware for the instrument-to-spacecraft interface simulator is complete; development build testing has been completed. Phase 2 of the inter-task communications system is nearly complete. SIU application-level boot command and telemetry handlers were added to the primary boot code. Minor modifications were made to the memory test, initialization, and scrubbing procedures. The first major release of the file and memory management package was made. Coding of both the LAT electronics module package and the LAT configuration package is complete. Design issues associated with the charge injection calibration were presented at a LAT engineering meeting, and coding has begun. A science data formatting scheme was selected; data formats for both ACD and Calorimeter are well underway.

4.1.8 Mechanical Systems

The flight grid was delivered to SLAC. Procedures were released for operations in the integration & test facility. A revision to the grid box base assembly drawing was released. Panel bonding (face-sheets to honeycomb) was completed on both radiator panels, and discrepancies noted. All in-process testing of the cross-LAT heat pipes is completed.

4.1.9 Integration & Test (I&T)

The integration readiness review was conducted. Rigging operations on the flight grid were successful (first lift since SLAC stand-down). The shaft flanges and attachment to the grid perimeter ring were reworked. Version 4.6.0 of the LAT Test Executive was released and is the baseline for two tower integration. Science Verification, Analysis & Calibration (SVAC) event data was correlated with housekeeping.

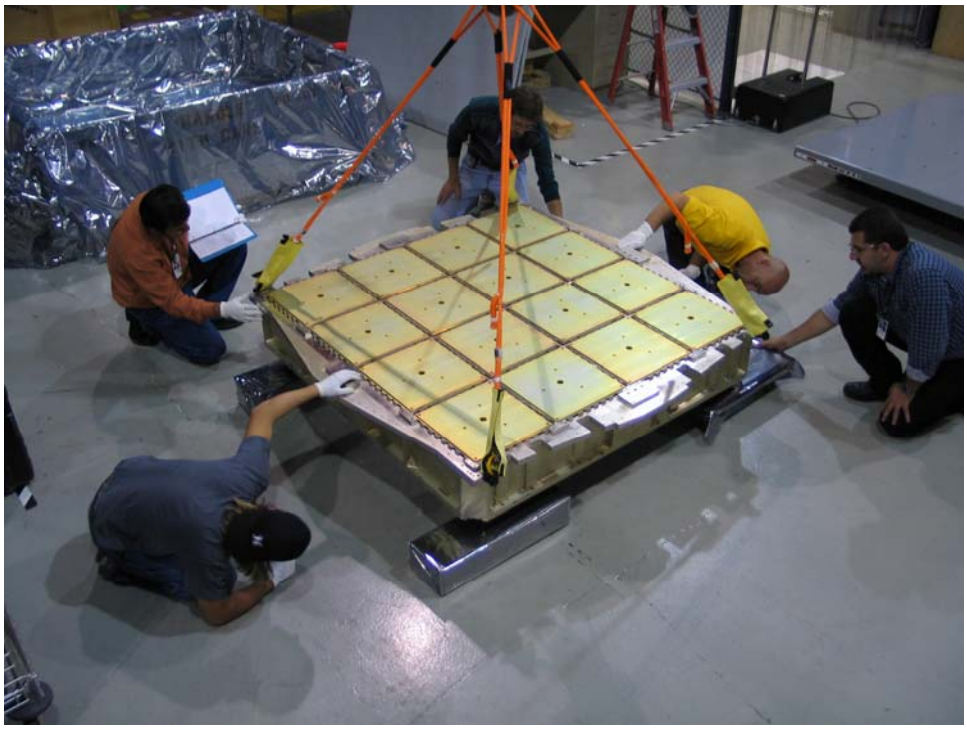


Figure 4: Moving the flight grid to the tilt-table.

3.0 Schedule Status

The critical path for the project is driven by the assembly of Tracker trays. There is no float to the "ready for CD-4 review" milestone (baseline has five weeks' float). Options are being explored with the international partners to accelerate the Tracker production schedule. Project plan reprogramming is underway.

The status of significant milestones is summarized in Attachments 1 and 2. Attachment 1 presents the status of the Level 1 and Level 2 milestones. Attachment 2 shows the status of the Level 3 milestones planned to occur during the six months preceding and following the current month. Unfavorable variance projections greater than one week to the future milestones are discussed below.

The start of integration (level 2 milestone 1M1000740) is driven by the receipt of the first Tracker tower. The delays in the pre-environmental test review (level 2 milestone 1M1000700) and the instrument pre-ship review (level 2 milestone 1M1000120) are due to the delay in Tracker tray assembly, and is the project critical path. These issues are addressed elsewhere in this report.

Following is discussion of the level 3 milestone variances, by responsible subsystem.

4.1.4 Tracker

Variances to the following milestones are due to technical problems related to in-process test failures and quality-control issues, which have required some design and process modifications and have led to delays in MCM and tray assembly.

- Tracker Modules (1M1000200, 1M1000201, 1M1000220, 1M1000221, 1M1000250, 1M1000251, 1M1000260, 1M1000261, 1M1000270, 1M1000271, 1M1000280, 1M1000281, 1M1000290, 1M1000291, 1M1000300, 1M1000301, 1M1000310, and 1M1000311)

4.1.5 Calorimeter

Variances to the following milestones are due to delayed receipt of Calorimeter ASICs and other flight EEE parts. The schedule impact will be minimized by using parts before completion of screening and qualification. However, continuing problems with the delivery of tantalum capacitors are impacting the schedule. A sufficient number of alternate capacitors have been found to proceed with the first Calorimeter module electronic cards.

- Calorimeter Modules (1M1000210, 1M1500, 1M1000230, 1M1510, 1M1000400, 1M1520, 1M1000390, 1M1530, 1M1000380, 1M1540, 1M1000370, 1M1550, 1M1560, 1M1000360, 1M1000350, 1M1570, 1M1000340, and 1M1580)
- EM2 TEM/PS for FM9 through FM16 (return FMA through FM6) from I&T to Calorimeter (1M1001790 through 1M1001860)

As of publication of this report, the first Calorimeter module has been received.

4.1.6 Anticoincidence Detector

There are several factors slowing the development of the ACD test scripts (1M1001000). The G3 test stands were delayed, the underlying LAT test executive software continues to evolve, and the translation of scientific requirements into test scripts has been more complex than planned. The test scripts are expected to be completed (though not in final form) by mid-January.

Several technical issues have impacted the delivery date of the ACD (1M1000410). The most notable issues have been flaws in the photomultiplier tubes that cause the glass tube to be much weaker than expected, the late delivery of ASICs, and the delay of the G3 test stands. The ACD team continues to mitigate these technical issues to minimize the overall schedule impact.

4.1.7 Electronics

Variances to the following milestones are due to delays in drawing release driving procurement placement. The drawing release process has been improved, and additional staff has been hired. Most of the drawings are now released. Changes in functional requirements with other subsystems, and the functional interface with the spacecraft, as

well as flight performance requirements not being satisfied by engineering model testing have impacted the deliveries of these milestones, as well. Additional testing of the qualification and engineering model units has been required in response. There have been several weeks of vendor delays in the assembly of the TEM and TEM power supply boards.

- Flight TEM Power Supply Assemblies to I&T (1M79002010 through 1M79002180)
- Flight TEM Assemblies to I&T (1M79001010 through 1M79001180)
- Flight Cable Assemblies to I&T (1M79003010 through 1M79003180)

The variance to the final EGSE milestone (1M7941440) is due to delayed receipt and quality problems with connectors. Effort has been diverted to the installation of TEMs on the Test Bed.

Fabrication of the following items has been delayed in order to conduct additional system and unit tests, and complete drawing review:

- Flight SIU (1M7941080)
- Flight PDU Box (1M7942000)
- Flight Harness (1M7941110)
- Flight GASU Box (1M7941070)
- Flight Event Processor Units (1M7941090)

The demonstration of the ISIS flight qualification test (1M79110) was delayed by unplanned difficulties in getting the science data interface configured and tested properly. Errors in the AstroRT interface required unplanned effort to characterize the errors and attempt to work around them.

The demonstrations of command & telemetry (1M79090) and the 1553 service (1M79100) were delayed due the Command and Telemetry/1553 Service software package (CTS) not being completed as planned. The overall schedule for flight software contained sufficient float that the delays to date in completing CTS have not impacted the planned start date for Formal Qualification Test (FQT).

4.1.8 Mechanical Systems

The flight grid (1M1000240) has been delayed due to the modifications made to the Tracker/grid interface, adding several weeks to the manufacturing effort. The schedule savings from adding a second shift to the grid machining has not compensated for the complexity of the machining operations. In addition, a machine failure resulted in a loss of eleven manufacturing days. Discrepancies were found during inspection, requiring resolution. A Materials Review Board was held and approval to proceed to the plating operations was given. The nickel plating operations took three weeks longer than planned and delayed the flight grid delivery.

