

# LAT Project Status Overview

March, 2005

Lowell Klaisner  
LAT Project Manager  
Rev. -



# Summary

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- 5 Tracker modules at SLAC
  - 6<sup>th</sup> ready for environmental test in Italy
- 18 Calorimeter modules through T/V
- 2 Towers integrated into the GRID
  - 2 Tower test underway
- Technical issues with TEM/TPS resolved
  - 4 sets of boards tested and back to vendor for coating and packaging
- Inter-Task Communications FSW module is complete
  - Integration with other packages underway
- Cost growth an issue
  - FY05 contingency down to \$1.8 M
- Stanford Proposal in 2 weeks
- Darren Marsh is transferring to the LCLS Project
  - Joe Cullinan will head PSA



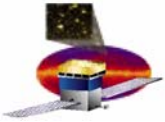
# Cost Report

Reporting Category	Cost Incurred/Hours Worked				Estimated Cost/Hours to Complete			4/3/2000	Estimated Final Cost/Hours	
	During Month		Cum. to Date		Detail		Balance of Contract	Contractor Estimate	Contract Value	
	Actual	Planned	Actual	Planned	APR05	MAY05				
4.1.1 INSTRUMENT MANAGEMENT	312	358	15,631	15,803	327	327	1,360	17,645	17,645	
4.1.2 SYSTEM ENGINEERING	169	213	6,635	6,704	180	166	666	7,647	7,647	
4.1.4 TRACKER	575	853	18,134	18,357	787	760	1,634	21,316	21,316	
4.1.5 CALORIMETER	388	507	20,573	21,061	495	275	1,251	22,594	22,594	
4.1.6 ANTICOINCIDENCE DETECTOR	315	274	16,395	16,534	165	222	459	17,241	17,241	
4.1.7 ELECTRONICS	918	981	24,747	24,997	961	1,137	2,050	28,894	28,894	
4.1.8 MECHANICAL SYSTEMS	-624	211	13,570	14,525	540	243	1,645	15,998	15,998	
4.1.9 INTEGRATION & TEST	403	415	6,923	7,045	486	327	1,715	9,451	9,451	
4.1.A PERFORMANCE AND SAFETY	215	203	3,144	3,194	179	103	420	3,846	3,846	
4.1.B LAT INSTRUMENT SCIENCE O	2	5	304	307	5	5	21	334	334	
4.1.C EDUCATION AND PUBLIC OUT	68	55	1,963	2,230	98	70	553	2,684	2,684	
4.1.D SCIENCE ANALYSIS SOFTWA	59	85	2,465	2,612	77	75	452	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	
<b>Total</b>	<b>2,800</b>	<b>4,160</b>	<b>131,807</b>	<b>134,693</b>	<b>4,300</b>	<b>3,710</b>	<b>12,226</b>	<b>152,044</b>	<b>152,044</b>	

