



AntiCoincidence Detector

**GLAST Large Area Telescope:
Cost/Schedule Review
April 27, 2004
AntiCoincidence Detector (ACD)
Subsystem
WBS: 4.1.6**

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Recent Accomplishments

- **Tile Detector Assembly**
 - Design of all TDAs has been completed. All are in fabrication.
 - 80 TDAs received. 62 TDAs tested; all meet our performance requirements.
 - Ribbon Detector prototypes fabricated. Final flight tooling being finalized and fabricated.
- **FREE Boards**
 - All FREE Boards are in flight assembly.
 - First FREE Board has successfully completed testing and has been sent to conformal coating. Second FREE Board is finishing up thermal cycling and will be sent out for coating this week.
 - Third and Fourth FREE Boards have been received and will begin testing this week
- **HVBS**
 - 4 HVBS's have been received. Two have passed testing and are in coating. The other two are being tested.

Recent Accomplishments

- **PMTs**
 - All pieces are in place to begin assembly. Working out the final details and paperwork. Will begin assembly this week and complete first PMTs late next week.
 - All tests of new mechanical mounting has been successful.
- **Mechanical Structure**
 - “Passed” pre-test review last week! Structure being prepared for testing (installing mass sims, interface to vibration fixture, integrating base frame to shell, etc.)
 - MGSE being finished up

Near Term Milestones

Milestone Description	Date	New Date	Status/Notes
Complete Flight HVBS	<u>6/30/04</u>		<u>First 4 are completed</u>
Complete Flight FREE Boards	<u>6/30/04</u>		<u>First 4 are completed</u>
Complete PMT Assembly	January, 2004	<u>6/30/04</u>	<u>Beginning flight production this week.</u>
Complete Qualification Unit Electronics Chassis Assembly	<u>5/20/04</u>		<u>Mechanical parts, FREE Boards, and HVBS ready by May 10. PMTs ready the following week.</u>
Mechanical Subsystem delivered to I&T	<u>5/17/04</u>		<u>Being prepared for mechanical qualification testing.</u>
Complete Flight Mechanical Drawings	September	<u>5/30/04</u>	All part drawings complete. Assembly drawings in process.
Complete Design on MGSE and EGSE	October	<u>April, 2004</u>	<u>COMPLETED</u>
Complete Fab of Clear Fiber Cables	August	<u>5/25/04</u>	<u>All cables assembled and have one end terminated and polished. Working on finalizing routing and lengths of cables.</u>
Complete Fab of Flight TDAs	November	<u>5/20/04</u>	<u>80 TDAs received, remainder in fabrication or wrapping.</u>

Interdependencies

1. Delivery of FREE Boards and ASICs to Electronics for test bed. – FREE boards, GAFEs, and GARCs have been delivered
2. EGSE/G3 – Ongoing development with I&T and Electronics groups.
 - ACD electronics chassis and G3 was received on 4/22. LAT team arrived on 4/26 for initial set up and testing.
 - Working on a significant issue that came up during testing.
 - Schedule for delivery of the remaining three G3 units (and one additional work station) has been agreed on.
3. Grid to Base Frame match drilling – Outline drawing and available date for work? Planning for Mid May. Currently performing similar operation on our vibration fixture (GRID simulator). Will use this experience for finalizing procedure.
4. Delivery of ACD Calibration Unit or subset to LAT I&T –The same electronics chassis being used for G3 commissioning will be used for the calibration unit. Delivery of calibration unit will occur some time after this testing.
5. ICD – Rich Bielawski is helping track a set of needed changes.

Open Design Issues

- **OPEN:** Outline drawing that defines some interfaces with LAT is still not complete (blanket attachment, grounding, cable tie-downs, optical survey mounts). Action Plan: Work with LAT mechanical design team to resolve open issues. **Status: Unchanged from last month**

Issues

- **PMT Anomaly (glass breaking)**
 - Closing it out
 - Visual Inspection criteria
- **HV Capacitor life testing failure**
 - Replacement capacitor has been received and has passed all testing so far. HALT test and full life time test are last two tests required
- **G3/EGSE**
 - Recent technical issue
 - Finish up software
 - Concerned about schedule

Concerns

- **Our schedule for assembly of the ACD is tight (or aggressive, or challenging, or whatever word you choose to indicate that we have a lot of hard work over the next few months).**

Documentation and Qualification Program

- **Documentation**
 - **Configuration Management system in place and working fairly well**
 - **Problem Reporting system in place and is working okay. It is a new system so people are still learning how to use it. Getting PRs closed out is an issue we are working on.**
- **Qualification Program**
 - **Verification Plan is signed off and in CM. It is in the process of being updated.**
 - **Mechanical Subsystem will finish qualification testing on May 17**
 - **Qualification Unit (i.e. flight spare) Electronics Chassis will finish assembly on May 20 and qualification testing will begin.**

ACD Schedule Variances

- **4.1.6.3 - TSA Schedule Variances (-\$70K cum, -\$11K February)**
 - Procedures
 - TDA Assembly and Test
- **4.1.6.4 BEA Schedule Variances (-\$448K cum, -\$99K February)**
 - (\$88K) – HVBS (HV Capacitor)
 - (\$339K) – PMTs (PMT Anomaly)
 - (\$21K) – FREE Board (ASIC Delay)
- **4.1.6.6 Mech Qual and Cal Unit (-\$110K cum, -\$39K February)**
 - (\$110K) – Late start on mechanical qualification testing.

ACD Cost Variances

- **4.1.6.1 ACD Project Management/Sys Eng/Science (+\$352K cum, -\$243K current period)**
 - (+\$221K) - Labor support lower than planned due to lower than planned science simulations and test support (\$148K), systems engineering being covered by GLAST Project (\$52K), Science Support lag in accruals (\$21K)
 - (+\$118K) MPS lower than planned (-\$240K - MPS/Lab Tax bill this month)

- **4.1.6.2 Safety and Mission Assurance (+\$10K cum, -\$31K current period)**
 - (+\$10K) - Cross utilizing support with the GLAST project. Staffing is not sufficient in this area. We will need an additional QA person during assembly and I&T.

- **4.1.6.3 Tile Shell Assembly (+\$96K cum, -\$9K current period)**
 - (-\$126K) - Labor higher than planned to complete drawings, schedule variance
 - (+\$219K) - Materials – Shell panels and TDAs not invoiced yet.

ACD Cost Variances

- **4.1.6.4 Base Electronics Assembly (-\$575K cum, +\$271K current month)**
 - (-\$207K) Labor
 - (-\$323K) M&S – Parts screening, parts purchases, FREE and HVBS assembly, and Resistor Network work performed, but have not received credit for work done.
 - (-\$46K) SLAC ASIC charges.
- **4.1.6.5 MS/TB (+\$41K cum, +\$14K current month)**
 - (+\$27K) – JSC cost reporting behind actual work performed.
- **4.1.6.B Ground Support Equipment (+\$345K cum, -\$107K current month)**
 - (+\$203K) – Labor
 - (+\$140K) - Materials

Threats to Schedule and Cost

- 1. Delivery of GASU/G3 EGSE**
- 2. PMT Anomaly**
- 3. PMT Assembly**
- 4. Electronics assembly and test**
- 5. Mechanical analysis & design (drawing completion)**