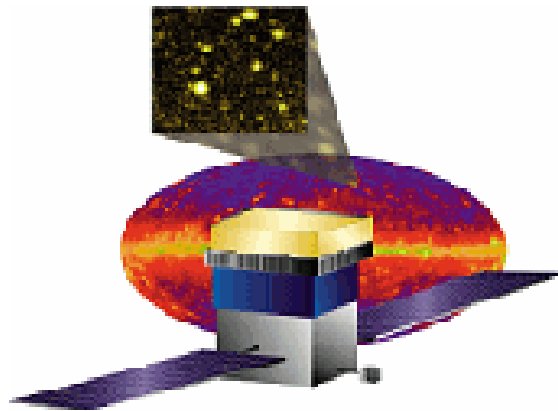


Monthly Progress Report

(Month Ending May 2005)

GLAST Large Area Telescope (LAT)



LAT-MR-06848-01

July 6, 2005

1.0 Introduction

This monthly progress report is submitted to the GLAST Project Office at the Goddard Space Flight Center and the Department of Energy SLAC Site Office. The report summarizes LAT project status as of the end of May, 2005.

2.0 Recent Progress and Status

4.1.4 Tracker

The sixth and seventh towers completed all environmental testing and pre-ship review. They are in transit to SLAC. Facility availability forced the vibration testing of the seventh tower to follow the thermal-vacuum test. All trays for the eighth tower are assembled and tested, and tower assembly has begun. Only five of eight cables are available, however, and a workaround plan is in place. The tower assembly and alignment, plus testing to the extent allowed by five cables, will be completed, and then the tower will be stored in the Pisa clean room pending arrival of the missing three cables. Tray panels for the ninth tower were delivered. The second vendor is producing ladders, with good test results.

Multichip module (MCM) production is about one tower ahead of tray assembly, with enough MCMs available through the tenth tower. The MCM production facility was moved, losing only a couple of days of production, but gaining improvement in the production layout. The main technical problem has been loss of boards at MIP-1 due to the flex-circuit trimmer cutting into the printed wiring board. Tooling is being adjusted and modifying to cut less deeply.

Equipment failures at the vendor have slowed production of flight cables. Preparations were completed to begin production at the second source.



Figure 1: Seventh Tracker tower.

4.1.5 Calorimeter

Pre-ship reviews of the first 14 Calorimeter modules have been completed; seven modules have been shipped to SLAC. Acceptance Test Data Package (ATDP) reports have been completed for the first fourteen modules. The eighteenth tower has successfully completed thermal-vacuum testing; the flight qualification TEM/TPS (tower electronics module and power supply) was removed and returned to SLAC; and baseline performance was re-established.

4.1.6 Anticoincidence Detector

All eight electronics chassis have been integrated and functionally tested. 146 fiber cables have been mated to their respective photomultiplier tubes. Light-tight testing has been completed on those tiles. The micrometeoroid shield's handling layer, six top and eight side Kevlar layers, first foam layer, and first Nextel layer have been completed. The preliminary closeout report for the noise anomaly has been distributed. Installation of the third- and fourth-row tile detector assemblies commenced. The first full functional test was performed, with 73 of 97 detectors integrated to the photomultiplier tubes.



Figure 2: Three rows of ACD tile detectors assembled.

4.1.7 Electronics, Data Acquisition, and Flight Software

The first four tower electronics modules (TEMs) and tower power supplies (TPSs) have been delivered to Integration & Test. The fifth and sixth have completed thermal-vacuum testing. The seventh and eighth have commenced environmental testing.

Assembly of the power distribution unit has been completed. Several modifications, discovered during testing, are required. The GASU surface-mount assembly has been completed, and is in flying-probe testing.

Problems with the spacecraft interface board (SIB) EEPROM were discovered during assembly: helium-tracer gas was not included in the re-sealed parts, and chlorine traces were detected in the capacitor die attachment. A new lot has been ordered.

Several types of harness cable assemblies were received. The heater control box printed circuit boards have been received and are being tested. The assembly procurement is underway.

Preparations are underway for thermal testing support.

The first virtual spacecraft simulator is completed, and is in use.

The first flight software candidate release was made. Work on the thermal control test system has commenced. Basic testing of the LAT thermal with simple thermal control sensor setup has been completed. Time hack processing is now integrated with the new version of inter-task communications. The design document for the LAT instrument

manager has been updated; development and testing continues. The inter-task communications test suite is underway, but was pre-empted by work on the thermal control simulator system. The first public version of the event/gamma filter code was released. Memory scrubber control for the LAT computer manager is complete. Most of the functionality for the LAT charge injection code is in place.

The Python interface package is now in the hands of the test team. This is their interface to the virtual spacecraft simulator.

Development of the infrastructure for generating Monte Carlo physics data files for physics-related tests is underway.

4.1.8 Mechanical Systems

The second grid has been machined. The radiators are complete, except for instrumentation and harness installation. The spare variable control heat pipes are nearly complete. Ground support equipment for the radiators and cross-LAT (X-LAT) plate is underway. Plans are being made for the X-LAT thermal test. The acoustic test fixture is complete. Fixtures for the acoustic test have been designed. Planning reviews for the radiator panel testing are held regularly.



Figure 3: Second grid machining completed.

4.1.9 Integration & Test (I&T)

Four towers have been integrated in the grid. Two-tower test was performed; data was successfully calibrated. The two-tower data analysis has commenced, with no major problems identified as yet. Receiving tests on three Tracker towers were completed. Grid thermistors and thermocouples were installed and crimped. Improvements are being made

to the E-logbook. The offline data processing system is now under configuration control and working well. Single tower data analysis continues. An emergency generator allowed work to continue at the Integration & Test facility during the several-day SLAC power outage. A fault occurred with a circuit breaker panel in one room of the facility during the outage; the root cause was identified and corrective action has been completed.



