Monthly Progress Report

(Month Ending December 2002)

GLAST Large Area Telescope (LAT)

LAT-MR-01450-01

February 12, 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 December, 2002.

2.0 Recent Progress and Status

4.1.4 Tracker

Eight functional multichip modules for the engineering model were completed, tested, and delivered. An ASIC design review was held; flight ASICs were ordered. Flight ladder production continues, with excellent test results on wire-bonded ladders. Progress was made on the flexure mount/bottom tray redesign and modeling. A detailed finite element model of the bottom tray was built. Bottom tray coupon testing was completed, as was a prototype bottom tray assembly. Engineering model assembly continues; all panels have been built, and mounting of tungsten and Kapton is in progress.

4.1.5 Calorimeter

Fourteen crystal detector elements (CDEs) manufactured by CEA for the engineering model have been received at NRL. Testing of the first eight yields expected performance results. One hundred (of 110) CDEs manufactured at Swales have been accepted for potential use in the engineering model. Sixteen of these have had a dual pin photodiode rebonded to one end of the CsI. Optical testing shows light yield is 1.5 times greater than requirements. Shear tests show bond strengths 8-12 times that required. A prototype carbon composite structure was fabricated using the planned flight manufacturing technique; additional modifications to the tooling are underway to improve the precision of the structure. Version 4 of the readout controllers for the engineering model have been received and tested. The AFEE-X printed circuit board has been manufactured. The front-end ASICs (version 7) have been functionally tested and are ready for assembly.

4.1.6 Anticoincidence Detector

A thermal vacuum test on tile detector assemblies with phototubes and resistor networks was completed - this was the final tile detector test. Preliminary results indicate no problems. The fixture for bending full-scale scintillating fiber ribbons was received, but some hole locations were not properly placed so they need to be re-drilled. The front-end electronics board was sent out for fabrication. Version 3 of the analog ASIC was received and testing commenced. The third set of 30 phototubes was received. A peer review of the ACD mechanical subsystem and a dry run for the ACD CDR were conducted.

4.1.7 Electronics

Version 6 of the Tracker controller ASIC was submitted for production fabrication. The ASIC design of the ACD readout controller ASIC, and versions 5 and 6 of the ACD front-end ASICs were completed and are in fabrication. The design of the tower engineering model Tracker and Calorimeter cable controller ASICs, as well as the global trigger ASIC, were completed and are in fabrication. The Calorimeter front-end (version

9) and readout controller (version 5) ASICs are also in fabrication. The design of the PCI (a DAQ bus standard) mezzanine card version of the LAT communication board schematic was completed. A review of the flight software specification was conducted.

4.1.8 Mechanical Systems

Two engineers and two designers were hired, with start dates in January. A review of the Calorimeter baseplate design was conducted. The preliminary investigation of tungsten carbide friction coating was completed.

4.1.9 Integration & Test

The second release of the electronics ground support equipment for the engineering model was made. The Van de Graaff simulator was tested and contamination was found in the unit, limiting current. A purer gas source is being obtained. The engineering model mechanical ground support equipment design is complete and most of the long-lead procurements have been made. The GLEAM infrastructure for the engineering model was completed. An environmental monitoring system has been installed in the LAT Integration Facility (SLAC Building 33), and long-lead items for the sprinkler system have been ordered.

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.

Three of the below milestones are related to the completion of the engineering model (EM). The Calorimeter Engineering Model milestone (1M59000000) is the critical path item for the EM effort as a whole. The LAT Project Manager, the Integration & Test subsystem manager, and the Calorimeter, Tracker, and Mechanical Systems subsystem managers have implemented workaround plans to accommodate these delays, without unfavorably impacting the flight unit schedules.

Engineering Model (1x4) Grid (1M1001380)

Baseline/Target Finish: 12/02/02 Projected Finish: 12/23/02 Variance: -15 days

Lack of sufficent manpower has resulted in the delay of this milestone. While the staffing levels have been increased, the completion of this milestone will still be delayed. The procurement has been made for the 1x4 EM grid, with planned delivery for integration in April. This delay can be accomodated in the I&T schedule with no further impact.

Tracker Engineering Model (1M1001430)
Baseline/Target Finish: 12/09/02 Projected Finish: 12/23/02 Variance: -10 days
This milestone has been delayed by the ASIC design issues, startup issues with the tray fabrication, and the ladder production being slower than planned. The expected completion date of this milestone is in March. This dealy can be accomodated 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: 04/16/03 Variance: -69 days
The subsystem managers for Electronics and Integration & Test have agreed on a completion date for this milestone in April. This will not adversely affect any other activities or level 3 milestones.

Calorimeter Engineering Model (1M59000000)
Baseline/Target Finish: 04/25/03 Projected Finish: 06/12/03 Variance: -33 days
Problems in the development of the crystal detector element manufacturing process (now resolved) unfavorably impacted this delivery. (Update: A change request has been approved in February to implement the workaround plan in the baseline 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.

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 (to ensure design maturity) 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.

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 schedule 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.

