

Monthly Progress Report

(Month Ending November 2002)

GLAST Large Area Telescope (LAT)

LAT-MR-01211-01

January 17, 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 November, 2002.

2.0 Recent Progress and Status

A quarterly review was conducted November 12-13.

4.1.4 Tracker

Assembly of the engineering model multichip modules progressed. There were some minor problems bonding the right angle interconnect and the wire bonding of the ASIC's. The units are now in final test with good results. These pre-production units are teaching us a lot about how to build the flight units in an efficient manner. The new encapsulation material was tested at G&A in Italy, with good results. Flight ladder production has commenced. New bottom tray corner fittings were machined and will be installed on a prototype tray. Coupon testing of the old and new corner joint configuration is in progress. Engineering model assembly continues in Italy. The bare tray panel assembly is complete, and the mounting of tungsten and Kapton onto these trays is in progress.

4.1.5 Calorimeter

A visit was made to Amcrys to finalize crystal drawing and specifications, and review fabrication plans. The first eight crystal detector elements (CDEs) were bonded in France. 110 CDEs for the engineering model have been manufactured; performance testing indicates bonding problems in about 20% of the CDEs. Investigations are underway and include rebonding of the bad CDEs. The silicone elastomer proposed as a replacement for the optical window on the PIN diode has passed outgassing tests. The revised design for the base plate was reviewed and approved for manufacturing. Modifications to the mechanical ground support equipment for insertion of the CDEs into the structure are complete. Testing of the CDEs in the mechanical structure with the pre-engineering model AFEE-X printed circuit board shows good results; triggering and readout anomalies are being investigated. The AFEE-Y printed circuit board has been manufactured. The Calorimeter front-end ASICs (version 7) have been received and are being functionally tested.

4.1.6 Anticoincidence Detector

Vibration testing was performed on four phototube/resistor network assemblies. The second set of 30 flight phototubes were received. A long bottom row tile was tested and shown to meet all requirements. The thermal vacuum test setup was completed for the test of three tile detector assemblies and four phototube/resistor network assemblies. It was demonstrated that the flight tube/resistor network was capable of operating at particle rates of up to tens of KHz (exceeding the requirement). Tests of the flight detector string shows that the electronics can qualitatively separate the signals from the noise and

backsplash. The front end electronics board design was completed, and the front-end version 4 ASIC was submitted.

4.1.7 Electronics

Two tower engineering model ASICs were completed. A prototype of the Y-version AFEE board was fabricated and one layer loaded; the X-version AFEE board layout was completed. The field-programmable gate array version of the Tracker multichip module was designed, fabricated, and loaded before submission. The ACD readout controller was incorporated into the ASIC and verified. A meeting was held with the spacecraft vendor to discuss flight software resource allocation, commanding, and basic utilities.

4.1.8 Mechanical Systems

The detailed radiator design is underway, and the grid design is being finalized. Friction testing has been completed, with acceptable results. The engineering model (1x4) grid detailed design has been completed, and the procurement is underway. The second phase of the engineering model heat pipe testing is complete. The electronic box packaging consultant has been hired, and an evaluation of manpower requirements through the subsystem peer review date has been performed.

4.1.9 Integration & Test

Online run control, scripts, and graphical user interface have been completed. The Calorimeter mechanical insertion test was successful. Plans were made for the engineering model calibration. The third version of the airplane test plan has been drafted.

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 of over one week to the future milestones are discussed below.

High Voltage Power Supply (1M794135)

Baseline/Target Finish: 11/15/02 Projected Finish: 02/03/03 Variance: -46 days
A delay in the finalization of board size impacted this delivery from ACD to Electronics. This variance does not impact any other significant activities or milestones. (In December, the LAT Configuration Control Board approved changing the baseline date of this milestone to match the projected finish date.)

EM1 EGSE Software Releases (1M1001510 through 1M1001514)

Baseline/Target Finish: 12/05/02 Projected Finish: 12/13/02 Variance: -6 days
This delay does not impact any other significant activities or milestones. (These releases were made as projected in December.)

Flight Software System Specification (1M1001360)

Baseline/Target Finish: 12/20/02 Projected Finish: 01/10/03 Variance: -8 days
(This milestone was completed in December, ahead of schedule.)

Instrument Power System description (1M1001460)

Baseline/Target Finish: 12/23/02 Projected Finish: 03/04/03 Variance: -42 days
(This milestone was completed in December, ahead of schedule.)

11 FREE Boards & ASICs, 1 Fully Tested Board (1M7941340)

Baseline/Target Finish: 03/10/03 Projected Finish: 05/07/03 Variance: -42 days
Additional ASIC testing has delayed this delivery. This variance does not impact any other significant activities or milestones. (In December, the LAT Configuration Control Board approved changing the baseline date of this milestone to match the projected finish date.)

Calorimeter Engineering Model (1M59000000)

Baseline/Target Finish: 04/25/03 Projected Finish: 05/08/03 Variance: -9 days
Problems in the development of the crystal detector element manufacturing process (now resolved) unfavorably impacted this delivery. The LAT Instrument Project Manager is concerned by this variance, and is working with the Calorimeter subsystem manager to recover the schedule.

