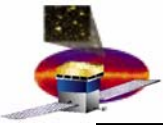


GLAST Large Area Telescope: I & T Input to Monthly Technical/Cost/Schedule Review 12/15/03

**Elliott Bloom
SU-SLAC
Subsystem Manager**

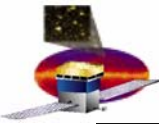
**Brian Grist
SU-SLAC
Subsystem Engineer**

**elliott@slac.stanford.edu, bgrist@slac.stanford.edu
650-926-2469 650-926-2998**



Last Month's Accomplishments

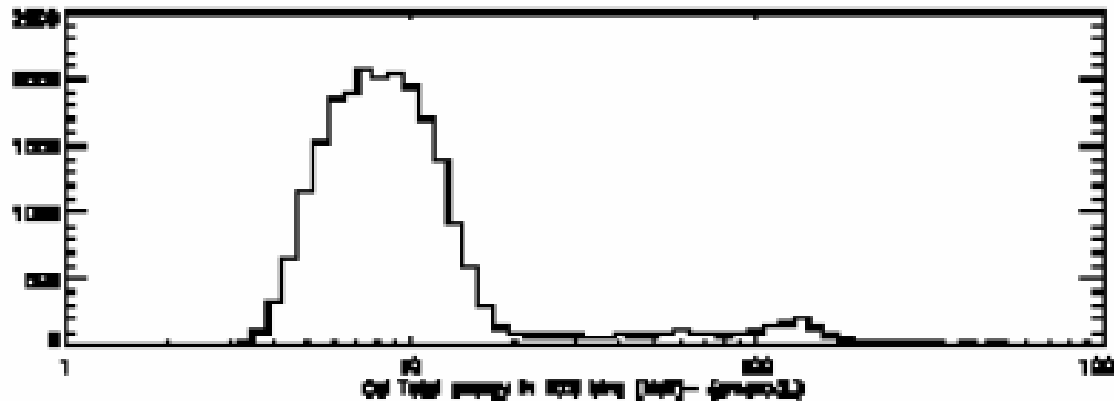
- Completed Rebaseline effort.
- Release of LATTE 1.9
 - Trigger information to snapshot files
 - single event display
 - event data distribution
 - event data playback
 - documentation
 - supports operation on UNIX as well as on Windows
 - LATTE Bug fixes
 - Future enhancements to 1.9 to satisfy new requirements from ACD and CAL (CAL insisting many of these items be done by end of December, this seems rather unreasonable to I&T online).
 - Test suite enhancements – more complex scripting ability.
 - Addressing performance requirements- e.g., 10 kHz commanding.
 - Current value table distribution-multi PC support.
 - Multitasking during long duration state transitions - launch GUIs from subtasks.
 - Transfer of front end flight software developed by I&T to flight software.
- G3 related support
 - AEM API
 - GLT improvements
- Hired mechanical floor engineer, Eliazar Ortiz, to help plan, manage and supervise mechanical assembly, integration of the LAT. Current plan is to have Ortiz be the "Test Conductor" during the LAT assembly and integration phase.
- Specified LAT integration photography requirements.
- Cable plant mock-up old cables removed and documented, new cables installed in sequence.
- Finalized the Lat integration sequence with LAT Integration Workgroup. (document due to be sent for broader review)
- I&T EM tower calibration requirements are complete.
- Completed 17.6 MeV photon EM analysis



EM-1 Mini-tower performance using 17.6 Van de Graaff gamma rays

TKR trigger – front entry.