4.1.8 Mechanical Systems

The unfavorable schedule variance is due to filling key engineering and design positions slower than planned. This is being addressed by adding four people in January and transferring the engineering of the cross-LAT plate to Lockheed Martin. This level of effort is believed to be adequate to stop the slip and then bring this system back to the baseline 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.

6.0 Change Control and Contingency Analysis

Six change requests were submitted to and approved by the LAT Configuration Control Board during December. A summary, including the impacts on the LAT fabrication phase cost and the impact on the LAT mass budget (as applicable), is below.

Change Request No.	Description	Submitted By	CCB Meeting	Current Status
LAT-XR-01119-02	Change to ACD CDR Date	T. Johnson	12/11/02	Approved $0K
LAT-XR-01148-02	4.1.D SAS NRL Resource Leveling	R. Dubois	12/11/02	Approved $0K
LAT-XR-01159-01	Move FY04 Procurements to FY03	G. Haller, M. Campell	12/11/02	Approved $0K
LAT-XR-01161-01	Micrometeoroid Shield Design and Test	T. Johnson	12/11/02	Approved $25K
LAT-XR-01192-01	Level 3 Milestone Changes	T. Johnson	12/11/02	Approved $0K
LAT-XR-01200-01	LAT ACD Mass Allocation Increase	K. Segal	12/18/02	Approved 45kg, $0K

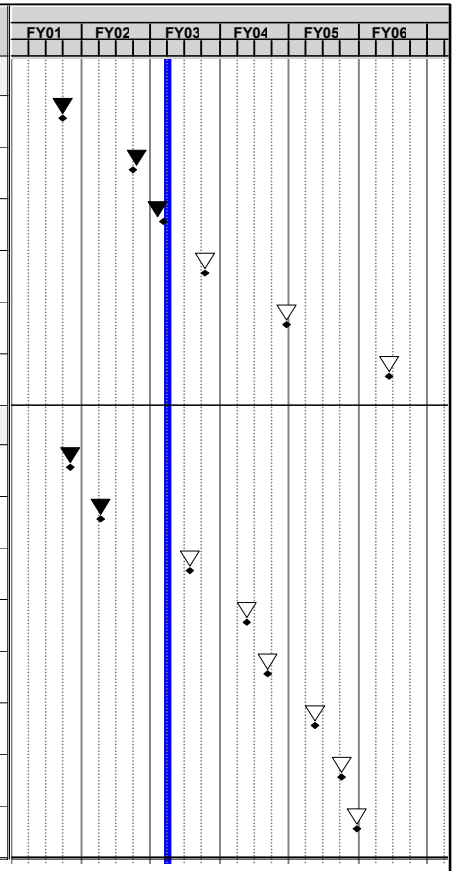
The fabrication phase cost baseline is now $101.1M. Funding applicable to that baseline is $121.3M; resulting contingency is $20.3M.

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.

Attachment 1
Milestones, Levels 1-2

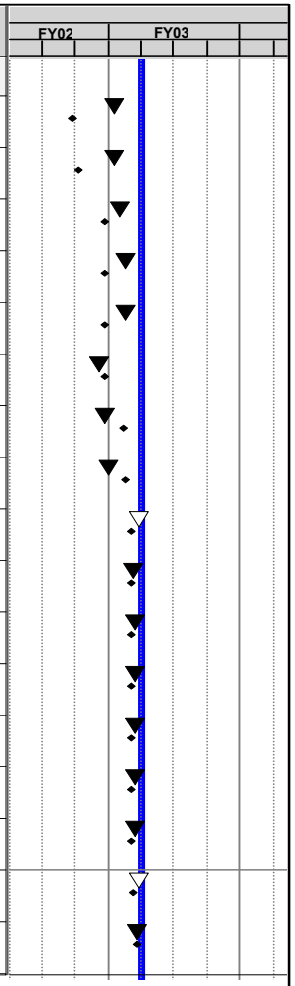
Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date
DOE/NASA Joint Oversight Group (Level 1				
1M1P000000	DOE Critical Decision (CD) 0 Approval	06/25/01A	0	06/25/01A
1M1P000010	CD-1 Approval	07/01/02*	-15	07/23/02A
1M1P000020	CD-2 Approval	12/13/02*	27	11/04/02A
1M1P000030	CD-3 Approval	07/15/03*	0	07/15/03*
1M1P000060	Flight GRID Complete	09/15/04*	0	09/15/04*
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*	0	04/30/03*
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 01/30/03 11:14	**GLAST LAT PROJECT**	0124 Sheet 1 of 1
	Project Milestones (Level 1 and 2)	LT_MS1-2