4.0 Financial Status

Attachment 3 depicts the costs and commitments through the end of the current reporting period. Commitments for level-of-effort subcontracts have been phased in response to the continuing resolution situation. This is being managed so that there is no cost impact, and the level of effort is not affected.

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.

In order to track DOE financial plan transfers and NASA subauthorizations to institutions which are not members of the LAT collaboration, a new organization code has been instituted. Actual cost has been recorded this month; corresponding budget will be transferred next period. This is an administrative change, with no impact on total project cost.

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.

4.1.5 Calorimeter

Problems, now resolved, in the development of the crystal detector element manufacturing process have unfavorably impacted the delivery of the engineering model. A recovery plan is in progress. Delays in the AFEE flight part procurements and development and delays in the ground support equipment are not currently critical, but the unfavorable trend is a concern and a recovery plan is in progress. The current month's unfavorable variance is due to the aforementioned delay in the AFEE flight part procurements. This delay was made to ensure design maturity at the time of procurement.

4.1.6 Anticoincidence Detector

The tile shell assembly design has taken longer than planned due to inadequate manpower. Manpower was diverted from the MGSE design work to support this effort. A recovery plan has been developed which preserves the MGSE delivery date, does not impact significant milestones, and removes the unfavorable schedule variance by the end of the fiscal year. A plan has been developed and is being implemented to minimize the impact of delays in the analog ASICs, by moving the ASIC design work to SLAC. The base electronics assembly (BEA) packaging design has been delayed, as well as the photomultiplier tube resistor network assembly. Recovery plans have been developed for both of these issues, and the unfavorable variance is expected to be removed before the end of the fiscal year.

The unfavorable cost variance is due to higher labor costs than planned for the tile shell assembly work, as well as the base electronics assembly (BEA). A change request is being prepared to address the BEA variance; this includes work occurring at SLAC not currently in the ACD baseline. The current period's unfavorable cost variance is due to the previously-mentioned variances, in addition to payment of invoices occurring later than planned and accounting corrections for SLAC ACD cost.

4.1.7 Electronics

The unfavorable cost variance is largely due to ACD and Calorimeter electronics work being charged to 4.1.7; change requests are being prepared to create new work packages at SLAC for that work. Two software professionals working on Flight Software are being charged to project budget, but were planned as contributed labor; a change request is being prepared to address this.

4.1.8 Mechanical Systems

The favorable cost variance is due to subcontractor actual labor rates being less than planned, and delayed accounting accruals. It is expected that the accruals will be caught up in the next reporting period.

The unfavorable schedule variance is centered in three areas: mechanical systems development, thermal control system work, and the grid engineering model (EM). The LAT Instrument Project Manager is concerned by the unfavorable trend of this variance, and is working directly with the Mechanical Systems subsystem manager to develop a recovery plan, stabilizing the variance by the end of April, and recovering the schedule by the end of the fiscal year.

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, and less travel taken than planned.

4.1.B Instrument Operations Center

A change in the subsystem management has resulted in a temporary favorable cost variance. The budget will be adjusted once longer-term plans have been made for management of this subsystem.

4.1.C Education & Public Outreach

The positive cost variance in 4.1.C E/PO is due to subcontractor invoice delays and fall semester labor cost at SSU not being posted; it is expected that these costs will be reported next period.

6.0 Change Control and Contingency Analysis

Four change requests were submitted to and approved by the LAT Configuration Control Board during November. A summary, including the cost impact on the LAT fabrication phase estimate, is below.

Change Request No.	Description	Submitted By	CCB Meeting	Current Status
LAT-XR-01063-01	I&T MGSE Schedule	E. Gawehn	11/20/02	Approved \$0K
LAT-XR-01080-01	E/PO Telescope Network/ Additional Funding	L. Cominsky	11/20/02	Approved \$0K*
LAT-XR-01146-01	Univ. Washington Science Analysis Software Support	R. Dubois	11/20/02	Approved \$283K
LAT-XR-01149-01	Mech Sys Lockheed Martin Baseline	M. Campell	11/20/02	Approved \$56K

The fabrication phase cost baseline is now \$101.0M. Funding applicable to that baseline is \$121.3M; resulting contingency is \$20.3M.

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.

* Cost increase of \$111K (\$86K in fabrication phase; \$25K in commissioning phase) is directly offset by corresponding NASA funding increase.

Attachment 1 Milestones, Levels 1-2

Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date	FY01	FY02	FY03	FY04	FY05	FY06
DOE/NASA Joint Oversight Group (Level										
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		▼				
1M1P00002C	CD-2 Approval	12/13/02*	27	11/04/02A			▼			
1M1P000030	CD-3 Approval	07/15/03*	0	07/15/03*				▼		
1M1P000060	Flight GRID Complete	09/15/04*	0	09/15/04*					▼	
1M1P00004C	CD-4 Approval	03/15/06*	0	03/15/06*						▼
DOE/NASA Federal Project Managers (Level										
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*	0	04/30/03*			▼			
1M100073C	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*						▼
1M100012C	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	12/18/02 09:38	GLAST LAT PROJECT Project Milestones (Level 1 and 2)			1216 LT_MS1-2	Sheet 1 of 1				
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Attachment 2 (Page 1 of 2)
Level 3 Milestones (One-Year View)