The cross-LAT (X-LAT) thermal plate (1M941710) has been delayed due to issues with the electronics box to X-LAT plate interface, the ground cooling design implementation, and heat pipe bending. These have all been resolved; the source control drawing was released and the manufacturing readiness review was held. The vendor has started work. This delay is not expected to impact the LAT schedule.

Fabrication issues have resulted in a delay in the radiators (1M941720). Heat pipe fabrication took longer than planned, as these units were the highest-complexity units built to date in Lockheed Martin's newly re-established Heat Pipe Center. There were assembly weld and bending development problems that resulted in the replacement of two flight pipes. The panel fabrication experienced delays stemming from the tight tolerances and large size of the radiators. Program-specific tools were built for the radiators and there have been problems with these typical of any first use.

4.1.B Instrument Science Operations Center

The dates for the Mission Operations Review (1M1000112), and the Ground System Interface Test Start (1M7941270) have been adjusted to align with the project level ground data system (GDS) preparation on which these reviews are dependent. Given the current GLAST GDS schedule, there is no impact due to the date change and no need for mitigation.

4.0 Financial Status

Attachment 3 depicts the costs, commitments, and performance through the end of the current reporting period.

Attachments 4 and 5 summarize the actual costs through the current period, by WBS level 3 and institution, respectively. The hours worked/FTE lines include only DOE/NASA-funded labor.

5.0 Performance Status (Comparison to Project Baseline)

Attachment 6 is a Cost Performance Report (CPR) for the end of the current reporting period, by WBS level 3. The CPR shows the time-phased budget to date (BCWS), the earned value (BCWP), and the actual costs through the end of the month (ACWP). Attachment 7 shows the same information for each participating DOE- and/or NASA-funded institution. The schedule variance is equal to the difference between the budget-to-date and the earned value and represents a measure of the ahead (positive) or behind (negative) schedule position. The cost variance is equal to the difference between the earned value and the actual costs.

Attachment 8 shows performance analysis (by WBS level 3), including trends in the schedule and cost variances from the previous period. Cumulative cost variances

exceeding 10% of the BCWP and cumulative schedule variances exceeding 10% of BCWS (favorable and unfavorable) are discussed below.

4.1.7 Electronics

Delays in finalizing the printed-circuit flight boards lead to the late start of flight production. In addition, the flight production of some of the boards is taking much longer due to vendor delays and conflicting priorities at the assembly vendor. More documentation and analysis (e.g. vibration, qualification testing) was required than planned. These schedule delays have resulted in additional labor cost. Production assembly contracts for the electronics boards are costing much higher than anticipated.

4.1.9 Integration & Test

The unfavorable schedule variance is primarily due to the delayed delivery of flight hardware, and the resulting delay in the start of integration. This will be corrected with the pending reprogramming of the baseline schedule. A second source of schedule variance is due to the delays in the design, procurement and assembly of the LAT support stand, personnel access platforms and lift fixtures.

4.1.C Education & Public Outreach

The favorable cost variance is due to delayed subcontractor invoice payments, and is not a concern at this time.

6.0 Change Control and Contingency Analysis

A summary of change requests approved during this period (Level 3 and above), including the impacts on the LAT fabrication phase contingency, is below.

Change Request No.	Description	Submitted By	Current Status	Contingency Impact[1]
LAT-XR-04109-01	Update to LAT Instrument Performance Verification Plan	R. Bright	Approved	N/A
LAT-XR-04746-01	Increase to Tracker Mass and Center of Mass Allocation	M. Nordby	Approved	20 kg
LAT-XR-04774-01	Survival Temperature for ACD Base Electronics Assembly	D. Thompson	Approved	N/A
LAT-XR-04777-01	Additional 4.1.7 Procurements for Risk Reduction	G. Haller	Approved	$183K
LAT-XR-04837-01	Continuing Tracker Team in Italy	R. Johnson	Approved	$553K

[1] A positive number indicates a draw on contingency.

Change Request No.	Description	Submitted By	Current Status	Contingency Impact
LAT-XR-04852-01	MGSE Design and IFCT Electrical Support	E. Bloom	Approved	$249K
LAT-XR-05306-01	Calorimeter-Grid Interface Requirements	N. Johnson	Approved	N/A
LAT-XR-05307-01	Calorimeter – Crystal Detector Element Energy Reach	N. Johnson	Approved	N/A
LAT-XR-05308-01	Calorimeter Electronics – Power Allocation	N. Johnson	Approved	N/A
LAT-XR-05309-01	Calorimeter Electronics – Overload Recovery	N. Johnson	Approved	N/A

The fabrication phase cost baseline is $133.2M. Funding applicable to that baseline is $136.0M; the resulting contingency is $2.8M.

7.0 Staffing

Attachments 9-10 demonstrate the staffing plan and reports of actual manpower received. Note from Attachment 10 that not all participating organizations are providing manpower data.

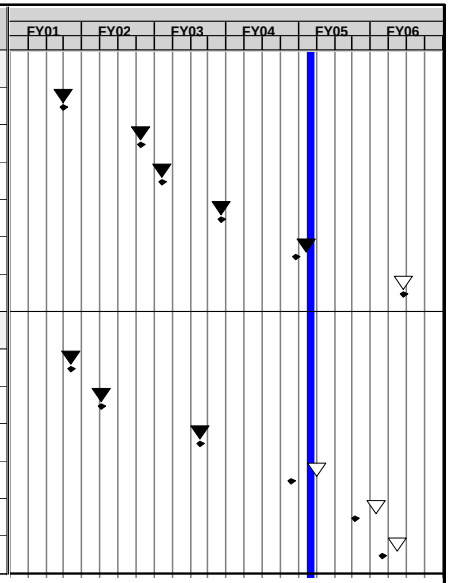
The monthly planned FTEs reflect adjustments made so that the cumulative-to-date manpower plan corresponds to the approved changes in that month.

Neither Goddard nor Stanford-HEPL manpower was reported in the month of August, 2004. The September, 2004, incremental FTE report includes a correction, so that the cumulative-to-date actual manpower is correct.

Goddard civil servant manpower was not reported for the months of October or November, 2004.

Attachment 1
Milestones, Levels 1-2

Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date
DOE/NASA Joint Oversight Group (Level 1				
1M1P000000	DOE Critical Decision (CD) 0 Approval	06/25/01A	0	06/25/01A
1M1P000010	CD-1 Approval	07/23/02A	0	07/23/02A
1M1P000020	CD-2 Approval	11/08/02A	0	11/08/02A
1M1P000030	CD-3 Approval	09/03/03A	0	09/03/03A
1M1P000060	Flight GRID Complete	09/15/04*	-38	11/08/04A
1M1P000040	CD-4 Approval	03/15/06*	0	03/15/06*
DOE/NASA Federal Project Managers (Level 2				
1M1BF00000	Launch Balloon Flight	08/01/01A	0	08/01/01A
1M1000100	Instrument Preliminary Design Review	01/08/02A	0	01/08/02A
1M1000110	I-CDR (Critical Design Review)	05/16/03A	0	05/16/03A
1M1000740	Start LAT Integration	08/24/04*	-85	01/03/05
1M1000700	Pre Environmental Testing Review	07/14/05*	-71	10/24/05
1M1000120	PSR-(Instrument Pre-Ship Review)	12/01/05*	-44	02/10/06



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GLAST LAT PROJECT
Project Milestones (Level 1 and 2)