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

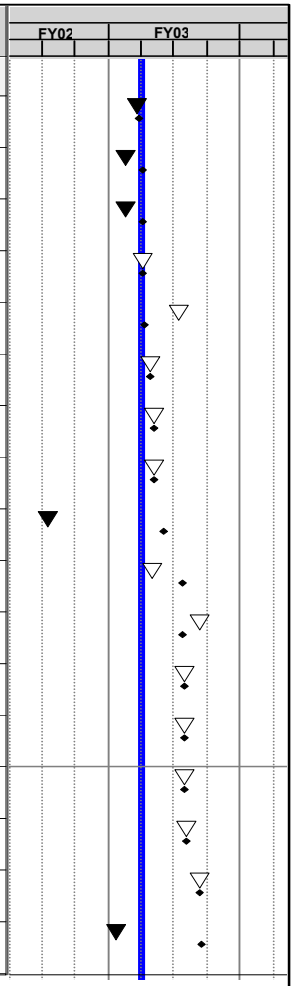
Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date	AV	ND
Instrument Project Office (Level 3						
1M1001120	Tracker Dead/Noisy Strips (SAS to I & T)	06/21/02*	-79	10/14/02A	D	9
1M1001110	Calorimeter Calibration Prototype Coding SAS-I&T	07/08/02	-69	10/14/02A	D	9
1M1000550	(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
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*	-15	12/23/02*	8	9
1M1001280	As-Built dwgs for EM TKR-TKR to I&T	12/05/02	-1	12/06/02A	4	9
1M1001510	EM1 EGSE WS-S/W R2 I&T to ACD	12/05/02	-6	12/13/02A	9	6
1M1001511	EM1 EGSE WS-S/W R2 I&T to CAL	12/05/02	-6	12/13/02A	9	5
1M1001512	EM1 EGSE WS-S/W R2 I&T to ELX	12/05/02	-6	12/13/02A	9	7
1M1001513	EM1 EGSE WS-S/W R2 I&T to IOC	12/05/02	-6	12/13/02A	9	B
1M1001514	EM1 EGSE WS-S/W R2 I&T to TKR	12/05/02	-6	12/13/02A	9	4
1M1001430	Delv of TKR EM to SLAC I&T/MGSE	12/09/02*	-10	12/23/02*	4	9
1M1001360	FSW system spec-ELX/FSW to I&T/Online	12/20/02	4	12/16/02A	7	9



Run Date 01/31/03 14:55	**GLAST LAT PROJECT**	0124 Sheet 1 of 3
	Project Milestones (Level 3)	LT - MS (L3)
	1 Year View (+/- 6mo)	

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

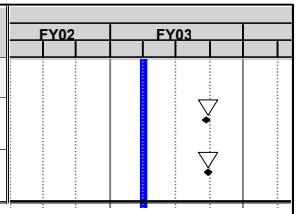
Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date	AV	ND
Instrument Project Office (Level 3						
1M1001460	IPS description-ELX to I&T/Online	12/23/02	5	12/16/02A	7	9
1M1001210	AEM H/W driver, init ver-ELX to I&T/Online	01/02/03*	25	11/15/02A	7	9
1M1001310	AEM data taking 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	-69	04/16/03	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
1M7941350	High Voltage Power Supply (Bd & Prts)-ACD toElec	02/03/03*	0	02/03/03*	6	7
1M7941380	EGSE Workstation / Software #3 (I&T to ACD)	03/03/03*	216	04/15/02A	9	6
1M7941320	(2) ACD Electronics Modules - EM2 (Elec to ACD)	04/24/03	59	01/30/03	7	6
1M59000000	EM from CAL to I&T	04/25/03	-33	06/12/03	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
1M7941340	(11) FREE Bds & ASICS, (1) Fully Tested Bd - EM2	05/07/03*	0	05/07/03*	6	7
1M7941150	EGSE EM2 Release-Elec to I&T	06/12/03*	0	06/12/03*	7	9
1M1001570	CU Monte Carlo sim from SAS to I&T/SVAC	06/13/03*	156	10/22/02A	D	9



Run Date 01/31/03 14:55	**GLAST LAT PROJECT**	0124
	Project Milestones (Level 3)	LT - MS (L3)
	1 Year View (+/- 6mo)	Sheet 2 of 3