Figure 4: Four towers installed on the grid.

4.1.B Instrument Science Operations Center

The first software release is nearly complete, in support of the second ground readiness test. A candidate software release has been committed into the version control system. The operations data products interface control document (ICD) was approved. The science data products ICD is under review. Planning is underway for the next face-to-face GLAST Operations Working Group (GOWG) Technical Interchange Meeting (TIM) in late September, at SLAC. A new ground system schedule has been distributed, which has been reworked to support GLAST launch in August 2007. Work is underway on LAT instrument configuration management and tracking.

3.0 Schedule Status

The critical path for the project is the fabrication of components of the Spacecraft Interface Unit and Event Processing Unit. There are 10 days of float to the shipment of the LAT.

The status of significant milestones is summarized in Attachments 1 and 2. Attachment 1 presents the status of the Level 1 and Level 2 milestones. The pre-environmental test

review and pre-ship review milestones (1M1000700 and 1M1000120) have been delayed as a result of this critical path.

Attachment 2 shows the status of the remaining Level 3 milestones. The following level 3 milestones were completed during this reporting period:

Milestone Number	Description	Date Completed
1M79210	Demo: Watchdog	5/6/05
1M79230	Demo: Housekeeping	5/10/05
1M1000220	Flight Tracker Tower 1 RFI	5/10/05
1M1000221	Flight Tracker Tower 2 RFI	5/10/05
1M1000250	Flight Tracker Tower 3 RFI	5/10/05
1M79001030	Flight TEM Assy 1	5/19/05
1M79002030	Flight TEM PS Assy 1	5/19/05
1M79001040	Flight TEM Assy 2	5/19/05
1M79002040	Flight TEM PS Assy 2	5/19/05
1MRTS060	Calorimeter Module 9 Ready to Ship	5/25/05
1MRTS070	Calorimeter Module 10 Ready to Ship	5/25/05
1MRTS090	Calorimeter Module 11 Ready to Ship	5/25/05
1MRTS080	Calorimeter Module 12 Ready to Ship	5/25/05
1M99020	Start 4-Tower Comprehensive Performance Test	5/31/05

Unfavorable variance projections greater than one week are discussed below, listed by responsible subsystem.

4.1.4 Tracker

The sixth tower (1M1000251) was delayed, awaiting readiness for thermal-vacuum testing of the seventh tower (1M1000260). The seventh tower has been delayed due to cable delivery delays, as have the remaining towers. The primary cable vendor is producing a 10% yield. The second cable vendor is also experiencing manufacturing problems. These delays are being mitigated by assembling towers without cables, with a plan to add the cables when available and then proceed with environmental testing.

4.1.5 Calorimeter

The delayed flight Calorimeter modules 13 through 15 (last two flight modules, and the first spare) were completed in early June.

4.1.6 Anticoincidence Detector

The ACD test scripts (1M1001000) milestone has been delayed due to the need for additional testing, and as more is learned about the performance of the ACD electronics. This milestone is not expected to be completed until the ACD is fully assembled and tested.

Issues with the test scripts and test data have been encountered during performance testing, resulting in a delay in the delivery of the ACD (1M1000410). These issues are

being resolved with assistance from the LAT online team. The ACD science team is evaluating reducing the ten-day duration of the ACD performance test.

4.1.7 Electronics

The following milestones have been delayed at the assembly vendor. The main issue is the quality of the solder assembly of the cPCI connectors onto the cPCI boards. The LAT project continues to work with the vendor to improve the situation.

- Flight PDU Box (1M17942000)
- Flight GASU Box (1M7941070)
- LCB Flight Units (1M7R050)
- Flight Event Processor Units (1M7941090)
- Flight EPU/SIUs (1M7R040, 1M7R010, 1M7R020, 1M7R030, 1M7941080)

Performance issues have slowed the progress of the TEM and TEM/PS production. The fifth through ninth modules (1M79001050 & -2050, 1M79001060 & -2060, 1M79001070 & -2070, 1M79001080 & -2080, and 1M79001090 & -2090) were delayed due to a production bottleneck at the assembler. As of publication of this report, the bottleneck has been solved and the fifth through seventh modules have been delivered.

The harness (1M7941110) has been delayed due to cable parts shortages, and is expected to be completed by the end of August.

The flight software demonstrations will be replaced as measures of progress by the running of real test scripts that will be used for the flight software formal qualification testing (FQT).

4.1.8 Mechanical Systems

In December 2004, SLAC directed Lockheed Martin to postpone work on test-related activities and focus on the completion of flight hardware. The test-related activities have restarted, however this resulted in delay to the completion of the X-LAT plate (1M941710).

SLAC accepted Lockheed Martin's recommendation to perform thermal cycling testing instead of thermal vacuum testing of the X-LAT plate as a cost saving measure. Additional time was required to qualify non-destructive inspection techniques for hardware configuration. These techniques were used before and after thermal cycling tests to verify that there was no degradation in the X-LAT bonds.

Radiator delivery (milestone 1M941720) has slipped due to the extra time required to install instrumentation harnesses onto the Radiators. There were also facility issues at both the acoustic (broken parts) and vibration (program conflicts) test areas at Lockheed. These issues are being resolved.

4.1.9 Integration & Test

Variances to the "Ready to Ship" and subsequent milestones are driven by the critical path for the project, as described above.

4.1.B Instrument Science Operations Center

The Ground System Interface Test Start (1M7941270) was rescheduled to correspond to the delay in the GLAST ground data system (GDS), on which this activity depends. Given the current GLAST GDS schedule, there is no impact due to the date change and no need for mitigation.

