Subsystem Mgrs F2F Meeting
Calorimeter Subsystem

12 November 2003
W. N. Johnson
Naval Research Lab
## GLAST Calorimeter

### LAT F2F Meeting

12 Nov 2003

## CAL Near Term Milestones

<table>
<thead>
<tr>
<th>Activity ID</th>
<th>WBS</th>
<th>Activity Description</th>
<th>Early Start</th>
<th>Early Finish</th>
<th>Current Finish</th>
<th>Comments</th>
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<tbody>
<tr>
<td>5C52000241</td>
<td>4.1.5.5.2.2</td>
<td>IA: FM5 CsI Crystals</td>
<td>14-Oct-03</td>
<td>14-Oct-03</td>
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<tr>
<td>5C9100010</td>
<td>4.1.5.9.1</td>
<td>ND: EM CAL Returned to NRL (arrives on dock)</td>
<td>17-Oct-03</td>
<td>17-Oct-03</td>
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<tr>
<td>5C61300048</td>
<td>4.1.5.6.1.3.1</td>
<td>SM2 Manufacture</td>
<td>21-Oct-03</td>
<td>27-Oct-03</td>
<td>24-Oct-03</td>
<td>MRR Activity</td>
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<tr>
<td>5C61500030</td>
<td>4.1.5.6.1.5</td>
<td>Aluminum Parts Manufacture</td>
<td>3-Nov-03</td>
<td>6-Feb-04</td>
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<td>Awaiting base plate release and approval.</td>
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<tr>
<td>5C76000224</td>
<td>4.1.5.7.6.1</td>
<td>Package ASIC Lot T36T</td>
<td>30-Oct-03</td>
<td>26-Nov-03</td>
<td>11-Dec-03</td>
<td>Need completion of grind/dice 10/30. Need contract in place.</td>
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<tr>
<td>5C52000261</td>
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<td>IA: FM6 CsI Crystals</td>
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<td>5C52000281</td>
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<td>IA: FM7 CsI Crystals</td>
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<td>5C52000301</td>
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<td>IA: FM8 CsI Crystals</td>
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<td>5C53100070</td>
<td>4.1.5.5.3.1.3</td>
<td>Receive 1st 600 diodes</td>
<td>26-Nov-03</td>
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<td>Critical path to FMA - Preventing start of CDE manufacture.</td>
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<tr>
<td>5C76000228</td>
<td>4.1.5.7.6.1</td>
<td>IA: GCFE9A, GCRC5 for Screen/Qual</td>
<td>1-Dec-03</td>
<td>12-Dec-03</td>
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<td>5C613000590</td>
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<td>AV: Flight Mech Dwgs</td>
<td>8-Dec-03</td>
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<td>5C1130</td>
<td>4.1.5.9.1</td>
<td>Hadronic beam test</td>
<td>10-Nov-03</td>
<td>9-Dec-03</td>
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<td>5C52000321</td>
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<td>5C62300000</td>
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<td>IN: Receive FMA Mechanical Struct</td>
<td>15-Dec-03</td>
<td>16-Jan-04</td>
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<td>5C52000341</td>
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<td>IA: FM10 CsI Crystals</td>
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<td>5C58200140</td>
<td>4.1.5.5.8.2</td>
<td>Lot 1 - Bond, Clean, Form Wraps</td>
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<td>5-Jan-04</td>
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<td>5C57000051</td>
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<td>IA: PDA Lot 1 (600)</td>
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<td>5C62300100</td>
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<td>5C77300120</td>
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<td>ND: (5) EM2 TEM/PS for AFEE board ass'y &amp; test</td>
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<td>5C77300130</td>
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<td>ND: (5) CAL Test Stations for AFEE ass'y &amp; test</td>
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<td>Activity description</td>
<td>Float</td>
<td>Available</td>
<td>Latest</td>
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<td>AV: Calorimeter Module A/B RFI</td>
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<td>AV: Calorimeter Module 1/2 RFI</td>
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<td>AV: Calorimeter Module 9/10 RFI</td>
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<td>02-Nov-04</td>
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<td>AV: Calorimeter Module 11/12 RFI</td>
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<td>AV: Calorimeter Module 13/14 RFI</td>
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<td>AV: Calorimeter Module 15/16 RFI (for Calibration)</td>
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<td>06-Jan-05</td>
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</table>
**Critical Path (Rebaseline 11/10/03) Qual Module (FMA)**