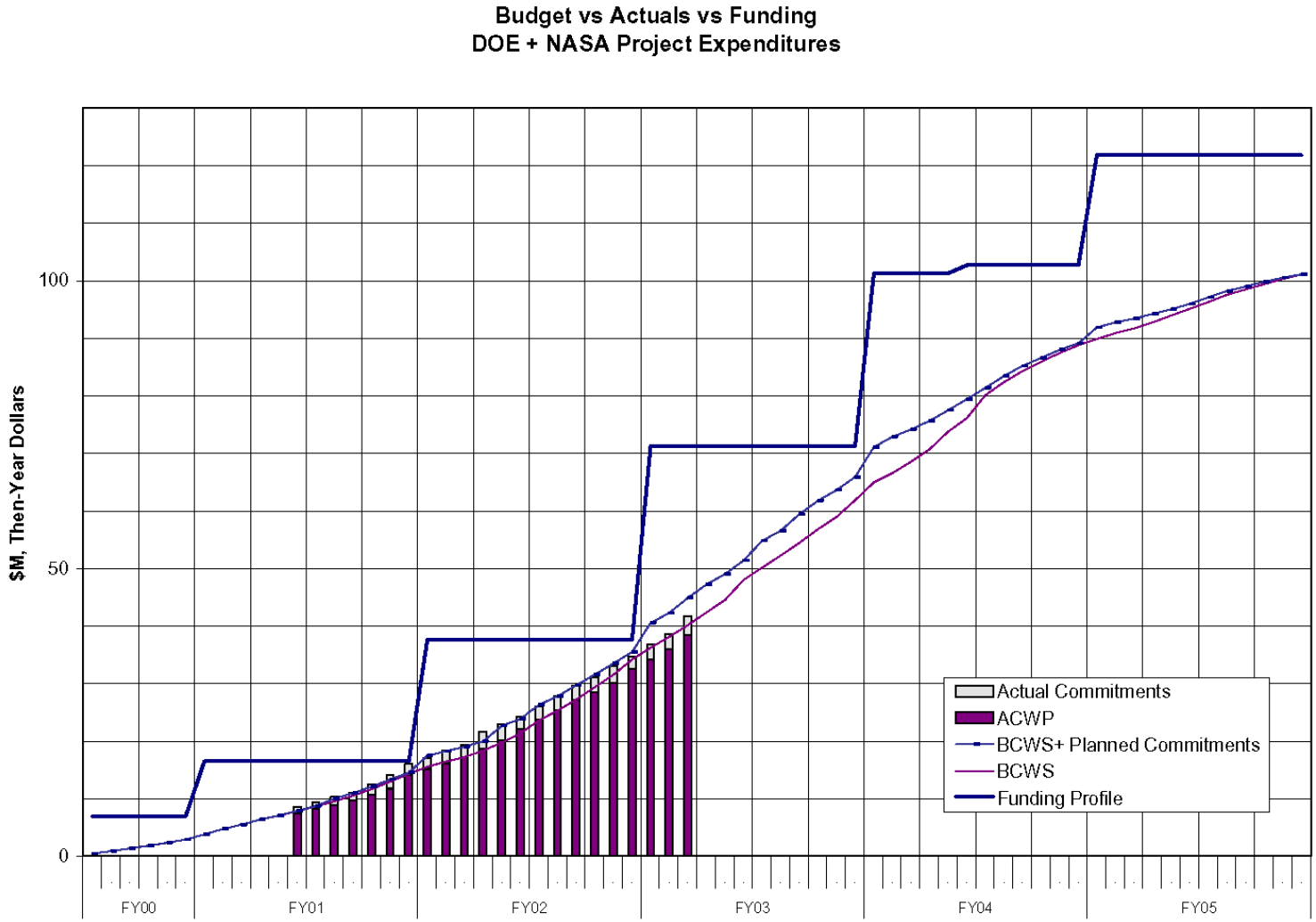
Attachment 2, Continued (Page 3 of 3)
Level 3 Milestones (One-Year View)

Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date	AV	ND
Instrument Project Office (Level 3						
1M1001520	EM CAL Returned to NRL (arrives on dock)	06/23/03	-1	06/24/03	9	5
1M1001550	Online EM2 release #2 to ELX	06/26/03	0	06/26/03	9	7



Run Date 01/31/03 14:55 © Primavera Systems, Inc.	**GLAST LAT PROJECT** **Project Milestones (Level 3)** **1 Year View (+/- 6mo)**	0124 LT - MS (L3) Sheet 3 of 3

Attachment 3



Attachment 4
LAT Costs, through December 2002, by WBS

Monthly Contractor Financial Management Report								Report for Month Ending: 12/31/02	
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 GLAST LAT Project	Type:							Fund Limitation: 0	
Reporting Category	Cost Incurred				Estimated Cost			4/3/00 Estimated Final Cost	Billing Unfilled Orders Outstanding
	During Month		Cum. to Date		Detail		Balance of Budget	Project Estimate	Budget Value	
	Actual	Planned	Actual	Planned	JAN03	FEB03				
4.1.1 INSTRUMENT MANAGEMENT	265	147	5,881	5,693	193	175	5,354	11,602	11,602	
4.1.2 SYSTEM ENGINEERING	177	76	2,570	2,396	98	89	1,890	4,647	4,647	
4.1.4 TRACKER	213	324	5,567	5,621	178	209	3,962	9,917	9,917	
4.1.5 CALORIMETER	272	301	6,431	7,406	384	505	10,255	17,575	17,575	
4.1.6 ANTICOINCIDENCE DETECTOR	580	438	5,611	5,298	299	317	4,544	10,772	10,772	
4.1.7 ELECTRONICS	131	184	4,037	3,832	374	281	11,046	15,737	15,737	
4.1.8 MECHANICAL SYSTEMS	512	241	3,123	3,957	327	319	8,024	11,794	11,794	
4.1.9 INTEGRATION & TEST	98	114	1,232	1,325	129	113	5,199	6,673	6,673	
4.1.A PERFORMANCE AND SAFETY ASSURANCE	51	42	732	1,047	55	49	1,338	2,174	2,174	
4.1.B LAT INSTRUMENT OPERATIONS CENTER	14	23	276	452	30	28	2,218	2,552	2,552	
4.1.C EDUCATION AND PUBLIC OUTREACH	92	29	671	725	49	36	1,928	2,684	2,684	
4.1.D SCIENCE ANALYSIS SOFTWARE	60	103	928	1,012	74	84	2,525	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	2,466	2,022	38,384	40,084	2,189	2,204	58,280	101,058	101,058	

