

GLAST Calorimeter

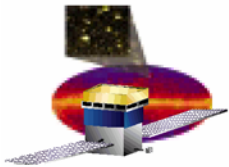
*Monthly Cost /
Schedule / Mission
October 2004*

Monthly Cost/Schedule/Mission Review

GLAST LAT Calorimeter November 3, 2004

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GLAST Calorimeter

Outline

*Monthly Cost /
Schedule / Mission
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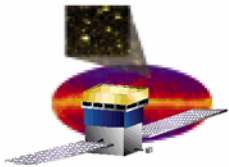
□ **Technical Status:**

- **Last Month's Accomplishments**
- **Near-term Milestones & Status towards them for next 3 months (from F2F)**
- **Drawing Release Plan & Status required to achieve production milestones**
- **Summary of issues & concerns**
- **Status of Subsystem's Documentation & qualification program**

□ **Cost & Schedule**

- **Variances**
- **Actions required to retain zero schedule variance**





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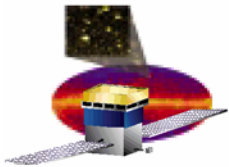
Significant Accomplishments

Crystal Detector Elements

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- ❑ **CsI Crystals – complete?**
 - Final 78 crystals from Amcrys-H have arrived in Kalmar.
 - Testing began last week.
 - First tested crystals to be shipped to NRL this week.
- ❑ **PIN Photodiode Assembly (PDA) – complete!**
- ❑ **CDE Assembly Process**
 - Team is mostly off-project awaiting final delivery of crystals.
 - Facility has been shutdown for about 2 weeks for HVAC upgrade.
 - Work is expected to restart with final crystals next week.





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Significant Accomplishments Composite Structures

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- **20 flight structures have been manufactured (#3 - #22).**
 - **One (#22) experienced autoclave cure failure – rejected.**
 - **19 of these have completed strength verification testing.**
 - **One (#13) has been rejected due to test anomaly.**
 - **Two structures, #10 and #12, are slightly out of tolerance and are being held at NRL for potential flight use.**
 - **A plan has been developed to correct alignment problem by re-machining 4 insert slots in base plate.**
 - **#12 can likely be used without base plate modification. Tolerance requirements and issues are being reviewed.**
 - **NRL has received 16 flight structures (including #10 and #12).**
 - **#18 is being held for non-destructive test**
 - **#21 is being prepared for shipment.**
 - **Ecole Polytechnique is fabing 2 more structures (up to #24)**
 - **Replacements for #10 and #12**



Significant Accomplishments Pre-Electronic Modules

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- ❑ 9 PEMs have been completely assembled and tested with cosmic muons.
 - PEM 110 was completed 10/22 and is now in muon testing.
- ❑ PEM 108 is beginning assembly. (out of tolerance structure has been replaced.)

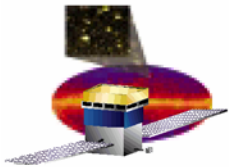


**2 Modules in AFEE
card installation.**

**2 PEMs waiting for
AFEE installation.**

**1 PEM in muon
testing**

1 PEM in assembly



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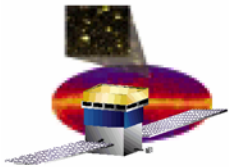
Significant Accomplishments

Analog Front End Electronics

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- ❑ **ASICs - Qual testing of GCFE and GCRC at GSFC completed**
 - **No issues**
- ❑ **All flight AFEE boards (110) have been manufactured**
 - **Remanufactured AFEE boards have been received, inspected and shipped to assembly vendor.**
- ❑ **40 AFEE boards have completed 168 hr burn in and 3 temperature acceptance tests.**
- ❑ **36 of these boards have completed conformal coating.**
- ❑ **Remaining AFEE board assembly**
 - **1st lot of 20 boards received this week.**





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Assembly and Test

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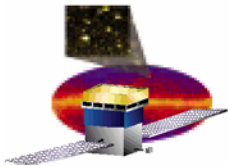
Module S/N	AFEE Installation	TEM/TPS Safe-to-Mate	TEM/TPS Installation	Conformal Coat	Initial CPT	EM/EMC	Vibration	TVAC	Mass Properties	Final CPT Calibration	Data Review	Ship	Post Ship Test
101	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑			
102	☑	☑	☑	☑	☑		☑	☑					
103	☑	☑	☑	☑	☑		☑	☑					
104	☑	☑	☑	☑	☑	☑							
105	☑	☑	☑	☐									
106	☐												
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Completion

