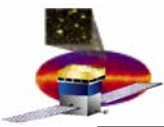


# **GLAST Large Area Telescope: I & T Input to Monthly Technical/Cost/Schedule Review 06/02/04**

**Elliott Bloom  
SU-SLAC  
Subsystem Manager**

**Brian Grist  
SU-SLAC  
Subsystem Engineer**

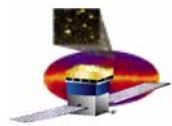
**elliott@slac.stanford.edu, bgrist@slac.stanford.edu  
650-926-2469 650-926-2998**



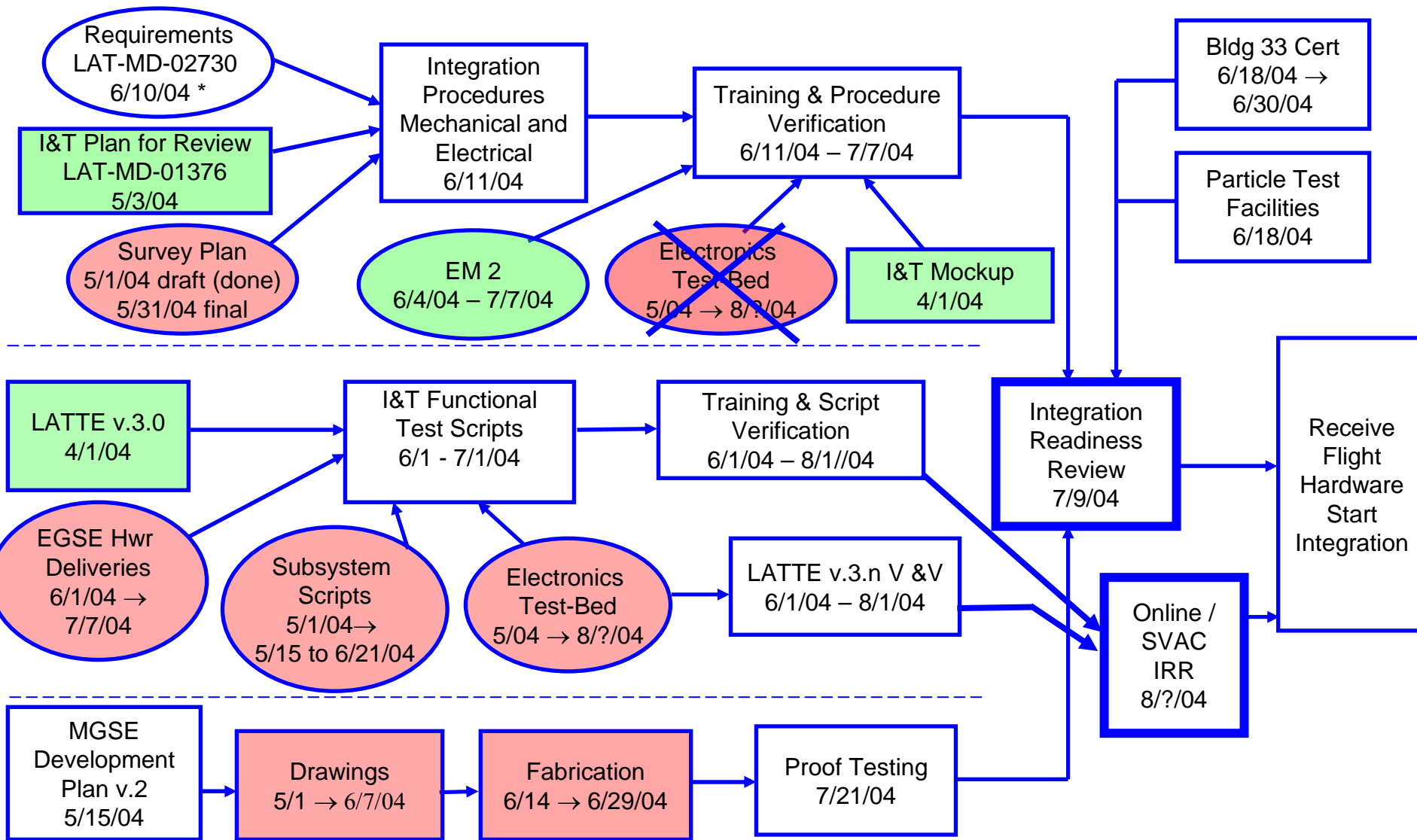
# Last Month's Accomplishments

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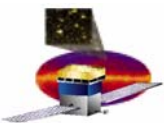
- Released LATTE 3.2.1
- Completed Crane Operational practical training for Mechanical Technicians
- Completed Bld 33 Clean Tent, Particle count and temp/hum in spec
- Completed documents and submitted for review and release:
  - Safe to Mate for TPS, TEM, GASU, and PDU,
  - Electrical Isolation, Continuity, and Interface Test for TPS, TEM, and GASU
  - Interface Verification Test for TPS
  - Calorimeter installation procedure, fastener torque procedure.
- Released drawings for:
  - Drawings for GPR, GPR to Grid Brackets, and Pre-machining drawings for the Support shaft flange assemblies are complete and in the release cycle.
  - Tower mass simulators
- 80% of Integration Stand is in procurement
- Support shafts in machining
- CAL Inversion Stand shaft completed (awaiting proof test to complete stand)
- SVAC workshop organized with datasets and corresponding software.



# I&T Overview to Start of Integration (1 and 2 tower) / Key-Milestones for Next 3 Months

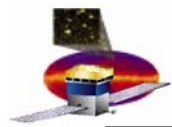


\* Final though two tower CPT, releases to support integration procedure development



# IFCT - Facility Action Item list

Item	ECD	Notes
