

GLAST Large Area Telescope: I & T Input to Monthly Technical/Cost/Schedule Review 09/24/03

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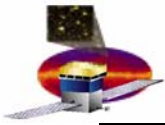
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Last Month's Accomplishments (August-Sept)

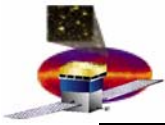
Months activities centered on EM.

- EM TKR and CAL integrated into single grid bay mockup – EM tower.
- Complete muon telescope (lead filter yet to be added).
- Performed LPT on EM tower-passed.
- Deintegrated EM tower to pursue TRK HV bias debugging, and TKR only characterization.
- Migrated CAL scripts from NRL form to standard LATTE form. Sent off list of changes/improvements to NRL for comment.
- Reintegrated EM tower and data taking resumed.
 - TACK optimization for CAL, TKR using internal and external muon telescope triggers.
 - Cosmic Ray data with internal and external muon telescope triggers.
- Supported TRK cable fit check and redesign efforts.
- Install intercom between control room and integration room.
- Support 1x4 fit checks.
- Characterized mechanical dimensions of modified 1x1 grid bay in SLAC metrology to support 1x4 grid fit check.
- Electrical safety upgrade to building 33 done.



Summary of issues and concerns

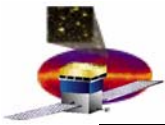
- Time frame and effort needed for rebaselining will impact our schedule to integration readiness.
- Need for electronics technician to be under I&T control – currently under electronics and not shown in PMCS. Under projected schedule I&T needs to start hiring to prepare for flight integration before the end of this year. Currently no qualified electronics tech allocated to I&T.
- Need to better coordinate I&T activities with mechanical systems.
 - Impact of CAL plate interface design on flight integration procedures. E.g., will we need to check for voids in epoxy when installing Menning plates.
 - Blind TEM connector mating due to close EMI skirt.
 - TRK cable fit and handling issues.



Status/Closure of action items

- **No action items from last months review meeting**

Open Design/Engineering model/ manufacturing issues and closure plan for them



- **Completion of EM Tower I&T program by October 15 (CAL EM on dock at NRL by October 17). See LAT-MD-01137-01 EM Plan.**
- **Work out sharing of EM CAL between CAL and I&T from October 15 until flight integration begins. We expect ~50/50 sharing in this time period.**
- **Fit check of TKR Mechanical model needs to be done with CAL EM and 1x4 grid as early as possible. TKR Mechanical model delivery is now expected in early January. Need CAL EM back in early January to make fit check.**
- **Plan for completion multi tower EGSE that uses GASU is in flux depending on GASU availability. Need date for completion of multi tower EGSE is Dec/Jan for ACD use. Need final plan (SE).**



Status of Subsystem's Parts List and qualification program

- **EGSE EM-1 qualification in progress in EM program. EM-1 used for production of flight TKR and CAL units. Final multi tower EGSE qualification needs to use software test bed. Qualification required for use by ACD in Dec/Jan. For more details of the EGSE qualification plan see, LAT-MD-01533 draft.**
- **MGSE qualification plan discussed in I&T MGSE Development Plan, LAT-MD-01462 draft.**

Key Milestone List to delivery

| Milestone ID | Milestone Description | Original Date | Current Date | Major Requirements to Achieve Milestone | Notes |
|----------------------|---|---------------|-------------------|--|---|
| | Decision on location of LAT Environmental Test | 08/21/03 | 09/10/03 Complete | Spectrum RFI quote. PSR 8/18 checklist. | NRL selected. |
| 9119500160 | Receive Tracker mini-tower | 08/22/03 | 08/20/03 Complete | | Hand carried from Italy on 8/20/03 |
| 91006820 91006822 | EM tower functional tests complete | 09/18/03 | 09/19/03 Complete | | |
| 91006930 91006932 | EM tower available for use by Flight Software | 09/18/03 | 09/20/03 Complete | | Schedule for use by FSW is not clear at this time. LCB tests desired by Gunther near October 14. |
| | EM Calibration Complete | 10/13/03 | 10/14/03 | | |
| 9119500180 | Cal EM at NRL Loading dock | 10/17/03 | 10/17/03 | Need to ship by 10/15/03 | |
| | I&T PMCS rebaseline | | 10/03/02 | Need new baseline subsystem delivery dates for final I&T schedule. | Begin replanning assuming hardware availability dates per Rebaseline Review presented 7/31/03 |
| | Bldg 33 Upgrades (except for humidity) | 09/01/03 | 10/30/03 | Earthquake new cabinets, more furniture, all phones in, permanent Liquid Nitrogen system operational, Clinton flight hardware stores complete (fire and earthquake). | |
| | Bldg 33 A/C & humidity control improvements, plus | 12/15/03 | 12/15/03 | Crane fine control adjustment. | A/C + humidity Kingston Chan responsible engineer. |
| | I&T training mockup complete and ready for use | 1/30/03 | | All I&T mechanical and electrical techs on board and ready to train. | Plan to use (TBR) injected molded plastic parts to the cad model in the 1x4 grid augmented by 4x4 footprint hardware. Also using ELX software test bed. |



