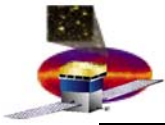


# **GLAST Large Area Telescope: I & T Input to Monthly Technical/Cost/Schedule Review 10/29/03**

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650-926-2469 650-926-2998**

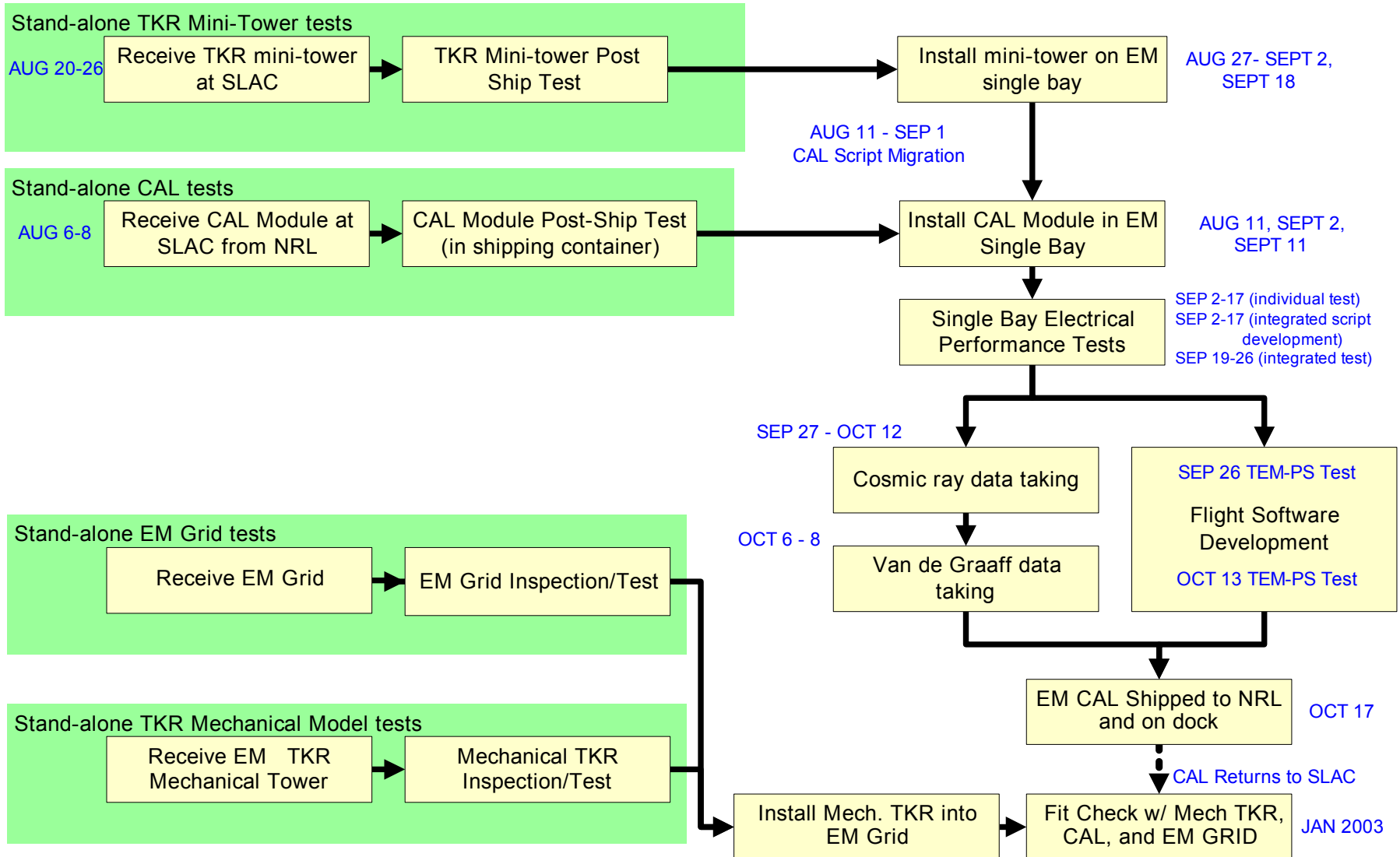


# Last Month's Accomplishments

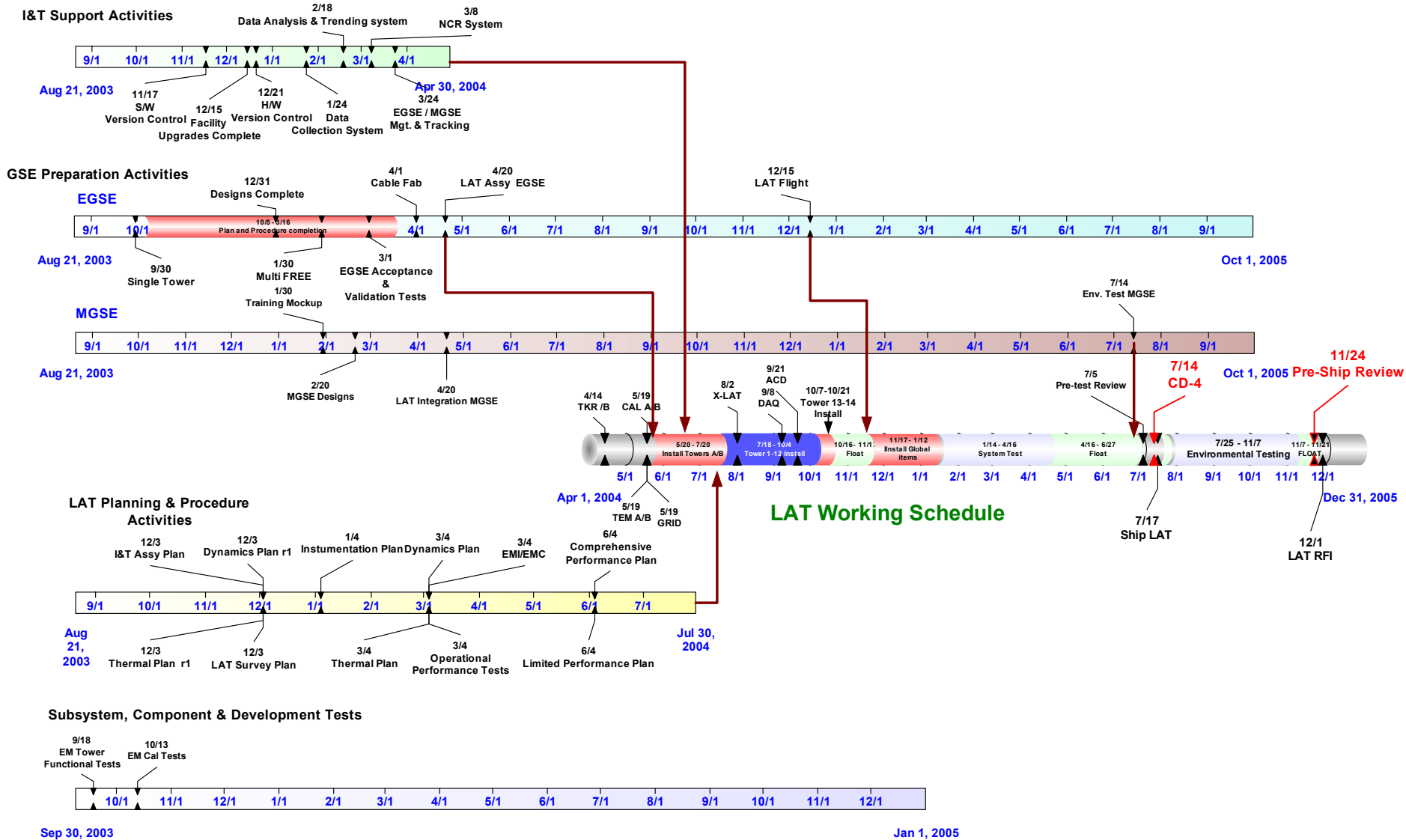
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- Rebaselining mostly done.
- Initiated LAT transportation vibe analysis.
- Completed seismic analysis of Van De Graaff.
- Detailed assembly procedure for TKR and CAL, TEM, TEMPS into single bay.
- Detailed disassembly procedure for CAL from single bay tower.
- A midterm report of the EM operations was made at the Tuesday Engineering Meeting.
- EM Van De Graaff data taking completed as planned.
- Deintegrated EM tower, shipped EM CAL back to NRL on schedule, and mounted EM mini-tower in TRK test stand with TEM and TEMPS.
- Helped ELX group check out GTRC TOT code using EM mini-tower with special TEM that had TOT code imbedded.
- Supported TKR Interface Design Review.
- Release of LATTE 1.9
  - Improved configuration snapshots- FITS data file header- Event data distribution- Single event display- Trigger rate and associated data corruption debugging- Online development- EM lessons learned discussions and implications for Online- Misc. subsystem support

