Monthly Cost/Schedule/Mission Review

GLAST LAT Calorimeter
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Outline

Technical Status:

- Last Month's Accomplishments
  - Summary of issues & concerns
  - Status/Closure of action items
- Open Design/Engineering model/manufacturing issues and closure plan for them
- Near-term Milestones & Status towards them for next 3 months

Significant Accomplishments November 2003

- **CDEs**
  - **CsI Crystals**
    - To date Kalmar has delivered ~650 fully tested crystals to NRL. Flight deliveries to Swales have begun.
  - **PIN Photodiode Assembly (PDA)**
    - ~1200 Dual PIN Photodiodes (corrected flight process) have been received from Hamamatsu
    - 50 copies of PDA tooling were manufactured and delivered to PDA assembly vendor.
    - First 150 flight PDAs have been manufactured, tested and delivered to Swales.
  - **CDE Assembly Process**
    - 12 pre-Qual CDEs have successfully completed thermal cycling.
    - 12 more Qual CDEs have been fab'ed.
    - Production rate test build (60 CDE/week) was completed. Used 12 crystals and 48 Aluminum dummys. No production flow problems detected. Ready to build.
    - Flight CDE build started December 8th.

Significant Accomplishments November 2003 (2)

- **Mechanical Structure**
  - **Revised, reviewed and released flight machined part drawings.**
    - Final revisions of base plate drawing completed last week.
  - **Structural Model 2 (SM2 – carbon composite structure) successfully completed strength test (LAT-SS-02052-01 == GLAST LLR-SP-078).**
  - **Titanium insert cleaning and kitting is underway. Kits for FMA and FMB have been delivered to LLR.**

Significant Accomplishments November 2003 (3)

- **AFEE Electronics**
  - Received Lot T31D ASICs (CAL and T&DF) from packaging at ASAT.
  - Shipped Lot T36T ASICs (ACD, CAL and T&DF) to ASAT for packaging.
  - Completed manufacture of ASIC burn-in boards.
  - ASIC functional test GSE is essentially complete. They have been used to screen GCFE9A and GCRC5 chips to be placed on EM-version AFEE boards.
  - Completed design and layout of ASIC functional test board that supports temperature forcing unit (tests at –30, +25 and +85 deg C).
  - Four more EM AFEE cards were assembled for mini-EM to be delivered to SLAC.
  - Flight AFEE layout is approaching completeness. 1st prototype was deemed unsatisfactory. Issue is placement of holes for PDA wires and areas for wire soldering and staking. New prototype next week.

Significant Accomplishments November 2003 (4)

- **EM CAL Module**
  - Modified 2/4 AFEE for flight version of GCFE (9A). Works as well or better. Noise is somewhat higher however.
  - Packed and shipped EM CAL and GSE to Darmstadt, Germany for heavy ion beam test at GSI.
  - Successfully executed 10 nights of tests with ^{58}Ni, ^{28}Si and ^{12}C beams. Preliminary evaluations of the data show expected performance (or better) and no significant problems.
- **Mini-EM (2 active layers with full electronics)**
  - 24 CDEs have been manufactured, tested and inserted in the structure.
  - AFEE cards have been installed (GCFE9As at cells w/ crystals, GCFE9s at remaining positions.
  - Ready for delivery to SLAC, will ship after holidays.

CAL Near Term Milestones

Activity ID	WBS	Activity description	Early Start	Early Finish	Current Finish	Comments
5C1130	4.1.5.9.1	Hadronic beam test	10-Nov-03	9-Dec-03		Done. EM CAL back at NRL on 12/9
5C61500030	4.1.5.6.1.5	Aluminum Parts Manufacture	3-Nov-03	6-Feb-04		Final comments received from IPO, released on 12/12/03. Baseplate delivery will delay the start of FMA PEM assy
5C61300590	4.1.5.6.1.3.2	AV: Flight Mech Dwgs		8-Dec-03		
5C62300000	4.1.5.6.2.3.1	IN: Receive FMA Mechanical Struct		9-Feb-04		
5C76000224	4.1.5.7.6.1	Package ASIC Lot T36T	30-Oct-03	17-Dec-03		In process at ASAT. Delivery is ….
5C76000228	4.1.5.7.6.1	IA: GCFE9A, GCRC5 for Screen/Qual		17-Dec-03		
5C76000460	4.1.5.7.6.1	100% functional test GCFE/GCRC	17-Dec-04	23-Dec-04		Need to complete test vector implementation.
5C76000480	4.1.5.7.6.1	10% RC Post Burn In Func test (-30C,25C,85C)	15-Jan-04	29-Jan-04		Need to assemble Variable Temp board and housing. Rent thermal control hood.
5C53100070	4.1.5.5.3.1.3	Receive 1st 600 diodes		26-Nov-03		Done. 1200 Diodes in hand.
5C57000050	4.1.5.5.7	Fab PDA Lot 1 (600)	2-Dec-04	7-Jan-04		First 150 PDAs are complete.
5C58200140	4.1.5.5.8.2	Lot 1 - Bond, Clean, Form Wraps	15-Dec-03	5-Jan-04		Starting 12/10
5C77300120	4.1.5.7.7.3	ND: (5) EM2 TEM/PS for AFEE board ass'y & test		15-Jan-04		
5C77300130	4.1.5.7.7.3	ND: (5) CAL Test Stations for AFEE ass'y & test		15-Jan-04		

Issues - PIN Diode Update

DPD Wire Bond failures at Hamamatsu

- Corrective actions have been implemented
  - CAL QA (Nick Virmani) recently completed source inspection visit at Hamamatsu in Japan – No significant problems identified.
  - Production is proceeding at a pace to deliver all 4800 diodes to NRL by the end of Jan ’04.
  - NRL has received ~1200 diodes.
  - Flight lot qualification samples have been delivered to GSFC for qualification testing.

Open Design/EM/Manufacturing Issues

- **EMI/EMC performance – CAL has implemented modifications to mechanical structure to improve EMI/EMC results.**
  - **Resulting performance will not be known until FMA testing.**
  - **Outstanding issues:**
    - EMI shielding around AFEE-TEM cable
    - Reasonable subsystem EMI/EMC specs and test configurations are still needed.
- **LAT environmental instrumentation**
  - **CAL has made no provisions for mounting or routing instrumentation / cabling used in LAT testing.**

Plans for December

- Ship mini-EM to SLAC.
- Post ship functional test of EM CAL. Change remaining 2 AFEE cards to GCFE9A ASICs.
- Build ~72 CDEs. First 12 will be qualification units.
- Fab FMA carbon composite structure.
- Receive flight lot (T36T) ASICs and begin functional testing and qualification program.
- Assemble and test prototype flight AFEE boards.
- Begin manufacture of aluminum parts.
- Complete documentation on ASICs and remaining analyses on AFEE boards.

Top 3 Threats to Cost / Schedule

- **Manufacturing delay in base plate could make this the pacing item for completion of FMA. Currently base plate will likely prevent the early start of FMA PEM assembly.**
- **Readiness and ability to execute the ASIC screening and qualification program as scheduled could also delay delivery of FMA. This is currently the critical path.**
- **Inability to sustain the flight module assembly and test schedule.**