5-ton and 15-ton crane certification	6/30/2004	Coordination with general SLAC certification contract
Earthquake monitoring system rack	6/15/2004	Brent is working on this
ELX T-Vac Installation	6/15/2004	Fork lift on order; estimated arrival 6/19; feedthru, electrical, other
Building 33 Back-Up Power Generators Installation	6/30/2004	GPP funding approved for transfer switch installation; req in process
Cleanroom AC hot water back-up boiler transfer switch	6/30/2004	Installation of transfer switch in process
Building 33 Substation	10/4/2004	Power outage for 1-2 weeks at end of September
non-controlled storage	5/28/2004	Larry to talk to Lowell
Solve drainage problem on north side of building	8/?/2004	Eliazar called in on 5/17, immediate problem solved
Omni-lock on room 102	6/30/2004	lock is on order, need to send list to security
Room 102 computer setup	6/30/2004	control room monitors on order
Incorporate webcam photos into time-lapse videos	7/7/2004	Jean Pierre is checking into MS Media software
Build MIU protective cover	6/4/2004	called into SEM on 5/25
Build protective cover for network rack	6/4/2004	called into SEM on 5/24
enable rollup door safety bladders	6/4/2004	called into SEM on 5/24
install 15-ton crane shut-off switch in receiving area	6/4/2004	Ray is working on this (5/26)
install warning lights for 5-ton and 15-ton crane areas	6/11/2004	called into SEM on 5/26
ensure that everybody is trained for ODM safety	6/11/2004	Diana is making list of handed in sheets (checked on 5/26)
ECS backup server installation	6/4/2004	Alvin/James are checking
Enable report function on monitoring system	6/4/2004	Alvin/James are checking
install webcams #9,10	6/4/2004	
install inside/outside fan on particle counter housing	6/4/2004	



