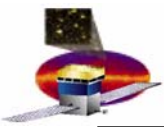


GLAST Large Area Telescope: I & T Input to Monthly Technical/Cost/Schedule Review 03/02/2005

**Elliott Bloom
SU-SLAC
Subsystem Manager**

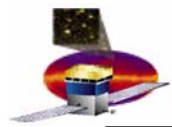
**Ken Fouts
SU-SLAC
Subsystem Engineering Manager**

**elliott@slac.stanford.edu, kfouts@slac.stanford.edu
650-926-2469 650-926-2553**



Last Month's Accomplishments

- **Management**
 - 49 of 66 I&T documents and procedures in review/approval cycle.
 - Supported successful pre-ship and delivery of TRK B.
 - Tracking hardware shortages for LAT integration.
- **IFCT**
 - Completed Tower A integration into the single bay test stand.
 - Completed receipt of CAL FM 106-107 and TRK B
 - Removed and returned three (3) TEM/TPS to NRL.
 - Completed thermocouple installation and post cure on flight Grid.
- **MGSE**
 - Completed proof test for 4x4 Lift Fixture for LAT handling.
- **Online**
 - Completed Validation, Verification and Release version of LATTE 4.7.3
 - Supported update to CAL test suites.
 - Supported data taking and trigger script development.
 - Supported resolution of ACD test script issue.
- **SVAC**
 - Finalized two tower test plan. Currently in review.
 - Completed baseline code for use during LAT integration
 - includes energy calibration and new TKR reconstruction.



I&T Milestone Overview for January 2005

- **FM101**
 - Receiving inspection completed on FM
 - Complete
 - Calorimeter Test Stand Validated
 - Complete
 - Post-ship test completed on FM
 - Complete
 - Calorimeter CPT Software Validated on EM
 - Complete
 - Calorimeter receiving CPT completed on FM
 - Complete
- **TKR-A**
 - Installation procedure validated on EM
 - Complete
 - Thermal strap procedure validated on EM
 - Complete
 - Tracker flex cable procedure validated
 - Complete
 - Tracker CPT software validated
 - Complete
- **TEM/TPS-A**
 - Tvac chamber installed in cleanroom
 - Complete
- **Single Tower I&T Validation**
 - Metrology bay I&T validated on EM
 - Complete
 - Single Bay trigger tests validated on EM
 - Complete
 - Single Bay data collection validated on EM
 - Complete
- **Grid Assembly**
 - Tilt table proof test
 - Complete
 - Heat pipe bonding completed
 - Complete
 - Thermal control system installation
 - Rescheduled due to design change
 - I&T Need
 - 3/17/05
- **Integration Stand**
 - Delivery of GPR to I&T
 - Complete
 - Earth quaking of base frame
 - Complete
 - Match GPR to Proof Test Weight 1
 - Complete
 - I&T Need
 - 3/17/05

I&T Accomplishments



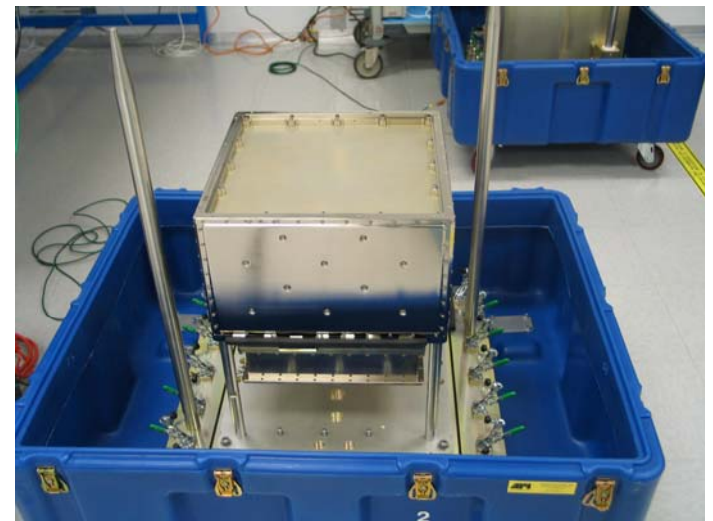
Preparation of flight grid for TCS integration