- ☑ This month
- ☑ Previously
- ☐ Started

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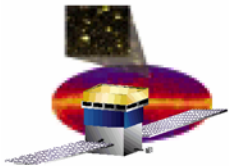
Near Term Schedule

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Flight Module A (FM 101)		Completion
	2 week Thermal Vacuum Test	13-Oct-2004
	Final Calibration and Performance Tests	27-Oct-2004
	LATTE upgrade and Verification	12-Nov-2004
	Ship to SLAC I&T	15-Nov 2004
	Ready for Integration	19-Nov-2004
Flight Module B (FM 102)		
	Environmental Tests Complete	8-Nov-2004
	Pre ship review	22-Nov-2004
	Ready for Integration	6-Dec-2004
Flight Module 1 (FM 103)		
	Environmental Tests Complete	10-Nov-2004
	Pre ship review	22-Nov-2004
	Ready for Integration	10-Dec-2004

Last Month
5-Nov-04





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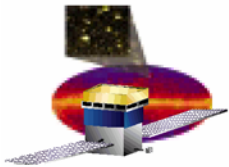
CAL Module Deliveries

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November '04	FMA
December '04	FMB – FM1
January '05	FM2 – FM5
February '05	...
March '05	FM6 – FM11
April '05	FM12 – FM15
May '05	FM16

- * Unconstrained by availability of TEM/TPS*
- * Includes impact of TVAC shutdown in January*





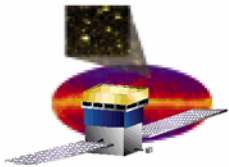
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Issues and Concerns

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- **NRL Thermal Vac Chamber refurbishment in January**
 - TVAC of FM 106, 107 ends Dec 16th. Will not TVAC during Dec holidays.
 - TVAC scheduled to go down for month of January. Trying to get it started Dec 20th.
 - Improve deliveries by TVAC'ing more than 2 modules at once.

