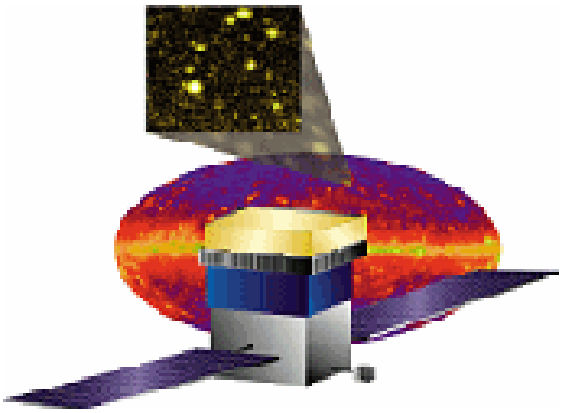
Monthly Progress Report

(Month Ending October 2003)

GLAST Large Area Telescope (LAT)



LAT-MR-02671-01

December 5, 2003

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 October, 2003.

2.0 Recent Progress and Status

The reader will note several references to the pending project replan. As of publication of this report, the replan was completed and approved by the LAT Configuration Control Board. The next monthly report (status as of November 2003) will be against the new plan.

4.1.4 Tracker

The readout controller ASIC time-over-threshold processing problem, causing occasional event reading timeouts, has been resolved. The design has been corrected and verified, and a new ASIC is being fabricated. The multichip module (MCM) printed wiring board radius was machined, and the drawings updated accordingly. The MCM assembly drawings were finalized. Preparations for MCM pre-production were made, and the pre-production started. Testing of the mini-Tracker tower continued, with detailed hit efficiency results. A review of the flex circuit cable interface issues and mechanical design was conducted. A printed circuit was fabricated to act as an interface between a cable and the electronic cable-tester. Sidewalls and coupons are being assembled in the US and in Italy. Tension, compression and short-beam tests have been conducted on the sidewall coupons. Static tests of the bottom tray have been conducted to 5% above qualification levels. The first lot of mid-tray panel closeout machining was completed. The bottom tray panel assembly fixtures are being improved, to allow flexures to be assembled into corner brackets prior to assembly. The bias circuit procurement is underway.

4.1.5 Calorimeter

Close to 500 CsI crystals have now been fully tested and shipped to NRL. Forty-eight qualification unit photodiode assemblies have been produced. A manufacturing readiness review for crystal detector element (CDE) assembly was held. The qualification test program has commenced with the twelve pre-qualification CDEs. A manufacturing readiness review for the carbon composite structure was held. The second structural model was manufactured and is being assembled for strength testing. Flight functional test boards have been used to screen both front-end and readout controller ASIC chips. The prototype AFEE board is in fabrication. The Calorimeter engineering model was returned to NRL from integration & test activities at SLAC. Aluminum components and modifications to the Calorimeter mini-engineering model have been manufactured.

4.1.6 Anticoincidence Detector

Several updated front-end ASIC versions and the third version of the readout controller ASIC were received, tested, and found to be functional. The screening and qualification

parametric test board is complete, and being assembled. Vibration and thermal cycle testing was performed on a populated front-end electronics (FREE) card. A new FREE card is being assembled, which will use flight-type ASICs. The phototube assembly area preparations were completed. Over 25 tile detector assemblies have been completed. The FREE board successfully passed vibration testing. Rough cutting of the base frame aluminum channel has started. Fabrication of the tile detector assemblies has resumed. The use of titanium flexures for mounting the four bottom tiles has been approved, and the design is being verified.

Figure 1: Polished TDA connector.

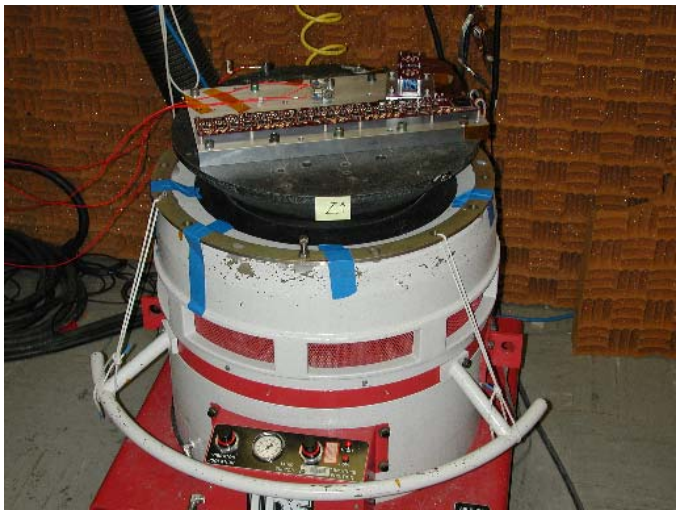


Figure 2: FREE board on vibration shaker.

4.1.7 Electronics

The GASU command-response unit section was debugged. The GASU power supply flight schematic was finalized, and is in layout. The bid package for the tower electronics module was finalized. The board for the data acquisition ASIC performance/function test was fabricated. Engineering model tests of the Calorimeter/Tracker tower power supply were conducted. The tower power supply enclosure was modified. A compact CPI crate enclosure was received and fit-checked. The custom backplane was received, loaded, and is being tested. The crate power supply module was debugged and tested with the backplane and LAT communications board. Procurements of all active components are underway for the power distribution unit, the GASU and GASU power supply, the tower electronics module, the tower power supply, and electronics ground support equipment. Progress was made on several packages for the flight software engineering model build. LAT communication board software and hardware was debugged.

4.1.8 Mechanical Systems

The first grid billet has been rough machined and heat treated. Although the billet's curvature was within specifications, a decision was made to improve it for subsequent operations, and the billet was further straightened. The grid/Tracker flex cable issues were resolved and the grid model was updated with these changes. The radiator specification was released and delivered to Lockheed Martin. The downspout and top flange heat pipes are being manufactured.

4.1.9 Integration & Test

The LAT transportation container vibration analysis was initiated. Seismic analysis of the Van de Graaff accelerator and support structure was completed. The engineering model Van de Graaff data taking was completed. The engineering model tower was de-integrated. The Calorimeter engineering model was shipped back to NRL, and the Tracker minitower was mounted in a test stand with the tower electronics module (TEM) and TEM power supply. A new version of the LAT Test Executive was released.

3.0 Schedule Status

The status of significant milestones identified in the Project Management Plan (LAT-MD-00054-08) for the LAT project 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.