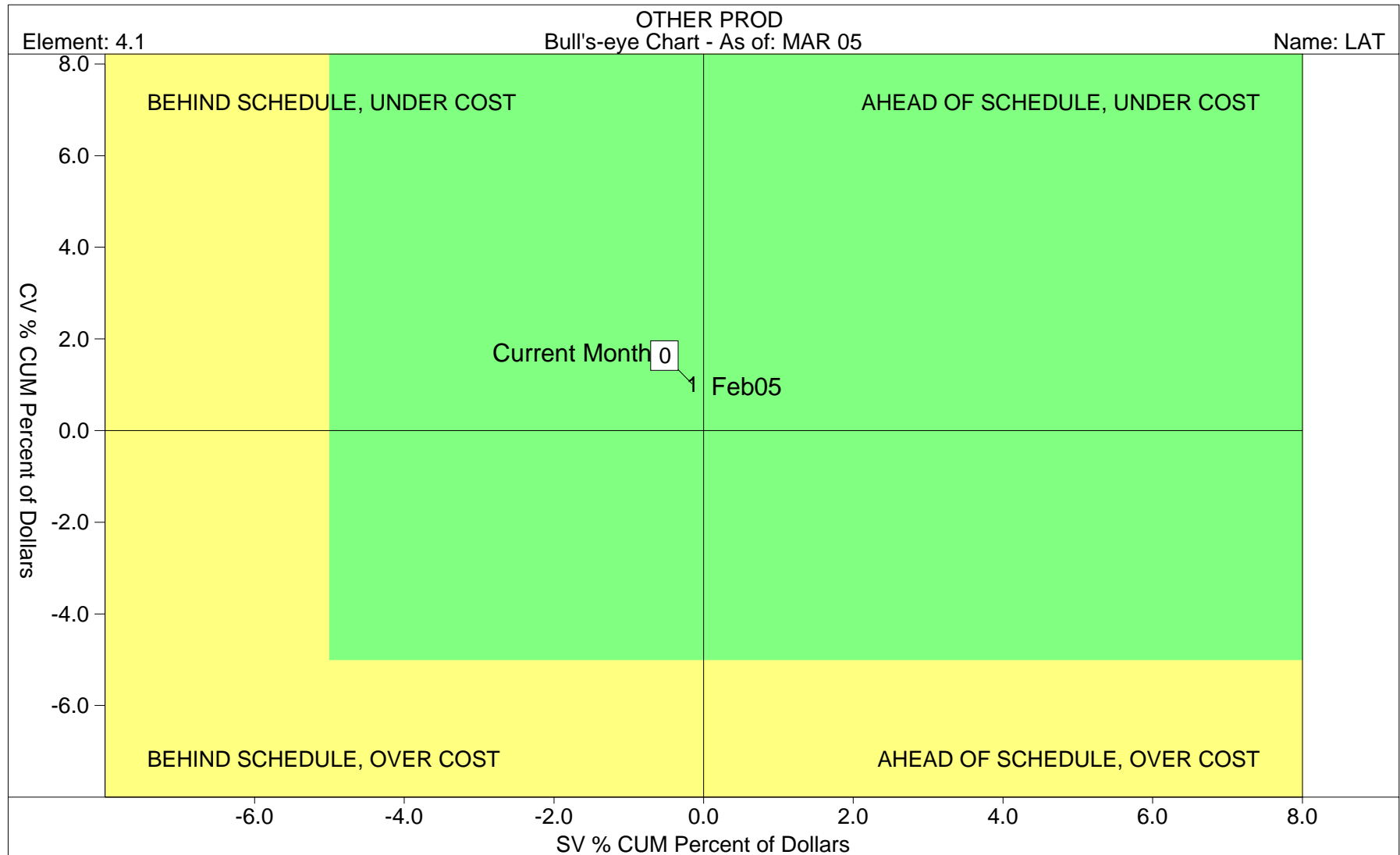


# CPR Level 3

Cost Performance Report - Work Breakdown Structure													
Contractor: Location:						Contract Type/No:			Project Name/No: LAT		Report Period: 2/28/2005 3/31/2005		
CAPW[3]  Item  (1)	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost Work Performed (4)	Variance		Budgeted Cost		Actual Cost Work Performed (9)	Variance		Budgeted (12)	Latest Revised Estimate (13)	Variance (14)
	Work Scheduled (2)	Work Performed (3)		Schedule (5)	Cost (6)	Work Scheduled (7)	Work Performed (8)		Schedule (10)	Cost (11)			
4.1.1 INSTRUMENT MANAGEMENT	358	358	312	0	46	15,803	15,803	15,631	0	171	17,645	17,645	0
4.1.2 SYSTEM ENGINEERING	213	213	169	0	43	6,704	6,704	6,635	0	69	7,647	7,647	0
4.1.4 TRACKER	853	815	575	-38	240	18,357	18,298	18,134	-59	163	21,316	21,316	0
4.1.5 CALORIMETER	507	532	388	25	144	21,061	21,012	20,573	-49	439	22,594	22,594	0
4.1.6 ANTICOINCIDENCE DETECTOR	274	66	315	-208	-249	16,534	16,314	16,395	-220	-81	17,241	17,241	0
4.1.7 ELECTRONICS	981	848	918	-133	-69	24,997	24,771	24,747	-225	25	28,894	28,894	0
4.1.8 MECHANICAL SYSTEMS	211	168	-624	-43	792	14,525	14,476	13,570	-49	906	15,998	15,998	0
4.1.9 INTEGRATION & TEST	415	317	403	-99	-87	7,045	6,953	6,923	-93	29	9,451	9,451	0
4.1.A PERFORMANCE AND SAFETY ASSURANCE	203	203	215	0	-12	3,194	3,194	3,144	0	50	3,846	3,846	0
4.1.B LAT INSTRUMENT SCIENCE OPERATIONS CENTER	5	5	2	0	4	307	307	304	0	4	334	334	0
4.1.C EDUCATION AND PUBLIC OUTREACH	55	49	68	-6	-19	2,230	2,224	1,963	-6	<b>261</b>	2,684	2,684	0
4.1.D SCIENCE ANALYSIS SOFTWARE	85	85	59	0	26	2,612	2,612	2,465	0	147	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	4,160	3,659	2,800	-501	858	134,693	133,992	131,807	-702	2,184	152,044	152,044	0
Contingency											3,941	3,941	0
Total	4,160	3,659	2,800	-501	858	134,693	133,992	131,807	-702	2,184	155,985	155,985	0



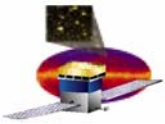
# Variance Analysis



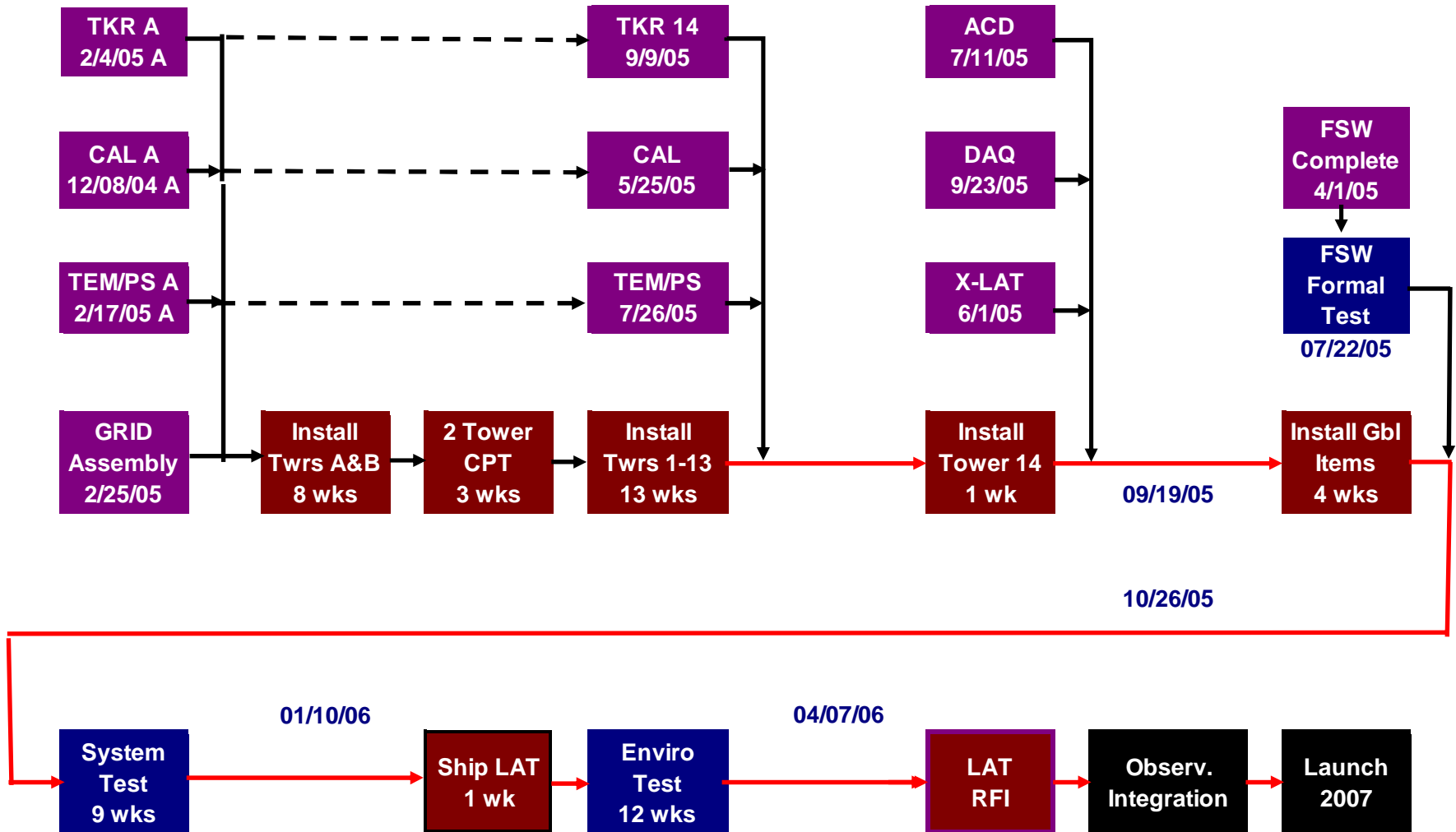


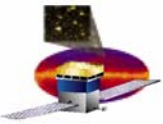
# Module Schedule

M/E March 2005	Forecast Dates and Float (working days) to "Ship LAT"									
	Mech/ACD		TKR		CAL		ELEC		I&T	
Grid	11/08/04A	-								
Module A			02/04/05A	-	12/08/04A	-	02/17/05A	-	7-Apr-05	50
Module B			02/24/05A	-	01/14/05A	-	03/09/05A	-	28-Apr-05	50
Module 1			28-Apr-05	54	01/14/05A	-	22-Apr-05	53	5-May-05	50
Module 2			22-Apr-05	53	01/14/05A	-	29-Apr-05	53	17-May-05	47
Module 3			28-Apr-05	59	01/14/05A	-	6-May-05	53	24-May-05	47
Module 4			16-May-05	52	02/22/05A	-	13-May-05	53	1-Jun-05	47
Module 5			3-Jun-05	44	02/22/05A	-	20-May-05	53	13-Jun-05	44
Module 6			22-Jun-05	36	18-Apr-05	75	27-May-05	53	30-Jun-05	36
Module 7			5-Jul-05	33	21-Apr-05	77	6-Jun-05	53	13-Jul-05	33
Module 8			13-Jul-05	32	25-Apr-05	80	13-Jun-05	53	21-Jul-05	32
Module 9			22-Jul-05	30	2-May-05	80	20-Jun-05	53	1-Aug-05	30
Module 10			2-Aug-05	28	10-May-05	79	27-Jun-05	53	10-Aug-05	28
Module 11			11-Aug-05	26	18-May-05	83	5-Jul-05	53	19-Aug-05	26
Module 12			22-Aug-05	24	13-May-05	81	12-Jul-05	53	30-Aug-05	24
Module 13			31-Aug-05	22	23-May-05	85	19-Jul-05	53	9-Sep-05	22
Module 14			9-Sep-05	21	25-May-05	88	26-Jul-05	53	19-Sep-05	21
ACD	11-Jul-05	85								
X-LAT	1-Jun-05	115								
Radiators	22-Jul-05	144								
Harness							5-Jul-05	73		
PDU							21-Jul-05	61		
GASU							15-Aug-05	44		
EPU							13-Sep-05	24		
SIU							23-Sep-05	16		
FSW FQT							22-Jul-05	61		
Inst Global Items									26-Oct-05	16
System Test									10-Jan-06	16
LAT Arrives at NRL									16-Jan-06	16
EMI/EMC Test									15-Feb-06	16
Sine Vibe									28-Feb-06	16
Acoustic Test									12-Mar-06	16
TVAC									29-Apr-06	16
Weight & CG									1-May-06	16
Preship Review									2-May-06	16
Ship LAT									7-May-06	16