Flight Tracker in the Cleanroom at SLAC

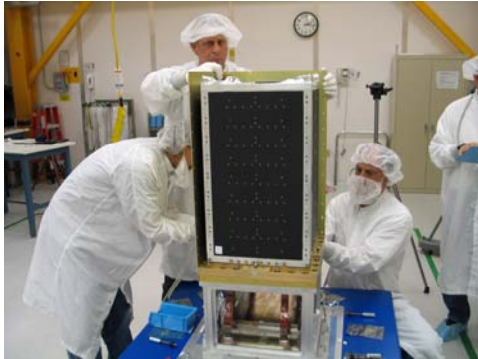


LAT Integration stand with PAP ready for proof test



Flight Calorimeter in the shipping container base

TKR Installation into the Single Bay



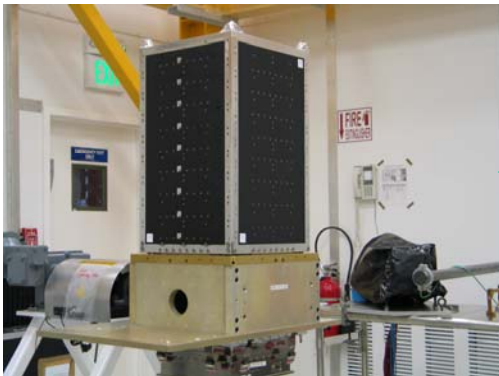
TKR Post receiving test configuration



Lifting from the test support stand



Installing into the single bay test stand



TKR configured in the single bay test stand



More flex cable tie down



Flex cable tie down

Recent I&T Accomplishments



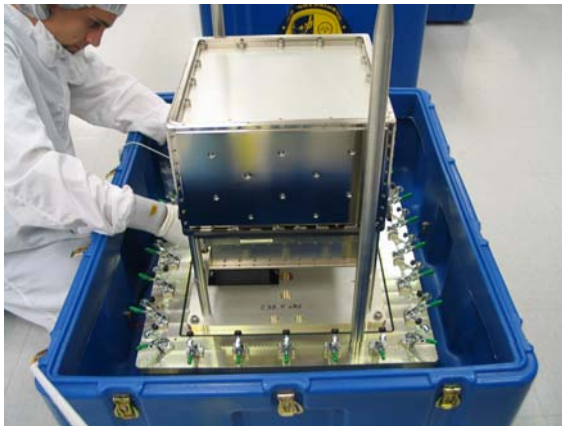
Grid thermocouple bonding and purge tube installation complete.



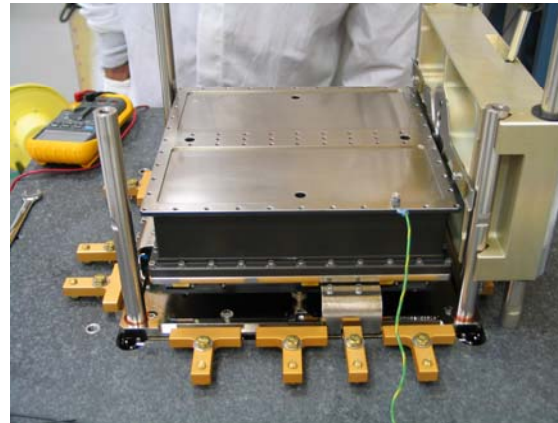
4X4 Z-axis Vertical Lift Fixture Proof Test Complete



4x4 Z-axis Horizontal Lift Fixture Proof Test Complete



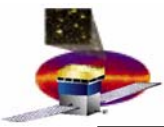
CAL FM 106-107 Received.