Key Milestone List to delivery

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|--------------|--|---------------|--------------|---|---|
| | ACD tent work | 1/30/04 | 1/30/04 | Investigate using previously used BaBar enclosure. | Needed for ACD 9/1/04 |
| | Single Tower EGSE Configuration including CAL and TKR Production Scripts | 9/30/03 | | Final LATTE scripts for TKR and CAL production. Support for CAL GSI beam test. | |
| | Multi-FREE Board EGSE. | 1/30/03 | | GASU delivered with software to I&T 12/30/03. Complete LATTE multi FREE Board support . | |
| | LAT Assembly Configuration | 4/20/04 | | Complete LATTE multi tower and FREE Board support. PDU support. Command and Telemetry database. Presented at IRR. | Use this EGSE for initial multi tower debugging and assembly of all towers into Grid. |
| | Complete Flight Unit Configuration EGSE. | 12/15/04 | | Delivery of Global items, final spacecraft simulator. | Use this EGSE to assemble and test global items, and I&T, comprehensive, limited performance and, end to end LAT tests. |
| | Flight Unit On-Orbit Configuration EGSE. | 12/01/05 | | All global items installed and tested, final Command and Telemetry database, instrument fully tested, instrument delivered. | Used for SC integration, IOC end to end tests, and flight. |
| | LAT I&T Beam Test EGSE. | > 12/01/05 | | | Use in SLAC CU beam test. |
| | MGSE for LAT integration | 4/20/04 | | Qualification and proof tests complete for manufactured items. Presented at IRR. | Excludes the special MGSE for environmental testing. |
| | MGSE for LAT environmental testing | 7/14/05 | | Qualification and proof tests complete for manufactured items. Presented at pretest/ship review. | |
| | Arrange for airplane for transportation to NRL/airplane test | 7/1/04 | | Requirements for MGSE and EGSE on airplane known. LAT parts tested as required by the time of delivery of A/B 4/15/04 (TKR), 5/20/04 (CAL/TEM/TPS), | <i>Past experience with Air Force indicates about one year lead time.</i> |



Significant Cost/Schedule Variances

- **Cumulative Cost and Schedule Variance**
 - **Cumulative Cost Variance: +41k\$ (+2%)**
 - **Cumulative Schedule Variance: -182k\$ (-7%)**
- **July Cost and Schedule Variance**
 - **July Cost Variance: +2k\$ (+1%)**
 - **July Schedule Variance: -106k\$ (-38%)**
 - **\$90k of the August schedule variance was anticipated as the baseline MGSE plan has not been replanned to reflect the expected later MGSE deliveries. This variances to be mitigated by the upcoming rebaselining effort.**



Threats to Maintaining Cost/Schedule

- **Delay in implementation of 3 month schedule extension will leave our MGSE schedule exposed to a very large schedule variance over the next 1-3 months, getting bigger as PMCS reprogramming is delayed longer. This is expected to be mitigated by the upcoming rebaselining effort.**
- **I&T test plan depends on future delivery of SE level test plans and committee reports. We have plan from SE for deliveries, but final content is currently in flux.**
- **Spacecraft interface detail uncertainty.**
 - **Environmental test fixtures.**
 - **EGSE interface.**
 - **MGSE handling fixtures.**
 - **SIIS (Spacecraft Instrument Interface Simulator) fidelity uncertainty.**
- **Delivery of flight hardware to I&T may be late.**