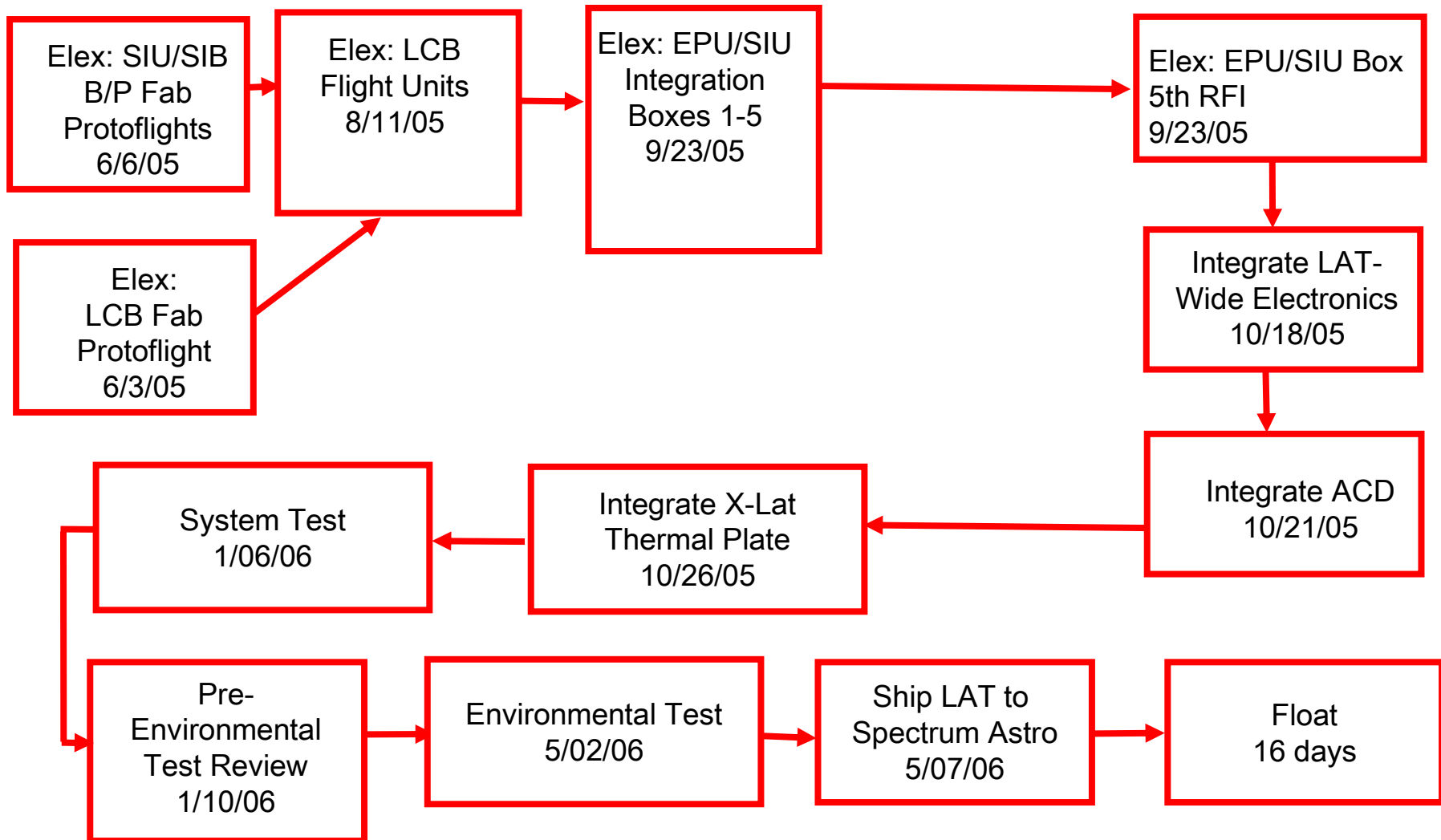


# LAT Schedule

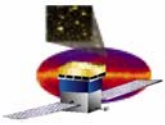




# Current Critical Path to Ship LAT to Spectrum Astro







## Current Critical Path to Ship LAT to Spectrum Astro

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- **1st critical path:** a) Electronics SIB/SIU B/P Protoflight  
b) Electronics LCB Protoflight  
16 days float to Ship LAT to Spectrum Astro
- **2nd critical path: Tracker MCM Fabrication Towers 6-9**  
5 days behind 1st critical path
- **3rd critical path: Tracker Tray Assembly Towers 6-14**  
9 days behind 2nd critical path
- **1st critical path to I&T Module A: I&T Functional Test**  
Completed April 7



# Level 1 & 2 Milestones

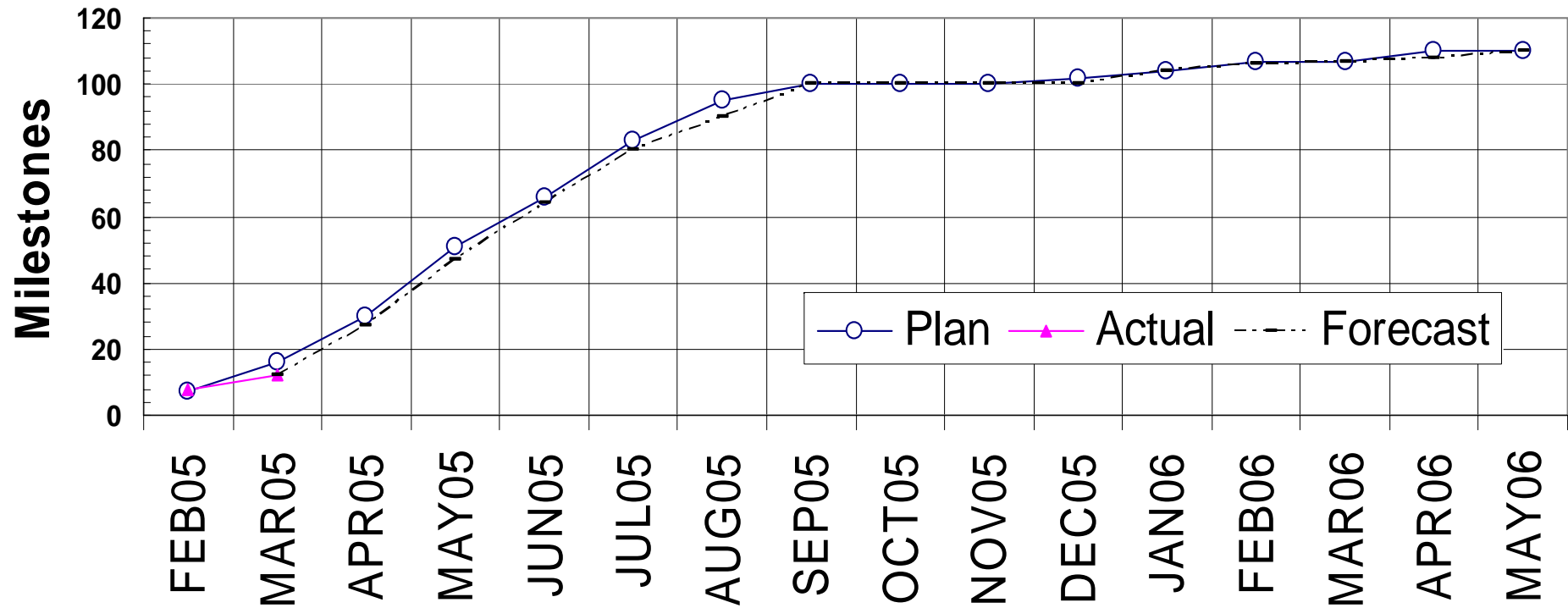
Activity ID	Activity Description	Baseline Finish	Bsln Var	Early Finish	Fiscal Year														
					FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12			
<b>DOE/NASA Joint Oversight Group (Level 1)</b>																			
1M1P000000	DOE Critical Decision (CD) 0 Approval	06/25/01A	0	06/25/01A	▼														
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*														▼	
<b>DOE/NASA Federal Project Managers (Level 2)</b>																			
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	-9	01/10/06														▼	
1M1000120	PSR-(Instrument Pre-Ship Review)	04/18/06	-10	05/02/06														▼	
Run Date: 04/22/05 14:01					<b>GLAST LAT PROJECT</b>					LT-T1: Level 1 & 2 Milestones					Sheet 1				
Data Date: 04/01/05					<b>Level 1&amp;&amp;2 Milestones</b>					FL-T1: Level 1 & 2 Milestones									
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# Level 3 Milestone Count