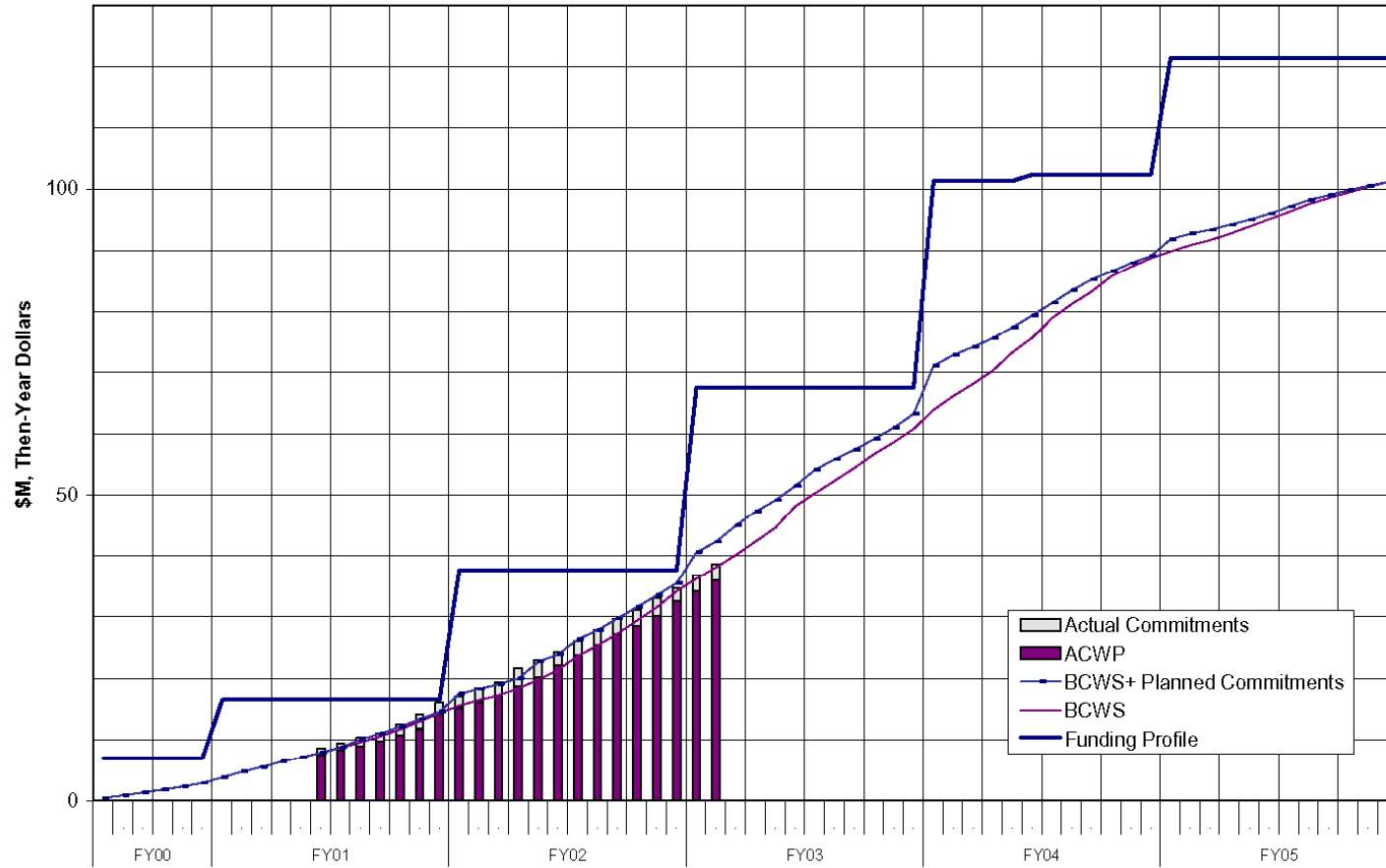
Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date	AV	ND	FY02		FY03		
Instrument Project Office (Level 3)											
1M57000030	1st Major Release of Sim/Recon (SAS to I & T)	06/12/02	0	06/12/02A	D	9					
1M1001120	Tracker Dead/Noisy Strips (SAS to I & T)	06/21/02*	-79	10/14/02A	D	9					
1M1001110	Calorimeter Calibration Prototype Coding SAS-I&T	07/08/02	-69	10/14/02A	D	9					
1M1000550	(9) MCM's from Tracker to Elec	09/20/02	-29	10/31/02A	4	7					
1M1001420	AEM H/W driver final ver-ELX to I&T/Online	09/20/02	-40	11/15/02A	7	9					
1M7941310	ACD Electronics Module - EM1 (Elec to ACD)	09/20/02	-40	11/15/02A	7	6					
1M7941330	Test/Screening Board w/ASIC for EM1 -ACD to Elec	09/20/02	12	09/04/02A	6	7					
1M1001340	GEM H/W driver, init ver-ELX to I&T/Online	11/12/02	37	09/20/02A	7	9					
1M7941350	High Voltage Power Supply (Bd & Prts)-ACD toElec	11/15/02*	-46	02/03/03*	6	7					
1M1001410	TEM H/W driver, final ver-ELX to I&T/Online	11/19/02	36	09/30/02A	7	9					
1M1001380	Delivery of EM (1X4) Grid to I&T/MSGE	12/02/02*	0	12/02/02*	8	9					
1M1001280	As-Built dwgs for EM TKR-TKR to I&T	12/05/02	0	12/05/02	4	9					
1M1001510	EM1 EGSE WS-S/W R2 I&T to ACD	12/05/02	-6	12/13/02	9	6					
1M1001511	EM1 EGSE WS-S/W R2 I&T to CAL	12/05/02	-6	12/13/02	9	5					
1M1001512	EM1 EGSE WS-S/W R2 I&T to ELX	12/05/02	-6	12/13/02	9	7					
1M1001513	EM1 EGSE WS-S/W R2 I&T to IOC	12/05/02	-6	12/13/02	9	B					
1M1001514	EM1 EGSE WS-S/W R2 I&T to TKR	12/05/02	-6	12/13/02	9	4					
Run Date							12/18/02 09:59	GLAST LAT PROJECT			1216
© Primavera Systems, Inc.								Project Milestones (Level 3)			LT - MS (L3)
								1 Year View (+/- 6mo)			Sheet 1 of 2