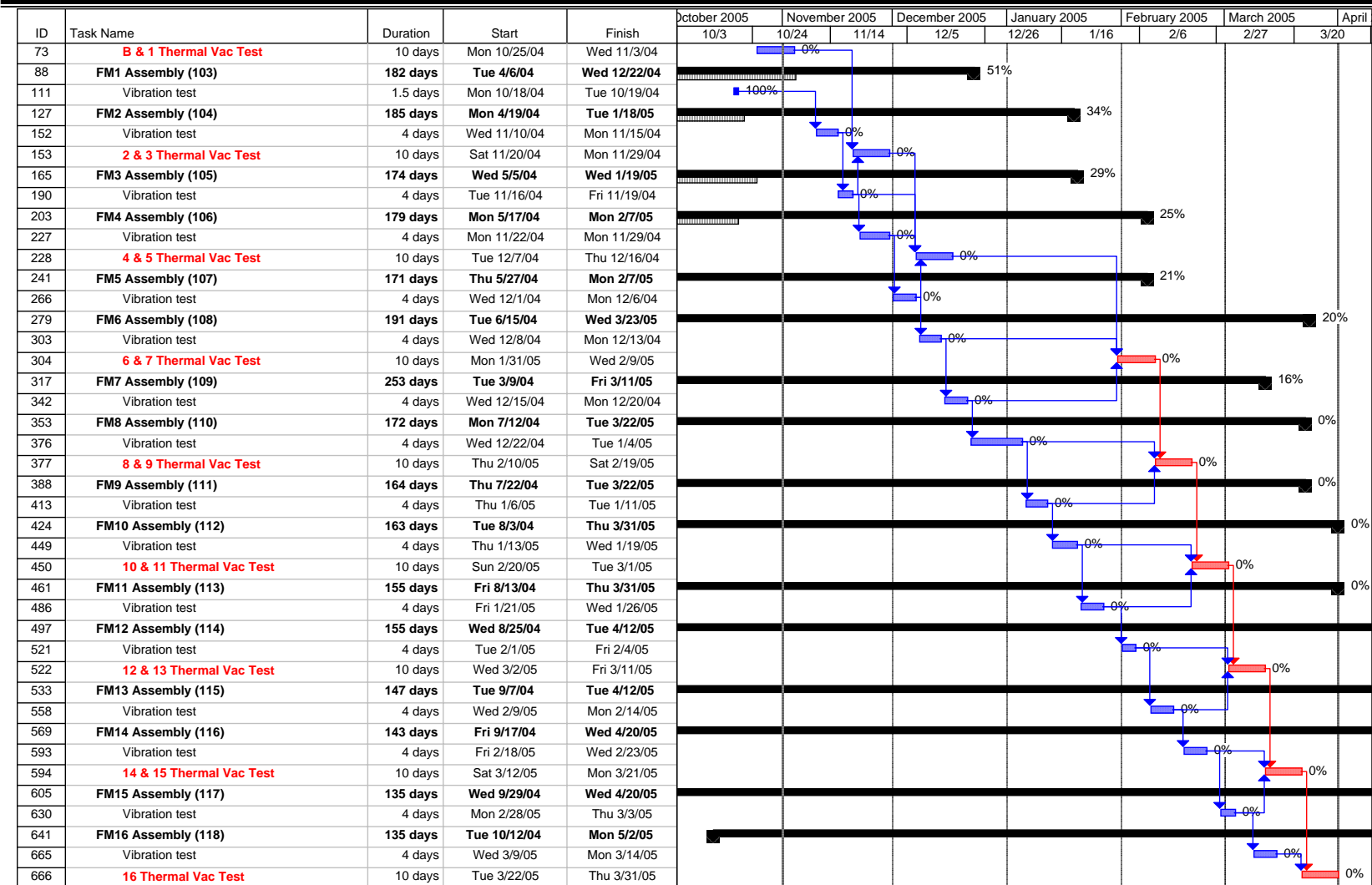




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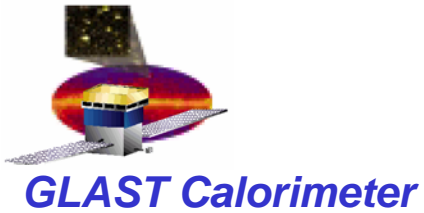
Impact of TVAC Shutdown

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Drawing Release Summary

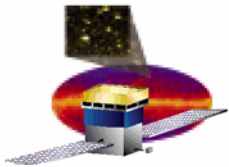
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No Change From Last Month

Flight Hardware Drawings

Element	Total Dwgs	Completed Dwgs	Comments
Module Assy	11	11	AFEE Cable support & shield – 3 parts.
PEM Assy	6	6	
Structure	12	12	Includes CAL-TEM stand off
CDE	5	5	
AFEE	8	8	
TOTAL	42	42	100% Complete





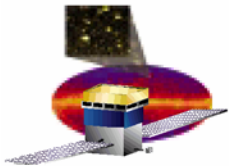
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Documentation and Qualification Program

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- ❑ CDE manufacture and test procedures – 100% complete
- ❑ Composite Structure manufacture and test procedures – 100% complete
- ❑ PEM Assembly and Test – 100% complete
- ❑ EEE qualification and screening procedures – 100% complete
- ❑ AFEE PCB manufacture and assembly – 100% complete
- ❑ Module Assembly and Qualification/Acceptance – 100% complete
 - Redlines / improvements from lessons learned are on-going.
- ❑ *(new)* Completing Acceptance Test Data Package (ATDP) content and format





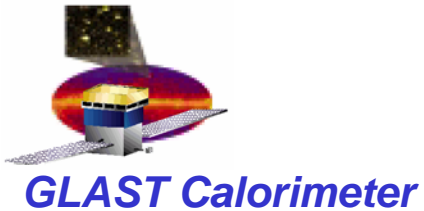
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PMCS - September '04 Cost Variances

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- **Cost Variance: + \$28 cum (-\$85 for Sep)**
 - **+92: Mgmt, Eng, R&QA, (-24 for Sep)**
 - **+639: CDE Manuf.**
 - PDA manufacturing - materials cost underrun.
 - CDE manufacturing - labor underrun (+541)
 - **-41: PEM**
 - **-419: AFEE (-66 for Sep)**
 - Much higher labor costs balanced by savings in GSE materials
 - Fabrication problems, parts problems, you name it.
 - **-313: Module Ass'y & Test (-63 for Sep)**
 - EM CAL overrun (-53)
 - Software (-38)
 - Labor (-81)
 - Facilities (-115)





PMCS – September '04 Schedule Variances

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- **Schedule Variance: - \$1896 cum (-134 for Sep)**
 - **- 68: CDE Manuf.**
 - Stopped bonding CDE for about 1 month due to lack of end caps to complete CDEs. Material storage problem. (No issue: CDE manufacturing is weeks off of the CAL critical path)
 - **- 278: PEM**
 - Delay in delivery of 1st composite structures.
 - **- 147: AFEE**
 - Delay in delivery of ASICs causing delay in screening and qualification work
 - Problems in manufacture of AFEE PCB.
 - **-1350: Module Assy & Test (-149 for Sep)**
 - Delay in electronics delivery for module A&T finally arrived at baseline environmental test costs.