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

Monthly Contractor Financial Management Report									Report for Month Ending: 12/31/02	
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 GLAST LAT Project	Type:								Fund Limitation: 0	
Reporting Category	Cost Incurred				Estimated Cost			4/3/00 Estimated Final Cost	Billing	Unfilled Orders Outstanding
	During Month		Cum. to Date		Detail		Balance of Budget	Project Estimate	Budget Value	
	Actual	Planned	Actual	Planned	JAN03	FEB03				
DG *** GSFC	597	473	6,723	6,727	345	358	6,307	13,733	13,733	
DH *** HEPL	75	82	2,925	3,226	97	86	4,485	7,593	7,593	
DL *** SLAC	1,318	944	18,553	18,277	1,128	1,028	29,486	50,195	50,195	
DN *** NRL	327	424	8,122	9,559	511	644	14,578	23,855	23,855	
DO *** Financial Plan Transfer/Sub Ou	0	32	32	32	0	0	0	32	32	
DS *** SSU	92	29	671	725	48	36	1,854	2,609	2,609	
DT *** Texas A&M	0	0	15	16	0	0	0	16	16	
DU *** UCSC	57	39	1,343	1,523	52	44	1,302	2,741	2,741	
DW *** UW	0	0	0	0	8	8	267	283	283	
Total	2,466	2,022	38,384	40,084	2,189	2,204	58,280	101,058	101,058	

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	JAN03	FEB03				
RL LABOR	1,040	900	22,998	23,746	1,157	1,033	30,320	55,509	55,509	
FTE (DOE/NASA)	*125.9*	*102.9*	*1,968.2*	*2,109.0*	*102.0*	*99.0*	*2,661.3*	*4,830.5*	*4,830.5*	
HOURS (DOE/NASA)	*16,118*	*13,166*	*330,107*	*346,068*	*17,082*	*15,033*	*435,355*	*797,576*	*797,576*	
RT TRAVEL	8	44	633	1,103	59	53	2,522	3,267	3,267	
RM MATERIAL & SERVICES	1,097	918	13,209	13,684	823	1,022	23,445	38,500	38,500	
RX MPS & LAB TAX	321	160	1,545	1,552	150	96	1,992	3,783	3,783	
Total (not incl FTE/Hours)	2,466	2,022	38,384	40,084	2,189	2,204	58,280	101,058	101,058	

Attachment 6
LAT Performance, through December 2002, by WBS

Cost Performance Report - Work Breakdown Structure													
Contractor: Location:					Contract Type/No:			Project Name/No: GLAST LAT Project		Report Period: 11/30/02 12/31/02			
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	147	147	265	0	-118	5,693	5,693	5,881	0	-188	11,602	11,602	0
4.1.2 SYSTEM ENGINEERING	76	76	177	0	-101	2,396	2,396	2,570	0	-173	4,647	4,647	0
4.1.4 TRACKER	324	303	213	-21	90	5,621	5,462	5,567	-158	-105	9,917	9,917	0
4.1.5 CALORIMETER	301	294	272	-6	22	7,406	6,692	6,431	-714	262	17,575	17,575	0
4.1.6 ANTICOINCIDENCE DETECTOR	438	497	580	59	-83	5,298	4,885	5,611	-413	-726	10,772	10,772	0
4.1.7 ELECTRONICS	184	247	131	63	116	3,832	3,745	4,037	-87	-292	15,737	15,737	0
4.1.8 MECHANICAL SYSTEMS	241	218	512	-23	-294	3,957	3,290	3,123	-667	167	11,794	11,794	0
4.1.9 INTEGRATION & TEST	114	115	98	1	17	1,325	1,268	1,232	-57	36	6,673	6,673	0
4.1.A PERFORMANCE AND SAFETY ASSURA	42	42	51	0	-9	1,047	1,047	732	0	315	2,174	2,174	0
4.1.B LAT INSTRUMENT OPERATIONS CENT	23	13	14	-10	0	452	408	276	-45	132	2,552	2,552	0
4.1.C EDUCATION AND PUBLIC OUTREACH	29	23	92	-6	-70	725	713	671	-11	43	2,684	2,684	0
4.1.D SCIENCE ANALYSIS SOFTWARE	103	128	60	25	68	1,012	1,006	928	-7	77	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	2,022	2,103	2,466	81	-363	40,084	37,927	38,384	-2,157	-457	101,058	101,058	0
Contingency											20,268	20,268	
Total	2,022	2,103	2,466	81	-363	40,084	37,927	38,384	-2,157	-457	121,326	121,326	