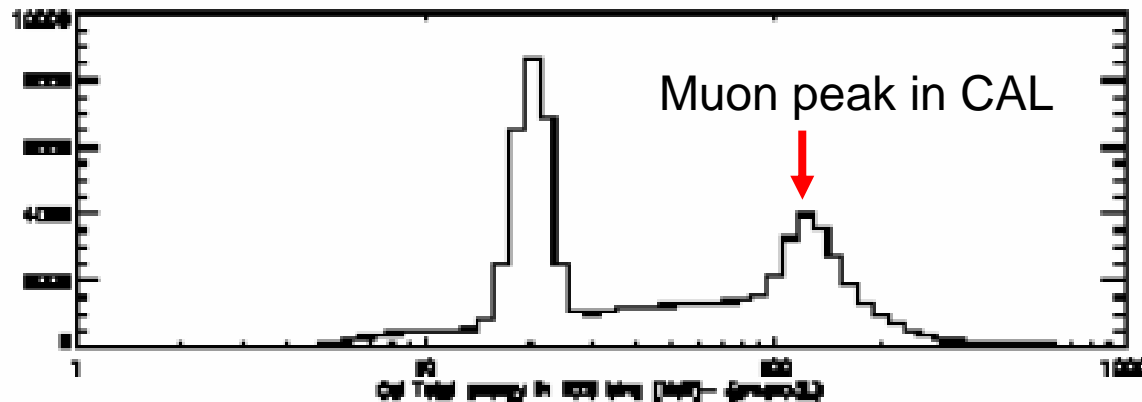
$\sigma \sim 43\%$, no correction for energy absorption in TKR



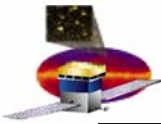
CAL energy deposition
events vs $\log(E_\gamma)$

CAL trigger – side entry.

$\sigma \sim 17\%$, full deposition in CAL.

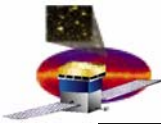


CAL energy deposition
events vs $\log(E_\gamma)$



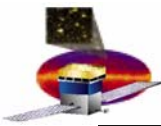
Key Milestone for Next 3 Months

Milestone Description	Original Date	Current Date	Major Requirements to Achieve Milestone	Notes
Bldg 33 Upgrades	09/01/03	01/31/04	Earthquake new cabinets-done, more furniture-done, all phones installed-done, permanent, Clinton flight hardware Stores complete (fire and earthquake)-done. Liquid Nitrogen System operational - waiting on O₂ deficiency monitors.	<i>Van De Graaff Seismic analysis done. Simple chaining to floor required. Completed in next two weeks. SLAC safety committee presentation for LNS Thursday.</i>
MGSE conceptual design for transportation container complete	11/30/03	1/30/04	Preliminary design, vibe analysis, impact on LAT in flight in work, 60% complete. Need more analysis help.	<i>Need as input for decision on airplane test.</i>
I&T training mockup complete and ready for use	01/03/04	02/03/04	All I&T mechanical & electrical techs on board and ready to train. Change request to hire 3 electrical techs to controls 12/02/03.	<i>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</i>
1x4 Grid Available for fit check	01/15/03	01/15/04		
ACD tent work	01/30/04	05/01/04	Design under development.	<i>Need for ACD 9/1/04. Complete tent work before LAT integration begins.</i>
Multi-FREE Board EGSE	01/30/04	02/22/04	GASU delivered with software to I&T 01/22/04. Complete LATTE multi FREE Board support to ACD.	<i>I&T needs 30 days after delivery of GASU with software to deliver FREE board online support to ACD.</i>
MGSE pre-production review	01/27/03	01/27/04	Present MGSE final designs for LAT integration at Tuesday engineering meeting. Needs coordination now with Martin Nordby and Mechanical systems.	<i>All MGSE needed for LAT integration. EV test MGSE later.</i>
ACD EM Tower Tiles and Electronics	02/17/04	02/29/04	ACD to deliver tiles, photo-tubes, freeboards for use with single tower + GASU . I&T to produce mechanical support and EGSE scripts.	<i>Key delivery to obsolete Calibration unit milestone date</i>