## 4.1. LAT

### Level 3 Milestones





# Level 3 Milestones Completed in March 2005

AV	Activity ID	ND	Activity Description	Baseline Finish	Bsln Var	Early Finish	FY05		
							FEB	MAR	APR
<b>Instrument Project Office (Level 3)</b>									
<b>4.1.7 Electronics</b>									
7	1M79001020	9	Flight TEM Assy B: Elec to I&T	03/07/05*	-2	03/09/05A		▼	
7	1M79002020	9	Flight TEM PS Assy B: Elec to I&T	03/07/05*	-2	03/09/05A		▼	
7	1M79250		Demo: Event Filtering	03/23/05	9	03/10/05A		▼	◆
<b>4.1.8 Mechanical</b>									
8	1M1000240	9	Flight Grid RFI-Mech to I&T	03/23/05	-5	03/30/05A		◆	▼

Run Date 04/22/05 13:48  
Data Date 04/01/05

**GLAST LAT PROJECT**  
**Completed Level 3 Milestones**  
**in Reporting Month**  
**Sort by Subsystem**

LT-TB: Completed Level 3 by Subsystem  
FL-TB: Level 3 Milestones compl. last month

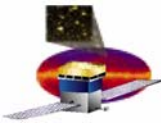
Sheet 1

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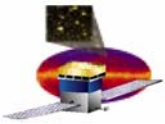
# Level 3 Milestones Completed in April 2005

AV	Activity ID	ND	Activity Description	Baseline Finish	Bsln Var	Early Finish	FY05				
							MAR	APR	MAY		
<b>Instrument Project Office (Level 3)</b>											
<b>4.1.5 Calorimeter</b>											
5	1MRTS030	5	Flight Calorimeter Module 6 Ready to Ship	04/18/05	0	04/18/05		▽			
5	1MRTS040	5	Flight Calorimeter Module 7 Ready to Ship	04/21/05	0	04/21/05		▽			
5	1MRTS050	5	Flight Calorimeter Module 8 Ready to Ship	04/25/05	0	04/25/05		▽			
<b>4.1.7 Electronics</b>											
7	1M79180		Demo: Inter-task Communications	03/11/05	-25	04/15/05	◆	▽			
7	1M79210		Demo: Watchdog	04/15/05	-5	04/22/05		◆	▽		
<b>4.1.9 I&amp;T</b>											
9	1M99010	9	Start 2 Tower Comprehensive Performance Test	04/20/05	4	04/14/05		▽	◆		
Run Date							04/25/05 15:09	GLAST LAT PROJECT		LT-T9: L3 MS Completed Curr Mo (tb)	Sheet 1
Data Date							04/01/05	Level 3 Milestones Completed in April		FL-T2: L3 Milestones Completed Current Month	
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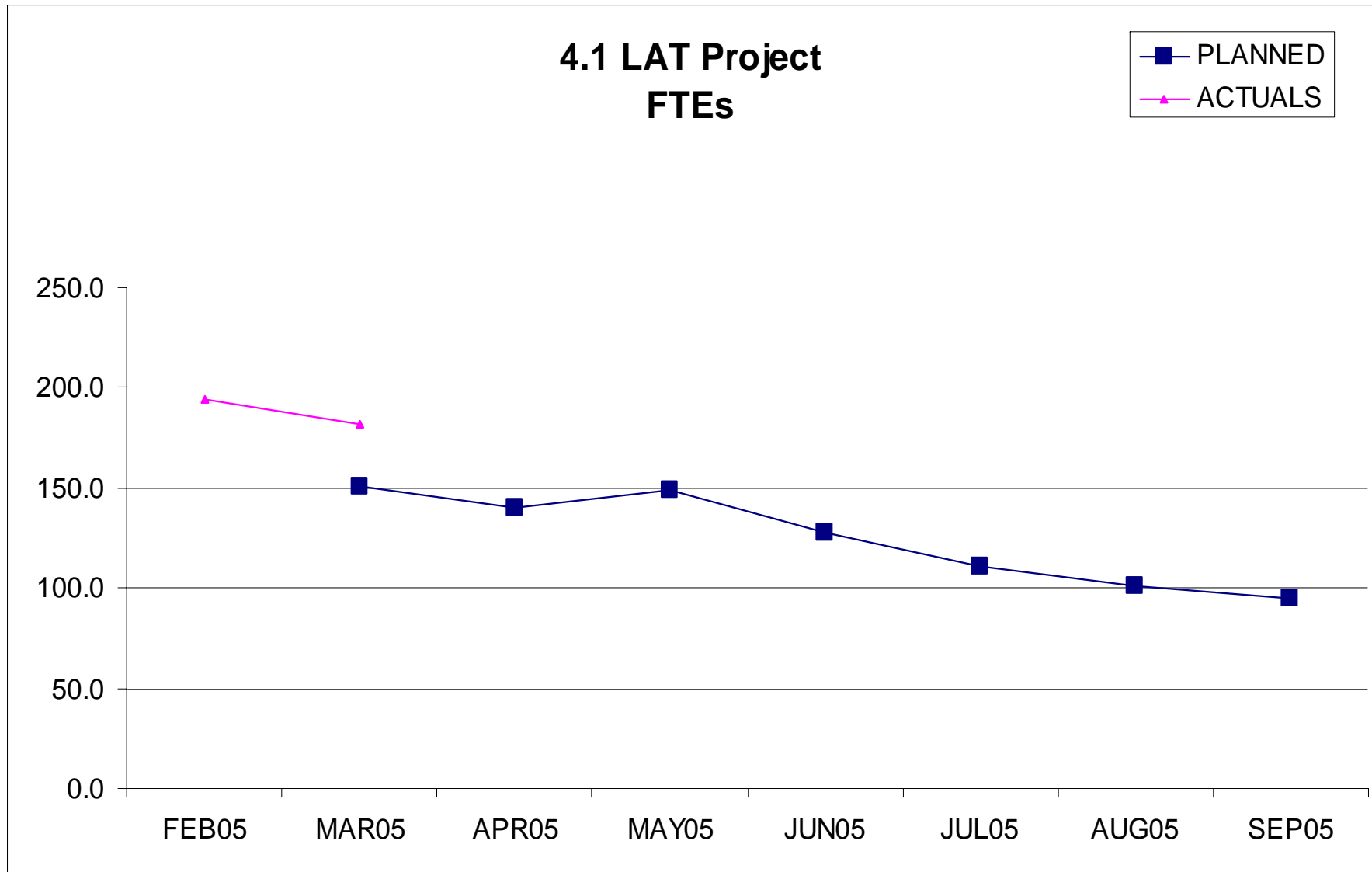