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Attachment 2
Level 3 Milestones (One-Year View)
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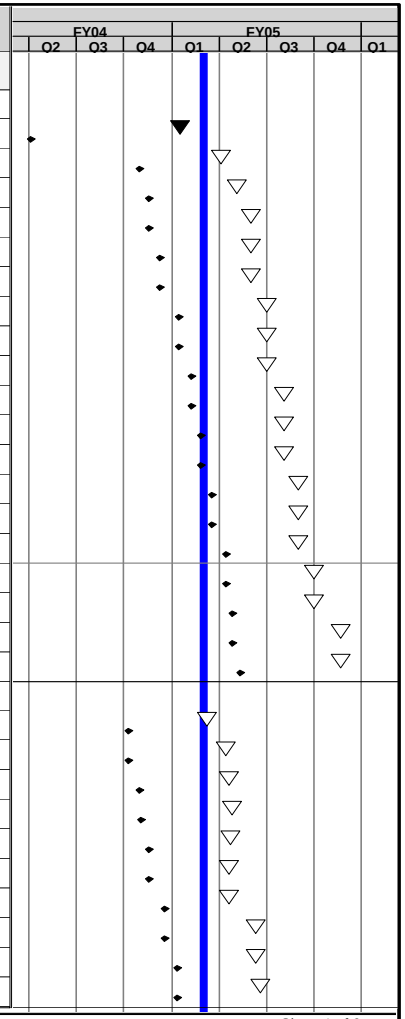
Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date
Instrument Project Office (Level 3				
4.1.4 Tracker				
1M1001430	Delv of TKR EM to SLAC I&T/MGSE	01/02/04	-200	10/15/04A
1M1000200	Tracker Modules A RFI	07/28/04	-104	01/03/05
1M1000201	Tracker Modules B RFI	08/18/04	-110	02/02/05
1M1000220	Tracker Modules 1 RFI	08/18/04	-129	03/02/05
1M1000221	Tracker Modules 2 RFI	09/08/04	-115	03/02/05
1M1000250	Flight Tracker Tower 3 RFI	09/08/04	-115	03/02/05
1M1000251	Flight Tracker Tower 4 RFI	10/14/04	-110	03/31/05
1M1000260	Flight Tracker Tower 5 RFI	10/14/04	-110	03/31/05
1M1000261	Flight Tracker Tower 6 RFI	11/05/04	-94	03/31/05
1M1000270	Flight Tracker Tower 7 RFI	11/05/04	-118	05/04/05
1M1000271	Flight Tracker Tower 8 RFI	11/24/04	-105	05/04/05
1M1000280	Flight Tracker Tower 9 RFI	11/24/04	-105	05/04/05
1M1000281	Flight Tracker Tower 10 RFI	12/17/04	-109	06/01/05
1M1000290	Flight Tracker Tower 11 RFI	12/17/04	-109	06/01/05
1M1000291	Flight Tracker Tower 12 RFI	01/11/05	-98	06/01/05
1M1000300	Flight Tracker Tower 13 RFI	01/11/05	-120	07/01/05
1M1000301	Flight Tracker Tower 14 RFI	01/25/05	-111	07/01/05
1M1000310	Flight Tracker Tower 15 RFI	01/25/05	-146	08/22/05
1M1000311	Flight Tracker Tower 16 RFI	02/08/05	-136	08/22/05
4.1.5 Calorimeter				
1M1000210	Calorimeter Modules A RFI	07/09/04	-105	12/08/04
1M1500	Calorimeter Modules B RFI	07/09/04	-125	01/13/05
1M1000230	Calorimeter Modules 1 RFI	07/30/04	-113	01/19/05
1M1510	Calorimeter Modules 2 RFI	08/02/04	-116	01/25/05
1M1000400	Flight Calorimeter Tower 3 RFI	08/17/04	-102	01/20/05
1M1520	Flight Calorimeter Tower 4 RFI	08/17/04	-100	01/18/05
1M1000390	Flight Calorimeter Tower 5 RFI	09/15/04	-80	01/18/05
1M1530	Flight Calorimeter Tower 6 RFI	09/15/04	-117	03/11/05
1M1000380	Flight Calorimeter Tower 7 RFI	10/11/04	-99	03/11/05
1M1540	Flight Calorimeter Tower 8 RFI	10/11/04	-105	03/21/05



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GLAST LAT PROJECT
Project Milestones (Level 3)
1 Year View (+/- 6mo)

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FLX1- MS (L3)

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Attachment 2
Level 3 Milestones (One-Year View)
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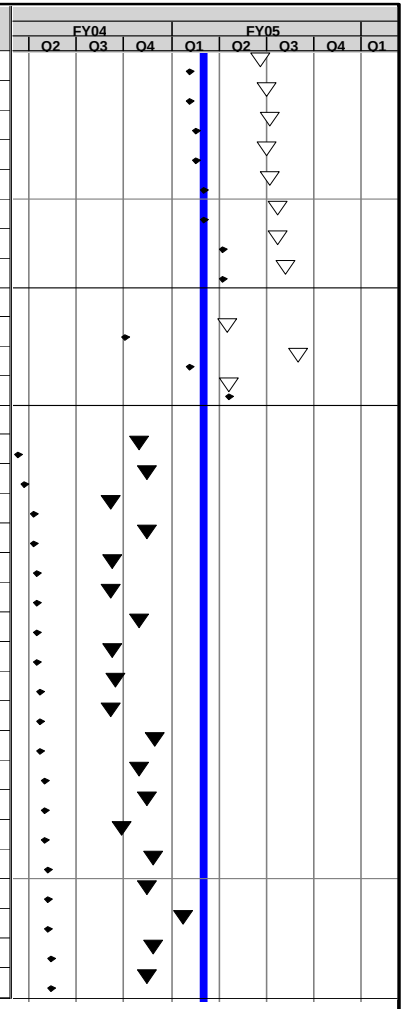
Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date
1M1000370	Flight Calorimeter Tower 9 RFI	11/02/04	-89	03/21/05
1M1550	Flight Calorimeter Tower 10 RFI	11/02/04	-98	04/01/05
1M1560	Flight Calorimeter Tower 12 RFI	11/15/04	-94	04/08/05
1M1000360	Flight Calorimeter Tower 11 RFI	11/16/04	-88	04/01/05
1M1000350	Flight Calorimeter Tower 13 RFI	12/02/04	-83	04/08/05
1M1570	Flight Calorimeter Tower 14 RFI	12/02/04	-93	04/22/05
1M1000340	Flight Calorimeter Tower 15 RFI (Spare)	01/06/05	-74	04/22/05
1M1580	Flight Calorimeter Tower 16 RFI (Spare)	01/06/05	-84	05/06/05
4.1.6 ACD				
1M1001000	ACD Test Scripts (from ACD to I&T)	07/01/04	-131	01/14/05
1M1000410	ACD Flight Unit at SLAC, Tested/Inspected & RFI	11/03/04	-138	05/31/05
1M1000990	ACD Calibration Test Unit at SLAC, Tested & RFI	01/18/05	0	01/18/05
4.1.7 Electronics				
1M7941130	EGSE TEM/TEM PS/CTS w/ FE Elec #1-Elec to I&T	12/08/03	-158	07/30/04A
1M7941150	EGSE TEM/TEM PS/CTS w/ FE Elec #2-Elec to I&T	12/22/03	-158	08/13/04A
1M74000030	Updated EGSE System 3: Elec to TKR	01/07/04	-104	06/04/04A
1M7941160	EGSE TEM/TEM PS/CTS w/ FE Elec #3-Elec to I&T	01/07/04	-153	08/13/04A
1M1001900	Test Stations (5) for AFEE: Elec to CAL	01/14/04	-100	06/07/04A
1M74000040	EGSE System 4: Elec to TKR	01/14/04	-99	06/04/04A
1M7941170	EGSE TEM/TEM PS/CTS/GASU FE Elec-Elec to I&T	01/14/04	-138	07/30/04A
1M1001870	5 EM2 TEM/PS for AFEE brd ass & tst: Elec to CAL	01/15/04	-99	06/07/04A
1M1001220	EM2 TEM/PS/CTS for FMA from Elec to CAL	01/22/04	-101	06/15/04A
1M74000050	EGSE System 5: Elec to TKR	01/22/04	-94	06/04/04A
1M7941180	EGSE Development Hrdw/FSW 1st Delivr-Elec to I&T	01/22/04	-154	08/30/04A
1M1001260	EM2 TEM/PS/CTS for FMB from Elec to CAL	01/29/04	-128	07/30/04A
1M74000060	EGSE System 6: Elec to TKR	01/29/04	-138	08/13/04A
1M7941190	EGSE TEM/TEM PS/CTS #1 for Bldg 33-Elec to I&T	01/29/04	-104	06/25/04A
1M1001600	EM2 TEM/PS/CTS for FM1 from Elec to CAL	02/05/04	-141	08/25/04A
1M7941420	EGSE TEM/TEM PS/CTS #2 for Bldg 33-Elec to I&T	02/05/04	-133	08/13/04A
1M7941430	EGSE TEM/TEM PS/CTS w/ GASU for B33-Elec to	02/05/04	-181	10/21/04A
1M1001650	EM2 TEM/PS/CTS for FM2 from Elec to CAL	02/12/04	-136	08/25/04A
1M74000070	EGSE System 7: Elec to TKR	02/12/04	-128	08/13/04A



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GLAST LAT PROJECT
Project Milestones (Level 3)
1 Year View (+/- 6mo)