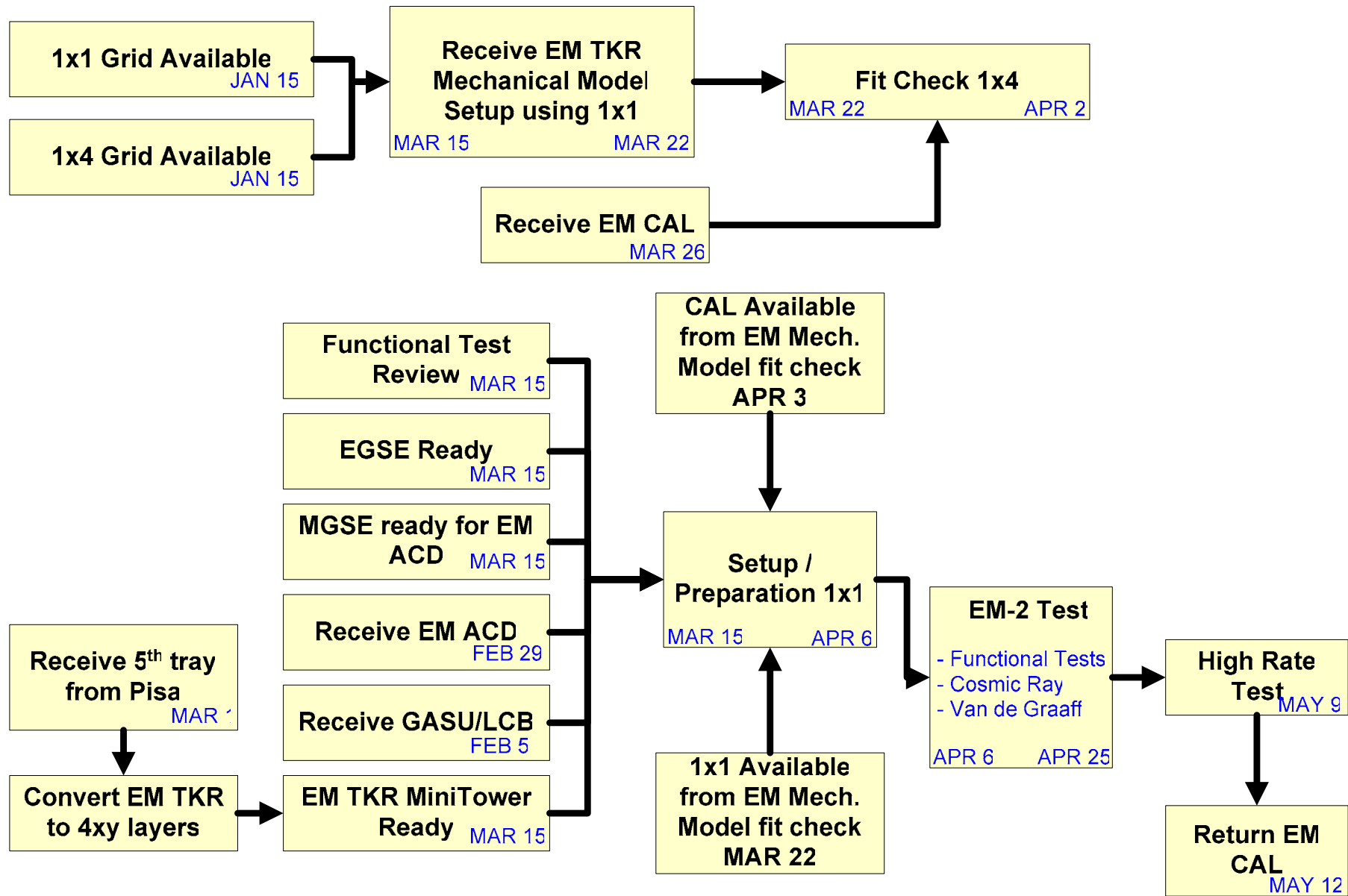


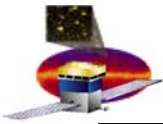
Key Milestone for Next 3 Months

Milestone Description	Original Date	Current Date	Major Requirements to Achieve Milestone	Notes
Receive EGSE from Electronics	02/05/04	02/05/04	GASU/LCB system needed for the EM-2 test	
Receive 5th tray from Pisa for EM-2	03/01/04	03/01/04	5th tracker tray available. Use GTRC 6 chips.	<i>High rate test requires disabling TOT on EM-2 Tracker.</i>
Receive EM TKR Mechanical Model for fit check	03/15/04	03/15/04	EM TKR model available	
MGSE ready for EM ACD	03/15/04	03/15/04	ACD EM-2 available.	
EM-2 TKR Mini-Tower Ready	03/15/04	03/15/04	Mini Tower here at SLAC converted to 4xy layers	
Receive EM Calorimeter for fit check	03/26/04	03/26/04	EM CAL available	
EM-2 Fit Check complete	04/02/04	04/02/04	Mechanical Model fit check completed with EM TKR mechanical model, EM CAL and 1x4 grid	
EM -2 Tower test	04/06/04	04/06/04	Parts availability.	
LAT assembly readiness review	05/06/04	05/06/04	One month before first flight parts arrive (beginning of LAT assembly and integration).	