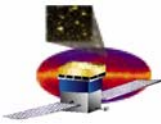
# Float to DOE Milestones

Activity Description	Early Finish	Baseline Variance	Baseline Finish	FY05							FY06
				MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
<b>4 GLAST INSTRUMENTS</b>											
<b>4.1 GLAST LAT PROJECT</b>											
<b>4.1.2 SYSTEM ENGINEERING</b>											
Systems Engineering	30SEP05*	0	30SEP05*								▲
<b>4.1.7 ELECTRONICS</b>											
<b>4.1.7.1 ELECTRONICS MANAGEMENT</b>											
Data Acquisition Management	30SEP05*	0	30SEP05*								▲
<b>4.1.7.4 DATAFLOW ELECTRONICS (TEMs + PROCESSOR FARM)</b>											
<b>4.1.7.4.3 TKR/CAL TEM ELECTRONICS</b>											
Tower Electronics Module - 4th Unit	09MAY05	14	30MAY05			▲	▲				
Tower Electronics Module - 8th Unit	27MAY05	20	27JUN05			▲	▲				
Tower Electronics Module - 16th Unit	26JUL05	23	26AUG05					▲	▲		
<b>4.1.7.4.4 GASU ACD EM ELECTRONICS</b>											
GASU	15AUG05	0	15AUG05						▲		
<b>4.1.7.4.5 LAT COMMUNICATION BOARD</b>											
LAT Communication Board	11AUG05	6	20AUG05						▲	▲	
<b>4.1.7.4.9 TEST BED DATA FLOW</b>											
Test Bed	30SEP05*	0	30SEP05*								▲
<b>4.1.7.5 SPACECRAFT INTERFACE UNIT</b>											
Spacecraft Interface Unit	23SEP05	-6	15SEP05							▲	▲
<b>4.1.7.6 POWER CONDITIONING</b>											
Power Conditioning	21JUL05	7	01AUG05					▲	▲		
<b>4.1.7.A EGSE &amp; OPERATIONS</b>											
Electronic Ground Support Equipment	29APR05	10	15MAY05		▲	▲					
<b>4.1.7.C INSTRUMENT INTEGRATION &amp; TEST</b>											
Integration and Test Support	30SEP05*	0	30SEP05*								▲



# FTE Report (DOE/NASA-funded only)





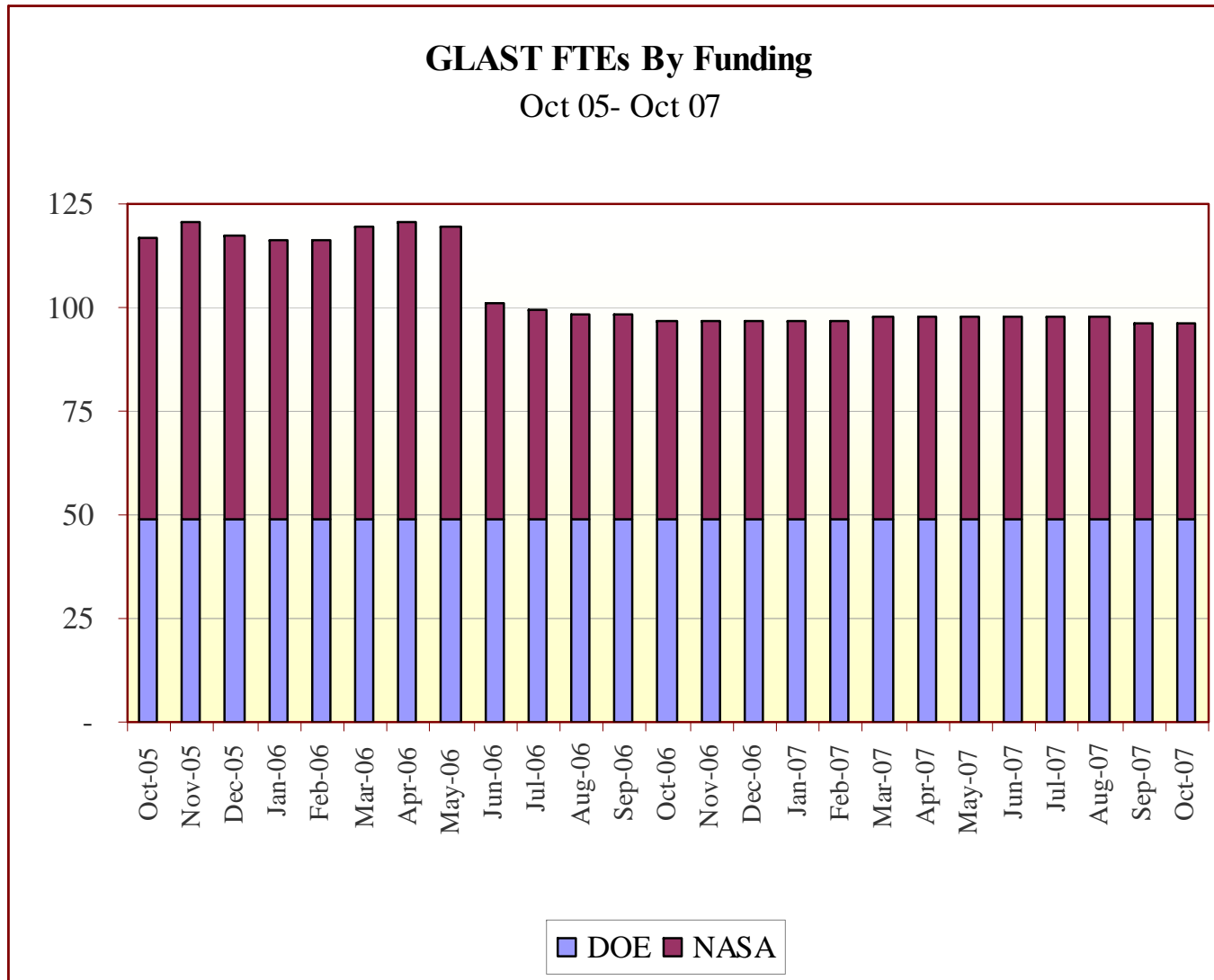
# Draft FY06 & 07 Costs (no contingency)

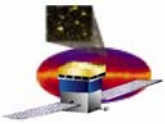
FY	WBS	Organization								Funding	
		GSFC	HEPL	NRL	SSU	UCSC	UW	SLAC	Total	DOE	NASA
FY06	4.1.1 INSTRUMENT MANAGEMENT	177	755	83		291		1,597	2,903		
	4.1.2 SYSTEM ENGINEERING		363					1,081	1,445		
	4.1.4 TRACKER					0		175	175		
	4.1.5 CALORIMETER			1,690					1,690		
	4.1.6 ANTICOINCIDENCE DETECTOR	225							225		
	4.1.7 ELECTRONICS			214				924	1,138		
	4.1.8 MECHANICAL SYSTEMS							557	557		
	4.1.9 INTEGRATION & TEST			1,145				1,973	3,118		
	4.1.A PERFORMANCE AND SAFETY ASSURANCE			211				760	971		
	4.1.B INSTRUMENT SCIENCE OPERATIONS CENTER							4,025	4,025		
	4.1.C EDUCATION AND PUBLIC OUTREACH					625	10		635		
	4.1.D SCIENCE ANALYSIS SOFTWARE Science	242	207	260			108	975	1,792		
							2,424	2,424			
FY06 Total		645	1,325	3,602	625	301	108	14,491	<b>21,097</b>	<b>7,424</b>	<b>13,673</b>
FY07	4.1.1 INSTRUMENT MANAGEMENT	141	774	69		327		1,261	2,571		
	4.1.2 SYSTEM ENGINEERING		381					1,074	1,455		
	4.1.4 TRACKER					0		83	83		
	4.1.5 CALORIMETER			1,035					1,035		
	4.1.6 ANTICOINCIDENCE DETECTOR	205							205		
	4.1.7 ELECTRONICS			65				986	1,051		
	4.1.8 MECHANICAL SYSTEMS							268	268		
	4.1.9 INTEGRATION & TEST			81				1,361	1,442		
	4.1.A PERFORMANCE AND SAFETY ASSURANCE							483	483		
	4.1.B INSTRUMENT SCIENCE OPERATIONS CENTER							3,991	3,991		
	4.1.C EDUCATION AND PUBLIC OUTREACH					618			618		
	4.1.D SCIENCE ANALYSIS SOFTWARE Science	318	200	273			111	1,009	1,911		
							2,521	2,521			
FY07 Total		664	1,355	1,522	618	327	111	13,037	<b>17,634</b>	<b>7,521</b>	<b>10,113</b>