# EM Test Flow



# I&T Timeline





# Key Milestone for Next 3 Months

Milestone Description	Original Date	Current Date	Major Requirements to Achieve Milestone	Notes
I&T PMCS Rebaseline	10/03/02	10/31/02	Need replan subsystem delivery dates for final I&T schedule.	Begin replan assuming hardware availability dates per Rebaseline Review presented 7/31/03
Bldg 33 Upgrades (except for humidity)	09/01/03	11/26/03	Earthquake new cabinets, more furniture, all phones installed, permanent <b>Liquid Nitrogen System operational</b> , Clinton flight hardware Stores complete (fire and earthquake)	<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>
Single Tower EGSE Configuration including CAL and TKR Production scripts	09/30/03	10/30/03	Final LATTE scripts for TKR and CAL production. Support for CAL GSI beam test	<i>Plan in place with TKR and CAL to synchronize scripts with I&amp;T for final delivery.</i>
I&T training mockup complete and ready for use	01/03/04	01/03/04	All I&T mechanical & electrical techs on board and ready to train.	<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>
MGSE conceptual design for transportation container complete	11/30/03	11/30/04	Preliminary design, vibe analysis, impact on LAT in flight complete	<i>Need as input for decision on airplane test.</i>
ACD tent work	01/30/04	01/30/04	Investigate using previously used BaBar enclosures	<i>Need for ACD 9/1/04</i>
Multi-FREE Board EGSE	01/30/04	01/30/04	GASU delivered with software to I&T 12/30/03. Complete LATTE multi FREE Board support to ACD.	
ACD EM Tower Tiles and Electronics	2/17/04		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>

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	2003												2004												2005											
					O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
<b>4 GLAST INSTRUMENTS</b>																																								
<b>4.1 GLAST LAT PROJECT</b>																																								
<b>4.1.9 INTEGRATION &amp; TEST</b>																																								
<b>4.1.9.5 ONLINE SOFTWARE</b>																																								
<b>4.1.9.5.5 FLIGHT UNIT</b>																																								
9I020963	EGSE Definition Document	41	01OCT03*	26NOV03	[Gantt bar from Oct 2003 to Nov 2003]																																			
9I020953	Twr Integration EGSE Dev & Support - Part 1	51	01OCT03*	12DEC03	[Gantt bar from Oct 2003 to Dec 2003]																																			
9I025221	ND: EGSE TEM/TEM PS/CTS w/FE Elec #1 for Dev	0	15DEC03		[Milestone diamond at Dec 15, 2003]																																			
9I02522A	ND: EGSE TEM/TEM PS/CTS w/FE Elec #2 for Dev	0	15DEC03		[Milestone diamond at Dec 15, 2003]																																			
9I02522B	ND: EGSE TEM/TEM PS/CTS w/FE Elec #3 for Dev	0	15DEC03		[Milestone diamond at Dec 15, 2003]																																			
9I02522C	ND: EGSE TEM/TEM PS/CTS/GASU FE Elec for Dev	0	15DEC03		[Milestone diamond at Dec 15, 2003]																																			
9I025231	ND: EGSE Development Hardware/FSW First Delivery	0	15DEC03		[Milestone diamond at Dec 15, 2003]																																			
9I020954	Twr Integration EGSE Dev & Support - Part 2	82	15DEC03	19APR04	[Gantt bar from Dec 2003 to Apr 2004]																																			
9I020951	ND: EGSE TEM/TEM PS/CTS #1 for bldg 33	0		02FEB04*	[Milestone diamond at Feb 2, 2004]																																			
9I02095A	ND: EGSE TEM/TEM PS/CTS #2 for Bldg 33	0		02FEB04*	[Milestone diamond at Feb 2, 2004]																																			
9I02095B	ND: EGSE TEM/TEM PS/CTS with GASU for Bldg 33	0		02FEB04*	[Milestone diamond at Feb 2, 2004]																																			
9I020952	EGSE Validation for Tower Integration	1	20APR04	20APR04	[Milestone diamond at Apr 20, 2004]																																			
9I025223	System Test EGSE Development & Support	156	21APR04	01DEC04	[Gantt bar from Apr 2004 to Dec 2004]																																			
9I02522Z	ND: Final EGSE for Sys Test incl S/C Sim, FSW	0		16AUG04	[Milestone diamond at Aug 16, 2004]																																			
9I0205276	EGSE Validation for System Test	1	02DEC04	02DEC04	[Milestone diamond at Dec 2, 2004]																																			
9I025227	EGSE Ready for System Test	0	03DEC04		[Milestone diamond at Dec 3, 2004]																																			
9I025225	LAT EGSE System Test Support	250	03DEC04	06DEC05	[Gantt bar from Dec 2004 to Dec 2005]																																			
9I025226	AV: LATTE Delivery from I&T to IOC	0		06DEC05	[Milestone diamond at Dec 6, 2005]																																			