CAL Integrated with TEM

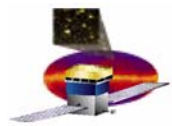


**Tower A Assembly
CAL/TEM Integrated with TKR A**



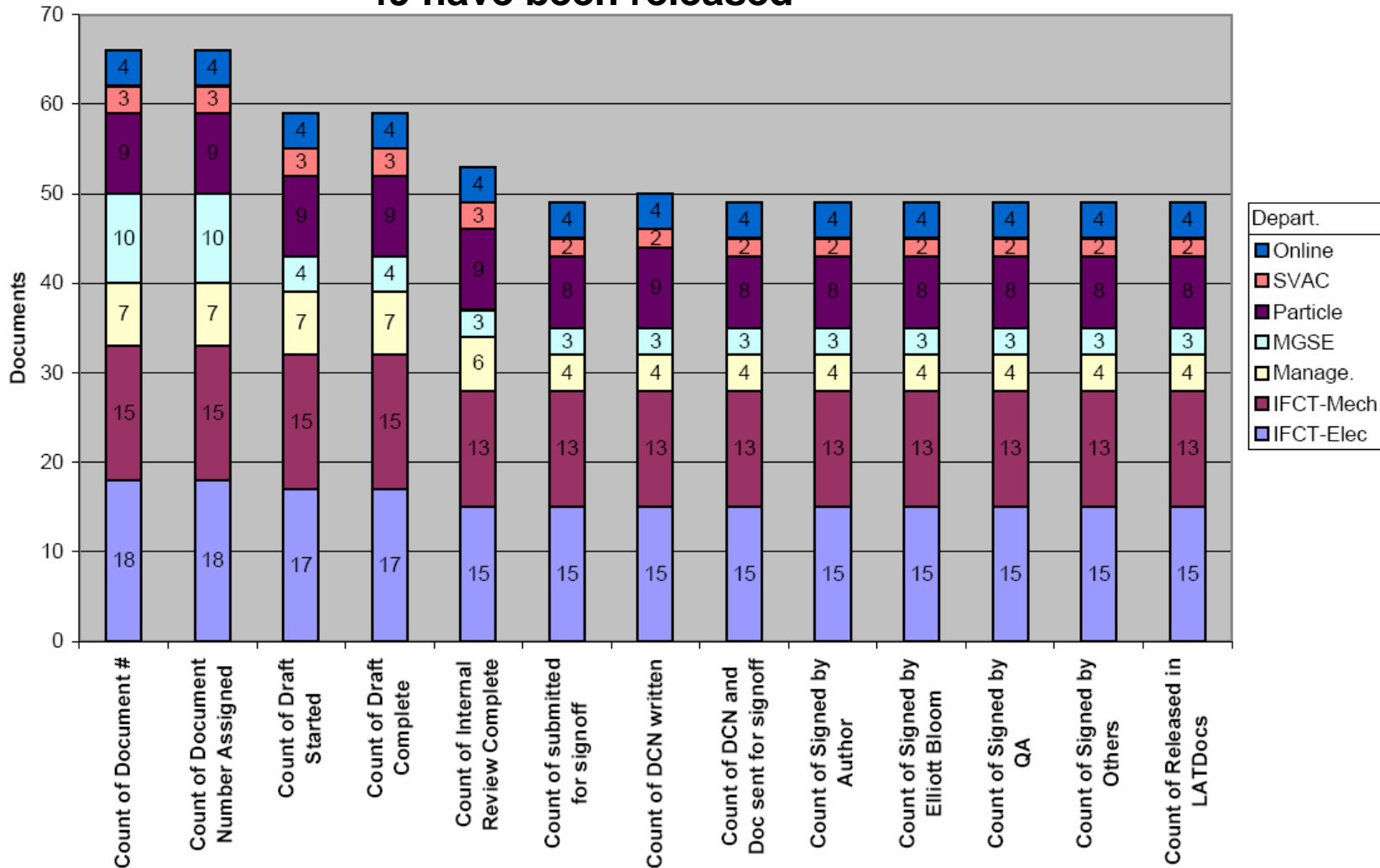
IFCT Accomplishments

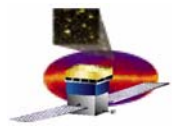
- **Mech. Systems**
 - Completed grid bake-out and thermocouple bonding.
- **Elec. Systems**
 - Completed TEM/TPS A safe-to-mate and “receiving tests”.
- **TKR Subsystem**
 - Supported TKR B receiving, EMI taping and EMI test.
 - Completed I&T receiving tests on TKR B.
- **I&T Test Validation**
 - I&T Test Stand Set-up Procedure completed and released.
 - CAL Module Test Procedure for LATTE 4.7 released.
 - Validation process for Trigger Scripts complete.
 - Validation process for TKR Scripts complete.
 - Validation process for data collection scripts complete.
 - TEM/PS Shimming Procedure released.
- **Tower A (Single tower) build complete in I&T test stand.**
 - Completed single tower CPT



