

Monthly Cost/Schedule/Mission Review

GLAST LAT Calorimeter December 2, 2004

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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





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.





- 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





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.





Assembly and Test

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Module S/N	AFEE Installation	TEM/TPS Safe-to-	TEM/TPS Installation	Conformal Coat	Initial CPT	EMI/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

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CAL Module Deliveries

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

□ Unconstrained by availability of TEM/TPS for module assembly and test

□ Includes one month (Jan '05) shut down of NRL TVAC facility





- 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





Impact of TVAC Shutdown

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09

Start Finish November 2005 December 2005 January 2005 February 2005 March 2005 April 2005 ID Task Name Duration 0 10/24 11/14 12/26 1/16 2/27 3/20 4/10 12/5 2/6 FM2 Assembly (104) Mon 4/19/04 64% 128 183 days Thu 1/13/05 153 Vibration test Mon 11/8/04 Tue 11/9/04 **__**100% 2 days 🗸 🖓 Tue 11/23/04 154 2 & 3 Thermal Vac Test 12 days Fri 11/12/04 1009 55% 166 FM3 Assembly (105) 172 days Wed 5/5/04 Fri 1/14/05 Tue 11/9/04 191 Vibration test 1.5 davs Mon 11/8/04 46% 204 FM4 Assembly (106) 176 days Mon 5/17/04 Wed 2/2/05 100% 228 Vibration test 1 day Mon 11/22/04 Mon 11/22/04 229 4 & 5 Thermal Vac Test Wed 12/1/04 Fri 12/10/04 10 days 242 FM5 Assembly (107) 169 days Thu 5/27/04 Thu 2/3/05 53% 2100% 267 Vibration test Tue 11/23/04 Tue 11/23/04 1 day 280 FM6 Assembly (108) Tue 6/15/04 Thu 3/24/05 50% 192 days 00/ 304 Vibration test 1 day Mon 11/29/04 Tue 11/30/04 **-**10% 305 **- 4** 6 & 7 Thermal Vac Test Tue 2/1/05 Thu 2/10/05 10 days 318 FM7 Assembly (109) Tue 3/9/04 Mon 3/14/05 23% 254 days 343 Vibration test Fri 1/7/05 Thu 1/13/05 4 days 354 FM8 Assembly (110) Mon 7/12/04 Tue 3/22/05 16% 172 days 377 Vibration test Fri 1/14/05 Fri 1/21/05 4 davs 378 2 8 & 9 Thermal Vac Test 10 days Fri 2/11/05 Sun 2/20/05 h0% 389 FM9 Assembly (111) 164 days Thu 7/22/04 Tue 3/22/05 0% 414 Vibration test 4 days Mon 1/24/05 Fri 1/28/05 425 FM10 Assembly (112) 164 days Tue 8/3/04 Fri 4/1/05 ∩% 450 Vibration test 4 days Mon 1/31/05 Fri 2/4/05 451 4 10 & 11 Thermal Vac Test Wed 3/2/05 h0% 10 days Mon 2/21/05 462 Fri 4/1/05 0% FM11 Assembly (113) 156 days Fri 8/13/04 0% 487 Mon 2/7/05 Fri 2/11/05 Vibration test 4 days 498 FM12 Assembly (114) 155 days Wed 8/25/04 Tue 4/12/05 0% 522 Vibration test Mon 2/14/05 Fri 2/18/05 4 days 523 12 & 13 Thermal Vac Test Thu 3/3/05 Sat 3/12/05 0% 9 10 days 534 FM13 Assembly (115) Tue 9/7/04 Tue 4/12/05 0% 147 davs 559 Vibration test 4 days Mon 2/21/05 Fri 2/25/05 570 FM14 Assembly (116) 144 days Fri 9/17/04 Thu 4/21/05 0% 594 Vibration test Fri 3/4/05 4 days Mon 2/28/05 0% 595 14 & 15 Thermal Vac Test 10 days Sun 3/13/05 Tue 3/22/05 ÷. 0% 606 FM15 Assembly (117) 136 days Wed 9/29/04 Thu 4/21/05 **~**___0% 631 Fri 3/11/05 Vibration test 4 days Mon 3/7/05 642 136 days FM16 Assembly (118) Tue 10/12/04 Tue 5/3/05 <mark>- 0</mark>% 667 Vibration test Mon 3/14/05 Fri 3/18/05 4 days 0% 668 16 Thermal Vac Test 10 days Wed 3/23/05 Fri 4/1/05





No Change From Last Month

Flight Hardware Drawings

	Total	Completed	
Element	Dwgs	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





Documentation and Qualification Program

- □ 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)





PMCS - October '04 Cost Variances

- □ 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

- □ 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.