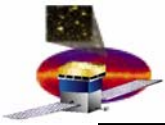
Draft EM-2 Plan





I&T Upcoming Need Milestones

Activity ID	current LAT4	Early Finish	FY04	
			Q1	Q2
1M7941130	EGSE TEM/TEM PS/CTS w/ FE Elec #1-Elec to I&T	12/08/03		
1M1001380	Delivery of EM (1X4) Grid to I&T/MSGSE	12/19/03		
1M7941150	EGSE TEM/TEM PS/CTS w/ FE Elec #2-Elec to I&T	12/22/03		
1M1001430	Delv of TKR EM to SLAC I&T/MGSE	01/02/04		
1M7941160	EGSE TEM/TEM PS/CTS w/ FE Elec #3-Elec to I&T	01/07/04		
1M7941170	EGSE TEM/TEM PS/CTS/GASU FE Elec-Elec to I&T	01/14/04		
1M7941180	EGSE Development Hrdw/FSW 1st Delivr-Elec to I&T	01/22/04		
1M7941190	EGSE TEM/TEM PS/CTS #1 for Bldg 33-Elec to I&T	01/29/04		
1M7941420	EGSE TEM/TEM PS/CTS #2 for Bldg 33-Elec to I&T	02/05/04		
1M7941430	EGSE TEM/TEM PS/CTS w/ GASU for B33-Elec to I&T	02/05/04		



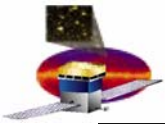
Issues/Concerns/Suggestions/Risks

- **Need for electronics technicians (3) 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.**
 - **Submitted details and cost information to project controls; they are preparing change request**
- **Finalization of all LAT test plan requirements is not complete.**
 - **An agreement with Systems on appropriate dates has been reached.**
- **EGSE definition Document needs to be completed. Cooperative effort between ELX and I&T.**
- **High rate test methodology needs definition. I&T currently working on very high rate Van de Graaff solution.**



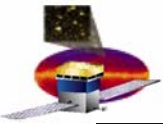
Status/Closure of action items

- No action items from last months review meeting
- RFA closure required? – recent progress towards closure.



