Subsystem Mgrs F2F Meeting
Calorimeter Subsystem

21 January 2003
Bill Raynor
Naval Research Lab
The Good – CDE Assembly

As of 13 Jan 2004

- PIN Diode Assemblies (PDAs)
  - 2841 (of 4800) Dual PIN Diodes delivered to NRL
  - 576 PDAs manufactured, tested & delivered to Swales

- CsI Crystals
  - 1032 (of ~1900) Crystals delivered to Kalmar from Amcrys
  - 835 of these tested and delivered to NRL

- End Caps
  - 50 have been delivered to NRL

- CDEs
  - 204 have been bonded
  - 25 wrapped and capped. (12 are qualification units)

Summary: well ahead of schedule. Cap availability is limiting completion. More caps will be available from LLR by the end of January.
The OK - Structures

- SM2 - LLR
  - Manufacturing review indicated some minor changes to tooling to ease in disassembly/cleaning of tooling
  - Composite structure strength tests of SM2 showed no problems

- FMA - LLR
  - Composite stucture manufacture began last week.
  - Strength testing scheduled for 1st week of Feb.

- Machined Parts – NRL
  - Late start in machining (drawing approval and release) has been mitigated by $$. All parts complete by Feb 26th using 2 – 3 shifts in shop.
  - Late discovery of error in close-out plate required modified design – need serpentine EMI “o-ring” groove to avoid heli-coil holes.

Summary: more or less on schedule.
Issue: scheduling all the strength testing with vendor in France.
Deliveries of Lot T36T ASICs from ASAT Packaging has not occurred as scheduled.

- 2 of the 9 parts (GAFE7 and GCRC5) have been delivered.
- As of 16 Jan, the other 7 parts have been held up at the factory for some unknown reason.
- The delivery of these ASICs are the CAL critical path and is currently five weeks behind the baseline schedule.

Qualification program has begun at GSFC – mechanical / packaging investigations using Lot T31D

Functional test stations (7) are in place at NRL and ready to test flight parts, if and when they arrive.

Summary: Deep dodo here.
Mitigation: Work qualification and screening program to make parts available for board assembly in early March. Release constraints on flight module assembly that will permit greater than one module per two weeks.
GLAST Calorimeter

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>
</tr>
</thead>
<tbody>
<tr>
<td>5C570000050</td>
<td>4.1.5.5.7</td>
<td>Fab PDA Lot 1 (600)</td>
<td>2-Dec-04</td>
<td>7-Jan-04</td>
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<td>Done</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>
<td>26-Feb-04</td>
<td>First parts available 2/16</td>
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<tr>
<td>5C623000000</td>
<td>4.1.5.6.2.3.1</td>
<td>IN: Receive FMA Mechanical Struct</td>
<td>9-Feb-04</td>
<td>20-Feb-04</td>
<td></td>
<td>delay in strength test schedule</td>
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<tr>
<td>5C623000030</td>
<td>4.1.5.6.2.3.1</td>
<td>CDE Inspection</td>
<td>10-Feb-04</td>
<td>17-Feb-04</td>
<td></td>
<td>FMA CDE</td>
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<tr>
<td>5C623000040</td>
<td>4.1.5.6.2.3.1</td>
<td>CDE - Mech Struct Integration</td>
<td>25-Feb-04</td>
<td>9-Mar-04</td>
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<td>Begin FMA PEM assembly</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>17-Dec-03</td>
<td>8-Jan-04</td>
<td>Come and gone w/o ASICs - still slipping.</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>
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<td>17-Dec-03</td>
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<tr>
<td>5C76000460</td>
<td>4.1.5.7.6.1</td>
<td>100% functional test GCFE/GCRC</td>
<td>17-Dec-04</td>
<td>23-Dec-04</td>
<td>20-Jan-04</td>
<td>Test equipment is ready</td>
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<tr>
<td>5C76000480</td>
<td>4.1.5.7.6.1</td>
<td>10% RC Post Burn In Func test (-30C,25C,85C)</td>
<td>15-Jan-04</td>
<td>29-Jan-04</td>
<td></td>
<td>Thermal forcing hood setup needed.</td>
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<td>5C760001000</td>
<td>4.1.5.7.6.2</td>
<td>AFEE PCB manufacturing</td>
<td>15-Jan-04</td>
<td>5-Feb-04</td>
<td>19-Feb-04</td>
<td>Finish check of 1st prototype this week.</td>
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<tr>
<td>5C76001050</td>
<td>4.1.5.7.6.3</td>
<td>Board Assembly (vendor)</td>
<td>9-Mar-04</td>
<td>7-May-04</td>
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<td>5C77300120</td>
<td>4.1.5.7.7.3</td>
<td>ND: (5) EM2 TEM/PS for AFEE board ass'y &amp; test</td>
<td>15-Jan-04</td>
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<td>Delay is not a problem</td>
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<td>5C77300130</td>
<td>4.1.5.7.7.3</td>
<td>ND: (5) CAL Test Stations for AFEE ass'y &amp; test</td>
<td>15-Jan-04</td>
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<td>Delay is not a problem</td>
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</tbody>
</table>

