

GLAST Calorimeter

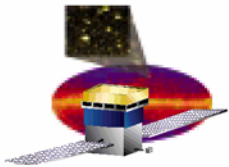
*Monthly Cost /
Schedule / Mission
November 2004*

Monthly Cost/Schedule/Mission Review

GLAST LAT Calorimeter December 2, 2004

**W Neil Johnson
Naval Research Lab
neil.johnson@nrl.navy.mil**





GLAST Calorimeter

Outline

*Monthly Cost /
Schedule / Mission
November 2004*

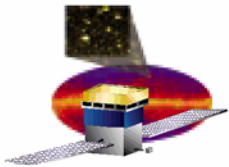
□ **Technical Status:**

- **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**





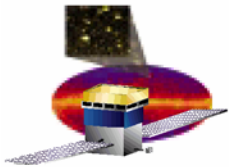
GLAST Calorimeter

Significant Accomplishments Pre Electronic Modules

Monthly Cost /
Schedule / Mission
November 2004

- ❑ **Csl Crystals**
 - Final 70 crystals from Sweden have arrived at NRL.
 - Inspections have been completed and material has been delivered to Swales.
- ❑ **CDE Assembly Process**
 - CDE bonding began again this week. A total of ~100 crystals remain to be bonded or rebonded.
 - Expect completion of CDE manufacturing and test around mid Jan '05.
- ❑ **All flight composite structures have been manufactured.**
 - Replacements for the 2 out-of-tolerance (#10 and #12) are complete.
 - NRL has received 17 flight structures (including #10 and #12).
 - #18 is being held for non-destructive test
 - #23 is being prepared for shipment.
 - #24 completed strength testing on 11/29, being prepared for shipment to NRL.





GLAST Calorimeter

Significant Accomplishments

Analog Front End Electronics

Monthly Cost /
Schedule / Mission
November 2004

- ❑ ASICs - Qual testing of GCFE and GCRC at GSFC completed
 - No issues
- ❑ All flight AFEE boards (110) have been manufactured
- ❑ 48 AFEE boards have completed 168 hr burn in and 3 temperature acceptance tests.
- ❑ 35 of these boards have completed conformal coating.
- ❑ Remaining AFEE board assembly
 - 40 more AFEE boards have been received from assembly.
 - Inspections show that vendor is still having trouble cleaning boards.
 - 20 of these boards have been recleaned and are proceeding with 168 hour dynamic burn in and temperature cycling.
 - 24 more boards have been assembled by vendor and will be shipped to NRL shortly.



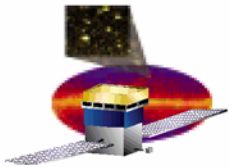
Significant Accomplishments Assembly & Test

Monthly Cost /
Schedule / Mission
November 2004



8 Completed Modules

- 101 ready to ship
- 102 & 103 final preship testing
- 104 & 105 back from TVAC
- 106 & 107 going to TVAC
- 108 initial performance tests



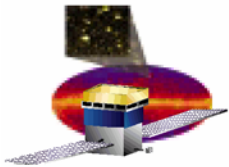
GLAST Calorimeter

Significant Accomplishments Assembly & Test

Monthly Cost /
Schedule / Mission
November 2004

- **CAL 101 Pre Ship Review – Nov 12th**
 - **Successful review of 1st CAL module.**
 - **Three open problem reports that needed CCB action**
 - Planarity of CAL base plate tabs
 - Power consumption at low temperatures
 - Energy reach in a single CDE
 - **Review indicated that shipment was approved but the decision was made to hold shipment while completing certain tasks:**
 - Conclude CCB action on outstanding problems.
 - Complete conversion and test of CAL scripts in Latte 04-06.
 - **A 2nd PSR for CAL 101 will occur prior to shipment. Scheduled date for review is Dec 3. Plan to ship on Dec 6th.**
 - **CCB review on Nov 30 approved CAL change requests closing all related problem reports.**
- **CAL 102 and 103 are ready for PSR and available for shipment**
 - **Still completing ATDPs**
 - **Will likely be held at NRL until after the holidays.**