Engineering Model (1x4) Grid (1M1001380)

Baseline/Target Finish: 12/02/02 Projected Finish: 12/19/03 Variance: -260 days

Lack of sufficient manpower, vendor machine failure, and design maturity of the Calorimeter-grid interface definition have impacted the delivery of this milestone. An existing 1x1 grid bay mockup will be used to develop test procedures and electrical

ground support equipment (EGSE). The 1x4 grid has been received at SLAC, and is being tested prior to delivery to I&T. The delay of the 1x4 grid delivery to I&T will be taken under consideration in the project replan.

Tracker Engineering Model (1M1001430)
Baseline/Target Finish: 12/09/02 Projected Finish: 01/02/04 Variance: -258 days
The delivery of the full Tracker EM has been delayed by the redesign of the bottom tray. In the meantime, the upgraded EM minitower has been delivered to I&T, and was used with the aforementioned 1x1 grid bay mockup to develop test procedures and EGSE. The delay of the full tower can be accommodated in the I&T schedule with no further impact.

GEM H/W Driver, Final Version, Elex to I&T/Online (1M1001390)
Baseline/Target Finish: 01/07/03 Projected Finish: 11/14/03 Variance: -218 days
Resources have been diverted from the completion of this milestone to other tasks with higher priority. The need for additional hardware testing is also a factor in the delay. This delay can be accommodated in the Integration & Test schedule with no further impact. (Note: this milestone will be redefined in the project rebaseline plan, and will be considered part of the GASU completion.)

EGSE EM2 Release, Electronics to I&T (1M7941150)
Baseline/Target Finish: 06/12/03 Projected Finish: 12/08/03 Variance: -123 days
Resources have been diverted from the completion of this milestone to other tasks with higher priority, most notably the power supply design. This can be accommodated in the Integration & Test schedule with no further impact.

EM2 Tower Engineering Model from Electronics to Calorimeter (1M75000000)
Baseline/Target Finish: 08/25/03 Projected Finish: 01/22/04 Variance: -97 days
This item is needed for the calibration unit; which will be rescheduled in accordance with the approved change in the beam test schedule.

Calibration Unit Spacecraft Simulator from Electronics to I&T (1M19500400)
Baseline/Target Finish: 08/29/03 Projected Finish: 05/03/04 Variance: -164 days
This item is needed for the calibration unit; which will be rescheduled in accordance with the approved change in the beam test schedule.

EM2 Tower EM Qual Towers A,B from Electronics to Tracker (1M1000920)
Baseline/Target Finish: 10/16/03 Projected Finish: 01/12/04 Variance: -53 days
Given the delay in Tracker modules A&B (see below), resources have been diverted from this task to address other priorities. This is not a schedule driver for the Tracker tower deliveries at this time.

EGSE Calibration Unit Release – Electronics to I&T (1M7941160)
Baseline/Target Finish: 01/14/04 Projected Finish: 04/30/04 Variance: -75 days
This item is needed for the calibration unit; which will be rescheduled in accordance with the approved change in the beam test schedule.

Tracker Modules A& B Ready for Integration (1M1000200)
Baseline/Target Finish: 02/17/04 Projected Finish: 07/23/04 Variance: -111 days
The delay is primarily due to a delay in MCM procurement contract negotiations and availability of parts. This has been further compounded by problems found in the readout controller ASIC, requiring re-fabrication. Issues in the bottom tray design and tower sidewall fabrication have been resolved. The pending replan of the LAT project will address these issues.

Calorimeter Modules A& B Ready for Integration (1M1000210)
Baseline/Target Finish: 02/17/04 Projected Finish: 07/09/04 Variance: -101 days
Withdrawal of French support for CDE manufacturing has delayed Calorimeter deliveries to LAT Integration & Test. The pending replan of the LAT project will take this under consideration.

ACD Calibration Test Unit at SLAC, Tested & RFI (1M1000990)
Baseline/Target Finish: 02/17/04 Projected Finish: 01/18/05 Variance: -228 days
This item is needed for the calibration unit; which will be rescheduled in accordance with the approved change in the beam test schedule.

EM2 TEM Assembly A,B – Electronics to I&T (1M7941120)
Baseline/Target Finish: 02/17/04 Projected Finish: 06/14/04 Variance: -83 days
The schedule for the TEM and associated power supply assemblies will be delayed, as part of the project replan.

EM2 TEM Power Supply Assembly A,B – Electronics to I&T (1M7941130)
Baseline/Target Finish: 02/17/04 Projected Finish: 05/19/04 Variance: -66 days
The schedule for the TEM and associated power supply assemblies will be delayed, as part of the project replan.

Flight Spacecraft Simulator from Electronics to I&T (1M19500540)
Baseline/Target Finish: 02/27/04 Projected Finish: 08/18/04 Variance: -121 days
At the time the baseline date was determined, the spacecraft vendor had not been selected. (Note: this milestone will be redefined in the project rebaseline plan, and will be considered part of the completion of the final electronics ground support equipment.)

Tracker Modules 1&2 Ready for Integration (1M1000220)
Baseline/Target Finish: 03/15/04 Projected Finish: 08/13/04 Variance: -107 days
See “Tracker Modules A&B”, above.

Calorimeter Modules 1&2 Ready for Integration (1M1000230)
Baseline/Target Finish: 03/15/04 Projected Finish: 08/02/04 Variance: -98 days
See “Calorimeter Modules A&B”, above.

Flight TEM Assembly 1,2 – Electronics to I&T (1M7941050)
Baseline/Target Finish: 03/15/04 Projected Finish: 08/10/04 Variance: -104 days
The schedule for flight TEM and associated power supply assemblies will be delayed, as part of the project replan.

Flight TEM Power Supply Assembly 1,2 – Electronics to I&T (1M7941060)
Baseline/Target Finish: 03/15/04 Projected Finish: 07/09/04 Variance: -82 days
The schedule for flight TEM and associated power supply assemblies will be delayed, as part of the project replan.

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.

Note: Favorable cost variance reported by HEPL in Attachment 7 due to non-reporting of actual costs in September and October (Stanford University accounting system issue).

4.1.4 Tracker
Problems found in testing of initial prototypes required extensive redesign, refabrication, and retesting to correct. This resulted in unplanned costs for the engineering model, flex-circuit cables, bias circuits, ASICs, and mechanical and electronics development. These variances will be taken into consideration in the project replan.