Description	Start	Finish	2003												2004												2005														
EGSE EGSE			O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
<b>EGSE from ELX to I&amp;T Level 3 Milestones (rebaseline plan)</b>																																									
ND: EGSE TEM/TEM PS/CTS w/FE Elec #1 for Dev	15DEC03		[Milestone diamond at Dec 15, 2003]																																						
ND: EGSE TEM/TEM PS/CTS w/FE Elec #2 for Dev	15DEC03		[Milestone diamond at Dec 15, 2003]																																						
ND: EGSE TEM/TEM PS/CTS w/FE Elec #3 for Dev	15DEC03		[Milestone diamond at Dec 15, 2003]																																						
ND: EGSE TEM/TEM PS/CTS/GASU FE Elec for Dev	15DEC03		[Milestone diamond at Dec 15, 2003]																																						
ND: EGSE Development Hardware/FSW First Delivery	15DEC03		[Milestone diamond at Dec 15, 2003]																																						
ND: EGSE TEM/TEM PS/CTS #1 for bldg 33		02FEB04*	[Milestone diamond at Feb 2, 2004]																																						
ND: EGSE TEM/TEM PS/CTS #2 for Bldg 33		02FEB04*	[Milestone diamond at Feb 2, 2004]																																						
ND: EGSE TEM/TEM PS/CTS with GASU for Bldg 33		02FEB04*	[Milestone diamond at Feb 2, 2004]																																						
ND:Final EGSE for Sys Test incl. S/C Sim, FSW		01SEP04*	[Milestone diamond at Sep 1, 2004]																																						