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

Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date	AV	ND	FY02		FY03		
Instrument Project Office (Level 3)											
1M1001430	Delv of TKR EM to SLAC I&T/MGSE	12/09/02*	0	12/09/02*	4	9					
1M1001360	FSW system spec-ELX/FSW to I&T/Online	12/20/02	-8	01/10/03	7	9					
1M1001460	IPS description-ELX to I&T/Online	12/23/02	-42	03/04/03	7	9					
1M1001210	AEM H/W driver, init ver-ELX to I&T/Online	01/02/03*	25	11/15/02A	7	9					
1M1001310	AEM data taking desc-ELX to I&T/Online	01/02/03*	25	11/15/02A	7	9					
1M1000980	Doc defining Backsplash Test Model (ACD to I&T)	01/03/03*	0	01/03/03*	6	9					
1M1001390	GEM h/w driver, final ver-ELX to I&T/Online	01/07/03	-4	01/13/03	7	9					
1M1001130	Tracker Tower & Tray Alignment (SAS to I&T)	01/22/03*	0	01/22/03*	D	9					
1M57000020	CAL AFFE Engr Model-CAL to Elec	02/03/03*	0	02/03/03*	5	7					
1M7941380	EGSE Workstation / Software #3 (I&T to ACD)	03/03/03*	216	04/15/02A	9	6					
1M7941340	(11) FREE Bds & ASICS, (1) Fully Tested Bd - EM2	03/10/03*	-42	05/07/03*	6	7					
1M7941320	(2) ACD Electronics Modules - EM2 (Elec to ACD)	04/24/03	34	03/07/03	7	6					
1M59000000	EM from CAL to I&T	04/25/03	-9	05/08/03	5	9					
1M1001490	SIS description-ELX to I&T	04/30/03*	0	04/30/03*	7	9					
1M1001500	Online EM2 release #1 to FSW	04/30/03	0	04/30/03	9	7					
1M19500500	CU IPS - ELX to I&T/Online*	04/30/03*	0	04/30/03*	7	9					
1M1001570	CU Monte Carlo sim from SAS to I&T/SVAC	06/13/03*	156	10/22/02A	D	9					
Run Date	12/18/02 09:59	GLAST LAT PROJECT Project Milestones (Level 3) 1 Year View (+/- 6mo)			1216 LT - MS (L3)	Sheet 2 of 2					
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Attachment 3

Budget vs Actuals vs Funding
DOE + NASA Project Expenditures



**Attachment 4
LAT Costs, through November 2002, by WBS**

Monthly Contractor Financial Management Report								Report for Month Ending: 11/30/02		
To: Al Vernacchio, Acting GLAST Project Manager (NASA) Ev Valle, LAT Project Manager (DOE)				From: Tanya Boysen, LAT Project Controls Manager				Budget Value		
								Cost: 0	Fee: 0	
LAT3		Type:				Fund Limitation:				
GLAST LAT Project						0				
Reporting Category	Cost Incurred				Estimated Cost			4/3/00	Billing	
	During Month		Cum. to Date		Detail		Balance of Budget	Estimated Final Cost		Unfilled Orders Outstanding
	Actual	Planned	Actual	Planned	DEC02	JAN03		Project Estimate	Budget Value	
4.1.1 INSTRUMENT MANAGEMENT	230	175	5,616	5,546	147	193	5,647	11,602	11,602	
4.1.2 SYSTEM ENGINEERING	56	91	2,393	2,320	76	98	2,080	4,647	4,647	
4.1.4 TRACKER	185	131	5,354	5,296	324	178	4,060	9,917	9,917	
4.1.5 CALORIMETER	360	694	6,159	7,106	301	384	10,731	17,575	17,575	
4.1.6 ANTICOINCIDENCE DETECTOR	530	192	5,031	4,860	458	318	4,939	10,746	10,746	
4.1.7 ELECTRONICS	142	134	3,906	3,648	184	374	11,274	15,738	15,738	
4.1.8 MECHANICAL SYSTEMS	104	220	2,611	3,716	241	327	8,614	11,794	11,794	
4.1.9 INTEGRATION & TEST	93	113	1,135	1,211	114	129	5,295	6,673	6,673	
4.1.A PERFORMANCE AND SAFETY ASSURANCE	48	49	681	1,005	42	55	1,396	2,174	2,174	
4.1.B LAT INSTRUMENT OPERATIONS CENTER	0	28	262	429	23	30	2,236	2,552	2,552	
4.1.C EDUCATION AND PUBLIC OUTREACH	48	28	578	696	29	49	2,028	2,684	2,684	
4.1.D SCIENCE ANALYSIS SOFTWARE	49	52	868	909	45	74	2,624	3,611	3,611	
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	1,847	1,906	35,919	38,062	1,984	2,209	60,920	101,032	101,032	