4.1.5 Calorimeter

The schedule variance is largely due to a delay in the flight analog front-end electronics boards; the ASICs are not expected to be received until December; this variance will be taken into consideration in the project replan.

4.1.6 Anticoincidence Detector

The flight shell and tile detector assembly tiedown procurements were not received on schedule (not considered critical path). Manpower was diverted from the MGSE design work to support the tile shell assembly design. MGSE hardware procurements have been deferred until fiscal year 2004.

The unfavorable cost variance is due to higher labor costs than planned for the tile shell assembly and base electronics assembly (BEA) work. Contract labor support is being reduced in favor of NASA/Goddard civil servant labor, where appropriate. The GLAST mission has provided funding to appropriate ACD items, contributing to the favorable cost variance in the current period.

4.1.7 Electronics

The lead time for the test bed parts order is longer than originally anticipated, resulting in an unfavorable schedule variance.

The unfavorable cost variance is due to an advance payment required by British Aerospace for the flight processors. This was not in the baseline schedule, rather, payment was planned to occur when the items were received. A spacecraft interface board has been added in the event processing unit crates to simplify flight software, more iterations of the engineering model board (plus more boards) were required than planned, and more EGSE test stands were required than planned. These variances will be reduced as part of the project replan.

4.1.8 Mechanical Systems

The unfavorable schedule variance is due to filling key engineering and design positions slower than planned. These positions have been filled, however, additional personnel may be required to recover schedule. There has also been a delay in placement of the Lockheed Martin Phase II subcontract (now placed). This variance will be addressed as part of the project replan.

4.1.9 Integration & Test

The mechanical ground support equipment work has been unfavorably affected by the delay in receiving the engineering models. This variance will be minimized as part of the project replan.

4.1.A Performance & Safety Assurance

The favorable cost variance is due to the delay in the hire of a part-time parts engineer at NRL (now on board), specific mission-assurance-related activities being covered by other LAT subsystems, less travel taken than planned, and invoicing delays. The replan of the

LAT project relieves a portion of this variance; the invoicing delays are expected to be resolved by the end of the calendar year.

4.1.B Instrument Operations Center

The unfavorable schedule variance results from a delay in hiring additional planned resources. Recruitment for a regular subsystem manager (non-acting) is underway at SLAC, which is the first step towards increasing the staffing. The pending replan of the LAT project includes incorporating much of the IOC cost into the SLAC operating budget; this will alleviate the positive cost variance.

4.1.D Science Analysis Software

Hiring delays at Stanford/HEPL and GSFC have resulted in a favorable cost variance. These hires have now been completed; the favorable cost variance will be returned to contingency.

6.0 Change Control and Contingency Analysis

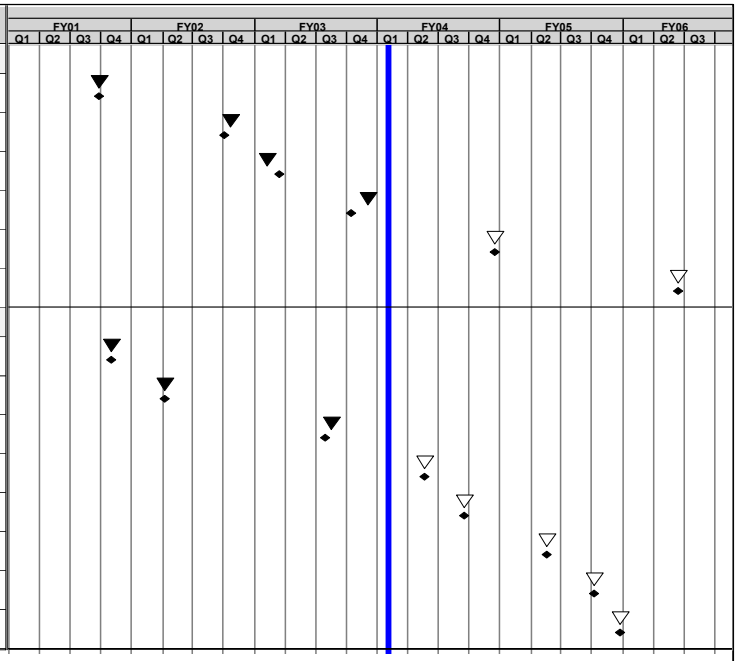
No change requests were approved by the LAT Configuration Control Board during this period. The fabrication phase cost baseline remains at $107.7M; contingency remains at $25.5M. (In anticipation of the pending replan of the project, funding was increased in August to $133.2M.)

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.

Attachment 1
Milestones, Levels 1-2

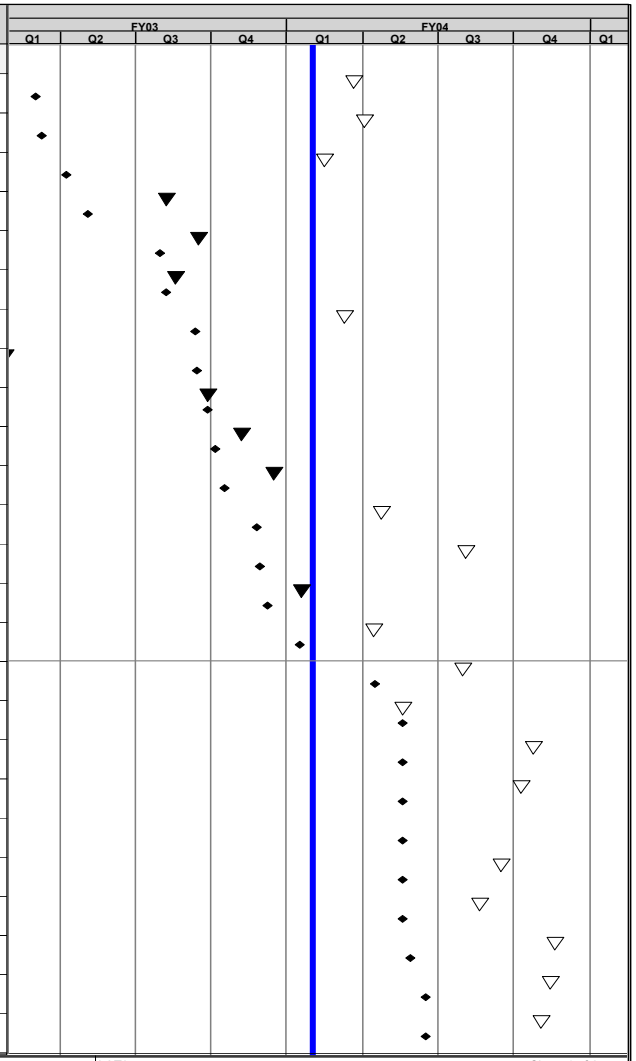
Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date
DOE/NASA Joint Oversight Group (Level 1				
1M1P000000	DOE Critical Decision (CD) 0 Approval	06/25/01A	0	06/25/01A
1M1P000010	CD-1 Approval	07/01/02*	-15	07/23/02A
1M1P000020	CD-2 Approval	12/13/02*	23	11/08/02A
1M1P000030	CD-3 Approval	07/15/03*	-50	09/03/03A
1M1P000060	Flight GRID Complete	09/15/04*	0	09/15/04*
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)	04/30/03*	-12	05/16/03A
1M1000730	TKR, CAL FM A, B Available for Calibration Unit	02/17/04*	0	02/17/04*
1M1000740	Start LAT Integration	06/15/04*	0	06/15/04*
1M1000700	Pre Environmental Testing Review	02/15/05*	0	02/15/05*
1M1000120	PSR-(Instrument Pre-Ship Review)	07/07/05*	0	07/07/05*
1M1000140	LAT Ready for Integration (RFI) to Spacecraft	09/22/05*	0	09/22/05*