1217
LTX1 - MS (L3)
FLX1- MS (L3)

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Attachment 2
Level 3 Milestones (One-Year View)
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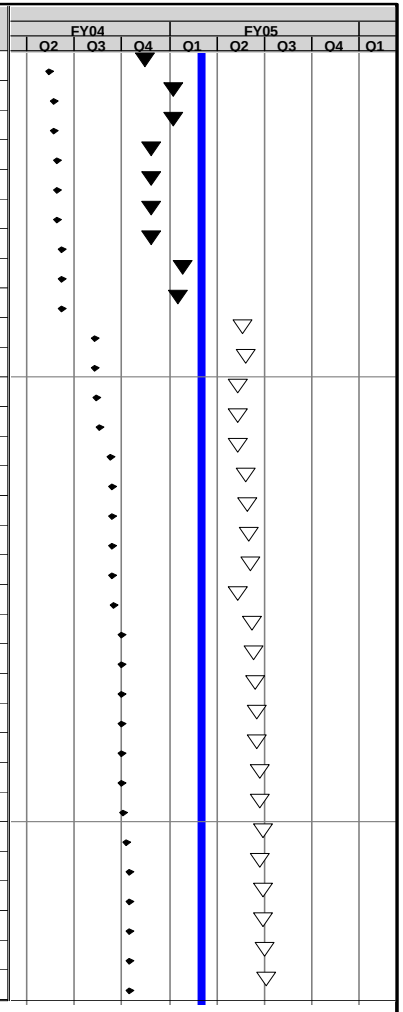
Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date
1M74000080	EGSE System 8: Elec to TKR	02/12/04	-128	08/13/04A
1M74000090	EGSE System 9: Elec to TKR	02/20/04	-162	10/08/04A
1M74000100	EGSE System 10: Elec to TKR	02/20/04	-162	10/08/04A
1M1001660	EM2 TEM/PS/CTS for FM3 from Elec to CAL	02/27/04	-126	08/25/04A
1M1001680	EM2 TEM/PS/CTS for FM4 from Elec to CAL	02/27/04	-126	08/25/04A
1M1001720	EM2 TEM/PS/CTS for FM5 from Elec to CAL	02/27/04	-126	08/25/04A
1M1001760	EM2 TEM/PS/CTS for FM6 from Elec to CAL	03/05/04	-121	08/25/04A
1M1001770	EM2 TEM/PS/CTS for FM7 from Elec to CAL	03/05/04	-164	10/26/04A
1M1001780	EM2 TEM/PS/CTS for FM8 from Elec to CAL	03/05/04	-157	10/15/04A
1M79003010	Flight Cables Assy A: Elec to I&T	05/10/04	-191	02/17/05
1M79003020	Flight Cables Assy B: Elec to I&T	05/10/04	-193	02/22/05
1M79002010	Flight TEM PS Assy A: Elec to I&T	05/12/04	-181	02/07/05
1M79002020	Flight TEM PS Assy B: Elec to I&T	05/19/04	-176	02/07/05
1M79001010	Flight TEM Assy A: Elec to I&T	06/07/04	-164	02/07/05
1M79003030	Flight Cables Assy 1: Elec to I&T	06/10/04	-173	02/24/05
1M79003040	Flight Cables Assy 2: Elec to I&T	06/10/04	-175	02/28/05
1M79003050	Flight Cables Assy 3: Elec to I&T	06/10/04	-177	03/02/05
1M79003060	Flight Cables Assy 4: Elec to I&T	06/10/04	-179	03/04/05
1M79001020	Flight TEM Assy B: Elec to I&T	06/14/04	-159	02/07/05
1M79003070	Flight Cables Assy 5: Elec to I&T	06/28/04	-169	03/08/05
1M79003080	Flight Cables Assy 6: Elec to I&T	06/28/04	-171	03/10/05
1M79003090	Flight Cables Assy 7: Elec to I&T	06/28/04	-173	03/14/05
1M79003100	Flight Cables Assy 8: Elec to I&T	06/28/04	-175	03/16/05
1M79003110	Flight Cables Assy 9: Elec to I&T	06/28/04	-177	03/18/05
1M79003120	Flight Cables Assy 10: Elec to I&T	06/28/04	-179	03/22/05
1M79002030	Flight TEM PS Assy 1: Elec to I&T	07/01/04	-177	03/23/05
1M79002040	Flight TEM PS Assy 2: Elec to I&T	07/09/04	-177	03/30/05
1M79003130	Flight Cables Assy 11: Elec to I&T	07/15/04	-169	03/24/05
1M79003140	Flight Cables Assy 12: Elec to I&T	07/15/04	-171	03/28/05
1M79003150	Flight Cables Assy 13: Elec to I&T	07/15/04	-173	03/30/05
1M79003160	Flight Cables Assy 14: Elec to I&T	07/15/04	-175	04/01/05
1M79003170	Flight Cables Assy 15: Elec to I&T	07/15/04	-177	04/05/05



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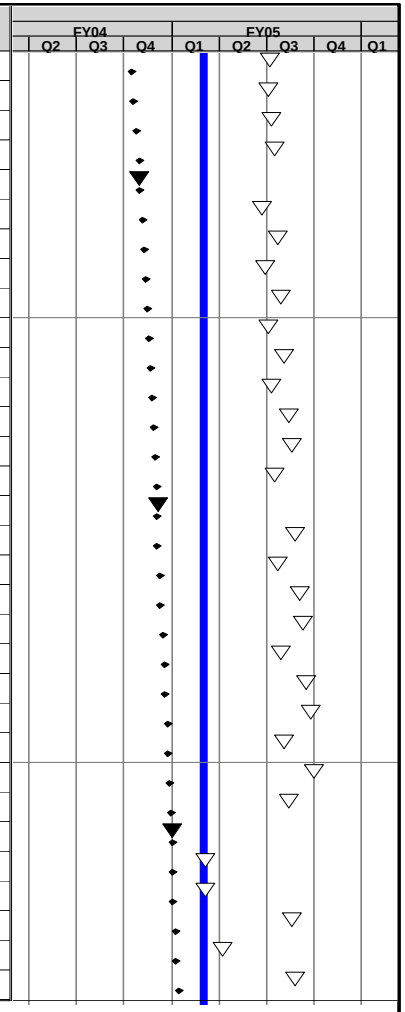
GLAST LAT PROJECT
Project Milestones (Level 3)
1 Year View (+/- 6mo)

1217
LTX1 - MS (L3)
FLX1- MS (L3)

Sheet 3 of 6

Attachment 2
Level 3 Milestones (One-Year View)
Page 4 of 6

Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date
1M79003180	Flight Cables Assy 16: Elec to I&T	07/15/04	-179	04/07/05
1M79002050	Flight TEM PS Assy 3: Elec to I&T	07/16/04	-176	04/05/05
1M79002060	Flight TEM PS Assy 4: Elec to I&T	07/23/04	-175	04/11/05
1M79002070	Flight TEM PS Assy 5: Elec to I&T	07/30/04	-174	04/15/05
1M79020	Demo: Inter-task Communications	07/30/04	0	07/30/04A
1M79001030	Flight TEM Assy 1: Elec to I&T	08/03/04	-155	03/23/05
1M79002080	Flight TEM PS Assy 6: Elec to I&T	08/06/04	-173	04/21/05
1M79001040	Flight TEM Assy 2: Elec to I&T	08/10/04	-155	03/30/05
1M79002090	Flight TEM PS Assy 7: Elec to I&T	08/13/04	-173	04/28/05
1M79001050	Flight TEM Assy 3: Elec to I&T	08/17/04	-154	04/05/05
1M79002100	Flight TEM PS Assy 8: Elec to I&T	08/20/04	-173	05/05/05
1M79001060	Flight TEM Assy 4: Elec to I&T	08/24/04	-153	04/11/05
1M79002110	Flight TEM PS Assy 9: Elec to I&T	08/25/04	-175	05/12/05
1M79002120	Flight TEM PS Assy 10: Elec to I&T	08/30/04	-177	05/19/05
1M79001070	Flight TEM Assy 5: Elec to I&T	08/31/04	-152	04/15/05
1M79030	Demo: Preliminary ISIS	09/01/04	-2	09/03/04A
1M79002130	Flight TEM PS Assy 11: Elec to I&T	09/02/04	-179	05/26/05
1M79001080	Flight TEM Assy 6: Elec to I&T	09/08/04	-151	04/21/05
1M79002140	Flight TEM PS Assy 12: Elec to I&T	09/08/04	-181	06/03/05
1M79002150	Flight TEM PS Assy 13: Elec to I&T	09/13/04	-183	06/10/05
1M79001090	Flight TEM Assy 7: Elec to I&T	09/15/04	-151	04/28/05
1M79002160	Flight TEM PS Assy 14: Elec to I&T	09/16/04	-185	06/17/05
1M79002170	Flight TEM PS Assy 15: Elec to I&T	09/21/04	-187	06/24/05
1M79001100	Flight TEM Assy 8: Elec to I&T	09/22/04	-151	05/05/05
1M79002180	Flight TEM PS Assy 16: Elec to I&T	09/24/04	-189	07/01/05
1M79001110	Flight TEM Assy 9: Elec to I&T	09/29/04	-151	05/12/05
1M79080	Demo: LAT Communication Board Driver	10/01/04	0	10/01/04A
1M79090	Demo: Command and Telemetry	10/01/04	-43	12/03/04
1M79100	Demo: 1553 Service	10/01/04	-43	12/03/04
1M79001120	Flight TEM Assy 10: Elec to I&T	10/06/04	-151	05/19/05
1M79110	Demo: ISIS FQT	10/08/04	-57	01/07/05
1M79001130	Flight TEM Assy 11: Elec to I&T	10/13/04	-151	05/26/05