Attachment 7
LAT Performance, through December 2002, by Organization

Cost Performance Report - Organization													
Contractor: Location:					Contract Type/No:			Project Name/No: GLAST LAT Project		Report Period: 11/30/02 12/31/02			
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		
OBS	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	473	532	597	59	-65	6,727	6,315	6,723	-413	-408	13,733	13,733	0
DH *** HEPL	82	90	75	8	16	3,226	3,132	2,925	-93	207	7,593	7,593	0
DL *** SLAC	944	988	1,318	44	-329	18,277	17,417	18,553	-859	-1,135	50,195	50,195	0
DN *** NRL	424	406	327	-17	79	9,559	8,789	8,122	-770	667	23,855	23,855	0
DO *** Financial Plan	32	32	0	0	32	32	32	32	0	0	32	32	
DS *** SSU	29	23	92	-6	-70	725	713	671	-11	43	2,609	2,609	0
DT *** Texas A&M	0	0	0	0	0	16	16	15	0	0	16	16	0
DU *** UCSC	39	32	57	-7	-25	1,523	1,513	1,343	-10	170	2,741	2,741	0
DW *** UW	0	0	0	0	0	0	0	0	0	0	283	283	
Gen. and Admin.	0	0	0	0	0	0	0	0	0	0	0	0	0
Undist. Budget											0	0	0
Sub Total	2,022	2,103	2,466	81	-363	40,084	37,927	38,384	-2,157	-457	101,058	101,058	0
Contingency											20,268	20,268	
Total	2,022	2,103	2,466	81	-363	40,084	37,927	38,384	-2,157	-457	121,326	121,326	

Attachment 8
LAT Performance Analysis, December 2002

	WBS	BAC	BCWS	BCWP	ACWP	SV $	CV $	% BCWS	% BCWP	% ACWP	SV Trend	CV Trend	SPI	CPI	Cpi_Fcst	CpiSpi_Fcst
2	4.1	101,058	40,084	37,927	38,384	-2,157	-457	39.66	37.53	37.98	↔	↓	0.946	0.988	102,277	105,911
3	4.1.1	11,602	5,693	5,693	5,881	0	-188	49.07	49.07	50.69	↔	↓	1.000	0.968	11,986	11,986
4	4.1.2	4,647	2,396	2,396	2,570	0	-173	51.57	51.57	55.30	↔	↓	1.000	0.933	4,983	4,983
5	4.1.4	9,917	5,621	5,462	5,567	-158	-105	56.68	55.08	56.14	↔	↑	0.972	0.981	10,108	10,240
6	4.1.5	17,575	7,406	6,692	6,431	-714	262	42.14	38.08	36.59	↔	↔	0.904	1.041	16,888	18,003
7	4.1.6	10,772	5,298	4,885	5,611	-413	-726	49.18	45.35	52.10	↑	↔	0.922	0.871	12,373	12,944
8	4.1.7	15,737	3,832	3,745	4,037	-87	-292	24.35	23.80	25.65	↑	↑	0.977	0.928	16,962	17,261
9	4.1.8	11,794	3,957	3,290	3,123	-667	167	33.55	27.90	26.48	↔	↓	0.832	1.053	11,195	12,830
10	4.1.9	6,673	1,325	1,268	1,232	-57	36	19.85	19.00	18.47	↔	↑	0.957	1.029	6,484	6,719
11	4.1.A	2,174	1,047	1,047	732	0	315	48.16	48.16	33.67	↔	↔	1.000	1.430	1,520	1,520
12	4.1.B	2,552	452	408	276	-45	132	17.73	15.98	10.82	↓	↔	0.902	1.477	1,728	1,886
13	4.1.C	2,684	724	713	671	-11	43	27.00	26.57	24.99	↓	↓	0.984	1.063	2,524	2,553
14	4.1.D	3,611	1,012	1,006	928	-7	77	28.03	27.85	25.71	↑	↑	0.993	1.083	3,334	3,350
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]	101,058	40,084	37,927	38,384	-2,157	-457	39.66	37.53	37.98	↔	↓	0.946	0.988	102,277	105,911

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)