# IFCT - Mechanical Integration Readiness Action Items

Mechanical Integration Procedures Action Items			
TASK	Actionee	ECD	Notes
Top level AIDS through 2-tower CPT	QA	11-Jun	Under review with QA,
Electronic Logbook	Wai	1-Jul	Need to determine upload procedure
Mate De-Mate Log	Wai	1-Jul	Alicia is working this
Component Installation Log	Wai	1-Jul	Alicia is working this
light leak test	Wai	29-Jun	Larry to investigate methods
Survey Procedures LAT-PS-1586	Borden	15-Jun	need to train w/ tracker mockup
Tracker Integration Procedures LAT-PS-03058	Borden	15-Jun	Crane-op alignment tool; cone fastening; precision cone tool; straps fastening; optical survey; flex cable bending tool, clips, glue
Calorimeter Integration Procedures LAT-PS-03027	Ortiz	30-Apr	Turned in for signoff
Room 104 Access Procedure LAT-PS-03060	Ortiz	4-Jun	Need monitoring system report working
Fastener Torquing Procedure LAT-PS-03263	Borden	14-May	under review before release
Critical Operations Procedure LAT-PS-03057	Ortiz	4-Jun	
Menning Plate procedures LAT-PS-03259	Ortiz	11-Jun	
Tem/TemPS Shimming Procedure LAT-PS-03062	Ortiz	4-Jun	
LAT test floor configuration procedure LAT-PS-03277	Borden	11-Jun	
Flight Hardware Bag and Purge Procedure LAT-PS-3291	Borden	11-Jun	
GPR onto rotation Stand per MGSE Procedure	Gawehn	27-Jun	
Grid integration into GPR per MGSE procedure	Gawehn	27-Jun	
Load Mass simulators into GRID	Gawehn	27-Jun	

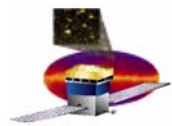
# IFCT – Mechanical Integration Training

	Dave	Tom	Leo	Mark	Reggie	Eliazar	Notes
Contamination Control	14-Apr-04	14-Apr-04	14-Apr-04	6-Aug-03	5-May-04	6-Aug-03	
Electrostatic discharge (ESD)	14-Apr-04	14-Apr-04	14-Apr-04	1-May-03	1-Dec-03	1-Apr-03	
Oxygen Deficiency	30-Apr-04	30-Apr-04	30-Apr-04	30-Apr-04	30-Apr-04	30-Apr-04	
Crane Operation	16-Apr-04	16-Apr-04	16-Apr-04	done	done	16-Apr-04	
Crane Operation Practical Test	20-May-04	20-May-04	20-May-04	20-May-04	done	20-May-04	
Critical Operations							
GERT	12-Apr-04	done	done	done	done	done	
ITAR Training	21-Apr-04	21-Apr-04	21-Apr-04			21-Apr-04	Jim Martin has video tape
RAD Worker Training		11-May-04	11-May-04	11-May-04		11-May-04	June 8 is next class
Van De-graaff							Gary to schedule after June 8
Hardware Bagging							Tom to complete procedure by 6-11
Room 104 Access	17-May-04	17-May-04	17-May-04	17-May-04		17-May-04	Train w hen metrology bay goes back in
Air Bearings Operation	22-Apr-04	22-Apr-04	22-Apr-04	25-May-04	26-May-04	22-Apr-04	
Cleanroom fork lift operation							Fork lift ECD is ?
Tracker Receiving Inspection							Train w hen Mock-Up TKR arrives 6-25
Calorimeter receiving Inspection				13-Feb-04		13-Feb-04	Train w hen EM CAL arrives June 7
CAL Insertion/Inversion Handling	18-May-04	28-Apr-04	28-Apr-04	21-May-04	21-May-04	28-Apr-04	
CAL Insertion/Inversion Crane	28-Apr-04	18-May-04	18-May-04	21-May-04	21-May-04	28-Apr-04	
CAL Removal/Inversion Handling	18-May-04	28-Apr-04	28-Apr-04	21-May-04	21-May-04	28-Apr-04	
CAL Removal/Inversion Crane	28-Apr-04	18-May-04	18-May-04	21-May-04	21-May-04	28-Apr-04	
CAL Torquing	21-May-04	21-May-04	21-May-04	21-May-04	21-May-04	21-May-04	
TEM/PSU Shimming/Torquing							met bay ECD June 4
ELX cable sequence	19-May-04	19-May-04	19-May-04	19-May-04		19-May-04	Final training on I&T trainer in 104
2-Tower CPT GASU / PDU / BOB Setup							BOB ECD June 11
Menning plate installation / removal							installed on May 26, remove after curing
Tracker Heat Straps Installation							parts ECD June 25
Tracker Cone installation							parts ECD June 25
Tracker Flex Cable Installation							parts ECD June 25
Tracker Flex Cable Removal							parts ECD June 25
Tracker Insertion Handling							parts ECD July 2
Tracker Insertion Crane							parts ECD July 2
Tracker Removal Handling							parts ECD July 2
Tracker Removal Crane							parts ECD July 2
Optical Survey Setup							parts ECD June 4 ?
LAT Lift Fixture Crane Operation							LAT lift fixture ECD is ?
GPR Installation							GPR ECD is ?
LAT Integration Stand Operation							Integration stand ECD is ?
LAT Floor Test Configuration							Integration stand ECD is ?
Mate/Demate							Leo to go to JPL on June 17-18
Crimping and possible soldering			n/a	n/a	n/a	n/a	Dave and Tom to go in August ?
<b>Summary (% complete of possible)</b>	<b>83%</b>	<b>89%</b>	<b>89%</b>	<b>89%</b>	<b>71%</b>	<b>94%</b>	