Procedure Status

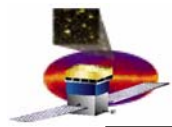
- 66 documents total
- 49 have been submitted for sign-off
- 49 have been released





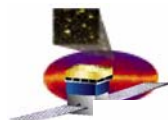
Procedure Status (1 of 5) – Management & Online

Depart.	Document #	Document Title	Author														Comments		
				Document Number Assigned	Draft Started	Draft Complete	Internal Review Complete	Latest Draft in LATDocs	Draft sent to NASA	Submitted to CM (Natalie) for signoff (or expected date)	DCN written	DCN and Doc sent for signoff	Signed by Author	Signed by Elliott Bloom	Signed by QA	Released by Others		Completion Date (or expected)	
Manage.	LAT-MD-01376-01	LAT Integration & Test Plan	Bloom / Fouts / Grist	✓	✓	✓	✓	✓	✓	03-May-04	✓	✓	✓	✓	✓	✓	✓	05-Aug-04	Version 2 in work
Manage.	LAT-TD-04542-01	ACD Subsystem to LAT I&T Deliverables MOU	Bloom / Bright	✓	✓	✓	✓		N/A	Past Due							14-Mar-05		
Manage.	LAT-TD-04543-01	CAL Subsystem to LAT I&T Deliverables MOU	Bloom / Bright	✓	✓	✓	✓	✓	N/A	07-Oct-04	✓	✓	✓	✓	✓	✓	17-Nov-04		
Manage.	LAT-TD-04544-01	Mechanical and TCS Subsystem to LAT I&T Deliverables MOU	Bloom / Bright	✓	✓	✓	✓	✓	N/A	18-Feb-05	✓	✓	✓	✓	✓	✓	24-Feb-05		
Manage.	LAT-TD-04545-01	Science Analysis Software to LAT I&T Deliverables MOU	Bloom / Bright	✓	✓	✓			N/A	Past Due							14-Mar-05		
Manage.	LAT-TD-04546-01	ELX/T&DF Subsystem to LAT I&T Deliverables MOU	Bloom / Bright	✓	✓	✓	✓	✓	N/A	27-Aug-04	✓	✓	✓	✓	✓	✓	04-Oct-04		
Manage.	LAT-TD-04547-01	TKR Subsystem to LAT I&T Deliverables MOU	Bloom / Bright	✓	✓	✓	✓		N/A	Past Due							14-Mar-05	Dave Rich reviewing with TKR team	
Online	LAT-MD-04601-01	LAT I&T E-Logbook Implementation	Kavelaars / Fouts	✓	✓	✓	✓	✓	✓	01-Nov-04	✓	✓	✓	✓	✓	✓	13-Dec-04		
Online	LAT-PS-05664-01	LAT I&T E-Logbook Test Proc.	Kavelaars	✓	✓	✓	✓	✓	✓	31-Jan-05	✓	✓	✓	✓	✓	✓	02-Feb-05		
Online	LAT-PS-05762-01	LATTE R4.7.1 Test Procedure	Claus	✓	✓	✓	✓	✓	✓	16-Feb-05	✓	✓	✓	✓	✓	✓	22-Feb-05		
Online	LAT-PS-05833-01	LATTE R4.7.3 Test Procedure	Claus	✓	✓	✓	✓	✓	✓	28-Feb-05	✓	✓	✓	✓	✓	✓	28-Feb-05		