# Summary of Issues and Concerns

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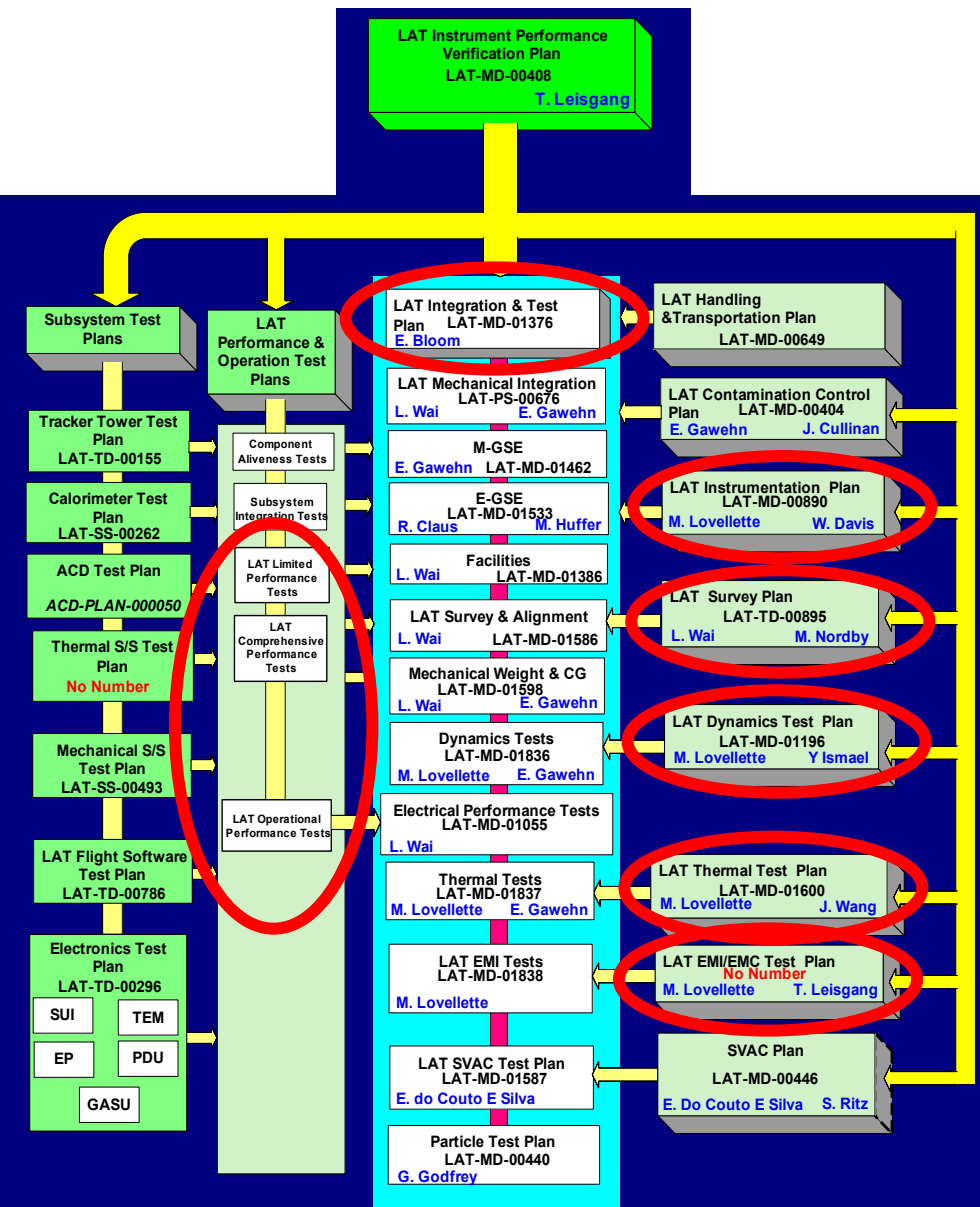
- Time frame and effort needed for rebaselining.
  - Should be complete by Friday, but needed additional personnel have not been included.
- Need for electronics technician to be under I&T control – currently under electronics and not shown in PMCS. Under projected schedule I&T needs to start hiring to prepare for flight integration before the end of this year.
  - This issue is currently under management discussion
- Finalization of all LAT test plan requirements is not complete.
  - An agreement with Systems on appropriate dates has been reached (next chart)
- There is concern if the current MGSE design allows adequate access during integration.
  - A regular meeting has been set up between I&T, System and Design Engineering to discuss these concerns.
  - Trade study MGSE for tooling and access during tower integration.
  - This regular meeting will also address the assembly plan and the MGSE designs for Environmental Testing
- A complete EGSE plan needs to be finalized now that the LAT has accepted a SIIS is not the entire solution. EGSE definition Document needs to be completed.



# Documentation Plan/Status

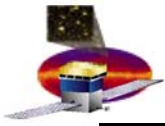
Agreement I&T and System Engineering on completion dates:

- 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**



4.1.9 - Integration and Test





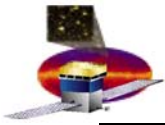
# Status/Closure of action items

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- **No action items from last months review meeting**
- **RFA closure required.**

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

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- **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. Preliminary plan from Bloom/Borden in review.**
- **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. I&T milestone delivery requirements from ELX are shown above.**



## Status of Subsystem's Parts List and qualification program

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- **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. More details required.**
- **MGSE qualification plan discussed in I&T MGSE Development Plan, LAT-MD-01262 draft.**



# Significant Cost/Schedule Variances

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- **Cumulative Cost and Schedule Variance**
  - **Cumulative Cost Variance: +106k\$ (+4%)**
  - **Cumulative Schedule Variance: -310k\$ (-11%)**
    - **218k\$ is in MGSE**
    - **65k\$ is in IFCT**
- **September Cost and Schedule Variance**
  - **September Cost Variance: +65k\$ (+48%)**
  - **September Schedule Variance: -106k\$ (-38%)**
    - **86k\$ of the Sept. schedule variance was anticipated as the baseline MGSE plan has not been replanned to reflect the expected later MGSE deliveries. This variance to be mitigated by the upcoming rebaselining effort.**



# Threats to Maintaining Cost/Schedule

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- **Delay in implementation of 3 month schedule extension has left our MGSE schedule exposed to a very large schedule variance over the past 3 months, getting bigger as PMCS reprogramming is delayed longer. This is expected to be mitigated by the upcoming rebaselining effort. We should not see big increases in the future.**
- **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.**
- **Delivery of flight hardware to I&T may be late.**