# IFCT – Electrical Test Action Items

## Electrical Test Procedures Action Items

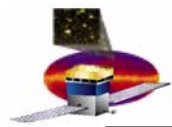
TASK	Actionee	ECD	Notes
Electrical Technician Hiring	Horwitz	n/a	Interviews in process
Breakout box plan/design/procurement	Horwitz	15-Jun	Horwitz coordinating with ELX to design/fab
Trending diagnostic parameters definition	Wai	28-May	Need input from Eric; got Hiro's input on 5/4
Test metric / trending database plan defn/implement	Wai	7-Jul	Need to talk to Eduardo & Ric
EGSE cables manufacturing	Canfield	7-Jul	Need 20 meter cable
Get plan to measure EMI environment of room 104, bld 33	Canfield	n/a	obtained estimate of cost for 1 sweep of room
Check back-up power generator specs	Canfield	n/a	
TPS Safe to mate procedure	Horwitz	14-May	with tech writer for cleanup and release
TEM Safe to mate procedure	Horwitz	14-May	with tech writer for cleanup and release
GASU Safe to mate procedure	Horwitz	28-May	with tech writer for cleanup and release
PDU Safe to mate procedure	Horwitz	28-May	with tech writer for cleanup and release
TPS EICIT procedure	Horwitz	14-May	with tech writer for cleanup and release
TEM EICIT procedure	Horwitz	14-May	with tech writer for cleanup and release
GASU EICIT procedure	Horwitz	28-May	with tech writer for cleanup and release
PDU EICIT procedure	Horwitz	18-Jun	
TPS IVT procedure	Horwitz	28-May	with tech writer for cleanup and release
TEM IVT procedure	Horwitz	28-May	Leonid is checking on levels by 5/26
GASU IVT procedure	Horwitz	15-Jun	
PDU IVT procedure	Horwitz	15-Jun	
EGSE Setup and Validation Procedures	Horwitz	25-Jun	see LAT-TD-2861 ELX EGSE acc. test
Tracker module test procedure PS-03290	Horwitz/Canfield	25-Jun	Met with Hiro on 5/4
TKR-CAL single bay LPT, time-in (LAT-PS-03271)	Godfrey	25-Jun	
Cal Module test procedure PS-03287	Horwitz/Canfield	25-Jun	Waiting for CAL software pre-release
Absolute time accuracy test procedure	Wai/Horwitz	25-Jun	Need GPS for PPS input
Two bay CPT per procedure PS-3276	Wai/Horwitz	25-Jun	
Two bay LPT	Wai/Horwitz	25-Jun	Test on ELX Test Bed (test bed not ready to use)
Multi bay LPT	Wai/Horwitz	25-Jun	Test on ELX Test Bed (test bed not ready to use)