Attachment 5
LAT Costs, through November 2002, by Organization and Cost Code

Monthly Contractor Financial Management Report								Report for Month Ending: 11/30/02		
To: Al Vernacchio, Acting GLAST Project Manager (NASA) Ev Valle, LAT Project Manager (DOE)				From: Tanya Boysen, LAT Project Controls Manager				Budget Value		
							Cost:	0	Fee:	0
LAT3	Type:						Fund Limitation:			
GLAST LAT Project							0			
Reporting Category	Cost Incurred				Estimated Cost			4/3/00	Billing	
	During Month		Cum. to Date		Detail		Balance of Budget	Estimated Final Cost		Unfilled Orders Outstanding
	Actual	Planned	Actual	Planned	DEC02	JAN03		Project Estimate	Budget Value	
DG *** GSFC	455	233	6,126	6,254	493	363	6,726	13,708	13,708	
DH *** HEPL	56	95	2,850	3,144	82	97	4,564	7,593	7,593	
DL *** SLAC	810	737	17,235	17,332	976	1,128	30,888	50,227	50,227	
DN *** NRL	399	771	7,795	9,135	366	511	15,183	23,855	23,855	
DO *** Financial Plan Transfer/Sub Ou	32	0	32	0	0	0	-32	0	0	
DS *** SSU	48	28	578	696	29	48	1,954	2,609	2,609	
DT *** Texas A&M	0	0	15	16	0	0	0	16	16	
DU *** UCSC	46	42	1,286	1,485	39	52	1,364	2,741	2,741	
DW *** UW	0	0	0	0	0	8	275	283	283	
Total	1,847	1,906	35,919	38,062	1,985	2,207	60,921	101,032	101,032	

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	DEC02	JAN03				
RL LABOR	1,175	1,016	21,958	22,846	844	1,164	31,542	55,508	55,508	
<i>FTE (DOE/NASA)</i>	<i>111.4</i>	<i>100.5</i>	<i>1,842.2</i>	<i>2,006.1</i>	<i>99.0</i>	<i>102.0</i>	<i>2,787.4</i>	<i>4,830.6</i>	<i>4,830.6</i>	
<i>HOURS (DOE/NASA)</i>	<i>16,925</i>	<i>15,277</i>	<i>313,989</i>	<i>332,902</i>	<i>12,664</i>	<i>17,217</i>	<i>453,710</i>	<i>797,580</i>	<i>797,580</i>	
RT TRAVEL	28	52	625	1,059	44	59	2,539	3,267	3,267	
RM MATERIAL & SERVICES	627	792	12,112	12,766	936	835	24,591	38,474	38,474	
RX MPS & LAB TAX	18	46	1,223	1,392	160	150	2,249	3,783	3,783	
Total (not incl FTE/Hours)	1,847	1,906	35,919	38,062	1,984	2,208	60,921	101,032	101,032	

Attachment 6
LAT Performance, through November 2002, by WBS

Cost Performance Report - Work Breakdown Structure													
Contractor: Location:						Contract Type/No:			Project Name/No: GLAST LAT Project		Report Period: 10/31/02 11/30/02		
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			
CAPW[3]	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost Work	Variance		Budgeted Cost		Actual Cost Work	Variance		Budgeted	Latest Revised Estimate	Variance
	Work Scheduled	Work Performed		Schedule	Cost	Work Scheduled	Work Performed		Schedule	Cost			
	Item	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
4.1.1 INSTRUMENT MANAGEMENT	175	175	230	0	-55	5,546	5,546	5,616	0	-70	11,602	11,602	0
4.1.2 SYSTEM ENGINEERING	91	178	56	87	122	2,320	2,320	2,393	0	-72	4,647	4,647	0
4.1.4 TRACKER	131	110	185	-21	-75	5,296	5,159	5,354	-137	-195	9,917	9,917	0
4.1.5 CALORIMETER	694	326	360	-368	-34	7,106	6,398	6,159	-708	239	17,575	17,575	0
4.1.6 ANTICOINCIDENCE DETECTOR	192	193	530	2	-337	4,860	4,388	5,031	-472	-643	10,746	10,746	0
4.1.7 ELECTRONICS	134	108	142	-26	-35	3,648	3,498	3,906	-150	-408	15,738	15,738	0
4.1.8 MECHANICAL SYSTEMS	220	128	104	-92	24	3,716	3,072	2,611	-643	461	11,794	11,794	0
4.1.9 INTEGRATION & TEST	113	216	93	103	123	1,211	1,153	1,135	-57	19	6,673	6,673	0
4.1.A PERFORMANCE AND SAFETY ASSURA	49	49	48	0	1	1,005	1,005	681	0	324	2,174	2,174	0
4.1.B LAT INSTRUMENT OPERATIONS CENT	28	25	0	-2	25	429	394	262	-35	132	2,552	2,552	0
4.1.C EDUCATION AND PUBLIC OUTREACH	28	44	48	15	-5	696	690	578	-5	112	2,684	2,684	0
4.1.D SCIENCE ANALYSIS SOFTWARE	52	38	49	-14	-11	909	877	868	-32	9	3,611	3,611	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	1,906	1,590	1,847	-316	-257	38,062	35,824	35,919	-2,238	-95	101,032	101,032	0
Contingency											20,294	20,294	
Total	1,906	1,590	1,847	-316	-257	38,062	35,824	35,919	-2,238	-95	121,326	121,326	