Run Date 12/04/03 10:22	**GLAST LAT PROJECT**	LAT3 Sheet 1 of 1
	Project Milestones (Level 1 and 2)	LT_MS1-2

Attachment 2
Level 3 Milestones (One-Year View)
Page 1 of 2

Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date	AV	ND
Instrument Project Office (Level 3						
1M1001380	Delivery of EM (1X4) Grid to I&T/MSGE	12/02/02*	-260	12/19/03*	8	9
1M1001430	Delv of TKR EM to SLAC I&T/MGSE	12/09/02*	-258	01/02/04*	4	9
1M1001390	GEM h/w driver, final ver-ELX to I&T/Online	01/07/03	-218	11/14/03	7	9
1M7941350	High Voltage Power Supply (Bd & Prts)-ACD toElec	02/03/03*	-66	05/07/03A	6	7
1M1001500	Online EM2 release #1 to FSW	04/30/03	-32	06/16/03A	9	7
1M7941340	(11) FREE Bds & ASICS, (1) Fully Tested Bd - EM2	05/07/03*	-8	05/19/03A	6	7
1M7941150	EGSE EM2 Release-Elec to I&T	06/12/03*	-123	12/08/03*	7	9
1M1001570	CU Monte Carlo sim from SAS to I&T/SVAC	06/13/03*	156	10/22/02A	D	9
1M1001550	Online EM2 release #2 to ELX	06/26/03	0	06/26/03A	9	7
1M59000000	EM from CAL to I&T	07/07/03*	-23	08/07/03A	5	9
1M1000910	(36) MCM's for EM2 from Tracker to Elec	07/18/03	-40	09/15/03A	4	7
1M75000000	(6) EM2 TEM-from Elec to CAL	08/25/03	-97	01/22/04*	7	5
1M19500400	CU S/C Simulator - ELX to I&T Online	08/29/03*	-164	05/03/04*	7	9
1M1001520	EM CAL Returned to NRL (arrives on dock)	09/08/03*	-29	10/17/03A	9	5
1M1000920	EM2 TEM for Qual Towers A,B from Elec to Tracker	10/16/03*	-53	01/12/04*	7	4
1M7941160	EGSE Calibration Unit Release-Elec to I&T	01/14/04	-75	04/30/04	7	9
1M005480	IOC CDR	02/17/04*	0	02/17/04*	B	B
1M1000200	Tracker Modules A & B RFI (for Calibration)	02/17/04*	-111	07/23/04*	4	9
1M1000210	Calorimeter Modules A & B RFI (for Calibration)	02/17/04*	-101	07/09/04*	5	9
1M1000990	ACD Calibration Test Unit at SLAC, Tested & RFI	02/17/04*	-228	01/18/05*	6	9
1M7941120	EM2 TEM Assy A,B-Elec to I&T	02/17/04*	-83	06/14/04*	7	9
1M7941130	EM2 TEM PS Assy A,B-Elec to I&T	02/17/04*	-66	05/19/04*	7	9
1M19500540	Flt S/C Simulator - ELX to I&T	02/27/04*	-121	08/18/04*	7	9
1M1000220	Tracker Modules 1 & 2 RFI (for Calibration)	03/15/04*	-107	08/13/04*	4	9
1M1000230	Calorimeter Modules 1 & 2 RFI (for Calibration)	03/15/04*	-98	08/02/04*	5	9



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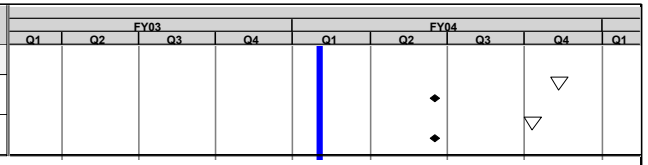
GLAST LAT PROJECT
Project Milestones (Level 3)
1 Year View (+/- 6mo)

LAT3
LTX1 - MS (L3)
FLX1- MS (L3)