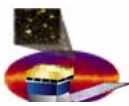
Procedure Status (2 of 5) - MGSE

Depart.	Document #	Document Title	Author	Document Number Assigned	Draft Started	Draft Complete	Internal Review Complete	Latest Draft in LATDocs	Draft sent to NASA	Submitted to CM (Natalie) for signoff (or expected date)	DCN written	DCN and Doc sent for signoff	Signed by Author	Signed by Elliott Bloom	Signed by QA	Released by Others	Completion Date (or expected)	Comments
MGSE	LAT-MD-01462-02	MGSE Development Plan	Gawehn	✓	✓	✓				Past Due							14-Mar-05	Tom and Ken are reviewing the draft
MGSE	LAT-PS-04226-01	1x1 Lift Fixture Installation and Removal	Gawehn / Borden	✓						Past Due							14-Mar-05	
MGSE	LAT-PS-04227-01	GPR onto rotation Stand MGSE	Gawehn / Borden	✓						Past Due							14-Mar-05	
MGSE	LAT-PS-04228-01	4x4 Stand Operations Manual	Gawehn / Borden	✓						Past Due							14-Mar-05	
MGSE	LAT-PS-04229-01	4x4 Lift Fixture Installation and Removal, +Z axis vertical	Gawehn / Borden	✓						Past Due							14-Mar-05	
MGSE	LAT-PS-04230-01	4x4 Lift Fixture Installation and Removal, +Z axis horizontal	Gawehn / Borden	✓						Past Due							14-Mar-05	
MGSE	LAT-PS-04231-01	Grid integration into GPR MGSE	Gawehn / Borden	✓						Past Due							14-Mar-05	
MGSE	LAT-PS-05137-01	Calorimeter Lift Fixture Proof Tests	Gawehn	✓	✓	✓	✓	✓	✓	09-Dec-04	✓	✓	✓	✓	✓	✓	13-Dec-04	
MGSE	LAT-PS-05236-01	Tracker Lift Fixture Proof Tests	Borden	✓	✓	✓	✓	✓	✓	22-Nov-04	✓	✓	✓	✓	✓	✓	07-Feb-05	
MGSE	LAT-PS-05748-01	GPR, GPR to Grid Bracket, Support Shaft, and Base Struc. Proof Tes - Yaxis	Gawehn	✓	✓	✓	✓	✓	✓	07-Feb-05	✓	✓	✓	✓	✓	✓	08-Feb-05	



Procedure Status (3 of 5) – IFCT Electrical

Depart.	Document #	Document Title	Author	Document Number Assigned	Draft Started	Draft Complete	Internal Review Complete	Latest Draft in LATDocs	Draft sent to NASA	Submitted to CM (Metalite) for signoff (or expected date)	DCN written	DCN and Doc sent for signoff	Signed by Author	Signed by Elliott Bloom	Signed by QA	Signed by Others	Released in LATDocs	Completion Date (or expected)	Comments
IFCT-Elec	LAT-MD-01533-01	EGSE Plan	Horwitz / Wai	✓	✓	✓	✓	✓	✓	17-Nov-04	✓	✓	✓	✓	✓	✓	✓	14-Dec-04	
IFCT-Elec	LAT-PS-03276-01	Two Tower Test Procedure	Horwitz	✓						07-Mar-05								21-Mar-05	
IFCT-Elec	LAT-PS-03287-04	Cal Module Test Procedure	Horwitz	✓	✓	✓	✓	✓	✓	14-Feb-05	✓	✓	✓	✓	✓	✓	✓	17-Feb-05	Version 5 in work
IFCT-Elec	LAT-PS-03290-02	Tracker Module Test Procedure	Canfield	✓	✓	✓	✓	✓	✓	31-Jan-05	✓	✓	✓	✓	✓	✓	✓	03-Feb-05	
IFCT-Elec	LAT-TD-03875-02	TEM EICIT Procedure	Horwitz	✓	✓	✓	✓	✓	✓	19-Jul-04	✓	✓	✓	✓	✓	✓	✓	28-Oct-04	Version 3 in work
IFCT-Elec	LAT-TD-04097-02	TEM SVT Procedure	Horwitz	✓	✓	✓	✓	✓	✓	19-Jul-04	✓	✓	✓	✓	✓	✓	✓	29-Oct-04	
IFCT-Elec	LAT-TD-04098-01	TPS SVT Procedure	Horwitz	✓	✓	✓	✓	✓	✓	19-Jul-04	✓	✓	✓	✓	✓	✓	✓	29-Oct-04	
IFCT-Elec	LAT-TD-04099-02	TPS EICIT Procedure	Horwitz	✓	✓	✓	✓	✓	✓	02-Dec-04	✓	✓	✓	✓	✓	✓	✓	17-Dec-04	
IFCT-Elec	LAT-TD-04260-02	GASU EICIT Procedure	Horwitz	✓	✓	✓	✓	✓	✓	14-Dec-04	✓	✓	✓	✓	✓	✓	✓	17-Dec-04	
IFCT-Elec	LAT-TD-04325-01	Acceptance Test Procedure, Break out Boxes and Cables	Horwitz	✓	✓	✓	✓	✓	✓	12-Nov-04	✓	✓	✓	✓	✓	✓	✓	16-Nov-04	
IFCT-Elec	LAT-TD-04332-02	PDU EICIT Procedure	Horwitz	✓	✓	✓	✓	✓	✓	16-Feb-05	✓	✓	✓	✓	✓	✓	✓	22-Feb-05	
IFCT-Elec	LAT-TD-04382-01	Flight GASU SVT Procedure	Horwitz	✓	✓	✓				31-Mar-05								14-Apr-05	
IFCT-Elec	LAT-TD-04384-01	Flight PDU SVT Procedure	Horwitz	✓	✓	✓				31-Mar-05								14-Apr-05	
IFCT-Elec	LAT-PS-04511-01	Data Collection Procedure	Horwitz	✓	✓	✓	✓	✓	✓	08-Feb-05	✓	✓	✓	✓	✓	✓	✓	22-Feb-05	
IFCT-Elec	LAT-PS-04512-01	Single Tower Test Procedure	Horwitz	✓	✓	✓	✓	✓	✓	11-Feb-05	✓	✓	✓	✓	✓	✓	✓	17-Feb-05	
IFCT-Elec	LAT-PS-05504-01	Computing Infrastructure	Canfield	✓	✓	✓	✓	✓	✓	28-Jan-05	✓	✓	✓	✓	✓	✓	✓	02-Feb-05	
IFCT-Elec	LAT-PS-05527-03	I&T Test Stand Setup Procedure	Horwitz	✓	✓	✓	✓	✓	✓	11-Feb-05	✓	✓	✓	✓	✓	✓	✓	17-Feb-05	Version 4 in work.
IFCT-Elec	LAT-PS-05736-02	LATTE and Components Installation	Canfield	✓	✓	✓	✓	✓	✓	23-Feb-05	✓	✓	✓	✓	✓	✓	✓	23-Feb-05	