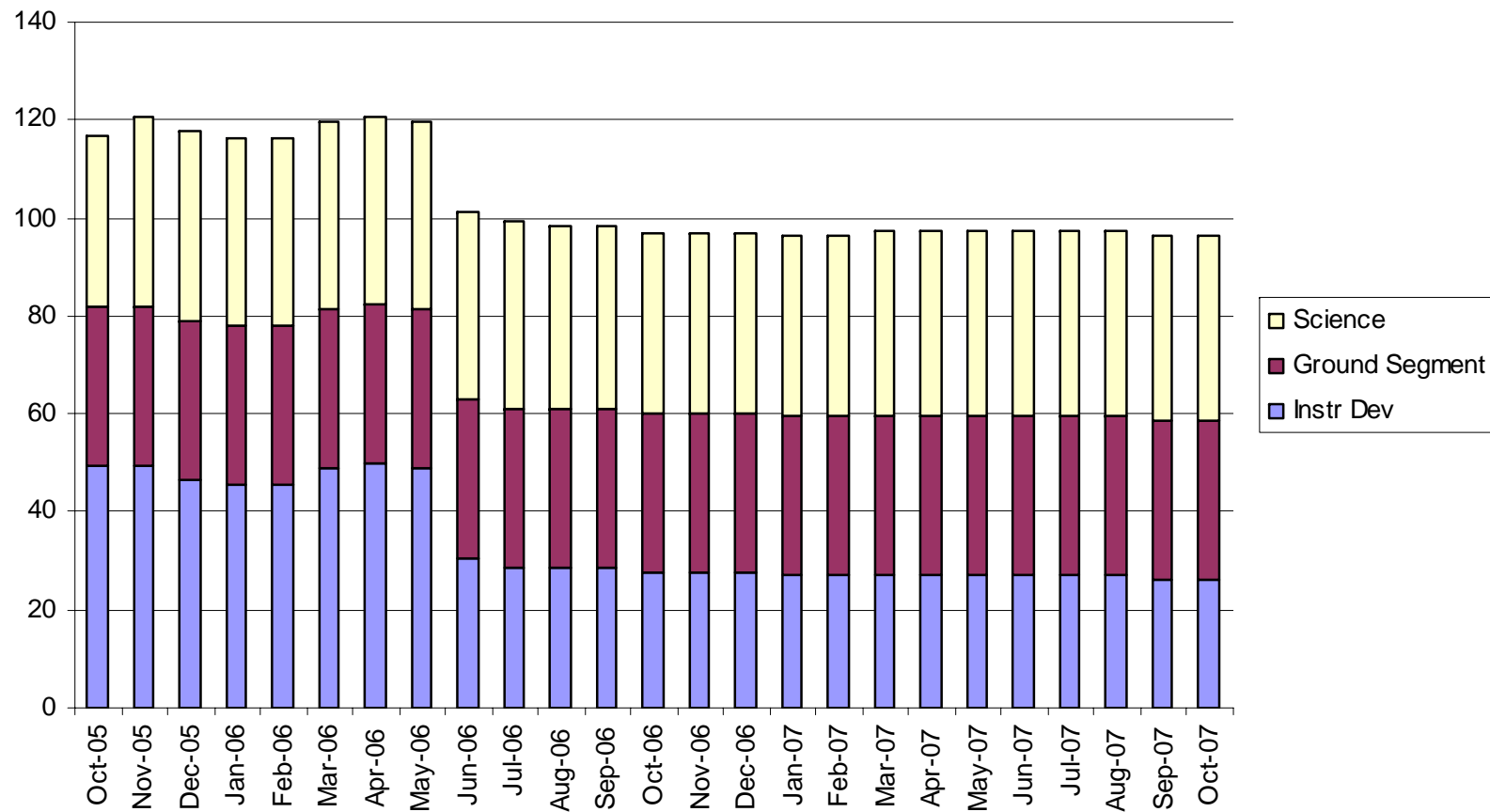
# FTEs by Funding





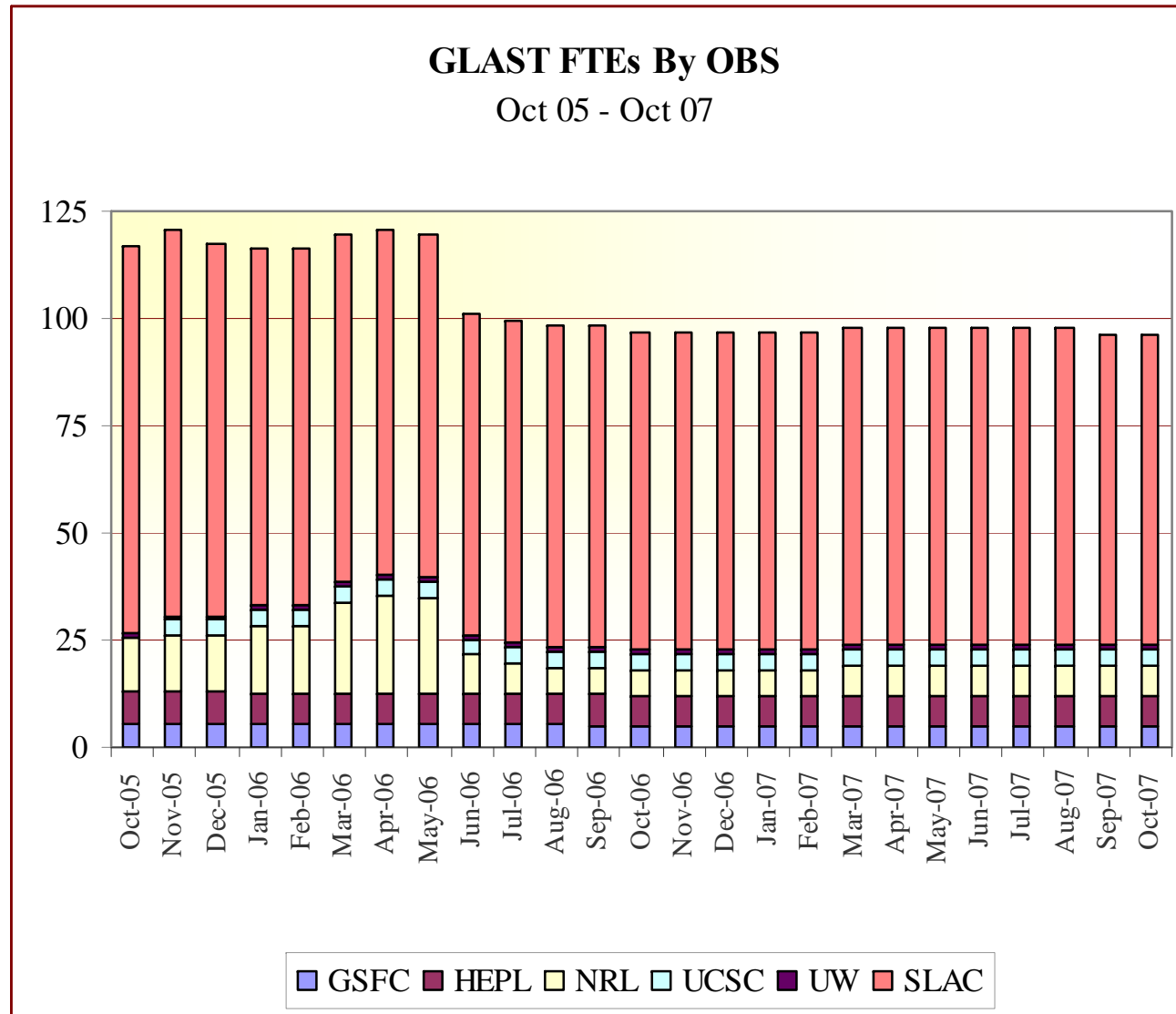
# LAT FTEs by Activity

LAT FTEs by Category  
Oct 05 - Oct 07



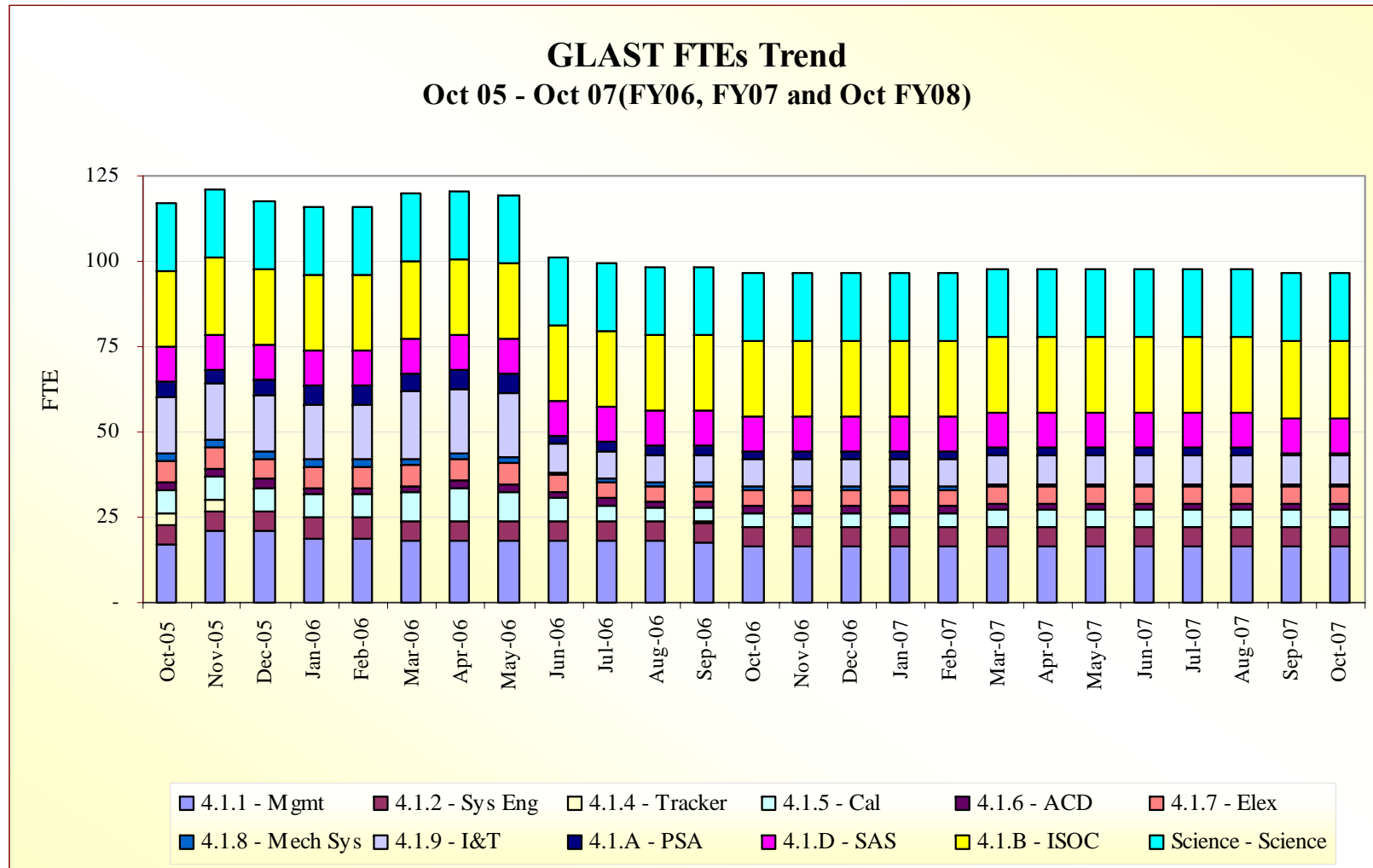


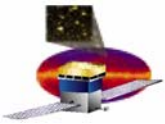
# FTEs by Organization



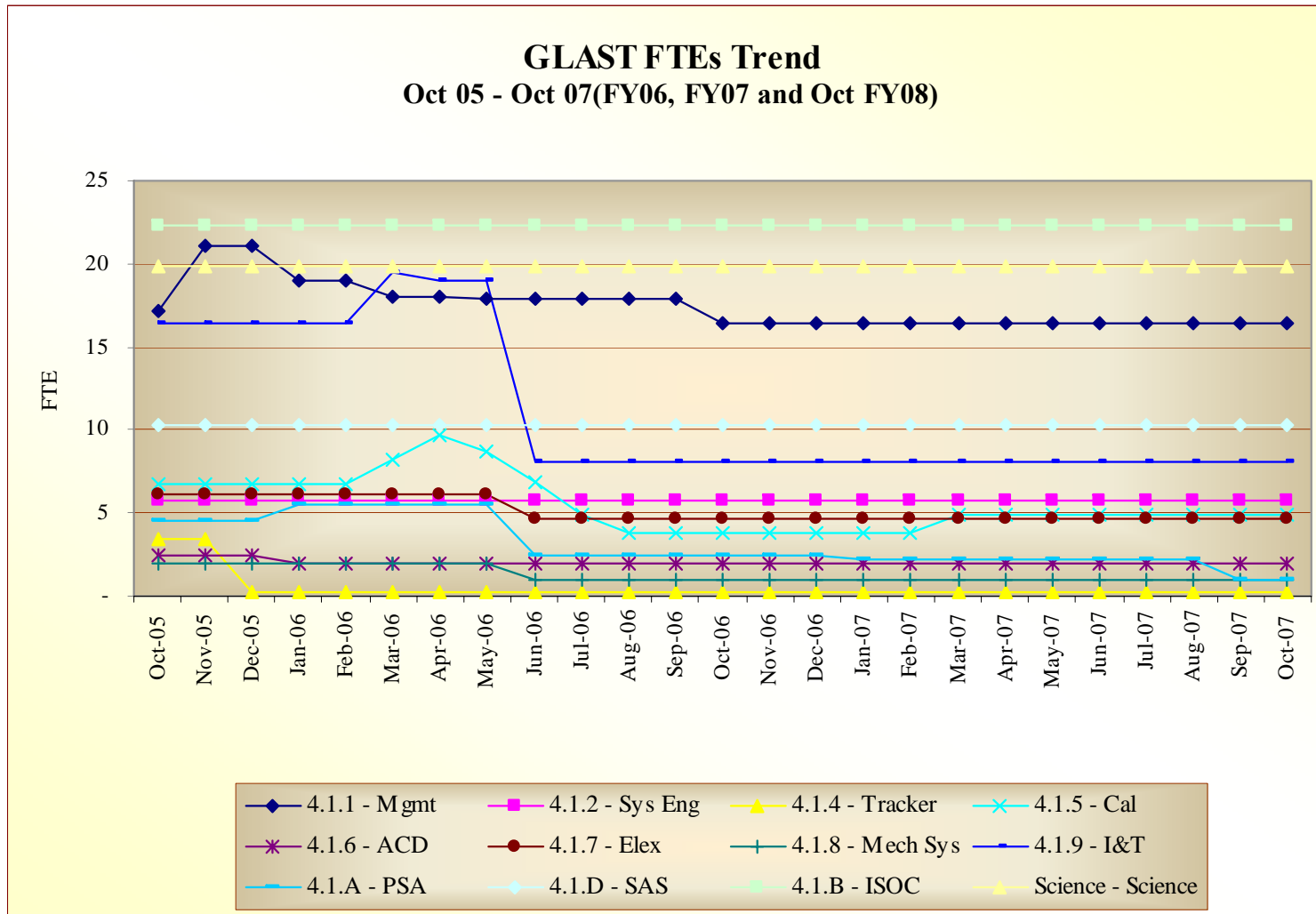


# FTEs by WBS by month



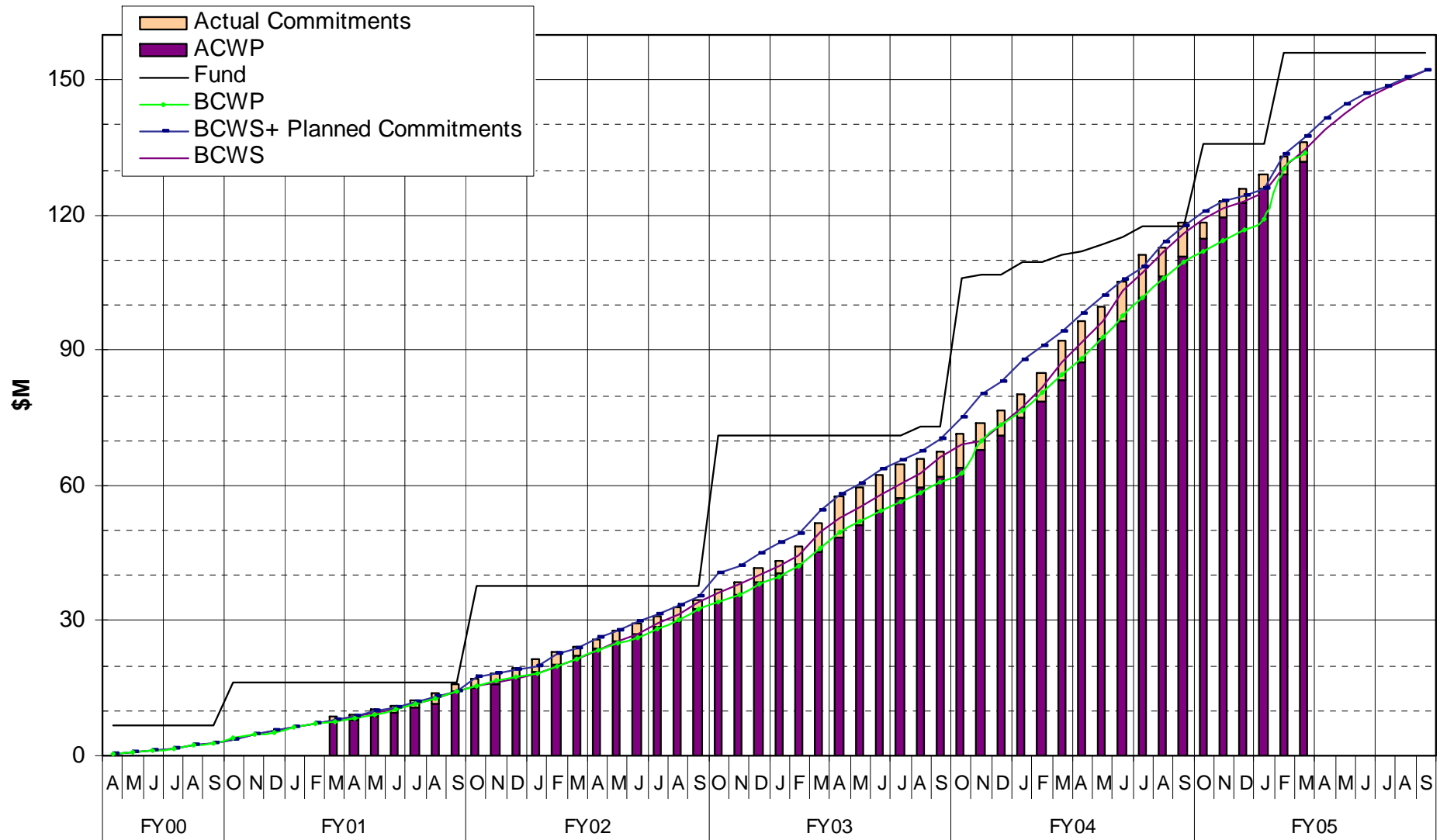


# FTEs by WBS and by month





# Budget, Cost, Funding, Performance





# Performance Analysis

	WBS	Description	BAC	BCWS	BCWP	ACWP	SV \$	CV \$	%BCWS	%BCWP	%ACWP	SPI	CPI	SPI	CPI	Cpi_Fcst	CpiSpi_Fcst
1	4.1	LAT	152,044	134,694	133,992	131,807	-702	2,184	88.59	88.13	86.69	↓	↑	0.995	1.017	149,565	149,658