GLAST Calorimeter

Assembly and Test

Monthly Cost /
Schedule / Mission
November 2004

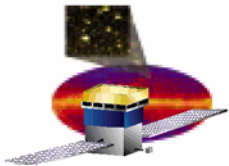
Module S/N	A FEE Installation	TEM/TPS Safe-to-	TEM/TPS Installation	Conformal Coat	Initial CPT	EM/EMC	Vibration	TVAC	Mass Properties	Final CPT Calibration	Data Review	Ship	Post Ship Test
101	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		
102	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑			
103	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑			
104	☑	☑	☑	☑	☑	☑	☑	☑					
105	☑	☑	☑	☑	☑	☑	☑	☑					
106	☑	☑	☑	☑	☑		☑	☐					
107	☑	☑	☑	☑	☑		☑	☐					
108	☑	☑	☑	☑	☑		☑						
109													
110													
111													
112													
113													
114													
115													
116													
117													
118													

Completion

- ☑ This month
- ☑ Previously
- ☐ Started

NAVAL RESEARCH LAB
WASHINGTON DC





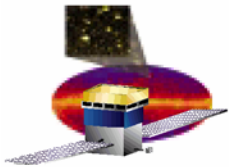
CAL Module Deliveries

November '04	(FMA – delayed ship)
December '04	FMA, FMB, FM1
January '04	FM2 – FM5
February '04	...
March '04	FM6 – FM9
April '04	FM10 – FM15
May '04	FM16

Hold 'til after holidays

- ❑ Unconstrained by availability of TEM/TPS for module assembly and test
- ❑ Includes one month (Jan '05) shut down of NRL TVAC facility

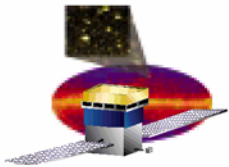




Issues and Concerns

- ❑ **NRL Thermal Vac Chamber refurbishment in January**
 - TVAC of FM 106, 107 ends Dec 10th. Will not TVAC during Dec holidays.
 - TVAC scheduled to go down for month of January.
 - Improve deliveries by TVAC'ing more than 2 modules at once. GSE is in hand to test 4 modules at once.
- ❑ **Availability of additional EM2 TEMs and/or removal of mounted EM2 TEMs from delivered CAL modules.**
 - CAL has/will have 14 TEMs and 11 TPS.
 - I need CAL 101 TPS returned to NRL ~7 Jan '05
 - I need CAL 102 TPS returned to NRL ~14 Jan, and so on.
 - I need CAL 101 TEM returned to NRL ~28 Jan along with TPS from CAL 104.
 - This TEM removal is before availability of flight TEM, I believe