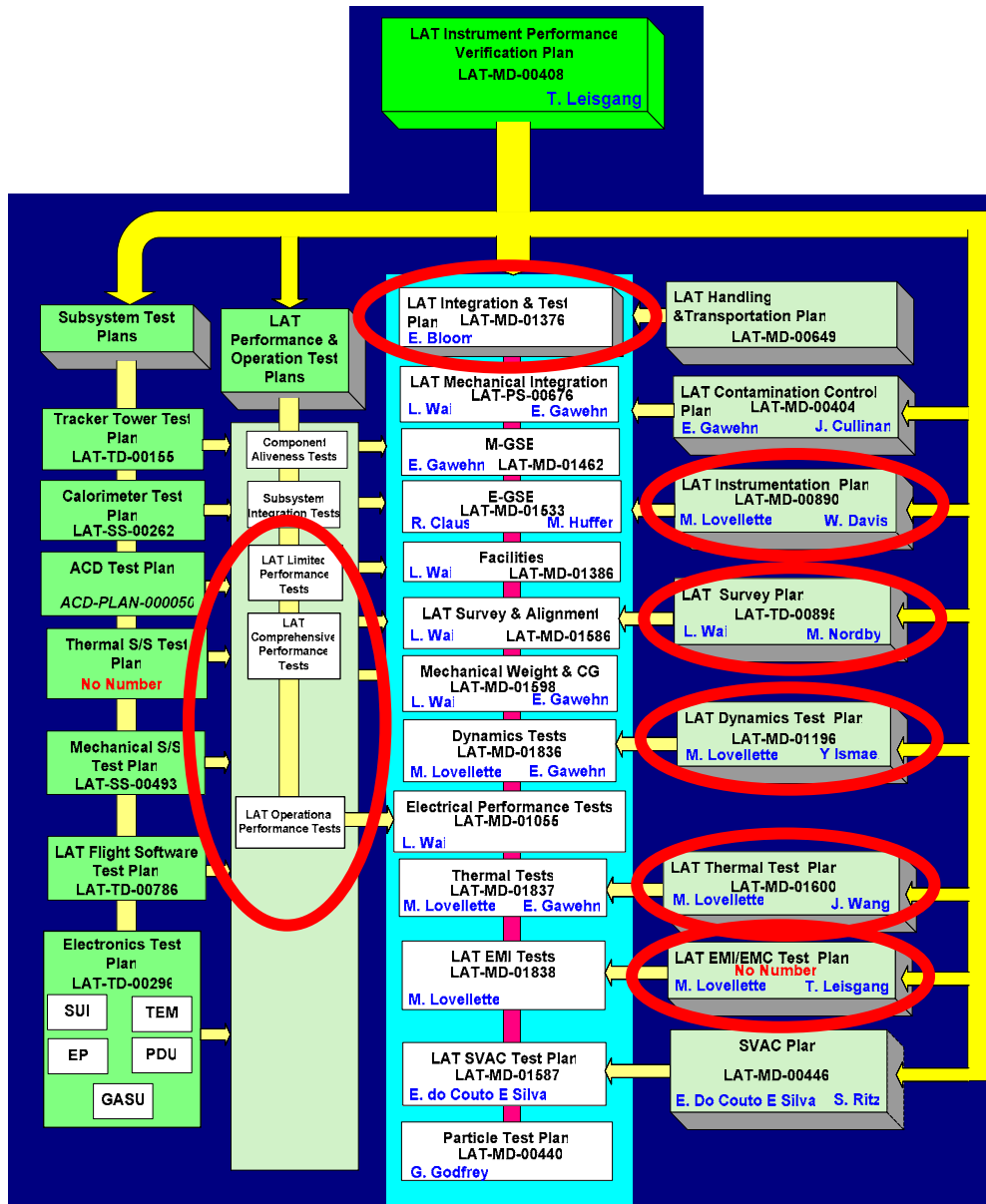
Open Flight Design Issues Status and Closure Plan

- **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. With delivery of tower A, we will require CAL EM to enable “2 tower” checkout.**
 - **Coordinate use of minitower and mini-Cal- Haller/Bloom**
- **Define goal of EM fit check. Review plan with Marc C. and Tom B. to understand the 1x4 and 1x1 grid and EM Tracker requirements. - Bloom/Grist**
 - **Fit check of TKR Mechanical model needs to be done with CAL EM, 1X1 and 1x4 grid as early as possible. Current date has slipped to March 15.**
- **Identify and implement a work around to G3 delay that implements ACD schedule impact. Haller/Bloom/T. Johnson**
- **LAT Assembly plan development. Weekly meetings chaired by Martin Nordby and strongly supported by I&T and other subsystems. Goal is to have assembly plan for review by mid December. Last Friday’s meeting resulted in next assembly document release to CCB soon.**



Documentation Plan/Status

Agreement I&T and System Engineering on completion dates:

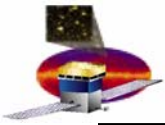


- LAT I&T - Assembly Plan - 12/03 ✓
- LAT Comprehensive Performance Plan - 6/04
- LAT Limited Performance Plan - 6/04
- LAT Operational Performance Tests - 3/04
- LAT Instrumentation Plan - Update 1/04
- LAT Survey Plan - 12/03
- LAT Dynamics Test Plan - First Release 12/03, Final 3/04
- LAT Thermal Test Plan - First Release 12/03, Final 3/04
- LAT EMI/EMC Test Plan - First Release 3/04



Significant Cost/Schedule Variances

- **Cumulative Schedule Variance**
 - **Work Scheduled: 2680 k\$**
 - **Work Performed: 2650 k\$**
 - **Schedule Variance: -29k\$ (-1%)**
 - **2k\$ is bogus**
 - **8k\$ is 1x4 lift fixture done in January. (2 month delay)**
 - **19k\$ is an error in PMCS in spreading activity. Will go away when activity is complete on April 20.**



Threats to Maintaining Cost/Schedule

- 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.
- I&T work depends on timely delivery of EM and flight hardware.