Attachment 7
LAT Performance, through November 2002, by Organization

Cost Performance Report - Organization													
Contractor: Location:				Contract Type/No:			Project Name/No: GLAST LAT Project		Report Period: 10/31/02 11/30/02				
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			
OBS	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost Work	Variance		Budgeted Cost		Actual Cost Work	Variance		Budgeted	Latest Revised Estimate	Variance
	Work Scheduled	Work Performed		Schedule	Cost	Work Scheduled	Work Performed		Schedule	Cost			
Item	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
DG *** GSFC	233	247	455	15	-208	6,254	5,783	6,126	-472	-343	13,708	13,708	0
DH *** HEPL	95	54	56	-41	-2	3,144	3,042	2,850	-102	191	7,593	7,593	0
DL *** SLAC	737	807	810	71	-3	17,332	16,429	17,235	-903	-806	50,227	50,227	0
DN *** NRL	771	398	399	-373	-1	9,135	8,383	7,795	-753	588	23,855	23,855	0
DO *** Financial Plan	0	0	32	0	-32	0	0	32	0	-32	0	0	0
DS *** SSU	28	44	48	15	-5	696	690	578	-5	112	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	39	46	-3	-7	1,485	1,481	1,286	-4	195	2,741	2,741	0
DW *** UW	0	0	0	0	0	0	0	0	0	0	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	1,906	1,590	1,847	-316	-257	38,062	35,824	35,919	-2,238	-95	101,032	101,032	0
Contingency											20,294	20,294	
Total	1,906	1,590	1,847	-316	-257	38,062	35,824	35,919	-2,238	-95	121,326	121,326	

Attachment 8 LAT Performance Analysis, November 2002

	WBS	BAC	BCWS	BCWP	ACWP	SV \$	CV \$	% BCWS	% BCWP	% ACWP	SV Trend	CV Trend	SPI	CPI	Cpi_Fcst	CpiSpi_Fcst
2	4.1	101,032	38,062	35,824	35,919	-2,238	-95	37.67	35.46	35.55	↓	↓	0.941	0.997	101,300	105,385
3	4.1.1	11,602	5,546	5,546	5,616	0	-70	47.80	47.80	48.40	↔	↓	1.000	0.987	11,749	11,749
4	4.1.2	4,647	2,320	2,320	2,393	0	-72	49.94	49.94	51.49	↑	↑	1.000	0.970	4,791	4,791
5	4.1.4	9,917	5,296	5,159	5,354	-137	-195	53.41	52.03	53.99	↓	↓	0.974	0.964	10,291	10,422
6	4.1.5	17,575	7,106	6,398	6,159	-708	239	40.43	36.41	35.04	↓	↓	0.900	1.039	16,918	18,108
7	4.1.6	10,746	4,860	4,388	5,031	-472	-643	45.22	40.83	46.82	↔	↓	0.903	0.872	12,321	13,105
8	4.1.7	15,738	3,648	3,498	3,906	-150	-408	23.18	22.23	24.82	↓	↔	0.959	0.896	17,572	18,156
9	4.1.8	11,794	3,716	3,072	2,611	-643	461	31.51	26.05	22.14	↔	↔	0.827	1.177	10,024	11,576
10	4.1.9	6,673	1,211	1,153	1,135	-57	19	18.14	17.28	17.00	↑	↑	0.953	1.017	6,564	6,834
11	4.1.A	2,174	1,005	1,005	681	0	324	46.24	46.24	31.32	↔	↔	1.000	1.476	1,473	1,473
12	4.1.B	2,552	429	394	262	-35	132	16.82	15.46	10.28	↔	↑	0.919	1.503	1,698	1,825
13	4.1.C	2,684	696	690	578	-5	112	25.92	25.72	21.54	↑	↓	0.992	1.194	2,247	2,260
14	4.1.D	3,611	909	877	868	-32	9	25.17	24.30	24.04	↓	↓	0.965	1.011	3,573	3,670
15	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
16	[PMB]	101,032	38,062	35,824	35,919	-2,238	-95	37.67	35.46	35.55	↓	↓	0.941	0.997	101,300	105,385