4.0 Financial Status

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

Attachments 4 and 5 summarize the actual costs through the current period, by WBS level 3 and institution, respectively.

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.C Education & Public Outreach

There are several projects nearly completed, for which final costs have not yet been recorded. This is not a concern at this time.

6.0 Change Control and Contingency Analysis

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

Change Request No.	Description	Submitted By	Current Status	Contingency Impact ¹
LAT-XR-06076-01	Tracker Minimum Temperature Increase	R. Bright	Approved	N/A
LAT-XR-06077-01	Elex H/W Unit Classification Change from Qual to Proto-Flight	R. Bright	Approved	N/A
LAT-XR-06616-02	Integration Sequence and Test Changes	P. Hascall/ L. Wai	Approved	N/A
LAT-XR-06671-01	Update Cal-LAT ICD	R. Bielawski	Approved	N/A

The cost baseline through FY05 is \$154,025K Funding applicable to that baseline is \$155,809K; the resulting contingency is \$1,784K.

7.0 Staffing

Attachment 9 demonstrates the staffing plan funded by DOE/NASA, and reports of actual manpower received. This report includes contracted labor which is bookkept as M&S.

An accounting adjustment was made to the reported cumulative actual ACD FTEs. Actual incremental FTEs for the month exceeded plan, due to the schedule delay described in section 3.0.

¹ A positive number indicates a draw on contingency.

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 1)												
1M1P000000	DOE Critical Decision (CD) 0 Approval	06/25/01A	0	06/25/01A	▼							
1M1P000010	CD-1 Approval	07/23/02A	0	07/23/02A		▼						
1M1P000020	CD-2 Approval	11/08/02A	0	11/08/02A			▼					
1M1P000030	CD-3 Approval	09/03/03A	0	09/03/03A				▼				
1M1P000060	Flight GRID Complete	11/08/04A	0	11/08/04A					▼			
1M1P000040	CD-4 Approval	03/15/06*	0	03/15/06*						▼		
DOE/NASA Federal Project Managers (Level 2)												
1M1BF00000	Launch Balloon Flight	08/01/01A	0	08/01/01A	▼							
1M1000100	Instrument Preliminary Design Review	01/08/02A	0	01/08/02A		▼						
1M1000110	I-CDR (Critical Design Review)	05/16/03A	0	05/16/03A			▼					
1M1000740	Start LAT Integration	03/23/05	-5	03/30/05A					▼			
1M1000700	Pre Environmental Testing Review	12/20/05	-27	02/06/06						▼		
1M1000120	PSR-(Instrument Pre-Ship Review)	04/18/06	-18	05/12/06						▼		
Run Date					06/27/05 10:39					GLAST LAT PROJECT Project Milestones (Level 1 and 2)	0620 LT_MS1-2	Sheet 1 of 1
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**Attachment 2
Future Level 3 Milestones
Page 1 of 3**

Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date	FY04			FY05			FY06		
					Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	
Instrument Project Office (Level 3)													
4.1.1 Instrument Management													
1M1001920	Pre-Environmental Test Review	12/20/05	-27	02/06/06								▽	
4.1.4 Tracker													
1M1000251	Flight Tracker Tower 4 RFI	05/16/05	-16	06/08/05				▽					
1M1000260	Flight Tracker Tower 5 RFI	06/03/05	-3	06/08/05				▽					
1M1000261	Flight Tracker Tower 6 RFI	06/16/05	-13	07/06/05				▽					
1M1000270	Flight Tracker Tower 7 RFI	06/27/05	-8	07/08/05				▽					
1M1000271	Flight Tracker Tower 8 RFI	07/06/05	-17	07/29/05				▽					
1M1000280	Flight Tracker Tower 9 RFI	07/15/05	-12	08/02/05				▽					
1M1000281	Flight Tracker Tower 10 RFI	07/26/05	-15	08/16/05				▽					
1M1000290	Flight Tracker Tower 11 RFI	08/04/05	-10	08/18/05				▽					
1M1000291	Flight Tracker Tower 12 RFI	08/15/05	-8	08/25/05				▽					
1M1000300	Flight Tracker Tower 13 RFI	08/24/05	-9	09/07/05				▽					
1M1000301	Flight Tracker Tower 14 RFI	09/02/05	-4	09/09/05				▽					
1M1000310	Flight Tracker Tower 15 RFI	09/13/05	-4	09/19/05				▽					
1M1000311	Flight Tracker Tower 16 RFI	09/22/05	-2	09/26/05				▽					
4.1.5 Calorimeter													
1MRTS100	Flight Calorimeter Module 13 Ready to Ship	05/23/05	-13	06/10/05				▽					
1MRTS110	Flight Calorimeter Module 14 Ready to Ship	05/25/05	-11	06/10/05				▽					
1MRTS120	Flight Calorimeter Module 15 Ready to Ship Spare	05/31/05	-8	06/10/05				▽					
1MRTS130	Flight Calorimeter Module 16 Ready to Ship Spare	06/08/05	-2	06/10/05				▽					
4.1.6 ACD													
1M1001000	ACD Test Scripts (from ACD to I&T)	03/15/05*	-76	06/30/05			▽						
1M1000410	ACD Flight Unit at SLAC, Tested/Inspected & RFI	07/15/05	-10	07/29/05				▽					
4.1.7 Electronics													
1M7941440	Final EGSE incl S/C Sim, FSW-Elec to I&T	04/01/05	-60	06/27/05				▽					
1M79270	Demo: Mode Control	04/22/05	-44	06/24/05				▽					
1M79220	Demo: Charge Injection Calibration	04/29/05	-44	07/01/05				▽					
1M79001050	Flight TEM Assy 3: Elec to I&T	05/06/05	-18	06/02/05				▽					
1M79002050	Flight TEM PS Assy 3: Elec to I&T	05/06/05	-18	06/02/05				▽					
1M79240	Demo: Event Integrity and Delivery	05/06/05	-24	06/10/05				▽					
Run Date		06/27/05 10:40		GLAST LAT PROJECT Project Milestones (Level 3) Planned Milestones			0620			Sheet 1 of 3			
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Attachment 2
Future Level 3 Milestones
Page 2 of 3

Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date	Gantt Chart																		
					FY04 Q4	FY04 Q1	FY04 Q2	FY04 Q3	FY04 Q4	FY05 Q1	FY05 Q2	FY05 Q3	FY05 Q4	FY06 Q1	FY06 Q2	FY06 Q3							
1M79280	Demo: Diagnostics	05/06/05	-47	07/14/05																			
1M79001060	Flight TEM Assy 4: Elec to I&T	05/13/05	-15	06/06/05																			
1M79002060	Flight TEM PS Assy 4: Elec to I&T	05/13/05	-15	06/06/05																			
1M79001070	Flight TEM Assy 5: Elec to I&T	05/20/05	-10	06/06/05																			
1M79002070	Flight TEM PS Assy 5: Elec to I&T	05/20/05	-10	06/06/05																			
1M79260	Demo: GRB Detection and Response	05/20/05	-48	07/29/05																			
1M79001080	Flight TEM Assy 6: Elec to I&T	05/27/05	-10	06/13/05																			
1M79002080	Flight TEM PS Assy 6: Elec to I&T	05/27/05	-10	06/13/05																			
1M79001090	Flight TEM Assy 7: Elec to I&T	06/06/05	-9	06/17/05																			
1M79002090	Flight TEM PS Assy 7: Elec to I&T	06/06/05	-9	06/17/05																			
1M79001100	Flight TEM Assy 8: Elec to I&T	06/13/05	-4	06/17/05																			
1M79002100	Flight TEM PS Assy 8: Elec to I&T	06/13/05	-4	06/17/05																			
1M79001110	Flight TEM Assy 9: Elec to I&T	06/20/05	-4	06/24/05																			
1M79002110	Flight TEM PS Assy 9: Elec to I&T	06/20/05	-4	06/24/05																			
1M79001120	Flight TEM Assy 10: Elec to I&T	06/27/05	1	06/24/05																			
1M79002120	Flight TEM PS Assy 10: Elec to I&T	06/27/05	1	06/24/05																			
1M7942000	Flight PDU Box-Elec to I&T	07/01/05	-64	10/03/05																			
1M79001130	Flight TEM Assy 11: Elec to I&T	07/05/05	1	07/01/05																			
1M79002130	Flight TEM PS Assy 11: Elec to I&T	07/05/05	1	07/01/05																			
1M7941110	Flight Harness-Elec to I&T	07/05/05	-8	07/15/05																			
1M79001140	Flight TEM Assy 12: Elec to I&T	07/12/05	6	07/01/05																			
1M79002140	Flight TEM PS Assy 12: Elec to I&T	07/12/05	6	07/01/05																			
1M79001150	Flight TEM Assy 13: Elec to I&T	07/19/05	6	07/11/05																			
1M79002150	Flight TEM PS Assy 13: Elec to I&T	07/19/05	6	07/11/05																			
1M7941070	Flight GASU Box-Elec to I&T	07/19/05	-42	09/16/05																			
1M7R050	LCB Flight Units - Elec to Elec	07/20/05	-44	09/21/05																			
1M79001160	Flight TEM Assy 14: Elec to I&T	07/26/05	11	07/11/05																			
1M79002160	Flight TEM PS Assy 14: Elec to I&T	07/26/05	11	07/11/05																			
1M79001170	Flight TEM Assy 15: Elec to I&T	08/02/05	11	07/18/05																			
1M79002170	Flight TEM PS Assy 15: Elec to I&T	08/02/05	11	07/18/05																			
1M79001180	Flight TEM Assy 16: Elec to I&T	08/09/05	16	07/18/05																			
1M79002180	Flight TEM PS Assy 16: Elec to I&T	08/09/05	16	07/18/05																			

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GLAST LAT PROJECT
Project Milestones (Level 3)
Planned Milestones