Sheet 1 of 2

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

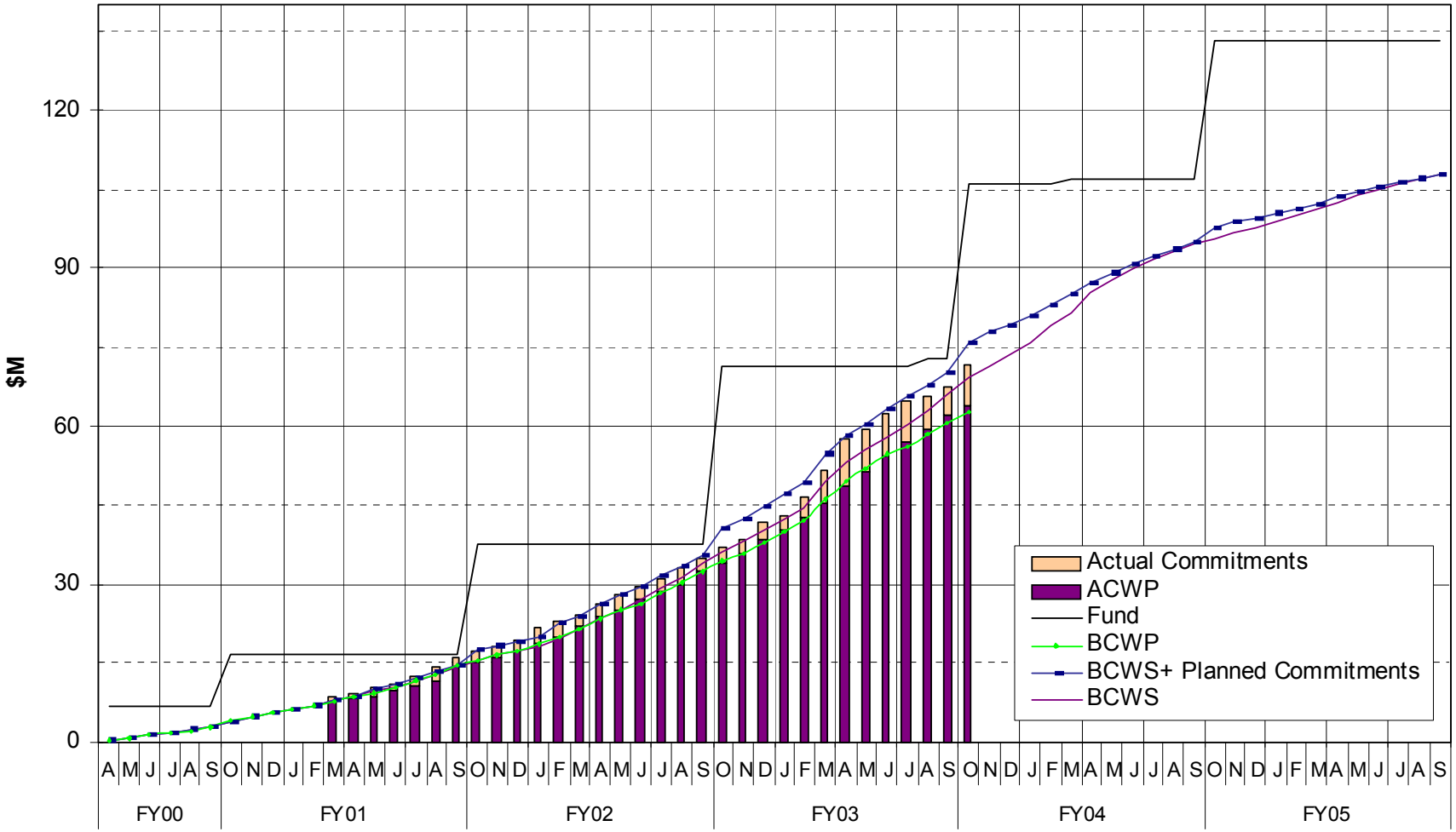
Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date	AV	ND
Instrument Project Office (Level 3						
1M7941050	Flight TEM Assy 1,2-Elec to I&T	03/15/04*	-104	08/10/04*	7	9
1M7941060	Flight TEM PS Assy 1,2-Elec to I&T	03/15/04*	-82	07/09/04*	7	9



Run Date 12/04/03 10:21 © Primavera Systems, Inc.	**GLAST LAT PROJECT** **Project Milestones (Level 3)** **1 Year View (+/- 6mo)**	LAT3 LTX1 - MS (L3) FLX1- MS (L3) Sheet 2 of 2

Attachment 3

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



Attachment 4
LAT Costs, through October 2003, by WBS

Monthly Contractor Financial Management Report									Report for Month Ending: 10/31/2003	
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	NOV03	DEC03				
4.1.1 INSTRUMENT MANAGEMENT	252	329	9,525	9,565	241	228	5,363	15,357	15,357	
4.1.2 SYSTEM ENGINEERING	11	161	3,742	4,266	128	124	2,458	6,453	6,453	
4.1.4 TRACKER	392	86	9,789	9,562	111	54	768	10,722	10,722	
4.1.5 CALORIMETER	384	831	10,513	11,835	508	513	6,296	17,830	17,830	
4.1.6 ANTICOINCIDENCE DETECTOR	42	275	8,801	9,416	170	219	2,835	12,025	12,025	
4.1.7 ELECTRONICS	495	577	8,284	8,157	309	561	7,517	16,672	16,672	
4.1.8 MECHANICAL SYSTEMS	133	257	5,899	7,181	191	235	4,047	10,373	10,373	
4.1.9 INTEGRATION & TEST	131	217	2,437	2,939	146	133	3,871	6,588	6,588	
4.1.A PERFORMANCE AND SAFETY ASSURANCE	24	50	820	1,110	39	37	712	1,607	1,607	
4.1.B LAT INSTRUMENT OPERATIONS CENTER	0	34	263	765	26	29	2,194	2,512	2,512	
4.1.C EDUCATION AND PUBLIC OUTREACH	22	78	1,023	1,187	58	54	1,549	2,684	2,684	
4.1.D SCIENCE ANALYSIS SOFTWARE	18	75	1,472	1,792	66	63	1,994	3,595	3,595	
4.1.E SUBORBITAL FLIGHT TEST	0	0	1,325	1,321	0	0	-4	1,321	1,321	
Gen. and Admin.	0	0	0	0	0	0	0	0	0	
Total	1,903	2,972	63,894	69,093	1,993	2,251	39,600	107,737	107,737	

Attachment 5
LAT Costs, through October 2003, by Organization and Cost Code

Monthly Contractor Financial Management Report									Report for Month Ending: 10/31/2003	
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	NOV03	DEC03				
DG *** GSFC	23	327	9,772	10,894	210	257	4,335	14,573	14,573	
DH *** HEPL	0	202	3,777	4,995	143	154	5,123	9,197	9,197	
DL *** SLAC	1,367	1,213	34,412	34,379	868	1,021	17,760	54,061	54,061	
DN *** NRL	445	1,104	12,919	15,618	676	729	9,976	24,300	24,300	
DO *** Financial Plan Transfer/Sub Out	0	0	38	32	0	0	-6	32	32	
DS *** SSU	22	75	1,018	1,179	56	52	1,482	2,609	2,609	
DT *** Texas A&M	0	0	15	16	0	0	0	16	16	
DU *** UCSC	45	42	1,863	1,896	33	31	739	2,666	2,666	
DW *** UW	0	9	79	85	7	7	190	283	283	
Total	1,903	2,972	63,894	69,093	1,993	2,251	39,600	107,737	107,737	