# IFCT – Elec. Training

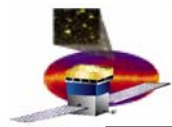
I&T Electrical Test Team Training						
Status 5/26 (L. Wai)						
	Brian H.	John C.	Roger W.	TBD	TBD	Notes
Contamination Control	14-Apr-04		14-Apr-04			Next class by Joe is ?
Electrostatic discharge (ESD)	14-Apr-04		14-Apr-04			Next class by Jeff is ?
Oxygen Deficiency						Get the form from Eliazar
GERT	done	done	done			
ITAR Training						Jim Martin has the video
RAD Worker Training						June 8 is next class
Van De-graaff						Gary to schedule after 6/8
Hardware Bagging						Tom will have procedure on 6/11
EGSE Crate/Cables/extendors EICIT/IVT						BOBs ready on 6/11
EGSE Crate CPT						
TEM CPT						
TPS CPT						
GASU CPT						
PDU CPT						
TPS interface and BOB usage						BOBs ready on 6/15
TEM interface and BOB usage						BOBs ready on 6/15
GASU interface and BOB usage						BOBs ready on 6/15
PDU interface and BOB usage						BOBs ready on 6/15
Tracker Module CPT						
CAL Module CPT						Start on 5/27 with Mini-CAL
Single Bay CPT						Start on ? with Mini-Tower/CAL
Single Bay Timing-In						
VDG test						
Two Bay CPT						Start on ? using test bed
<b>Summary (% complete of possible)</b>	<b>43%</b>	<b>14%</b>				





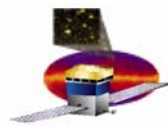
# MGSE Drawing Release Status (1 of 2)

LAT I&T MGSE Item	Stress Analysis		Design - Drafting			Procurement		Assembly		Ready / Comments
	Status	Report	Modeled	Detailed	Released	Ordered	In-House	Status	Proof Test	
4x4 Integration Stand										96 Dwgs Total
4x4 Rotation / Support Stand	√	Jun 08	√	90%	√ May 06	85%	Jun 23 ?			(44 Dwg Sheets Released)
Personnel Access Platforms		Jun 08	65%	15%	June 03	70%	Jul 15			(41 dwgs)
Grid Perimeter Ring - Brackets	√	Jun 08	√	99%	May 27		Jun 22			In DCN Cycle ( 10 Dwgs )
Support Shaft - Flange Assemblies	√	Jun 08	√	99%	Jun 04	50%	Jun 22			In DCN Cycle ( 4 Dwgs )
Z Axis Up Lift Fixture		Jun 08								12 Dwgs
Z Axis Up Lift Spreader	√		√	98%	Jun 04		Jul 20			Ready for DCN by May 21
Z Axis Up Tension Rod Assemblies			√	98%		20%	Jun 29			
Z Axis Horizontal Lift Fixture		Jun 08								9 Dwgs
Z Axis Horizontal Lift Spreader	√		√	98%	Jun 04		At SLAC			Ready for DCN by Jun 04
Z Axis Horizontal Shackles	√		√	98%		30%	At SLAC			1019 Mat'l Aprv'd by Stress
Crane Scale Height Modification	√	Jun 08	√	98%	May 27	30%	Jun 23			3 Dwgs; Vendor Identified
4x4 MGSE Proof Test Assemblies		Jun 08			TBD		Jun 29			90% of Material at SLAC
CAL -Z Up Lift Fixture	√		√	√	√	√	√	√	√	Complete
CAL Alignment Tool	√		√	√		√	√	√	n/a	Complete
CAL Alignment Rods	√		√	√		90%				2 Dwgs
CAL Inversion Stand / Interface	√		√	√	√	√	√	√	√	Final Shaft Needs Heat Treat
E-Box Shimming										
Metrology Bay with Stand	n/a		√	√	√	√			n/a	DCN Comp NCR in Process
Clamps, Align Rods, Lift Eyes, etc	n/a		√	√	√	√	√		n/a	Clamps complete