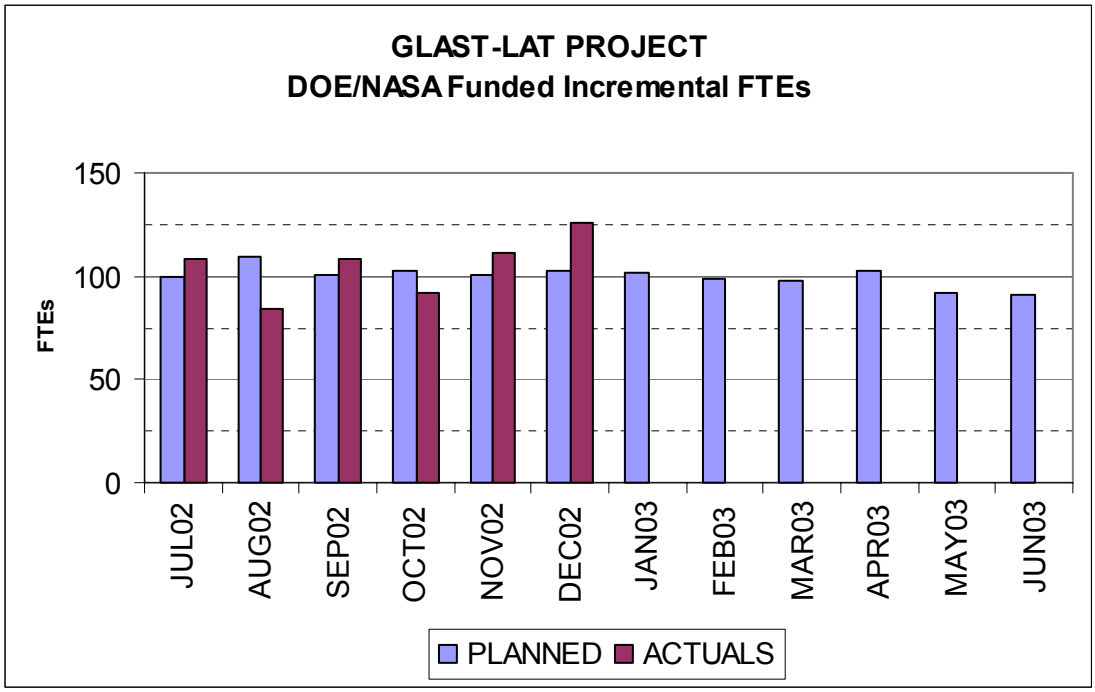
SV $: Schedule Variance = BCWP - BCWS
CV $: Cost Variance = BCWP - ACWP
SPI: Schedule Performance Index = BCWP/BCWS
CPI: Cost Performance Index = BCWP/ACWP

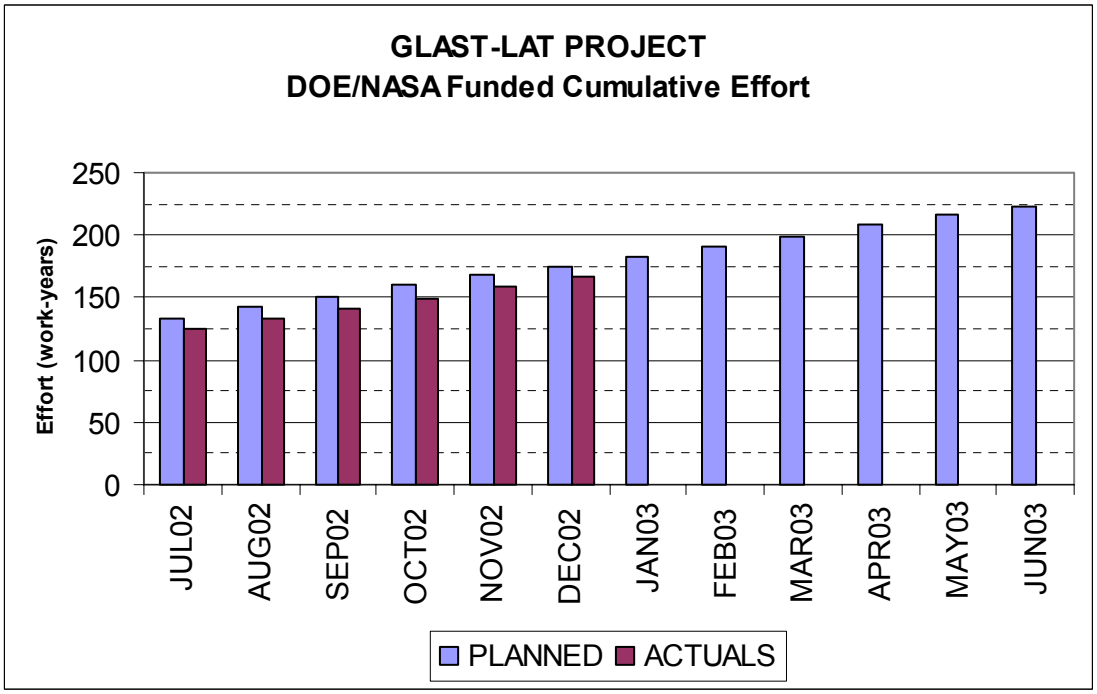
% BCWS: Percent Scheduled = BCWS/BAC
% BCWP: Percent Complete = BCWP/BAC
% ACWP: Percent Spent = ACWP/BAC

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

Attachment 9
LAT Manpower (DOE/NASA-Funded)





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

Program:	Description:	Approval:
LAT3	GLAST LAT Project	Program Manager
Run Date:	Status Date:	Functional Manager
1/29/03	12/31/02	Cost Account Manager