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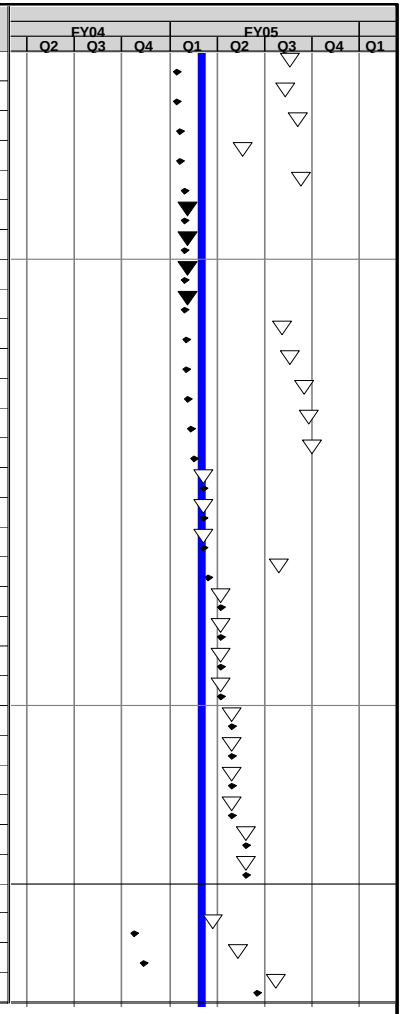
GLAST LAT PROJECT
Project Milestones (Level 3)
1 Year View (+/- 6mo)

1217
LTX1 - MS (L3)
FLX1- MS (L3)

Sheet 4 of 6

Attachment 2
Level 3 Milestones (One-Year View)
Page 5 of 6

Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date
1M7941080	Flight SIU-Elec to I&T	10/13/04	-145	05/18/05
1M7942000	Flight PDU Box-Elec to I&T	10/13/04	-139	05/10/05
1M79001140	Flight TEM Assy 12: Elec to I&T	10/20/04	-151	06/03/05
1M7941110	Flight Harness-Elec to I&T	10/20/04	-77	02/17/05
1M79001150	Flight TEM Assy 13: Elec to I&T	10/27/04	-151	06/10/05
1M79120	Demo: Primary Boot	10/29/04	-3	11/03/04A
1M79130	Demo: Secondary Boot	10/29/04	-3	11/03/04A
1M79140	Demo: LCB Service	10/29/04	-3	11/03/04A
1M79150	Demo: Power/Initialize GASU	10/29/04	-3	11/03/04A
1M7941070	Flight GASU Box-Elec to I&T	11/01/04*	-121	05/03/05
1M7941090	Flight Event Processor Units-Elec to I&T	11/01/04	-132	05/18/05
1M79001160	Flight TEM Assy 14: Elec to I&T	11/03/04	-151	06/17/05
1M79001170	Flight TEM Assy 15: Elec to I&T	11/10/04	-151	06/24/05
1M79001180	Flight TEM Assy 16: Elec to I&T	11/17/04	-151	07/01/05
1M79160	Demo: File and Memory Management	12/03/04	0	12/03/04
1M79170	Demo: Spacecraft Interfaces	12/03/04	0	12/03/04
1M79180	Demo: Inter-task Communications	12/03/04	0	12/03/04
1M7941440	Final EGSE incl S/C Sim, FSW-Elec to I&T	12/13/04	-89	04/27/05
1M79190	Demo: Command and Telemetry Data Dictionary	01/07/05	0	01/07/05
1M79200	Demo: Thermal Control	01/07/05	0	01/07/05
1M79210	Demo: Watchdog	01/07/05	0	01/07/05
1M79220	Demo: Charge Injection Calibration	01/07/05	0	01/07/05
1M79230	Demo: Housekeeping	01/28/05	0	01/28/05
1M79240	Demo: Event Integrity and Delivery	01/28/05	0	01/28/05
1M79250	Demo: Event Filtering	01/28/05	0	01/28/05
1M79260	Demo: GRB Detection and Response	01/28/05	0	01/28/05
1M79270	Demo: Mode Control	02/25/05	0	02/25/05
1M79280	Demo: Diagnostics	02/25/05	0	02/25/05
4.1.8 Mechanical				
1M1000240	Flight Grid RFI-Mech to I&T	07/22/04	-105	12/21/04
1M941710	X-LAT Thermal Plate RFI from Mech to I&T	08/12/04	-119	02/09/05
1M941720	Radiators ready for I&T (from Mech to I&T)	03/17/05	-25	04/21/05



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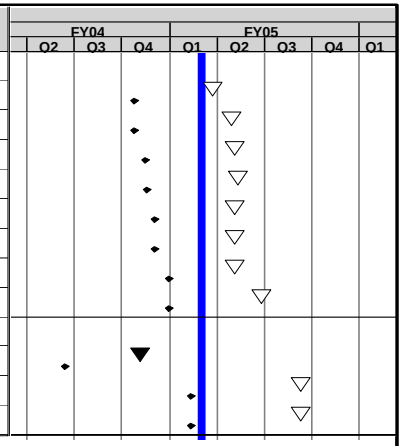
GLAST LAT PROJECT
Project Milestones (Level 3)
1 Year View (+/- 6mo)

1217
LTX1 - MS (L3)
FLX1- MS (L3)

Sheet 5 of 6

Attachment 2
Level 3 Milestones (One-Year View)
Page 6 of 6

Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date
4.1.9 I&T				
1M1001790	EM2 TEM/PS (return FMA) from I&T to CAL	07/23/04	-105	12/22/04
1M1001800	EM2 TEM/PS (return FMB)from I&T to CAL	07/23/04	-125	01/28/05
1M1001810	EM2 TEM/PS (return FM1) from I&T to CAL	08/13/04	-113	02/02/05
1M1001820	EM2 TEM/PS (return FM2) from I&T to CAL	08/16/04	-116	02/08/05
1M1001830	EM2 TEM/PS (return FM3) from I&T to CAL	08/31/04	-102	02/03/05
1M1001840	EM2 TEM/PS (return FM4) from I&T to CAL	08/31/04	-100	02/01/05
1M1001850	EM2 TEM/PS (return FM5) from I&T to CAL	09/29/04	-80	02/01/05
1M1001860	EM2 TEM/PS (return FM6) from I&T to CAL	09/29/04	-117	03/25/05
4.1.B ISOC				
1M005480	ISOC CDR	03/12/04	-101	08/04/04A
1M1000112	Mission Operations Review (L-21mo.)	11/10/04	-140	06/09/05
1M7941270	Ground System Interface Test start	11/10/04	-140	06/09/05



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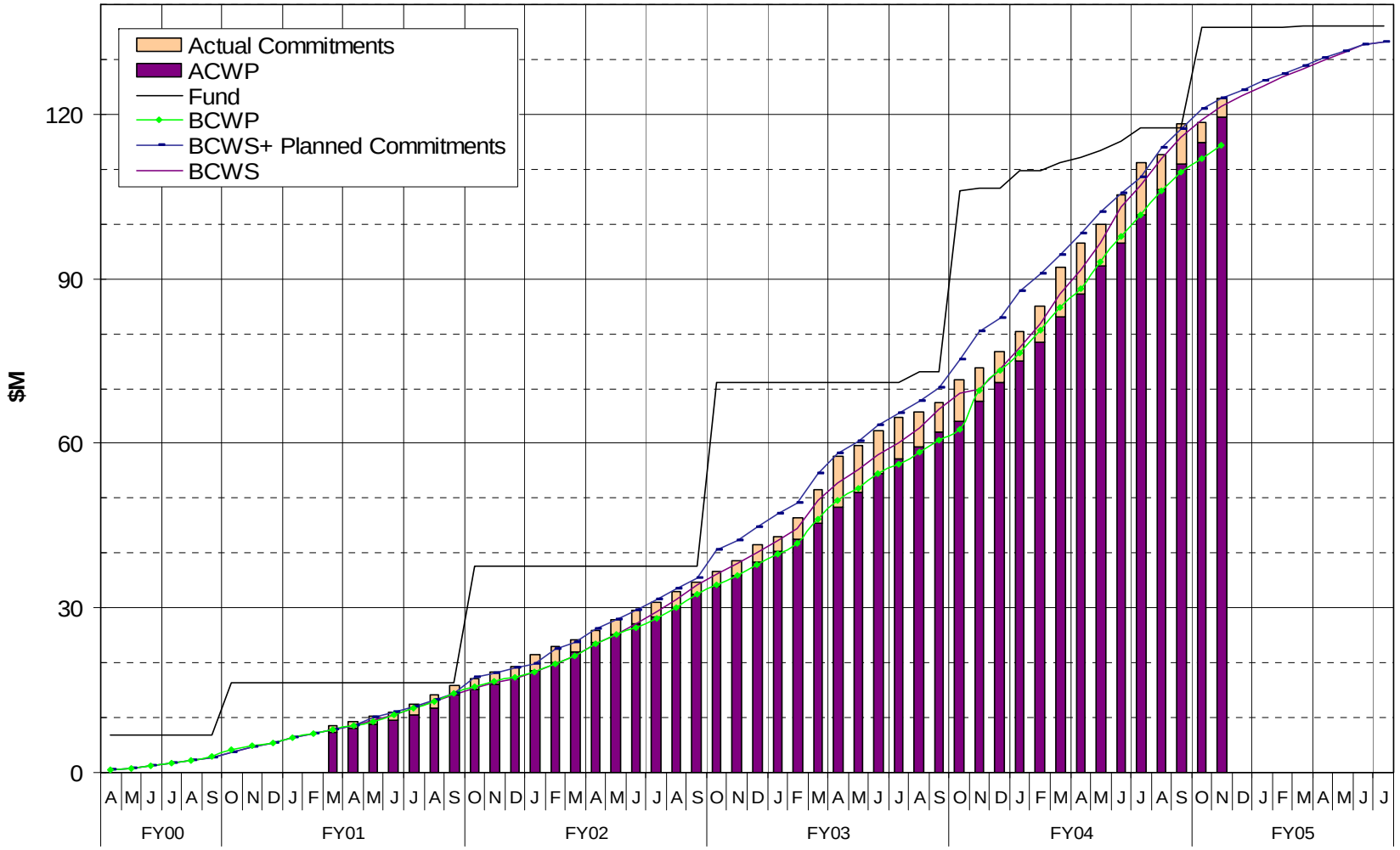
Attachment 3