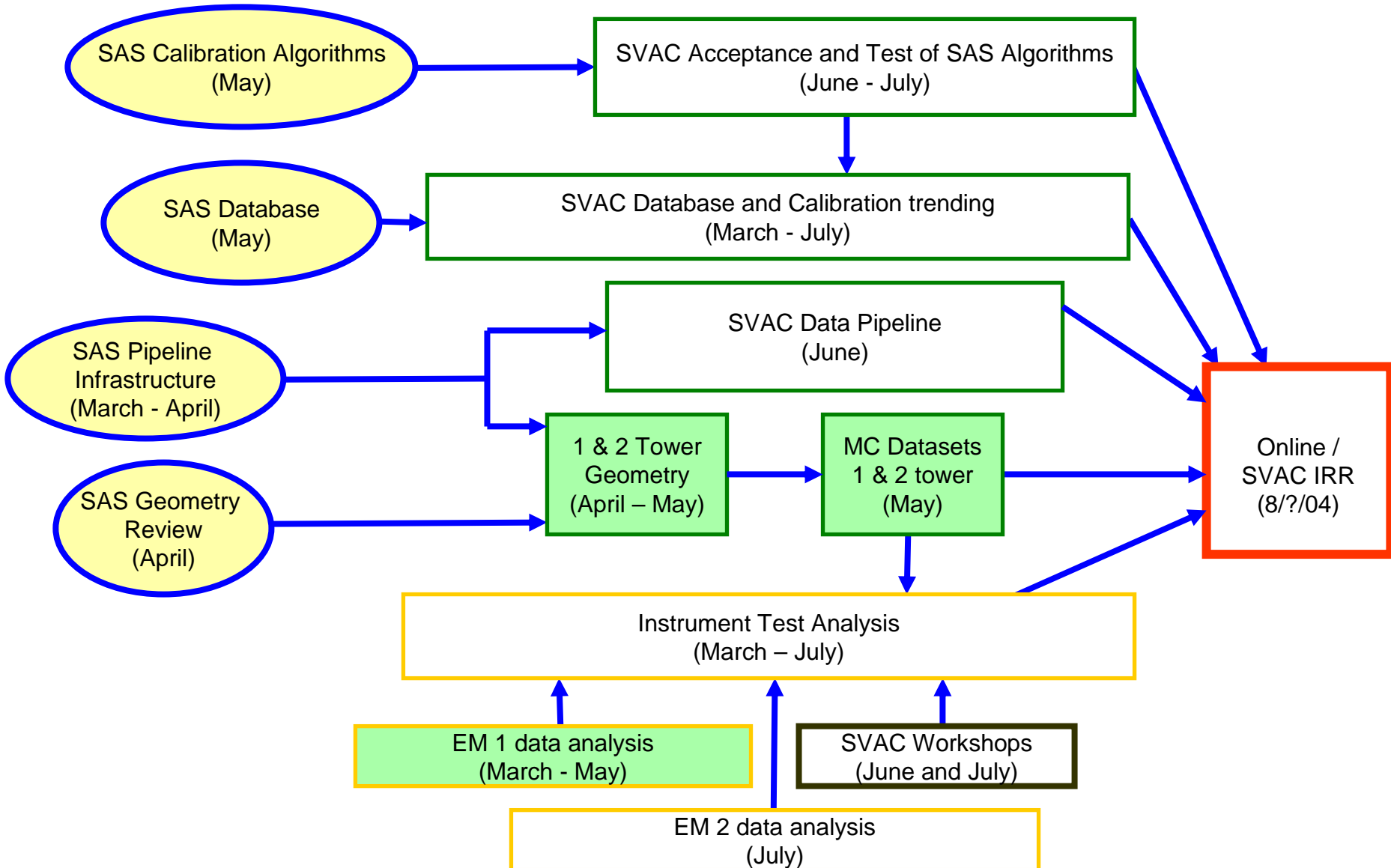


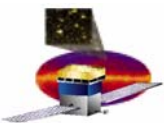
# MGSE Drawing Release Status (2 of 2)