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

SV Trend: Schedule Variance Trend = SV\$ / BCWS

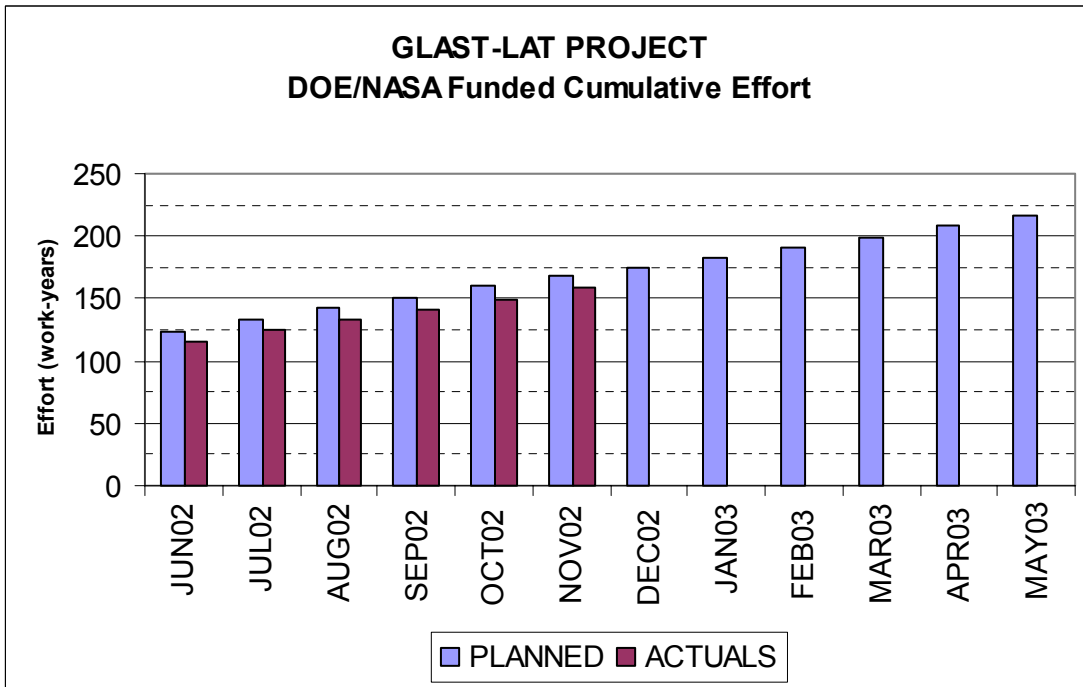
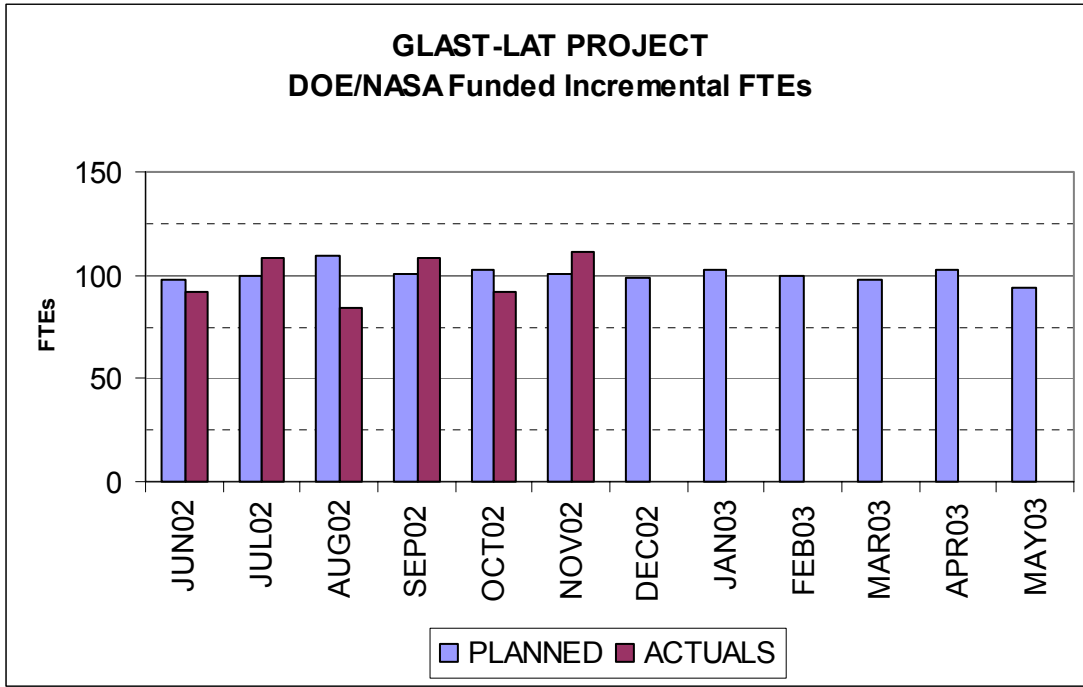
CV Trend: Cost Variance Trend = CV\$ / BCWP

Cpi_Fcst: CPI (to date) EAC Forecast = BAC / CPI

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

	Worse than -15%		Between -5% and 10%
	Between -15% and -5%		Better than 10%
Change Threshold 10%			