Budget vs Actuals vs Performance
DOE + NASA Project Expenditures
4.1 LAT



Attachment 4
LAT Costs, through November 2004, by WBS

Monthly Contractor Financial Management Report								Report for Month Ending: 11/30/2004		
To: Kevin Grady, GLAST Project Manager (NASA) Ev Valle, LAT Project Manager (DOE)			From: Tanya Boysen, LAT Project Controls Manager					Budget Value	Cost: 0	Fee: 0
LAT3 GLAST LAT Project	Type:							Fund Limitation: 0		
Reporting Category	Cost Incurred				Estimated Cost			4/3/2000 Estimated Final Cost	Billing	Unfilled Orders Outstanding
	During Month		Cum. to Date		Detail		Balance of Budget	Project Estimate	Budget Value	
	Actual	Planned	Actual	Planned	DEC04	JAN05				
4.1.1 INSTRUMENT MANAGEMENT	369	346	14,555	14,605	280	329	1,747	16,911	16,911	
4.1.2 SYSTEM ENGINEERING	325	152	5,908	5,963	129	152	859	7,047	7,047	
4.1.4 TRACKER	838	336	16,418	16,284	109	129	470	17,126	17,126	
4.1.5 CALORIMETER	473	349	18,883	20,758	204	215	2,720	22,022	22,022	
4.1.6 ANTICOINCIDENCE DETECTOR	210	80	15,105	15,237	114	103	274	15,595	15,595	
4.1.7 ELECTRONICS	891	229	21,868	21,007	398	220	-248	22,238	22,238	
4.1.8 MECHANICAL SYSTEMS	782	406	13,033	12,903	147	163	835	14,179	14,179	
4.1.9 INTEGRATION & TEST	319	264	5,576	5,944	200	254	1,983	8,013	8,013	
4.1.A PERFORMANCE AND SAFETY ASSURANCE	226	135	2,533	2,600	115	135	152	2,935	2,935	
4.1.B LAT INSTRUMENT OPERATIONS CENTER	1	3	298	303	3	3	24	328	328	
4.1.C EDUCATION AND PUBLIC OUTREACH	52	44	1,687	2,079	36	43	682	2,448	2,448	
4.1.D SCIENCE ANALYSIS SOFTWARE	58	74	2,258	2,462	63	74	624	3,019	3,019	
4.1.E SUBORBITAL FLIGHT TEST	0	0	1,325	1,325	0	0	0	1,325	1,325	
Gen. and Admin.	0	0	0	0	0	0	0	0	0	
Total	4,543	2,420	119,446	121,471	1,798	1,821	10,122	133,187	133,187	

Attachment 5
LAT Costs, through November 2004, by Organization and Cost Code

Monthly Contractor Financial Management Report									Report for Month Ending: 11/30/2004	
To: Kevin Grady, GLAST Project Manager (NASA) Ev Valle, LAT Project Manager (DOE)			From: Tanya Boysen, LAT Project Controls Manager						Budget Value Cost: 0	Fee: 0
LAT3 GLAST LAT Project	Type:								Fund Limitation: 0	
								4/3/2000	Billing	
Reporting Category	Cost Incurred				Estimated Cost			Estimated Final Cost		Unfilled Orders Outstanding
	During Month		Cum. to Date		Detail		Balance of Budget	Project Estimate	Budget Value	
	Actual	Planned	Actual	Planned	DEC04	JAN05				
DG *** GSFC	229	115	16,435	16,914	144	139	823	17,541	17,541	
DH *** HEPL	580	252	6,393	6,677	161	191	1,349	8,094	8,094	
DL *** SLAC	3,121	1,510	69,613	68,336	1,127	1,089	3,588	75,416	75,416	
DN *** NRL	554	455	22,774	24,790	293	316	3,297	26,679	26,679	
DO *** Financial Plan Transfer/Sub Out	0	0	59	54	0	0	-5	54	54	
DS *** SSU	52	43	1,673	2,037	35	42	650	2,401	2,401	
DT *** Texas A&M	0	0	15	16	0	0	0	16	16	
DU *** UCSC	4	36	2,305	2,452	31	36	354	2,726	2,726	
DW *** UW	3	8	179	195	7	8	66	260	260	
Total	4,543	2,420	119,446	121,471	1,798	1,821	10,122	133,187	133,187	

Reporting Category	Cost Incurred/Hours Worked				Estimated Cost/Hours to Complete			Estimated Final Cost/Hours		Unfilled Orders Outstanding
	During Month		Cum. to Date		Detail		Balance of Budget	Project Estimate	Budget Value	
	Actual	Planned	Actual	Planned	DEC04	JAN05				
RL LABOR	1,504	1,257	57,927	58,218	979	1,084	5,326	65,316	65,316	
FTE (DOE/NASA)	*131.7*	*106.0*	*5,273.0*	*4,962.5*	*94.0*	*86.0*	*83.4*	*5,536.4*	*5,536.4*	
HOURS (DOE/NASA)	*21,069*	*16,956*	*878,852*	*824,269*	*12,836*	*13,724*	*11,782.8*	*917,195*	*917,195*	
RT TRAVEL	25	64	1,451	2,068	45	53	933	2,481	2,481	
RM MATERIAL & SERVICES	3,014	1,096	57,711	58,692	772	601	3,706	62,790	62,790	
RX MPS & LAB TAX	0	4	2,357	2,493	3	82	157	2,599	2,599	
Total (not incl FTE/Hours)	4,543	2,420	119,446	121,471	1,798	1,821	10,122	133,187	133,187	

Attachment 6
LAT Performance, through November 2004, by WBS

Cost Performance Report - Work Breakdown Structure													
Contractor: Location:					Contract Type/No:			Project Name/No: GLAST LAT Project		Report Period: 10/31/2004 11/30/2004			
Quantity 1	Negotiated Cost 0		Est. Cost Authorized Unpriced Work 0		Tgt. Profit/ Fee % 0 0		Tgt. Price 0	Est Price 0	Share Ratio	Contract Ceiling 0	Estimated Contract Ceiling 0		
CAPW[3]	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest	
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
4.1.1 INSTRUMENT MANAGEMENT	346	346	369	0	-23	14,605	14,605	14,555	0	51	16,911	16,911	0
4.1.2 SYSTEM ENGINEERING	152	152	325	0	-173	5,963	5,963	5,908	0	55	7,047	7,047	0
4.1.4 TRACKER	336	224	838	-113	-614	16,284	15,183	16,418	-1,102	-1,235	17,126	17,126	0
4.1.5 CALORIMETER	349	576	473	227	103	20,758	19,152	18,883	-1,606	269	22,022	22,022	0
4.1.6 ANTICOINCIDENCE DETECTOR	80	65	210	-15	-145	15,237	14,700	15,105	-537	-405	15,595	15,595	0
4.1.7 ELECTRONICS	229	175	891	-54	-715	21,007	18,469	21,868	-2,539	-3,400	22,238	22,238	0
4.1.8 MECHANICAL SYSTEMS	406	483	782	76	-299	12,903	12,157	13,033	-746	-876	14,179	14,179	0
4.1.9 INTEGRATION & TEST	264	201	319	-63	-118	5,944	5,330	5,576	-614	-246	8,013	8,013	0
4.1.A PERFORMANCE AND SAFETY ASS	135	135	226	0	-91	2,600	2,600	2,533	0	67	2,935	2,935	0
4.1.B LAT INSTRUMENT OPERATIONS C	3	3	1	0	2	303	303	298	0	4	328	328	0
4.1.C EDUCATION AND PUBLIC OUTRE	44	39	52	-5	-13	2,079	2,075	1,687	-4	388	2,448	2,448	0
4.1.D SCIENCE ANALYSIS SOFTWARE	74	74	58	0	16	2,462	2,462	2,258	0	203	3,019	3,019	0
4.1.E SUBORBITAL FLIGHT TEST	0	0	0	0	0	1,325	1,325	1,325	0	0	1,325	1,325	0
Gen. and Admin.	0	0	0	0	0	0	0	0	0	0	0	0	0
Undist. Budget											0	0	0
Sub Total	2,420	2,473	4,543	53	-2,070	121,471	114,323	119,446	-7,148	-5,124	133,187	133,187	0
Contingency											2,798	2,798	0
Total	2,420	2,473	4,543	53	-2,070	121,471	114,323	119,446	-7,148	-5,124	135,985	135,985	0