0620
 LTX2 - MS3 (planned)
 FLX1- MS (L3)
 Sheet 2 of 3

**Attachment 2
Future Level 3 Milestones
Page 3 of 3**

Activity ID	Activity Description	Target Finish Date	Variance	Scheduled Finish Date	Timeline															
					FY04 Q4	Q1	Q2	FY05 Q3	Q4	Q1	FY06 Q2	Q3								
1M7941090	Flight Event Processor Units-Elec to I&T	08/19/05	-43	10/20/05																
1M7R040	1st Flight EPU/SIU-Elec to I&T	08/19/05	-38	10/13/05																
1M7R010	2nd Flight EPU/SIU-Elec to I&T	08/24/05	-40	10/20/05																
1M7R020	3rd Flight EPU/SIU-Elec to I&T	08/26/05	-41	10/25/05																
1M7R030	4th Flight EPU/SIU-Elec to I&T	08/30/05	-44	11/01/05																
1M7941080	5th Flight EPU/SIU-Elec to I&T	09/02/05	-46	11/08/05																
4.1.8 Mechanical																				
1M941710	X-LAT Thermal Plate RFI from Mech to I&T	04/20/05	-43	06/21/05																
1M941720	Radiators ready for I&T (from Mech to I&T)	07/22/05	-12	08/09/05																
4.1.9 I&T																				
1M99030	Start 8 Tower Comprehensive Performance Test	06/20/05	-16	07/13/05																
1M1001740	Online FU S/W Final Release-I&T to ISOC	07/14/05	0	07/14/05																
1M99040	Start 16 Tower Comprehensive Performance Test	09/07/05	-8	09/19/05																
1M1000130	LAT Ready to Ship to NRL for Env Test	12/20/05	-27	02/06/06																
1M19010	Ship LAT to NRL for Env Test	01/03/06	-40	02/12/06																
1M19020	LAT EMI/EMC Test	02/01/06	-58	03/31/06																
1M19030	LAT Sine Vibe	02/14/06	-24	03/10/06																
1M19040	LAT Acoustic Test	02/24/06	-46	04/11/06																
1M19050	LAT TVAC	04/14/06	-20	05/04/06																
1M19060	LAT Weight & CG	04/17/06	-25	05/12/06																
1M19070	Ship LAT to Spectrum Astro	04/21/06	-23	05/14/06																
4.1.B ISOC																				
1M7941270	Ground System Interface Test start	06/15/05*	-9	06/28/05*																
1M1000112	Mission Operations Review	01/17/06*	0	01/17/06*																

Run Date 06/27/05 10:40

**GLAST LAT PROJECT
Project Milestones (Level 3)
Planned Milestones**

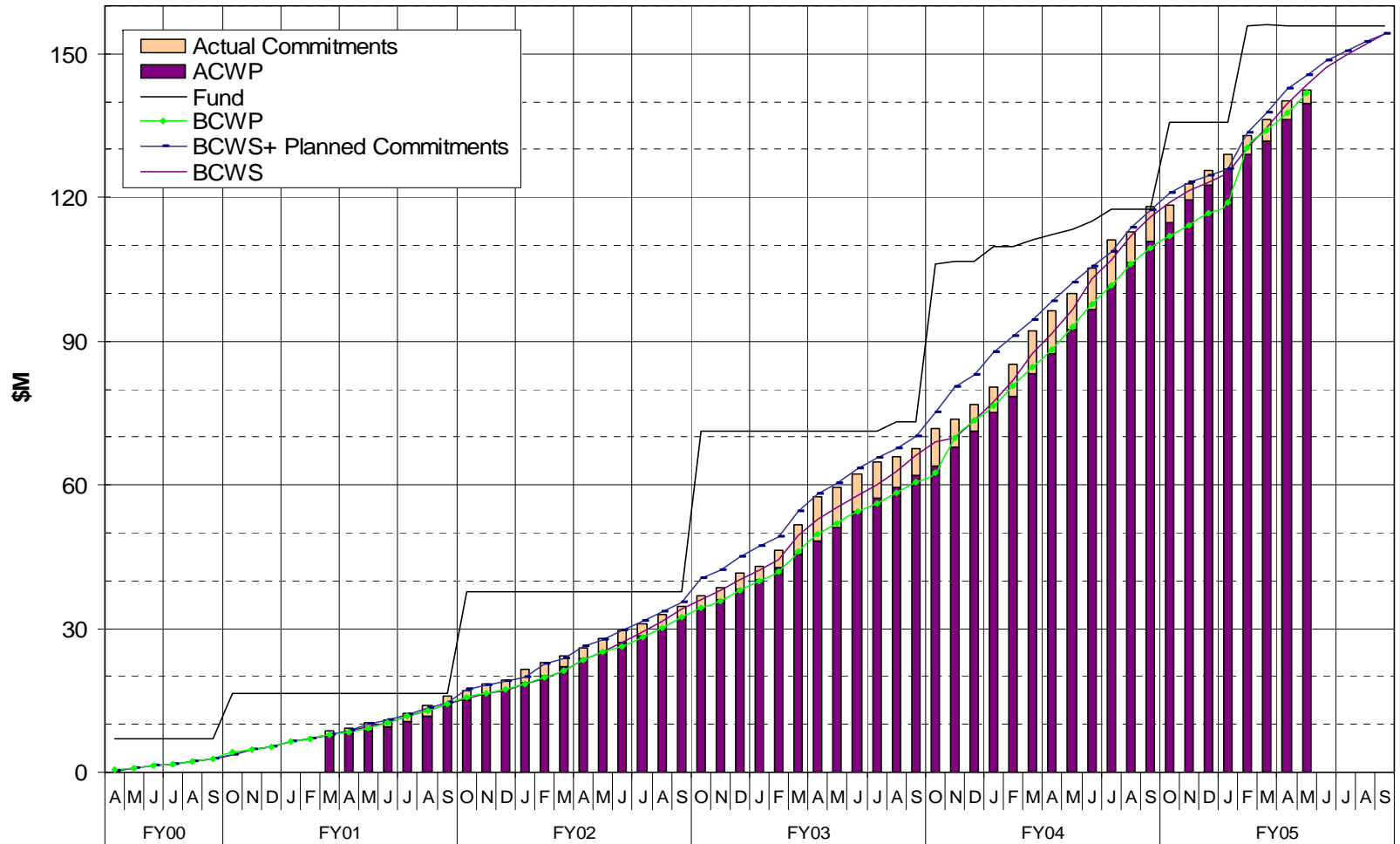
0620
LTX2 - MS3 (planned)
FLX1- MS (L3)