**Attachment 9
LAT Manpower (DOE/NASA-Funded)**



Attachment 10
LAT Manpower Data, through November 2002, by Organization

Program: LAT3		Description: GLAST LAT Project		Approval: Program Manager												
Run Date: 12/18/02		Status Date: 11/30/02		Functional Manager			Cost Account Manager									
			PRIOR	JUN02	JUL02	AUG02	SEP02	OCT02	NOV02	Cum-to- Date	DEC02	JAN03	FEB03	MAR03	APR03	MAY03
OBS																
DG *** GSFC																
FTE	PLANNED	283.4	24.2	24.9	25.1	38.8	26.4	26.1	448.9	22.3	23.5	22.4	21.5	24.3	22.2	
	ACTUALS	205.0	13.7	42.5	27.6	28.1	26.4	28.7	371.9	0.0	0.0	0.0	0.0	0.0	0.0	
DH *** HEPL																
FTE	PLANNED	177.1	7.8	8.5	7.3	6.9	7.2	8.0	222.9	8.1	7.3	7.2	6.7	7.5	7.7	
	ACTUALS	162.0	8.9	5.5	0.0	3.2	4.1	4.3	188.0	0.0	0.0	0.0	0.0	0.0	0.0	
DL *** SLAC																
FTE	PLANNED	593.9	54.7	51.1	60.0	61.4	42.4	47.2	910.9	53.7	56.4	56.9	57.9	60.5	57.6	
	ACTUALS	519.9	39.4	37.6	85.9	53.7	44.8	52.0	833.3	0.0	0.0	0.0	0.0	0.0	0.0	
DN *** NRL																
FTE	PLANNED	306.2	20.7	21.6	23.7	28.9	30.4	23.8	455.2	20.5	23.0	23.5	22.2	22.2	17.9	
	ACTUALS	311.3	30.1	21.1	17.0	31.1	21.9	25.3	457.8	0.0	0.0	0.0	0.0	0.0	0.0	
DS *** SSU																
FTE	PLANNED	35.8	1.5	4.2	1.5	1.5	1.7	1.7	47.9	1.6	1.9	1.9	1.9	1.9	1.9	
	ACTUALS	37.1	4.0	2.8	3.1	0.4	0.0	5.5	52.9	0.0	0.0	0.0	0.0	0.0	0.0	
DU *** UCSC																
FTE	PLANNED	137.4	4.8	4.8	4.8	4.8	5.1	5.1	167.0	4.7	4.8	5.4	6.4	5.7	4.8	
	ACTUALS	159.3	5.9	6.3	6.2	4.4	5.5	6.6	194.3	0.0	0.0	0.0	0.0	0.0	0.0	
DW *** UW																
FTE	PLANNED	26.7	1.1	1.0	0.9	0.9	0.9	0.9	32.4	0.9	0.4	0.4	0.4	0.4	0.4	
	ACTUALS								0.0							
FF *** France																
FTE	PLANNED	513.4	35.9	37.1	37.3	36.0	35.5	35.1	730.2	26.7	30.0	31.3	31.3	31.3	31.2	
	ACTUALS								0.0							
FI *** Italy																
FTE	PLANNED	173.5	14.6	15.1	14.0	12.9	16.5	16.9	263.5	18.4	16.9	16.6	13.7	18.9	19.2	
	ACTUALS	127.3	9.8	10.9	10.9	10.9	10.9	10.9	191.3	0.0	0.0	0.0	0.0	0.0	0.0	
FJ *** Japan																
FTE	PLANNED	56.0	2.8	2.8	2.8	2.8	2.8	2.8	72.6	2.8	2.8	2.8	2.8	2.8	2.8	
	ACTUALS	42.2	1.8	1.8	1.8	1.8	1.8	1.8	52.7	0.0	0.0	0.0	0.0	0.0	0.0	
FK *** Sweden																
FTE	PLANNED	22.8	4.6	4.6	4.6	4.6	4.6	4.6	50.3	3.4	4.9	5.1	5.1	5.1	5.1	
	ACTUALS								0.0							
Grand Totals:																
	PLANNED	2326.2	172.6	175.7	182.2	199.4	173.3	172.2	3401.6	163.2	171.9	173.4	169.9	180.5	170.7	
	ACTUALS	1564.1	113.5	128.4	152.4	133.5	115.3	135.0	2342.1	0.0	0.0	0.0	0.0	0.0	0.0	
4.1 GLAST LAT																
Contributed	PLANNED	930.3	74.6	76.5	73.0	98.4	71.0	71.7	1395.5	64.3	69.4	73.6	72.3	77.9	76.5	
	ACTUALS	317.9	21.4	20.2	68.2	25.5	23.1	23.6	499.9	0.0	0.0	0.0	0.0	0.0	0.0	
Funded	PLANNED	1395.9	98.0	99.3	109.1	101.0	102.4	100.5	2006.1	99.0	102.5	99.8	97.6	102.7	94.2	
	ACTUALS	1246.3	92.1	108.2	84.2	108.0	92.2	111.4	1842.2	0.0	0.0	0.0	0.0	0.0	0.0	
Grand Totals:																
	PLANNED	2326.2	172.6	175.7	182.2	199.4	173.3	172.2	3401.6	163.2	171.9	173.4	169.9	180.5	170.7	
	ACTUALS	1564.1	113.5	128.4	152.4	133.5	115.3	135.0	2342.1	0.0	0.0	0.0	0.0	0.0	0.0	