LAT I&T MGSE Item	Stress Analysis		Design - Drafting			Procurement		Assembly		Ready / Comments
	Status	Report	Modeled	Detailed	Released	Ordered	In-House	Status	Proof Test	
TWR Mass Simulators	√	Jun 08	√	100%	May 27		Jun 22		n/a	
EM-2 Single Bay ( TKR Interface Plate)	√	n/a	70%	10%					n/a	
1x4 Lift Fixture		Jun 08			Jun 04					2 Dwgs 10 dwgs
1x4 Lift Spreader	√		√	80%			Jun 22			
1x4 Tension Rod Assemblies			√	80%		20%	Jun 22			
TKR - TKR No Touch at Ascent Tool									n/a	1 Dwg
4x4 Horiz Braces / Counter Wt Support			80%							
Menning Plate Installation Equipment									n/a	
Interim E-Box Support Brackets									n/a	
ACD Low Profile Integration Stand										
Lift Spreader Storage Brackets			80%						n/a	Seismic Analysis In Work
Lift Spreader Transport Boxes									n/a	
LAT Transport Container	50%									
LAT EMI Test Stand										Same as T-Vac Stand ?
LAT Sine-Vibe Test Interface										Brackets Conceived
LAT T-Vac Test Stand										



# Science Verification, Analysis, and Calibration (SVAC) - Roadmap

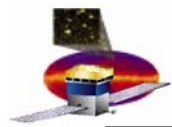




# Priority Ordering for Online

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1. **Hardware Monitoring, Trending, and Power up.**
  - Requires Ric to design – July 1 design done, and fair amount of implementation.
  - Requires FSW to provide interface – June 15
  - Full implementation (I&T online + ISOC) – July 15
2. **Subsystem – I&T scripts ready to use by I&T on Flight Hardware and under configuration control.**
  - Receive subsystem scripts
    - CAL – June 15
    - ELX – July 1
    - TKR – June 15
    - ACD – June 15
    - Trigger group, implement scripts in end-to-end test committee report – Ric (volunteer lead), Jim P., Gary G., Hiro, Johann, JJ and Mike H. – June 21
  - Modify subsystem scripts to I&T specification. (Delivery + 2 weeks)
  - Place scripts under configuration control (1 hour)
3. **LATTE security against unauthorized software changes (August 1)**
4. **Method for full configuration tracking of all components**
  - Provided method as part of the configuration files
5. **V&V online system and Scripts (June 1- August 1)**
6. **Event “prescaling” in Event Server (July 1)**
7. **Transfer of LDF.fits, Run Configuration files, Run and Test Report files to persistent storage.**
  - Transfer manually (done)
  - Transfer via OPUS (July 1)
8. **Electronic Logbook (July 1)**



# Hire Status for recent open positions

- **Have been filling 11 positions**
  - **8 Hired**
  - **2 Interviewing**
  - **1 Offer in work**