Sheet 3 of 3

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Attachment 3

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



**Attachment 4
LAT Costs, through May 2005, by WBS**

Monthly Contractor Financial Management Report								Report for Month Ending: 5/31/2005		
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	Billing	
	During Month		Cum. to Date		Detail		Balance of Budget	Estimated Final Cost		Unfilled Orders Outstanding
	Actual	Planned	Actual	Planned	JUN05	JUL05		Project Estimate	Budget Value	
4.1.1 INSTRUMENT MANAGEMENT	326	327	16,159	16,456	342	291	852	17,645	17,645	
4.1.2 SYSTEM ENGINEERING	269	166	7,078	7,051	163	150	256	7,647	7,647	
4.1.4 TRACKER	665	983	19,397	20,158	768	352	1,185	21,702	21,702	
4.1.5 CALORIMETER	221	275	21,200	21,832	226	166	1,003	22,594	22,594	
4.1.6 ANTICOINCIDENCE DETECTOR	217	363	17,135	17,546	216	56	561	17,968	17,968	
4.1.7 ELECTRONICS	597	1,137	26,148	27,094	767	434	1,546	28,894	28,894	
4.1.8 MECHANICAL SYSTEMS	592	75	15,243	15,253	485	412	726	16,866	16,866	
4.1.9 INTEGRATION & TEST	293	82	7,507	7,613	416	555	974	9,451	9,451	
4.1.A PERFORMANCE AND SAFETY ASSURANCE	182	103	3,502	3,477	111	81	152	3,846	3,846	
4.1.B LAT INSTRUMENT OPERATIONS CENTER	13	5	319	317	5	5	5	334	334	
4.1.C EDUCATION AND PUBLIC OUTREACH	18	68	2,083	2,397	73	67	460	2,684	2,684	
4.1.D SCIENCE ANALYSIS SOFTWARE	9	75	2,541	2,765	80	71	377	3,069	3,069	
4.1.E SUBORBITAL FLIGHT TEST	0	0	1,325	1,325	0	0	0	1,325	1,325	
Gen. and Admin.	0	0	0	0	0	0	0	0	0	
Total	3,402	3,659	139,635	143,283	3,653	2,640	8,098	154,025	154,025	

Attachment 5
LAT Costs, through May 2005, by Organization and Cost Code

Monthly Contractor Financial Management Report								Report for Month Ending: 5/31/2005		
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	Type:							Fund Limitation:		
GLAST LAT Project								0		
Reporting Category	Cost Incurred				Estimated Cost			4/3/2000	Billing	
	During Month		Cum. to Date		Detail		Balance of Budget	Estimated Final Cost		Unfilled Orders Outstanding
	Actual	Planned	Actual	Planned	JUN05	JUL05		Project Estimate	Budget Value	
DG *** GSFC	235	400	18,593	19,284	254	91	917	19,856	19,856	
DH *** HEPL	339	240	7,570	7,703	241	243	619	8,674	8,674	
DL *** SLAC	2,442	2,625	83,038	84,872	2,620	1,866	4,743	92,267	92,267	
DN *** NRL	355	303	25,755	26,344	454	365	1,250	27,825	27,825	
DO *** Financial Plan Transfer/Sub Ou	0	0	59	59	0	0	0	59	59	
DS *** SSU	18	67	2,069	2,370	73	66	446	2,654	2,654	
DT *** Texas A&M	0	0	15	15	0	0	0	15	15	
DU *** UCSC	10	14	2,335	2,393	1	1	60	2,396	2,396	
DW *** UW	3	9	199	243	9	9	62	279	279	
Total	0	0	0	0	0	0	0	0	0	
Total	3,402	3,659	139,635	143,283	3,653	2,640	8,098	154,025	154,025	

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		
	Actual	Planned	Actual	Planned	JUN05	JUL05		Budget Value		
RL LABOR	1,084	1,340	66,814	67,423	1,272	1,062	2,696	71,844	71,844	
RT TRAVEL	34	71	1,661	2,224	71	75	718	2,524	2,524	
RM MATERIAL & SERVICES	2,284	2,243	68,774	71,096	2,306	1,500	4,470	77,049	77,049	
RX MPS & LAB TAX	0	4	2,386	2,539	4	3	214	2,607	2,607	
	0	0	0	0	0	0	0	0	0	
Total	3,402	3,659	139,635	143,283	3,653	2,640	8,098	154,025	154,025	

**Attachment 6
LAT Performance, through May 2005, by WBS**

Cost Performance Report - Work Breakdown Structure													
Contractor: Location:					Contract Type/No:			Project Name/No: GLAST LAT Project		Report Period: 4/30/2005 5/31/2005			
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		
CAPW[3] Item	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance		Budgeted	Latest Revised Estimate	Variance
	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
4.1.1 INSTRUMENT MANAGEMENT	327	327	326	0	1	16,456	16,456	16,159	0	298	17,645	17,645	0
4.1.2 SYSTEM ENGINEERING	166	166	269	0	-103	7,051	7,051	7,078	0	-27	7,647	7,647	0
4.1.4 TRACKER	983	763	665	-220	98	20,158	19,676	19,397	-483	279	21,702	21,702	0
4.1.5 CALORIMETER	275	252	221	-23	31	21,832	21,796	21,200	-35	596	22,594	22,594	0
4.1.6 ANTICOINCIDENCE DETECTOR	363	267	217	-96	50	17,546	17,324	17,135	-222	189	17,968	17,968	0
4.1.7 ELECTRONICS	1,137	1,163	597	27	566	27,094	26,401	26,148	-693	253	28,894	28,894	0
4.1.8 MECHANICAL SYSTEMS	75	515	592	439	-77	15,253	15,250	15,243	-3	7	16,866	16,866	0
4.1.9 INTEGRATION & TEST	82	372	293	290	79	7,613	7,585	7,507	-28	79	9,451	9,451	0
4.1.A PERFORMANCE AND SAFETY AS	103	103	182	0	-79	3,477	3,477	3,502	0	-25	3,846	3,846	0
4.1.B LAT INSTRUMENT OPERATIONS (5	5	13	0	-9	317	317	319	0	-2	334	334	0
4.1.C EDUCATION AND PUBLIC OUTRE	68	68	18	0	50	2,397	2,397	2,083	0	313	2,684	2,684	0
4.1.D SCIENCE ANALYSIS SOFTWARE	75	75	9	0	66	2,765	2,765	2,541	0	224	3,069	3,069	0
4.1.E SUBORBITAL FLIGHT TEST	0	0	0	0	0	1,325	1,325	1,325	0	0	1,325	1,325	0
Gen. and Admin.	0	0	0	0	0	0	0	0	0	0	0	0	0
Undist. Budget											0	0	0
Sub Total	3,659	4,075	3,402	417	673	143,283	141,819	139,635	-1,464	2,184	154,025	154,025	0
Contingency											1,784	1,784	0
Total	3,659	4,075	3,402	417	673	143,283	141,819	139,635	-1,464	2,184	155,809	155,809	0