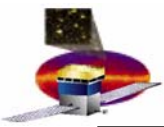
Procedure Status (4 of 5) – IFCT Mechanical

Depart.	Document #	Document Title	Author														Comments		
				Document Number Assigned	Draft Started	Draft Complete	Internal Review Complete	Latest Draft in LATDocs	Draft sent to NASA	Submitted to CM (Natalie) for signoff (for expected date)	DCN written	DCN and Doc sent for signoff	Signed by Author	Signed by Elliott Bloom	Signed by QA	Released by Others		Completion Date (or expected)	
IFCT-Mech	LAT-MD-01386-02	LAT Facilities Plan	Borden	✓	✓	✓	✓	✓	✓	02-Feb-05	✓	✓	✓	✓	✓	✓	✓	11-Feb-05	
IFCT-Mech	LAT-PS-03027-01	Calorimeter Integration Procedures	Ortiz	✓	✓	✓	✓	✓	✓	06-Aug-04	✓	✓	✓	✓	✓	✓	✓	09-Dec-04	
IFCT-Mech	LAT-PS-03058-02	Tracker Integration Procedures	Borden	✓	✓	✓				04-Mar-05								18-Mar-05	Version 1 released, Version 2 needed for Tracker into Grid
IFCT-Mech	LAT-PS-03060-01	Room 104, Ingress and Egress of Large Equipment Procedure	Ortiz	✓	✓	✓	✓	✓	✓	27-Jul-04	✓	✓	✓	✓	✓	✓	✓	16-Dec-04	
IFCT-Mech	LAT-PS-03062-01	Tem/TemPS Shimming Procedure	Ortiz	✓	✓	✓	✓	✓	✓	28-Jul-04	✓	✓	✓	✓	✓	✓	✓	05-Jan-05	Version 2 in work
IFCT-Mech	LAT-PS-03259-01	Shear Plate Shim Procedure	Ortiz	✓	✓	✓	✓	✓	✓	02-Sep-04	✓	✓	✓	✓	✓	✓	✓	22-Nov-04	
IFCT-Mech	LAT-PS-03263-01	Fastener Installation and Torquing Procedure	Borden	✓	✓	✓	✓	✓	✓	13-Oct-04	✓	✓	✓	✓	✓	✓	✓	02-Dec-04	
IFCT-Mech	LAT-PS-03281-01	LAT Test Floor Configuration Procedure	Borden	✓	✓	✓	✓	✓	✓	21-Jan-05	✓	✓	✓	✓	✓	✓	✓	24-Jan-05	
IFCT-Mech	LAT-PS-03291-01	Flight Hardware Bag and Purge Procedure	Borden	✓	✓	✓	✓	✓	✓	28-Oct-04	✓	✓	✓	✓	✓	✓	✓	14-Dec-04	
IFCT-Mech	LAT-PS-03481-02	GLAST LAT Integration Facility Emergency Plan	Borden	✓	✓	✓	✓	✓	✓	01-Oct-04	✓	✓	✓	✓	✓	✓	✓	12-Nov-04	
IFCT-Mech	LAT-PS-04244-01	Load Mass simulators into GRID MGSE	Ortiz	✓	✓	✓				04-Mar-05								18-Mar-05	
IFCT-Mech	LAT-PS-04436-01	AeroGo Air Bearing Reference Guide	Ortiz	✓	✓	✓	✓	✓	✓	02-Sep-04	✓	✓	✓	✓	✓	✓	✓	04-Nov-04	
IFCT-Mech	LAT-PS-04459-01	Connector Mate and Demate	Manger / Horwitz	✓	✓	✓	✓	✓	✓	16-Dec-04	✓	✓	✓	✓	✓	✓	✓	05-Jan-05	