2	4.1.1	Instr Mgmt	17,645	15,803	15,803	15,631	0	171	89.56	89.56	88.59	↔	↑	1.000	1.011	17,453	17,453
3	4.1.2	System Engr	7,647	6,704	6,704	6,635	0	69	87.66	87.66	86.76	↔	↑	1.000	1.010	7,568	7,568
4	4.1.4	Tracker	21,316	18,357	18,298	18,134	-59	163	86.12	85.84	85.07	↓	↑	0.997	1.009	21,126	21,135
5	4.1.5	Calorimeter	22,594	21,061	21,012	20,573	-49	439	93.21	93.00	91.05	↑	↑	0.998	1.021	22,122	22,126
6	4.1.6	ACD	17,241	16,534	16,314	16,395	-220	-81	95.90	94.62	95.10	↓	↓	0.987	0.995	17,326	17,339
7	4.1.7	Electronics	28,894	24,997	24,771	24,747	-225	25	86.51	85.73	85.65	↓	↓	0.991	1.001	28,865	28,903
8	4.1.8	Mechanical	15,998	14,525	14,476	13,570	-49	906	90.79	90.49	84.82	↓	↑	0.997	1.067	14,996	15,001
9	4.1.9	I&T	9,451	7,045	6,953	6,923	-93	29	74.54	73.56	73.25	↓	↓	0.987	1.004	9,411	9,445
10	4.1.A	PSA	3,846	3,194	3,194	3,144	0	50	83.05	83.05	81.75	↔	↓	1.000	1.016	3,786	3,786
11	4.1.B	ISOC	334	307	307	304	0	4	91.95	91.95	90.88	↔	↑	1.000	1.012	330	330
12	4.1.C	EPO	2,684	2,230	2,224	1,963	-6	261	83.10	82.86	73.14	↔	↓	0.997	1.133	2,369	2,370
13	4.1.D	SAS	3,069	2,612	2,612	2,465	0	147	85.10	85.10	80.29	↔	↑	1.000	1.060	2,896	2,896
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)

<span style="color: red;">■</span>	Worse than .85	<span style="color: green;">■</span>	Between .95 and 1.10
<span style="color: yellow;">■</span>	Between .85 and .95	<span style="color: blue;">■</span>	Better than 1.10

SPI and CPI Change Thresholds