Attachment 7
LAT Performance, through May 2005, by Organization

Cost Performance Report - Work Breakdown Structure													
Contractor: Location:				Contract Type/No:				Project Name/No: GLAST LAT Project		Report Period: 4/30/2005 5/31/2005			
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[1]	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	400	304	235	-96	69	19,284	19,062	18,593	-222	469	19,856	19,856	0
DH *** HEPL	240	240	339	0	-99	7,703	7,703	7,570	0	132	8,674	8,674	0
DL *** SLAC	2,625	3,026	2,442	401	584	84,872	83,674	83,038	-1,198	635	92,267	92,267	0
DN *** NRL	303	415	355	111	60	26,344	26,300	25,755	-44	545	27,825	27,825	0
DO *** Financial Plan	0	0	0	0	0	59	59	59	0	0	59	59	0
DS *** SSU	67	67	18	0	50	2,370	2,370	2,069	0	301	2,654	2,654	0
DT *** Texas A&M	0	0	0	0	0	15	15	15	0	0	15	15	0
DU *** UCSC	14	14	10	0	4	2,393	2,393	2,335	0	58	2,396	2,396	0
DW *** UW	9	9	3	0	6	243	243	199	0	44	279	279	0
Gen. and Admin.	0	0	0	0	0	0	0	0	0	0	0	0	0
Undist. Budget											0	0	0
Sub Total	3,659	4,075	3,402	417	673	143,283	141,819	139,635	-1,464	2,184	154,025	154,025	0
Contingency											1,784	1,784	0
Total	3,659	4,075	3,402	417	673	143,283	141,819	139,635	-1,464	2,184	155,809	155,809	0

Attachment 8 LAT Performance Analysis, May 2005

	WBS	Description	BAC	BCWS	BCWP	ACWP	SV \$	CV \$	%BCWS	%BCWP	%ACWP	SPI	CPI	SPI	CPI	Cpi_Fcst	CpiSpi_Fcst
1	4.1	LAT	154,025	143,283	141,819	139,635	-1,464	2,184	93.03	92.08	90.66	↑	↑	0.990	1.016	151,653	151,777
2	4.1.1	Instr Mgmt	17,645	16,456	16,456	16,159	0	298	93.27	93.27	91.58	↔	↔	1.000	1.018	17,325	17,325
3	4.1.2	System Engr	7,647	7,051	7,051	7,078	0	-27	92.20	92.20	92.55	↔	↓	1.000	0.996	7,676	7,676
4	4.1.4	Tracker	21,702	20,158	19,676	19,396	-483	279	92.89	90.66	89.38	↓	↑	0.976	1.014	21,394	21,443
5	4.1.5	Calorimeter	22,594	21,832	21,796	21,200	-35	596	96.62	96.47	93.83	↓	↔	0.998	1.028	21,976	21,977
6	4.1.6	ACD	17,968	17,546	17,324	17,135	-222	189	97.65	96.42	95.36	↓	↑	0.987	1.011	17,772	17,780
7	4.1.7	Electronics	28,894	27,094	26,401	26,148	-693	253	93.77	91.37	90.50	↔	↑	0.974	1.010	28,617	28,682
8	4.1.8	Mechanical	16,866	15,253	15,250	15,243	-3	7	90.44	90.42	90.38	↑	↓	1.000	1.000	16,858	16,858
9	4.1.9	I&T	9,451	7,613	7,585	7,507	-28	79	80.55	80.26	79.42	↑	↑	0.996	1.010	9,353	9,360
10	4.1.A	PSA	3,846	3,477	3,477	3,502	0	-25	90.39	90.39	91.05	↔	↓	1.000	0.993	3,874	3,874
11	4.1.B	ISOC	334	317	317	319	0	-2	94.88	94.88	95.57	↔	↓	1.000	0.993	337	337
12	4.1.C	EPO	2,684	2,397	2,397	2,083	0	313	89.30	89.30	77.62	↔	↑	1.000	1.150	2,333	2,333
13	4.1.D	SAS	3,069	2,765	2,765	2,541	0	224	90.08	90.08	82.79	↔	↑	1.000	1.088	2,821	2,821
14	4.1.E	Balloon Flight	1,325	1,325	1,325	1,325	0	0	100.00	100.00	99.98	↔	↔	1.000	1.000	1,325	1,325