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	NOV03	DEC03				
RL LABOR	1,105	1,412	35,138	36,469	1,254	1,150	20,961	58,503	58,503	
FTE (DOE/NASA)	*80.0*	*111.9*	*3,103.3*	*3,172.7*	*120.0*	*118.0*	*1,703.9*	*5,045.2*	*5,045.2*	
HOURS (DOE/NASA)	*14,711*	*20,587*	*522,528*	*526,643*	*17,268*	*16,110*	*276,922*	*832,828*	*832,828*	
RT TRAVEL	41	83	964	1,727	84	67	2,191	3,306	3,306	
RM MATERIAL & SERVICES	757	1,462	25,817	28,521	610	888	14,822	42,137	42,137	
RX MPS & LAB TAX	0	16	1,974	2,376	46	147	1,624	3,791	3,791	
Total (not incl FTE/Hours)	1,903	2,972	63,894	69,093	1,993	2,251	39,600	107,737	107,737	

Attachment 6
LAT Performance, through October 2003, by WBS

Cost Performance Report - Work Breakdown Structure													
Contractor: Location:					Contract Type/No:			Project Name/No: GLAST LAT Project		Report Period: 9/30/2003 ########			
Quantity 1	Negotiated Cost 0		Est. Cost Authorized Unpriced Work 0		Tgt. Profit/ Fee % 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	329	329	252	0	77	9,565	9,565	9,525	0	40	15,357	15,357	0
4.1.2 SYSTEM ENGINEERING	161	161	11	0	150	4,266	4,266	3,742	0	523	6,453	6,453	0
4.1.4 TRACKER	86	74	392	-12	-318	9,562	8,756	9,789	-806	-1,033	10,722	10,722	0
4.1.5 CALORIMETER	831	584	384	-248	200	11,835	10,151	10,513	-1,684	-362	17,830	17,830	0
4.1.6 ANTICOINCIDENCE DETECTOR	275	108	42	-168	66	9,416	7,813	8,801	-1,603	-987	12,025	12,025	0
4.1.7 ELECTRONICS	577	196	495	-381	-299	8,157	7,337	8,284	-820	-947	16,672	16,672	0
4.1.8 MECHANICAL SYSTEMS	257	242	133	-15	109	7,181	6,197	5,899	-983	298	10,373	10,373	0
4.1.9 INTEGRATION & TEST	217	176	131	-41	44	2,939	2,588	2,437	-351	150	6,588	6,588	0
4.1.A PERFORMANCE AND SAFETY ASS	50	50	24	0	26	1,110	1,110	820	0	290	1,607	1,607	0
4.1.B LAT INSTRUMENT OPERATIONS (	34	22	0	-11	22	765	629	263	-135	366	2,512	2,512	0
4.1.C EDUCATION AND PUBLIC OUTRE	78	98	22	20	76	1,187	1,131	1,023	-56	108	2,684	2,684	0
4.1.D SCIENCE ANALYSIS SOFTWARE	75	61	18	-15	43	1,792	1,784	1,472	-8	312	3,595	3,595	0
4.1.E SUBORBITAL FLIGHT TEST	0	0	0	0	0	1,321	1,321	1,325	0	-4	1,321	1,321	0
Gen. and Admin.	0	0	0	0	0	0	0	0	0	0	0	0	0
Undist. Budget											0	0	0
Sub Total	2,972	2,100	1,903	-872	197	69,093	62,648	63,894	-6,445	-1,246	107,737	107,737	0
Contingency											25,483	25,483	0
Total	2,972	2,100	1,903	-872	197	69,093	62,648	63,894	-6,445	-1,246	133,220	133,220	0

Attachment 7
LAT Performance, through October 2003, by Organization

Cost Performance Report - Work Breakdown Structure													
Contractor: Location:					Contract Type/No:			Project Name/No: GLAST LAT Project		Report Period: 9/30/2003		########	
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 Work Performed	Variance		Budgeted Cost		Actual Cost Work Performed	Variance			Latest Revised Estimate	
Item	Work Scheduled	Work Performed		Schedule	Cost	Work Scheduled	Work Performed		Schedule	Cost	Budgeted		Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
DG *** GSFC	327	159	23	-168	136	10,894	9,291	9,772	-1,603	-480	14,573	14,573	0
DH *** HEPL	202	160	0	-42	160	4,995	4,764	3,777	-231	987	9,197	9,197	0
DL *** SLAC	1,213	911	1,367	-302	-456	34,379	31,612	34,412	-2,768	-2,800	54,061	54,061	0
DN *** NRL	1,104	723	445	-380	278	15,618	13,848	12,919	-1,769	929	24,300	24,300	0
DO *** Financial Plan	0	0	0	0	0	32	32	38	0	-6	32	32	0
DS *** SSU	75	88	22	13	66	1,179	1,118	1,018	-60	100	2,609	2,609	0
DT *** Texas A&M	0	0	0	0	0	16	16	15	0	0	16	16	0
DU *** UCSC	42	48	45	7	3	1,896	1,881	1,863	-15	18	2,666	2,666	0
DW *** UW	9	9	0	0	9	85	85	79	0	6	283	283	0
Gen. and Admin.	0	0	0	0	0	0	0	0	0	0	0	0	0
Undist. Budget											0	0	0
Sub Total	2,972	2,100	1,903	-872	197	69,093	62,648	63,894	-6,446	-1,246	107,737	107,737	0
Management Resrv.											25,483	25,483	0
Total	2,972	2,100	1,903	-872	197	69,093	62,648	63,894	-6,446	-1,246	133,220	133,220	0