IFCT-Mech	LAT-PS-04727-01	Tie Mount Bonding Procedure	Ortiz	✓	✓	✓	✓	✓	✓	30-Sep-04	✓	✓	✓	✓	✓	✓	✓	17-Nov-04	
IFCT-Mech	LAT-PS-05487-01	Mobile Hydraulic Unit (MHU) Operations Procedure	Manger	✓	✓	✓	✓	✓	✓	17-Dec-04	✓	✓	✓	✓	✓	✓	✓	20-Dec-04	



Procedure Status (5 of 5) – Particle & SVAC

Depart.	Document #	Document Title	Author														Comments			
				Document Number Assigned	Draft Started	Draft Complete	Internal Review Complete	Latest Draft in LATDocs	Draft sent to NASA	Submitted to CM (Natalie) for signoff (for expected date)	DCN written	DCN and Doc. sent for signoff	Signed by Author	Signed by Elliott Bloom	Signed by QA	Released by Others		Completion Date (for expected)		
Particle	LAT-TD-00440-07	LAT Particle Test Plan	Godfrey	✓	✓	✓	✓			<i>Past Due</i>	✓								14-Mar-05	
Particle	LAT-TD-01396-01	Calibration of the Van de Graaff Photon Flux	Godfrey	✓	✓	✓	✓	✓	✓	06-Aug-04	✓	✓	✓	✓	✓	✓	✓	✓	17-Nov-04	
Particle	LAT-TD-01805-02	Van de Graaff Accelerator Safety/Operations Handbook	Godfrey	✓	✓	✓	✓	✓	✓	30-Sep-04	✓	✓	✓	✓	✓	✓	✓	✓	14-Oct-04	
Particle	LAT-PS-04133-01	Procedure to Take Simultaneous BGO and LAT Data	Godfrey	✓	✓	✓	✓	✓	✓	06-Aug-04	✓	✓	✓	✓	✓	✓	✓	✓	17-Nov-04	
Particle	LAT-TD-04134-01	Procedure for Setting the LAT Timing Registers	Godfrey	✓	✓	✓	✓	✓	✓	06-Aug-04	✓	✓	✓	✓	✓	✓	✓	✓	18-Nov-04	
Particle	LAT-TD-04135-01	Procedure for Measuring the LAT Trigger Jitter using the Muon Telescope	Godfrey	✓	✓	✓	✓	✓	✓	06-Aug-04	✓	✓	✓	✓	✓	✓	✓	✓	18-Nov-04	
Particle	LAT-TD-04136-01	Van de Graaff and Cosmic Data Runs for LAT Integration	Godfrey	✓	✓	✓	✓	✓	✓	10-Feb-05	✓	✓	✓	✓	✓	✓	✓	✓	11-Feb-05	
Particle	LAT-TD-04419-02	Muon Telescope	Godfrey	✓	✓	✓	✓	✓	✓	04-Nov-04	✓	✓	✓	✓	✓	✓	✓	✓	18-Nov-04	
Particle	LAT-TD-04980-01	Use of an Am241 Source for High Rate Triggering	Godfrey	✓	✓	✓	✓	✓	✓	14-Feb-05	✓	✓	✓	✓	✓	✓	✓	✓	23-Feb-05	
SVAC	LAT-MD-00446-06	SVAC Plan	do Couto e Silva	✓	✓	✓	✓	✓	✓	24-Aug-04	✓	✓	✓	✓	✓	✓	✓	✓	30-Oct-04	
SVAC	LAT-MD-00575-01	SVAC Plan for LAT Integration at SLAC	do Couto e Silva	✓	✓	✓	✓	✓	✓	04-Nov-04	✓	✓	✓	✓	✓	✓	✓	✓	16-Nov-04	
SVAC	LAT-MD-00613-02	SVAC Contributed Manpower	do Couto e Silva	✓	✓	✓	✓			01-Jul-05									15-Jul-05	