LEGEND

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

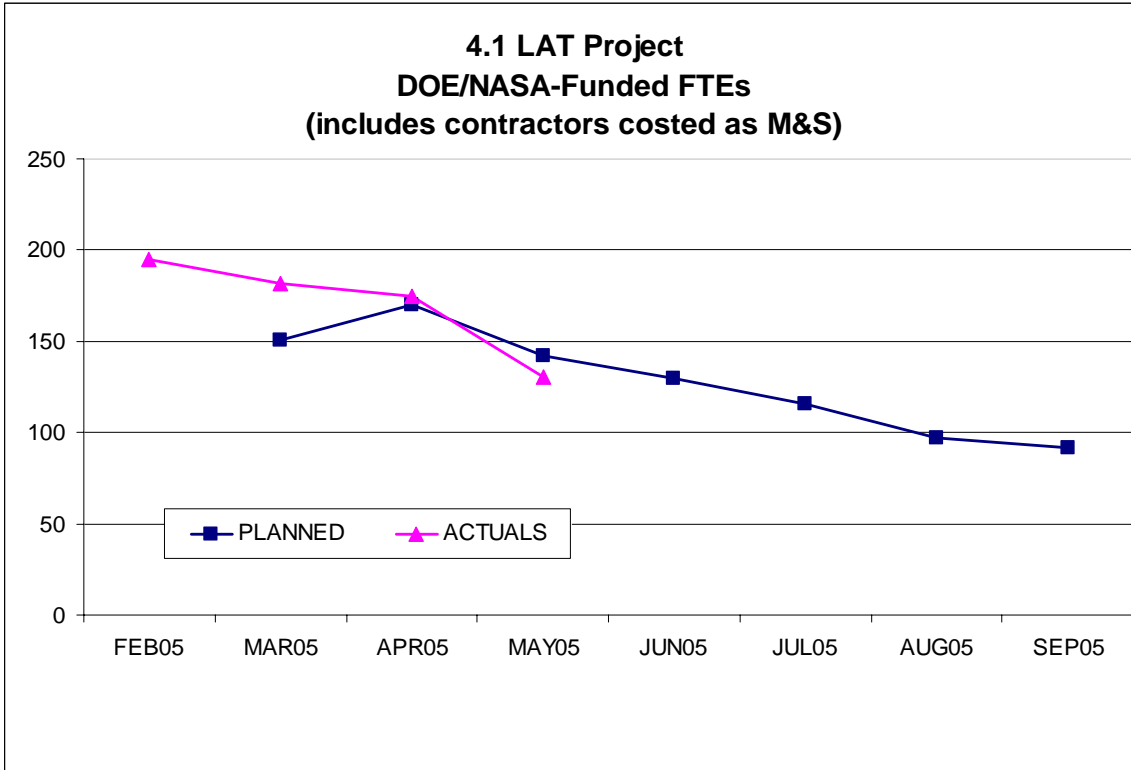
SV \$: Schedule Variance = BCWP - BCWS
 CV \$: Cost Variance = BCWP - ACWP
 SPI: Schedule Performance Index = BCWP/BCWS
 CPI: Cost Performance Index = BCWP/ACWP

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

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

■	Worse than .85	■	Between .95 and 1.10
■	Between .85 and .95	■	Better than 1.10
SPI and CPI Change Thresholds			

Attachment 9 LAT Manpower



FEB05 MAR05 APR05 MAY05 JUN05 JUL05 AUG05 SEP05

4.1.1 INSTRUMENT MANAGEMENT	PLANNED		19.2	19.2	19.2	19.2	19.4	16.0	16.0
	ACTUALS	19.7	23.4	19.2	18.4				
4.1.2 SYSTEM ENGINEERING	PLANNED		10.2	10.3	10.3	10.3	10.3	9.2	8.2
	ACTUALS	10.5	10.1	9.8	8.8				
4.1.4 TRACKER	PLANNED		16.8	16.6	12.7	10.7	9.9	9.2	9.2
	ACTUALS	17.0	15.4	15.9	13.9				
4.1.5 CALORIMETER	PLANNED		18.7	19.6	13.4	9.9	7.6	8.1	7.4
	ACTUALS	23.8	19.8	21.6	11.5				
4.1.6 ANTICOINCIDENCE DETECTOR	PLANNED		16.4	39.0	26.4	22.1	11.6	3.2	3.6
	ACTUALS	36.2	33.1	29.8	15.5				
4.1.7 ELECTRONICS	PLANNED		28.8	22.1	22.8	18.3	15.4	12.8	11.8
	ACTUALS	36.7	35.2	32.5	27.8				
4.1.8 MECHANICAL SYSTEMS	PLANNED		6.0	6.4	1.7	4.1	7.2	5.9	4.3
	ACTUALS	3.7	3.2	3.9	3.6				
4.1.9 INTEGRATION & TEST	PLANNED		15.3	17.2	16.2	16.3	16.4	16.5	15.9
	ACTUALS	20.5	23.0	19.1	13.9				
4.1.A PERFORMANCE AND SAFETY ASSURANCE	PLANNED		12.5	12.3	9.9	8.9	7.9	6.9	5.9
	ACTUALS	12.6	12.4	12.1	11.5				
4.1.B LAT INSTRUMENT SCIENCE OPERATIONS CENTER	PLANNED		0.2	0.2	0.2	0.2	0.2	0.2	0.1
	ACTUALS	0.1	0.1	0.1	0.1				
4.1.C EDUCATION AND PUBLIC OUTREACH	PLANNED		1.5	2.0	4.3	4.1	4.5	3.9	4.3
	ACTUALS	10.1	3.3	7.1	2.3				
4.1.D SCIENCE ANALYSIS SOFTWARE	PLANNED		5.3	5.3	5.1	5.2	5.2	5.1	5.1
	ACTUALS	3.8	2.6	3.7	3.1				
Grand Totals:	PLANNED		150.8	170.3	142.3	129.3	115.5	97.1	91.8
	ACTUALS	194.5	181.6	174.8	130.4				