Attachment 8
LAT Performance Analysis, October 2003

	WBS	BAC	BCWS	BCWP	ACWP	SV $	CV $	% BCWS	% BCWP	% ACWP	SPI Trend	CPI Trend	SPI	CPI	Cpi_Fcst	CpiSpi_Fcst
1	4.1	107,737	69,093	62,648	63,894	-6,446	-1,246	64.13	58.15	59.31	↓	↑	0.907	0.981	109,879	114,611
2	4.1.1	15,357	9,565	9,565	9,525	0	40	62.28	62.28	62.02	↔	↑	1.000	1.004	15,292	15,292
3	4.1.2	6,453	4,266	4,266	3,742	0	523	66.11	66.11	58.00	↔	↑	1.000	1.140	5,661	5,661
4	4.1.4	10,722	9,562	8,756	9,789	-806	-1,033	89.17	81.66	91.30	↔	↓	0.916	0.894	11,987	12,190
5	4.1.5	17,830	11,835	10,151	10,513	-1,684	-362	66.38	56.94	58.96	↔	↑	0.858	0.966	18,465	19,784
6	4.1.6	12,025	9,416	7,813	8,801	-1,603	-987	78.30	64.98	73.19	↔	↔	0.830	0.888	13,544	14,517
7	4.1.7	16,672	8,157	7,337	8,284	-820	-947	48.93	44.01	49.69	↓	↓	0.900	0.886	18,823	20,001
8	4.1.8	10,373	7,181	6,197	5,899	-983	298	69.23	59.75	56.87	↔	↑	0.863	1.051	9,874	10,505
9	4.1.9	6,588	2,939	2,588	2,437	-351	150	44.61	39.28	37.00	↔	↑	0.880	1.062	6,206	6,717
10	4.1.A	1,607	1,110	1,110	820	0	290	69.04	69.04	51.00	↔	↔	1.000	1.354	1,187	1,187
11	4.1.B	2,512	765	629	263	-135	366	30.44	25.05	10.48	↔	↔	0.823	2.389	1,051	1,221
12	4.1.C	2,684	1,187	1,131	1,023	-56	108	44.23	42.13	38.12	↑	↑	0.953	1.105	2,428	2,498
13	4.1.D	3,595	1,792	1,784	1,472	-8	312	49.85	49.63	40.95	↓	↑	0.996	1.212	2,966	2,973
14	4.1.E	1,321	1,321	1,321	1,325	0	-4	100.00	100.00	100.29	↔	↔	1.000	0.997	1,325	1,325

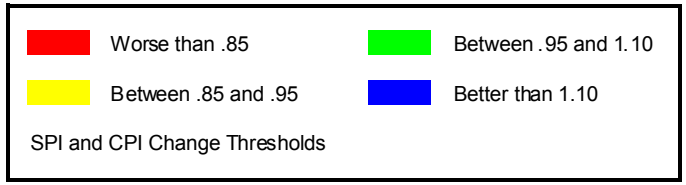
LEGEND

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)

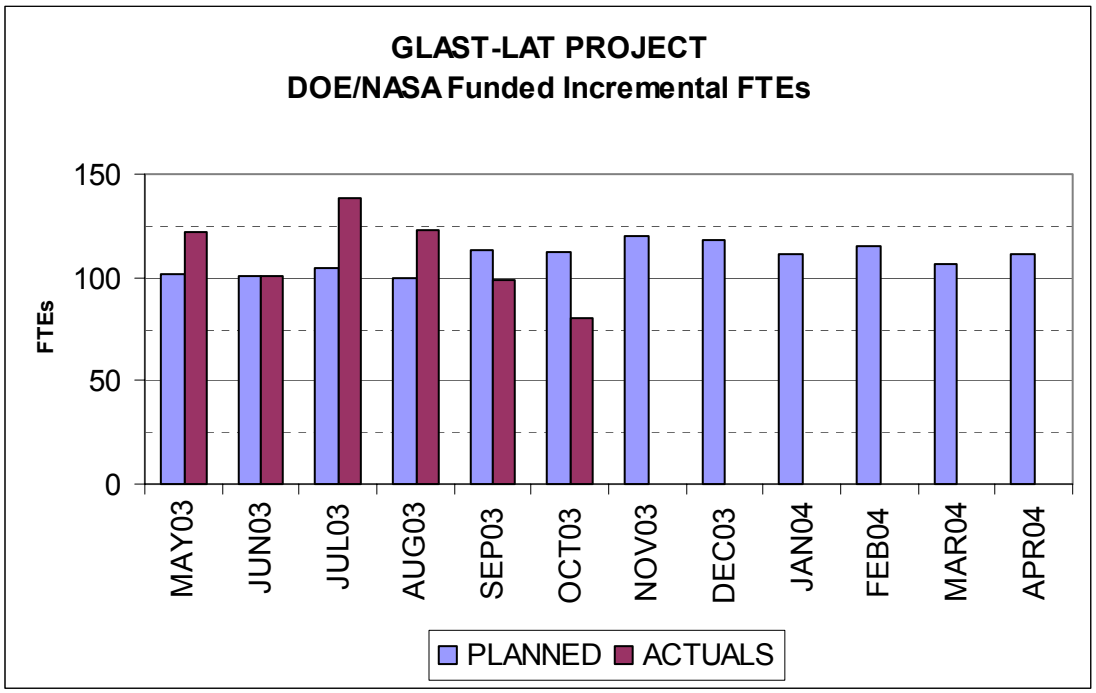
SV $: Schedule Variance = BCWP - BCWS
CV $: Cost Variance = BCWP - ACWP
SPI: Schedule Performance Index = BCWP/BCWS
CPI: Cost Performance Index = BCWP/ACWP

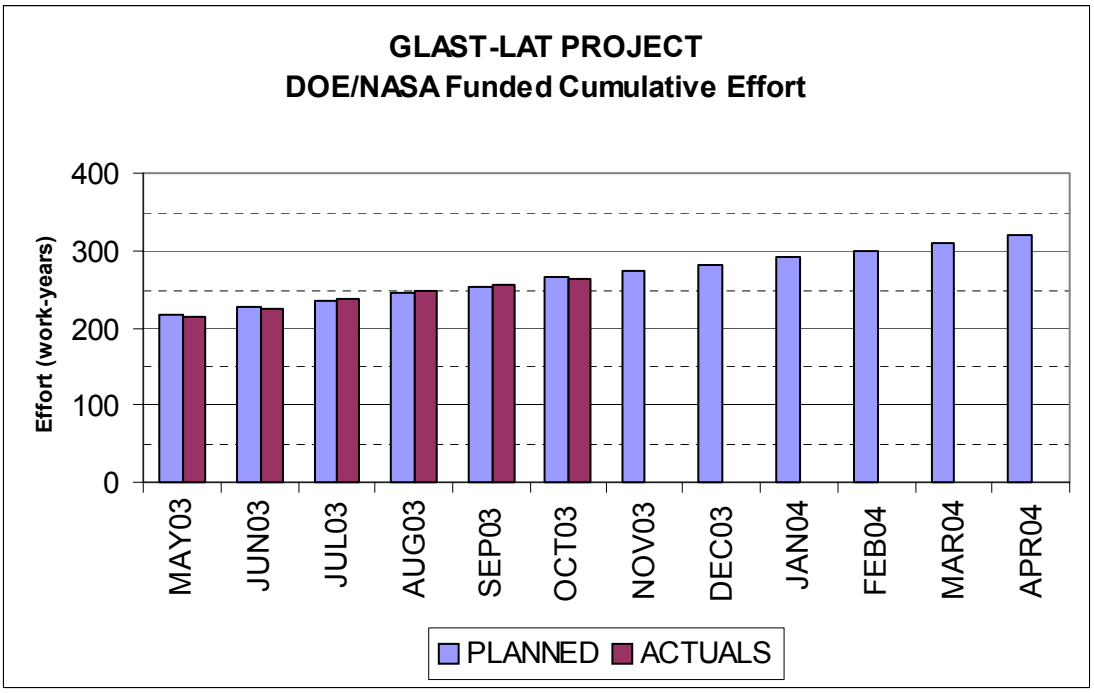
% BCWS: Percent Scheduled = BCWS/BAC
% BCWP: Percent Complete = BCWP/BAC
% ACWP: Percent Spent = ACWP/BAC