**New Position Status**

Status as of: 5/28/2004 15:14

Req Written

Req. Approved

Job Posted

Interviewees Selected

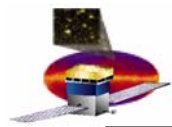
Interviews Scheduled

Interviews Complete

Hired

Job Req#	Job Title	Req Written	Req. Approved	Job Posted	Interviewees Selected	Interviews Scheduled	Interviews Complete	Hired	Action Needed	Actionee
22395	IFCT, Electrical Engineer	●	●	●	●	●	●	●		
22396	IFCT, Electrical Technician	●	●	●	●	○	○	○	Interviews in process	Tim, Elliott, Brian, Larry, Gunther
22397	IFCT, Electrical Technician	●	●	●	●	○	○	○	Interviews in process	Tim, Elliott, Brian, Larry, Gunther
22398	IFCT, Electrical Technician	●	●	●	●	●	●	●		
22399	IFCT, Mechanical Technician, Lead	●	●	●	●	●	●	●		
22400	IFCT, Mechanical Technician	●	●	●	●	●	●	●		
24265	IFCT, Mechanical Technician	●	●	●	●	●	●	●		
29264	SVAC, Engineering Physicist	●	●	●	●	●	●	●		
29406	SVAC, Engineering Physicist	●	●	●	●	●	●	●		
29420	ONLINE, Engineering Physicist	●	●	●	●	●	●	●		
29483	I&T Engineering Manager	●	●	●	●	●	●	○		Elliott, Dick

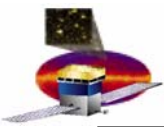
- Not started
- ◐ In-Process
- Complete



# Cost and Schedule Status

	WBS	BAC	BCWS	BCWP	ACWP	SV \$	CV \$	% BCWS	% BCWP	% ACWP	SPI Trend	CPI Trend	SPI	CPI	Cpi_Fcst	CpiSpi_Fcst
65	4.1.9	7,373	3,795	3,634	3,643	-161	-9	51.47	49.29	49.40	↓	↓	0.958	0.998	7,391	7,557

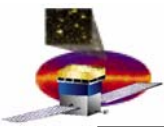
- **Cumulative Schedule Variance (end of April)**
  - **Work Scheduled: 3795 k\$; Work Performed: 3634 k\$**
  - **Schedule Variance: -161k\$ (-4.2%)**
    - -105k\$ in MGSE (1x4 lift fixture, LAT Grid Perimeter Ring and Attach Brackets, proof support stand, LAT lifting fixture, ground heat exchanger, other misc. MGSE)
    - -54k\$ in IFCT department ( test procedure development, grid preparations, install test stands, test installed stands, survey and alignments)
  - **Specific actions to maintain zero schedule variance:**
    - **Approve and implement change request LAT-XR-03452 to reschedule and re-plan MGSE. CR is approved by I&T manager and currently resides with Controls.**
- **Cumulative Cost Variance (end of April)**
  - **Work Performed: 3634 k\$; Actual Cost: 3643 k\$**
  - **Cost Variance: -9k\$ (-0.2%)**
  - **Cost variance has been going down each month. Specifically in April MGSE schedule slippage is impacting IFCT department.**



# IFTC Variance Report

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- **Schedule variance: -46K for April, -54K cum**
  - **Delayed completion of procedures and installation of test stands in clean room due to delayed receipt of flight hardware.**
- **Cost variance: -2.1K for April, - 170.4K cum**
  - **Primarily workforce. Flight integration delayed with workforce in place. Need CCB to allocate workforce and resources to integration preparation tasks to cover gap between Baseline and actual schedule**
  - **CCB for design (spent) and fabrication (FM June) of special connector mate and de-mate tool for TEM.**
  - **CCB for technician labor for December to April (cost over run)**



# Issues and Concerns

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- Need of get approval of I&T suggestion for Trigger group.
- Need of get approval of documents from project:
  - **LAT-MD-01376, I&T Test Plan. This has been out for signoff since May 3<sup>rd</sup>.**
  - **LAT-MD-3492, I&T Configuration Management/ Change Control Requirements.**
- Need another EM GASU from Gunther by the time of 2<sup>nd</sup> tower integration into grid. (Elliott has discussed this with Gunther and he agrees). Capture this agreement in PMCS with a change request.
- Need change request approval for:
  - **LAT-XR-03452, to correct the MGSE plan.**
  - **LAT-XR-03793, to add funding for the I&T Engineering Manager.**
  - **LAT-XR-03794, to extend designer for IFCT department**
  - **LAT-XR-03795, for additional mechanical tools and special technician training.**
  - **Integration personnel during gap caused by late start of flight I&T.**
  - **Cover cost to design and manufacture I&T break out boxes and test cables.**
  - **Cover design and fabrication of special connector mate tool for TEM.**