CAPW[3]		PRIOR	JUL02	AUG02	SEP02	OCT02	NOV02	DEC02	**Cum-to Date**	JAN03	FEB03	MAR03	APR03	MAY03	JUN03
4.1.1 INSTRUMENT MANAGEMENT															
FTE	PLANNED	173.7	11.0	11.0	11.0	11.1	11.1	11.1	**239.9**	11.1	11.1	11.1	11.1	11.1	11.1
	ACTUALS	165.0	13.0	9.4	11.0	15.0	10.7	12.5	**236.6**	0.0	0.0	0.0	0.0	0.0	0.0
4.1.2 SYSTEM ENGINEERING															
FTE	PLANNED	31.3	1.9	1.8	2.0	2.1	2.1	2.0	**43.2**	1.8	1.9	1.9	1.9	1.7	1.6
	ACTUALS	20.3	2.1	1.8	1.9	1.7	1.1	1.2	**30.1**	0.0	0.0	0.0	0.0	0.0	0.0
4.1.4 TRACKER															
FTE	PLANNED	437.9	24.2	24.2	23.0	21.6	25.8	27.3	**584.0**	26.1	26.6	24.6	28.3	28.1	19.9
	ACTUALS	423.3	20.6	20.8	15.2	16.9	24.5	25.3	**546.6**	0.0	0.0	0.0	0.0	0.0	0.0
4.1.5 CALORIMETER															
FTE	PLANNED	797.9	54.0	56.8	61.9	63.4	57.4	44.2	**1135.7**	48.5	49.2	48.3	48.1	43.3	47.7
	ACTUALS	247.0	17.4	13.0	22.1	20.4	22.9	24.9	**367.7**	0.0	0.0	0.0	0.0	0.0	0.0
4.1.6 ANTICOINCIDENCE DETECTOR															
FTE	PLANNED	224.7	22.3	22.9	36.6	23.2	22.9	19.0	**371.6**	19.5	18.3	18.1	21.2	16.9	16.5
	ACTUALS	187.2	38.3	24.9	25.5	25.8	31.5	39.1	**372.3**	0.0	0.0	0.0	0.0	0.0	0.0
4.1.7 ELECTRONICS															
FTE	PLANNED	224.1	7.5	7.8	15.3	7.1	7.7	13.3	**282.7**	19.1	17.6	16.0	17.2	16.3	15.1
	ACTUALS	169.2	7.8	57.7	29.3	8.1	8.6	10.8	**291.4**	0.0	0.0	0.0	0.0	0.0	0.0
4.1.8 MECHANICAL SYSTEMS															
FTE	PLANNED	93.8	9.9	12.4	14.5	10.9	13.8	7.5	**162.7**	8.4	7.8	6.8	8.6	7.6	5.1
	ACTUALS	75.2	6.4	4.0	7.4	7.4	8.5	9.2	**118.1**	0.0	0.0	0.0	0.0	0.0	0.0
4.1.9 INSTRUMENT INTEGRATION AND TESTING															
FTE	PLANNED	46.1	13.6	19.3	12.5	8.9	6.8	13.2	**120.3**	9.5	8.5	11.4	12.9	12.0	12.3
	ACTUALS	55.8	9.5	8.6	8.2	8.4	9.7	8.3	**108.4**	0.0	0.0	0.0	0.0	0.0	0.0
4.1.A PERFORMANCE AND SAFETY ASSURANCE															
FTE	PLANNED	44.2	2.6	2.6	2.6	2.6	2.6	2.6	**59.7**	2.6	2.6	2.6	2.6	2.6	2.6
	ACTUALS	34.7	1.6	2.5	2.9	2.2	1.8	2.1	**47.7**	0.0	0.0	0.0	0.0	0.0	0.0
4.1.B LAT INSTRUMENT OPERATIONS CENTER															
FTE	PLANNED	20.2	1.3	0.8	0.5	2.2	2.2	2.2	**29.4**	2.2	2.2	2.3	2.3	2.4	2.4
	ACTUALS	22.6	0.1	0.0	0.0	0.0	0.0	1.7	**24.5**	0.0	0.0	0.0	0.0	0.0	0.0
4.1.C EDUCATION AND PUBLIC OUTREACH															
FTE	PLANNED	37.3	4.2	1.5	1.5	1.7	1.7	1.6	**49.5**	1.9	1.9	1.9	1.9	1.9	1.9
	ACTUALS	41.0	2.8	3.1	0.4	0.0	5.5	3.0	**55.9**	0.0	0.0	0.0	0.0	0.0	0.0
4.1.D SCIENCE ANALYSIS SOFTWARE															
FTE	PLANNED	255.8	23.3	21.1	18.1	18.5	18.2	23.1	**378.0**	20.2	25.0	24.7	24.7	24.7	24.5
	ACTUALS	161.1	8.9	6.7	9.6	9.6	10.2	10.5	**216.4**	0.0	0.0	0.0	0.0	0.0	0.0
4.1.E SUBORBITAL FLIGHT TEST															
FTE	PLANNED	111.9	0.0	0.0	0.0	0.0	0.0	0.0	**111.9**	0.0	0.0	0.0	0.0	0.0	0.0
	ACTUALS	75.3	0.0	0.0	0.0	0.0	0.0	0.0	**75.3**	0.0	0.0	0.0	0.0	0.0	0.0
Grand Totals:															
	PLANNED	2498.8	175.7	182.2	199.4	173.3	172.2	167.1	**3568.8**	171.1	172.5	169.6	180.6	168.5	160.7
	ACTUALS	1677.6	128.4	152.4	133.5	115.3	134.9	148.6	**2490.8**	0.0	0.0	0.0	0.0	0.0	0.0