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)





Attachment 10
LAT Manpower Data, through October 2003, by Organization

Program:	Description:	Approval:
LAT3	GLAST LAT Project	Program Manager
Run Date:	Status Date:	Functional Manager
12/3/2003	10/31/2003	Cost Account Manager

OBS		PRIOR	MAY03	JUN03	JUL03	AUG03	SEP03	OCT03	**Cum-to-Date**	NOV03	DEC03	JAN04	FEB04	MAR04	APR04
DG *** GSFC															
FTE	PLANNED	579.3	22.7	22.4	17.6	18.6	22.0	22.2	**704.7**	19.8	20.8	22.7	22.3	20.8	20.8
	ACTUALS	538.6	29.0	11.8	52.6	39.3	23.6	0.0	**694.9**	0.0	0.0	0.0	0.0	0.0	0.0
DH *** HEPL															
FTE	PLANNED	259.7	7.7	6.4	7.2	6.6	8.8	7.2	**303.5**	5.9	7.7	7.7	10.8	8.0	14.8
	ACTUALS	206.8	3.6	3.3	5.1	4.5	0.0	0.0	**223.3**	0.0	0.0	0.0	0.0	0.0	0.0
DL *** SLAC															
FTE	PLANNED	1218.4	61.3	56.1	60.9	62.4	64.7	62.7	**1586.5**	62.8	59.3	54.1	56.2	55.1	53.8
	ACTUALS	1136.5	62.7	55.8	50.3	52.2	55.0	64.3	**1476.7**	0.0	0.0	0.0	0.0	0.0	0.0
DN *** NRL															
FTE	PLANNED	563.1	19.8	26.7	28.7	21.9	25.8	32.5	**718.5**	43.7	40.1	33.2	30.0	27.7	28.0
	ACTUALS	568.3	26.0	30.3	27.3	25.7	30.1	20.7	**728.4**	0.0	0.0	0.0	0.0	0.0	0.0
DS *** SSU															
FTE	PLANNED	57.3	2.9	2.9	2.9	2.9	2.9	2.3	**73.8**	2.4	2.3	2.3	2.3	2.2	2.3
	ACTUALS	68.7	3.3	1.3	2.5	4.4	3.7	2.4	**86.2**	0.0	0.0	0.0	0.0	0.0	0.0
DU *** UCSC															
FTE	PLANNED	184.7	4.8	4.7	4.5	4.5	4.5	4.5	**212.1**	4.5	4.5	4.5	4.5	4.5	4.5
	ACTUALS	227.8	8.4	6.9	7.1	6.4	-5.2	4.3	**255.7**	0.0	0.0	0.0	0.0	0.0	0.0
DW *** UW															
FTE	PLANNED	34.9	0.4	0.4	0.4	0.4	0.4	0.4	**37.3**	0.4	0.4	0.4	0.4	0.4	0.4
	ACTUALS	4.3	0.0	1.7	1.1	0.0	2.0	0.0	**9.0**	0.0	0.0	0.0	0.0	0.0	0.0
FF *** France															
FTE	PLANNED	880.8	31.2	31.0	31.0	31.0	31.0	31.4	**1067.3**	31.4	24.1	14.2	14.5	14.5	14.5
	ACTUALS								**0.0**						
FI *** Italy															
FTE	PLANNED	348.0	19.2	13.0	11.1	12.0	14.1	14.8	**432.2**	15.3	15.1	13.4	11.3	8.6	1.5
	ACTUALS	245.5	10.9	10.9	10.9	10.9	10.9	10.9	**310.6**	0.0	0.0	0.0	0.0	0.0	0.0
FJ *** Japan															
FTE	PLANNED	86.4	2.8	1.1	1.0	1.0	1.0	1.0	**94.3**	1.0	1.0	1.0	1.0	0.9	0.5
	ACTUALS	61.5	1.8	1.8	1.8	1.8	1.8	1.8	**72.0**	0.0	0.0	0.0	0.0	0.0	0.0
FK *** Sweden															
FTE	PLANNED	74.0	5.1	5.1	5.1	5.1	5.1	5.1	**104.6**	5.1	3.8	3.5	3.6	3.6	3.6
	ACTUALS								**0.0**						
Grand Totals:															
	PLANNED	4286.5	177.7	169.7	170.2	166.3	180.1	184.2	**5334.7**	192.4	179.1	156.9	156.9	146.3	144.5
	ACTUALS	3057.9	145.6	123.6	158.6	145.1	121.9	104.2	**3856.8**	0.0	0.0	0.0	0.0	0.0	0.0

4.1 GLAST LAT															
Contributed	PLANNED	1745.7	76.0	69.5	65.5	66.1	67.0	72.3	**2162.0**	72.5	60.6	45.3	42.2	40.0	32.9
	ACTUALS	616.9	23.8	22.8	20.6	22.5	22.8	24.3	**753.6**	0.0	0.0	0.0	0.0	0.0	0.0
Funded	PLANNED	2540.7	101.8	100.3	104.7	100.1	113.1	111.9	**3172.7**	119.9	118.5	111.6	114.7	106.3	111.6
	ACTUALS	2441.0	121.8	100.8	138.0	122.7	99.1	80.0	**3103.3**	0.0	0.0	0.0	0.0	0.0	0.0
Grand Totals:	PLANNED	4286.5	177.8	169.8	170.2	166.3	180.1	184.1	**5334.7**	192.4	179.1	156.9	156.9	146.3	144.5
	ACTUALS	3057.9	145.6	123.6	158.6	145.1	121.9	104.2	**3856.8**	0.0	0.0	0.0	0.0	0.0	0.0