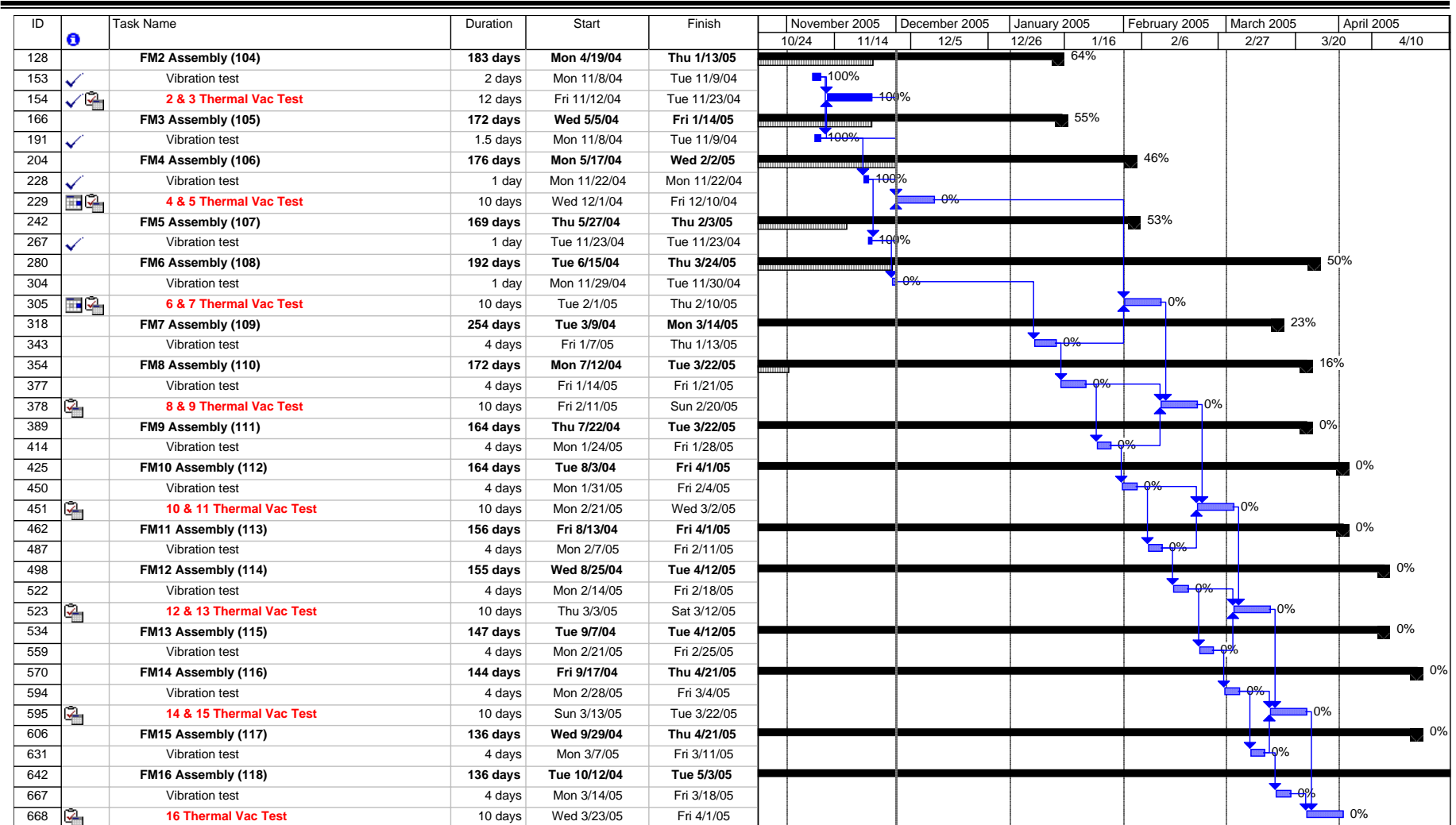




GLAST Calorimeter

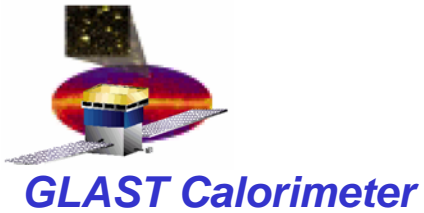
Impact of TVAC Shutdown

Monthly Cost /
Schedule / Mission
November 2004



NAVAL RESEARCH LAB
WASHINGTON DC





Drawing Release Summary

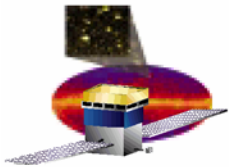
Monthly Cost /
Schedule / Mission
November 2004

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





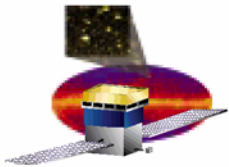
GLAST Calorimeter

Documentation and Qualification Program

*Monthly Cost /
Schedule / Mission
November 2004*

- ❑ **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.*
- ❑ **Completing Acceptance Test Data Packages (ATDP)**





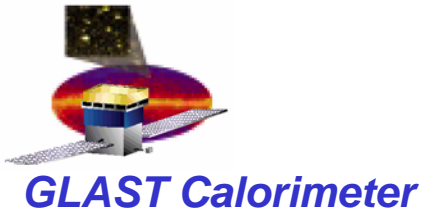
GLAST Calorimeter

PMCS - October '04 Cost Variances

*Monthly Cost /
Schedule / Mission
November 2004*

- **Cost Variance: + \$166 cum (\$138 for Oct)**
 - **+104: Mgmt, Eng, R&QA, (+12 for Oct)**
 - **+641: CDE Manuf.**
 - PDA manufacturing - materials cost underrun.
 - CDE manufacturing - labor underrun (+541)
 - **-34: PEM**
 - **-465: AFEE (-46 for Oct)**
 - Much higher labor costs balanced by savings in GSE materials
 - Fabrication problems, parts problems, you name it.
 - **-163: Module Ass'y & Test (+150 for Oct)**
 - EM CAL overrun (-53)
 - Software (-30)
 - Labor (+58)
 - Facilities (-111)





PMCS – October '04 Schedule Variances

Monthly Cost /
Schedule / Mission
November 2004

- **Schedule Variance: - \$1833 cum (+62 for Oct)**
 - **- 57: 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.
 - **- 108: AFEE (+39 for Oct)**
 - Delay in delivery of ASICs causing delay in screening and qualification work
 - Problems in manufacture of AFEE PCB.
 - **-1319: Module Assy & Test (+32 for Oct)**
 - Delay in electronics delivery for module A&T finally arrived at baseline environmental test costs.