Attachment 7
LAT Performance, through November 2004, by Organization

Cost Performance Report - Work Breakdown Structure													
Contractor: Location:					Contract Type/No:			Project Name/No: GLAST LAT Project		Report Period: 10/31/2004		########	
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling		
1	0		0		0	0	0	0		0	0		
OBS[1]	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest	
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
DG *** GSFC	115	100	229	-15	-129	16,914	16,376	16,435	-537	-59	17,541	17,541	0
DH *** HEPL	252	246	580	-7	-335	6,677	6,664	6,393	-13	271	8,094	8,094	0
DL *** SLAC	1,510	1,389	3,121	-121	-1,732	68,336	63,522	69,613	-4,814	-6,091	75,416	75,416	0
DN *** NRL	455	663	554	209	109	24,790	23,027	22,774	-1,763	253	26,679	26,679	0
DO *** Financial Plan	0	0	0	0	0	54	54	59	0	-5	54	54	0
DS *** SSU	43	38	52	-5	-14	2,037	2,033	1,673	-4	360	2,401	2,401	0
DT *** Texas A&M	0	0	0	0	0	16	16	15	0	0	16	16	0
DU *** UCSC	36	28	4	-8	25	2,452	2,435	2,305	-17	130	2,726	2,726	0
DW *** UW	8	8	3	0	5	195	195	179	0	16	260	260	0
Gen. and Admin.	0	0	0	0	0	0	0	0	0	0	0	0	0
Undist. Budget											0	0	0
Sub Total	2,420	2,473	4,543	53	-2,070	121,471	114,323	119,446	-7,148	-5,124	133,187	133,187	0
Contingency											2,798	2,798	0
Total	2,420	2,473	4,543	53	-2,070	121,471	114,323	119,446	-7,148	-5,124	135,985	135,985	0

Attachment 8
LAT Performance Analysis, November 2004

	WBS	Description	BAC	BCWS	BCWP	ACWP	SV $	CV $	%BCWS	%BCWP	%ACWP	SPI	CPI	SPI	CPI	Cpi_Fcst	CpiSpi_Fcst
1	4.1	LAT	133,187	121,471	114,323	119,446	-7,148	-5,124	91.20	85.84	89.68	↔	↓	0.941	0.957	139,156	140,388
2	4.1.1	Instr Mgmt	16,911	14,605	14,605	14,555	0	51	86.37	86.37	86.07	↔	↓	1.000	1.003	16,852	16,852
3	4.1.2	System Engr	7,047	5,963	5,963	5,908	0	55	84.62	84.62	83.83	↔	↓	1.000	1.009	6,982	6,982
4	4.1.4	Tracker	17,126	16,284	15,183	16,418	-1,102	-1,235	95.08	88.65	95.86	↔	↓	0.932	0.925	18,519	18,672
5	4.1.5	Calorimeter	22,022	20,758	19,152	18,883	-1,606	269	94.26	86.97	85.75	↑	↑	0.923	1.014	21,712	21,949
6	4.1.6	ACD	15,595	15,237	14,700	15,105	-537	-405	97.70	94.26	96.85	↔	↓	0.965	0.973	16,025	16,059
7	4.1.7	Electronics	22,238	21,007	18,469	21,868	-2,539	-3,400	94.47	83.05	98.34	↔	↓	0.879	0.845	26,331	26,945
8	4.1.8	Mechanical	14,179	12,903	12,157	13,033	-746	-876	91.01	85.74	91.92	↑	↓	0.942	0.933	15,200	15,333
9	4.1.9	I&T	8,013	5,944	5,330	5,576	-614	-246	74.18	66.51	69.59	↔	↓	0.897	0.956	8,383	8,707
10	4.1.A	PSA	2,935	2,600	2,600	2,533	0	67	88.59	88.59	86.29	↔	↓	1.000	1.027	2,859	2,859
11	4.1.B	ISOC	328	303	303	298	0	4	92.24	92.24	90.94	↔	↑	1.000	1.014	324	324
12	4.1.C	EPO	2,448	2,079	2,075	1,687	-4	388	84.90	84.74	68.91	↓	↔	0.998	1.230	1,991	1,992
13	4.1.D	SAS	3,019	2,462	2,462	2,258	0	203	81.52	81.52	74.78	↔	↔	1.000	1.090	2,770	2,770
14	4.1.E	Balloon Flight	1,325	1,325	1,325	1,325	0	0	100.00	100.00	99.98	↔	↔	1.000	1.000	1,325	1,325

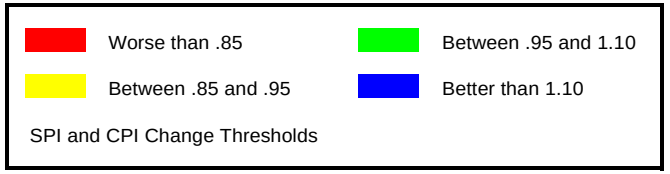
LEGEND

BAC: Budget At Complete
BCWS: Budgeted Cost of Work Scheduled (to date)
BCWP: Budgeted Cost of Work Performed (to date)
ACWP: Actual Cost of Work Performed (to date)

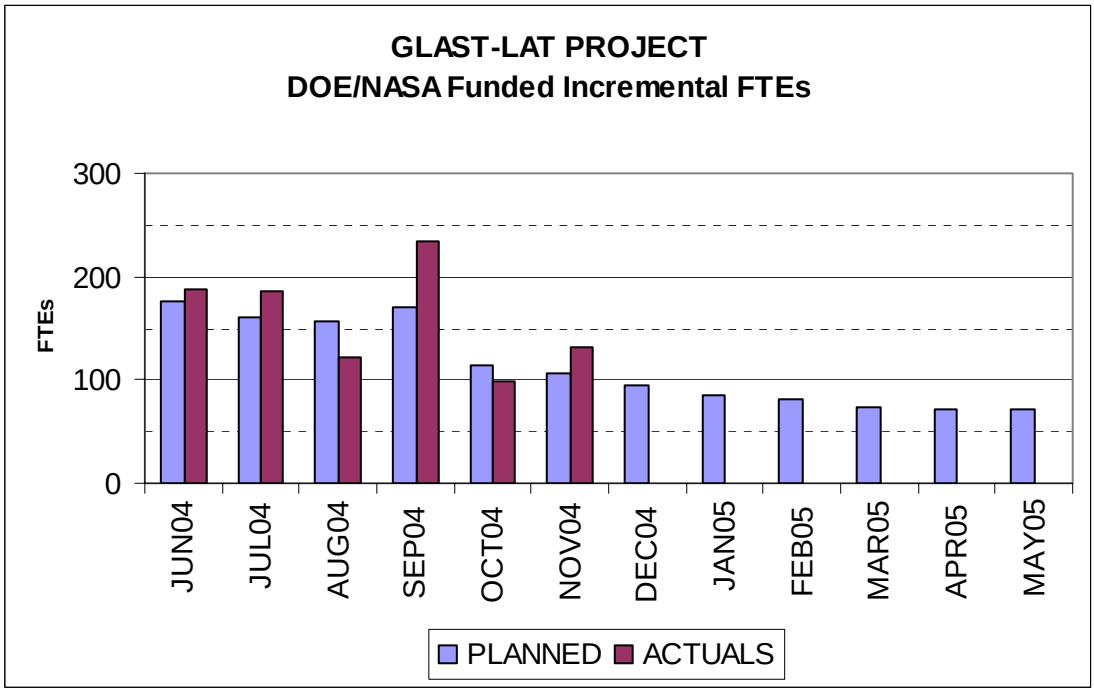
SV $: Schedule Variance = BCWP - BCWS
CV $: Cost Variance = BCWP - ACWP
SPI: Schedule Performance Index = BCWP/BCWS
CPI: Cost Performance Index = BCWP/ACWP