- **Dual PIN Photodiode**
  - NRL
  - 12/04/03 (-97)

- **CsI Crystals Sweden**
  - 08/13/03

- **Carbon Composite Structure**
  - Al base, closeouts, plastic parts
  - LLR/Ecole Polytechnique, NRL
  - 01/16/04 (-79)

- **ASiCs**
  - SLAC, NRL
  - 12/12/03 (-107)

- **Crystal Detector Elements (CDE)**
  - NRL/Swales
  - 2/09/04 (-97)

- **Pre Electronics Module**
  - NRL
  - 03/18/04 (-97)

- **CAL Module**
  - NRL
  - 04/22/04 (-100)

- **Analog Front End Electronics (AFEE)**
  - NRL
  - 03/26/04 (-100)

- **Other EEE parts**
  - Parts
  - Qual/Screen
  - NRL
  - 02/09/04 (-100)

- **PCB**
  - NRL
  - 01/09/04 (-89)

- **Calibration Environmental Test**
  - NRL
  - 06/17/04 (-101)

- **Ready for Integration (RFI)**
  - NRL
  - 07/09/04 (-101)
  - (L3: ?????)

Completion Dates (float)
Improve A/B Deliveries

- Improve delivery of AFEE boards.
  - Could use ASICs before completion of 10% screening (save up to 7 wks depending on amount of risk). [This will be a hard sell to the LAT PCB and GSFC because of lack of flight heritage.]

- Improve delivery of PEMs
  - DPD availability limits start of CDE manufacturing
    - Looking at recovering a week or two with CDE manufacturing slight of hand.
Resolve and verify CAL – Grid interface
- Final details of base plate are being reviewed w/ Mike Menning.

Resolve CAL EMI/EMC test requirements and configuration.
- Need better definition of test configuration and specs for CAL subsystem EMI/EMC testing.
Interdependencies with other LAT components (2)

- TEM and PS (EM2) that support CAL assembly and test schedule.
  - Failure to communicate on quantities – 10 offered, 15 requested.
    - Not necessarily a problem if 5 delivered for AFEE board test can be reused for later module ass’y and test. That is, they are environmentally qualified.
    - There will be no spare hardware at NRL in case of problems.
    - Options – remove TEM/PS from CAL EM and miniEM.
  - Discussion on TEM/PS documentation and procedures is just beginning, but there is a chasm between ELEX offering and CAL QA desires.

- Produce EEE Parts required documentation (as identified by GSFC) for the ASICs and resolve the qualification of the ASICs for flight.
  - SLAC will provide required ASIC documentation by 16 Nov. which will permit completion of CAL documentation for LAT PCB review.
Open Design /EM /Manufacturing Issues

GLAST Calorimeter

- EMI/EMC performance
  - Outstanding issues are closing holes thru base plate around AFEE-TEM cable and getting good shield on cable.
  - EM testing failed EMI/EMC specs for CAL. Will not be able to test design changes until FMA. Still need testable spec and test configuration.

- AFEE – TEM Cable
  - EM version of cable is too stiff – caused by several layers of kapton tape and copper tape for EMI protection.
  - New shield is electroplated polyester fabric. Kapton tape will cover ends of shield.
  - No use of connector savers to attach to EM2 or FM TEM mounted on base plate.
    - Connector savers used only in AFEE board ass’y and test and during module test when TEM is removed and electrically connected via extension cables.
    - Train employees for handling of connectors and mate/demate operation.