Naval Research Lab
Washington DC

wnjohnson
### Current Deliveries

**GLAST Calorimeter**

**LAT F2F Meeting**  
21 Jan 2004

<table>
<thead>
<tr>
<th>Activity description</th>
<th>Float</th>
<th>Current</th>
<th>Baseline</th>
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<tbody>
<tr>
<td>AV: Calorimeter Module A RFI</td>
<td>36</td>
<td>08/05/04</td>
<td>07/09/04</td>
</tr>
<tr>
<td>AV: Calorimeter Module B RFI</td>
<td>56</td>
<td>08/05/04</td>
<td>07/09/04</td>
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<tr>
<td>AV: Calorimeter Module 1/2 RFI</td>
<td>55/57</td>
<td>08/27/04</td>
<td>08/02/04</td>
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<tr>
<td>AV: Calorimeter Module 3/4 RFI</td>
<td>52/55</td>
<td>09/15/04</td>
<td>08/17/04</td>
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<td>AV: Calorimeter Module 5/6 RFI</td>
<td>49/54</td>
<td>10/12/04</td>
<td>09/15/04</td>
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<tr>
<td>AV: Calorimeter Module 7/8 RFI</td>
<td>40/45</td>
<td>11/08/04</td>
<td>10/11/04</td>
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<tr>
<td>AV: Calorimeter Module 9/10 RFI</td>
<td>35</td>
<td>12/01/04</td>
<td>11/02/04</td>
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<tr>
<td>AV: Calorimeter Module 11/12 RFI</td>
<td>35/41</td>
<td>12/15/04</td>
<td>11/16/04</td>
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<tr>
<td>AV: Calorimeter Module 13/14 RFI</td>
<td>36</td>
<td>01/05/05</td>
<td>12/02/04</td>
</tr>
<tr>
<td>AV: Calorimeter Module 15/16 RFI (for Calibration)</td>
<td>462</td>
<td>01/20/05</td>
<td>01/06/05</td>
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</tbody>
</table>

It may be possible to recover the baseline deliveries for the last 8 modules by assembling modules A – 8 faster than the PMCS rate of one per 2 weeks.
GLAST Calorimeter

Critical Path (Rebaseline 11/26/03)
Qual Module (FMA)

Critical Path in Red
Secondary in Blue

Dual PIN Photodiode
NRL 12/03/03

Crystal Detector Elements (CDE)
NRL/Swales 2/09/04 (59)

Pre Electronics Module
NRL 03/25/04 (54)

Cal Module
NRL 05/17/04 (36)

Analog Front End Electronics (AFEE)
NRL 04/22/04 (36)

Calibration Environmental Test
NRL 07/15/04 (36)

Ready for Integration (RFI)
08/05/04 (36) [BL: 07/09/04 (55)]

Completion Dates (float)

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Completion Dates (float)
Risks to FM A Delivery

EEE Parts

- ASIC packaging and testing.
- Readiness for functional testing of GCFE
  - Need 7 test GSE and supporting software for GCFE – 10,000 parts.
- Readiness for sample testing (10%) at –30, +25, +85 C
  - Modified test board with thermal forcing unit and enclosure.
  - Thermal forcing unit is being set up.

Radiation Testing issues
- More tests in February

AFEE Assembly

- Verify redesign of AFEE layout.
  - Prototype boards have been received and are being assembled.
  - Routing and handling of PDA wires to AFEE board are still concerns but new board layout looks promising.
Resolve CAL EMI/EMC test requirements and configuration.
  - Need better definition of test configuration and specs for CAL subsystem EMI/EMC testing.

TEM and PS (EM2) that support CAL assembly and test schedule.
  - Discussion on TEM/PS documentation and procedures is just beginning, but there is a chasm between ELEX offering and CAL QA desires.
  - Still need to resolve difference in quantity needed and quantity provided.

Produce EEE Parts required documentation (as identified by GSFC) for the ASICs and resolve the qualification of the ASICs for flight.
  - Revised GCRC5 complete.
  - Need similar doc on GCFE9A.
EMI/EMC performance

- Outstanding issues are closing holes thru base plate around AFEE-TEM cable and getting good shield on cable.
- Design of aluminum cable shield is not complete.
- 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.