% BCWS: Percent Scheduled = BCWS/BAC
% BCWP: Percent Complete = BCWP/BAC
% ACWP: Percent Spent = ACWP/BAC

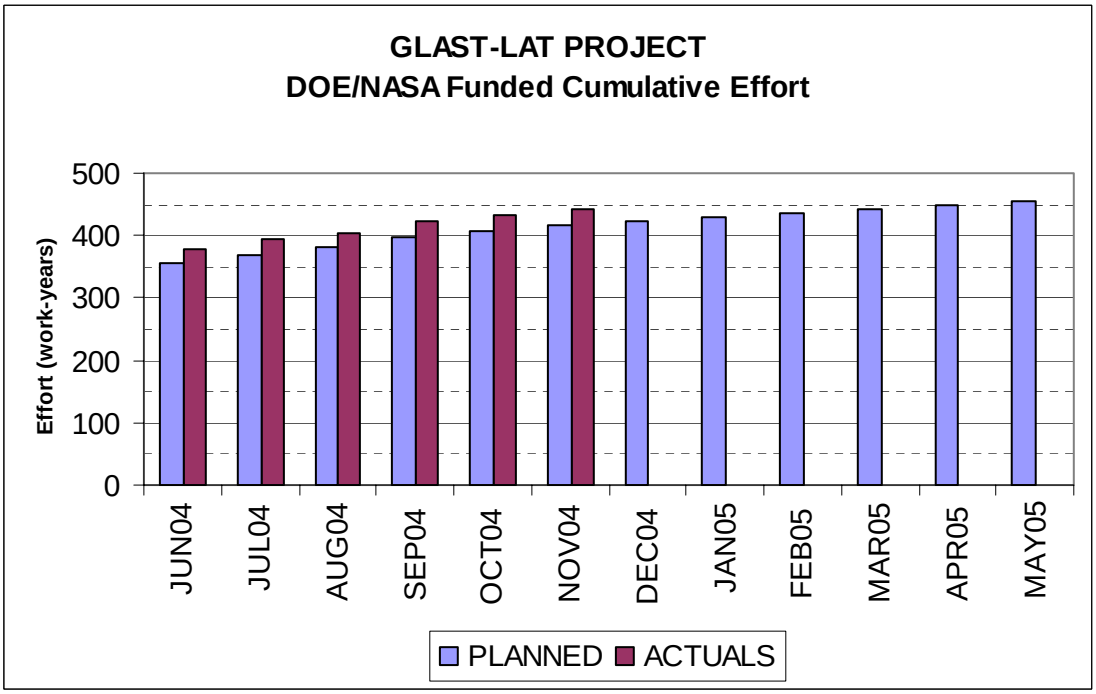
Cpi_Fcst: CPI (to date) EAC Forecast = BAC / CPI
CpiSpi_Fcst: Combination CPI and SPI EAC Forecast = ACWP + (BAC - BCWP) / (CPI *SPI)



Attachment 9
LAT Manpower (DOE/NASA-Funded)



Note: Neither Goddard nor Stanford-HEPL manpower was reported in the month of August, 2004. The September, 2004, incremental FTE report includes a correction, so that the cumulative-to-date actual manpower is correct. Goddard civil servant manpower was not reported in the months of October and November, 2004.



Attachment 10
LAT Manpower Data, through November 2004, by Organization

Program:	Description:	Approval:
LAT3	GLAST LAT Project	Program Manager
Run Date:	Status Date:	Functional Manager
1/3/2005	11/30/2004	Cost Account Manager

OBS		PRIOR	JUN04	JUL04	AUG04	SEP04	OCT04	NOV04	**Cum-to-Date**	DEC04	JAN05	FEB05	MAR05	APR05	MAY05
DG *** GSFC															
FTE	PLANNED	923.3	38.3	31.6	54.1	55.3	13.3	17.8	**1133.6**	13.0	7.7	7.7	7.7	7.7	7.7
	ACTUALS	1069.1	47.3	46.2	0.0	69.7	0.0	16.4	**1248.8**	0.0	0.0	0.0	0.0	0.0	0.0
DH *** HEPL															
FTE	PLANNED	264.9	4.5	4.9	-0.9	2.0	3.8	3.8	**283.0**	3.7	3.8	3.8	3.8	3.7	3.6
	ACTUALS	262.6	3.9	1.5	0.0	5.9	2.4	4.8	**281.0**	0.0	0.0	0.0	0.0	0.0	0.0
DL *** SLAC															
FTE	PLANNED	2184.5	98.2	89.4	85.4	94.3	80.2	77.3	**2709.4**	77.5	70.7	66.0	63.4	60.9	60.7
	ACTUALS	2023.5	101.4	105.0	105.6	124.1	70.9	93.6	**2624.1**	0.0	0.0	0.0	0.0	0.0	0.0
DN *** NRL															
FTE	PLANNED	956.1	52.2	44.2	41.4	31.9	29.4	21.0	**1176.2**	17.6	15.9	12.8	10.7	11.1	11.2
	ACTUALS	980.0	39.8	36.4	31.8	41.1	36.1	29.4	**1194.6**	0.0	0.0	0.0	0.0	0.0	0.0
DS *** SSU															
FTE	PLANNED	96.4	3.2	3.2	3.2	3.2	2.0	2.0	**112.9**	1.9	1.9	1.9	1.9	1.9	1.9
	ACTUALS	114.4	2.7	3.4	4.6	4.9	3.2	3.9	**137.0**	0.0	0.0	0.0	0.0	0.0	0.0
DU *** UCSC															
FTE	PLANNED	253.4	4.4	4.4	4.4	4.4	4.4	4.4	**279.9**	4.4	4.4	4.4	4.4	4.4	4.4
	ACTUALS	301.8	5.5	5.0	5.0	4.7	2.4	0.0	**324.3**	0.0	0.0	0.0	0.0	0.0	0.0
DW *** UW															
FTE	PLANNED	40.1	0.4	0.4	0.4	0.4	0.4	0.4	**42.5**	0.4	0.4	0.4	0.4	0.4	0.4
	ACTUALS	15.2	1.0	1.1	1.0	1.1	1.0	0.1	**20.3**	0.0	0.0	0.0	0.0	0.0	0.0
FF *** France															
FTE	PLANNED	1138.1	15.2	15.2	15.2	15.2	14.2	13.9	**1226.8**	10.8	6.4	6.7	6.7	6.7	6.7
	ACTUALS								**0.0**						
FI *** Italy															
FTE	PLANNED	430.0	14.9	12.8	14.6	15.2	9.1	9.1	**505.7**	7.1	1.5	1.5	1.5	1.5	1.5
	ACTUALS	386.6	10.9	10.9	21.2	0.0	10.9	0.0	**440.4**	0.0	0.0	0.0	0.0	0.0	0.0
FJ *** Japan															
FTE	PLANNED	100.1	0.5	0.5	0.5	0.5	0.5	0.5	**102.8**	0.5	0.5	0.5	0.5	0.5	0.5
	ACTUALS	84.2	1.8	1.8	3.4	0.0	1.8	0.0	**92.9**	0.0	0.0	0.0	0.0	0.0	0.0
FK *** Sweden															
FTE	PLANNED	131.3	3.6	3.6	3.6	3.6	3.6	3.6	**152.7**	2.7	3.4	3.6	3.6	3.6	3.6
	ACTUALS								**0.0**						
Grand Totals:															
	PLANNED	6518.1	235.1	210.0	221.7	225.8	160.8	153.8	**7725.3**	139.5	116.4	109.2	104.5	102.3	102.1
	ACTUALS	5237.4	214.2	211.1	172.6	251.4	128.5	148.2	**6363.3**	0.0	0.0	0.0	0.0	0.0	0.0

4.1 GLAST LAT															
Contributed	PLANNED	2437.5	59.7	49.7	65.6	55.3	47.2	47.9	**2762.8**	45.1	30.6	28.8	30.5	30.5	30.3
	ACTUALS	925.8	25.8	25.3	50.8	16.5	29.6	16.5	**1090.3**	0.0	0.0	0.0	0.0	0.0	0.0
Funded	PLANNED	4080.6	175.4	160.3	156.1	170.5	113.6	106.0	**4962.5**	94.4	85.8	80.4	74.0	71.8	71.8
	ACTUALS	4311.6	188.4	185.8	121.8	234.9	98.8	131.7	**5273.0**	0.0	0.0	0.0	0.0	0.0	0.0
Grand Totals:	PLANNED	6518.1	235.1	210.0	221.7	225.8	160.8	153.8	**7725.3**	139.5	116.4	109.2	104.5	102.3	102.1
	ACTUALS	5237.4	214.2	211.1	172.6	251.4	128.5	148.2	**6363.3**	0.0	0.0	0.0	0.0	0.0	0.0