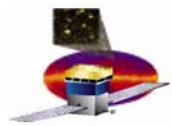


LAT MGSE Activities

- Completed proof test of the 4x4 and Z-axis lift fixtures.

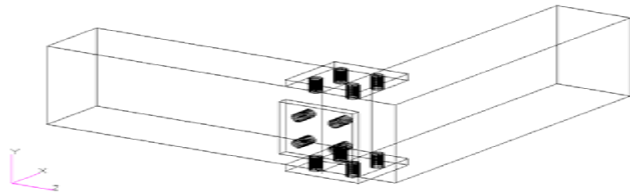
GPR Proof test

- During proof test of the GPR on the Base Structure Assembly, movement of the GPR corner joints was believed to have been observed after test on Feb. 09.
- The movement of the joint was confirmed on Feb. 10, 2005.
 - The slippage began with creaking noises as the GPR with Proof Test Weight (PTW) was rotated through 360 degrees.
 - This implies the joint was failing and not of sufficient pedigree to go forward with the proof test.
- Root Cause Investigation
 - Review of the stress report from Nov. 2004 indicates GPR joints showed positive margins.
 - The load case for proof testing the the 4x4 lift fixture was analyzed for the lift fixture but not for the GPR.
 - Current analysis indicates that the joint design was not capable of reacting the torsion loads through friction with the proof test weight configured for the lift fixture test per EWR 127.1 (2 times operating load = 16,000lbs).
 - Therefore, slippage occurred in the joint during proof test.
 - The grid perimeter ring was disassembled and an inspection was completed.
 - No indication of damage to the joint.
 - Tapered alignment pins were not properly seated.
 - Lubricant (machine oil) was found in one joint.
- Redesign and analysis are complete and documented (LAT-TD-05924). Shear keys added.
 - 3 design concepts for the GPR corner joint were analyzed.



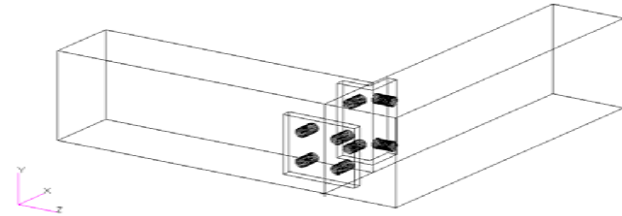
GPR Joint Repair Concepts

Option 1



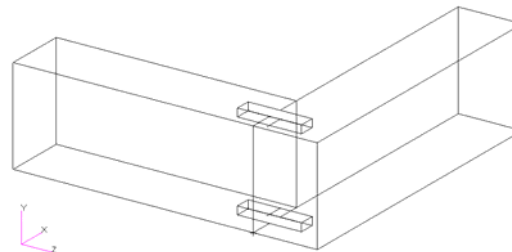
Three shear pinned shear plates

Option 2

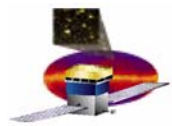


Outside shear plate with a corner boss

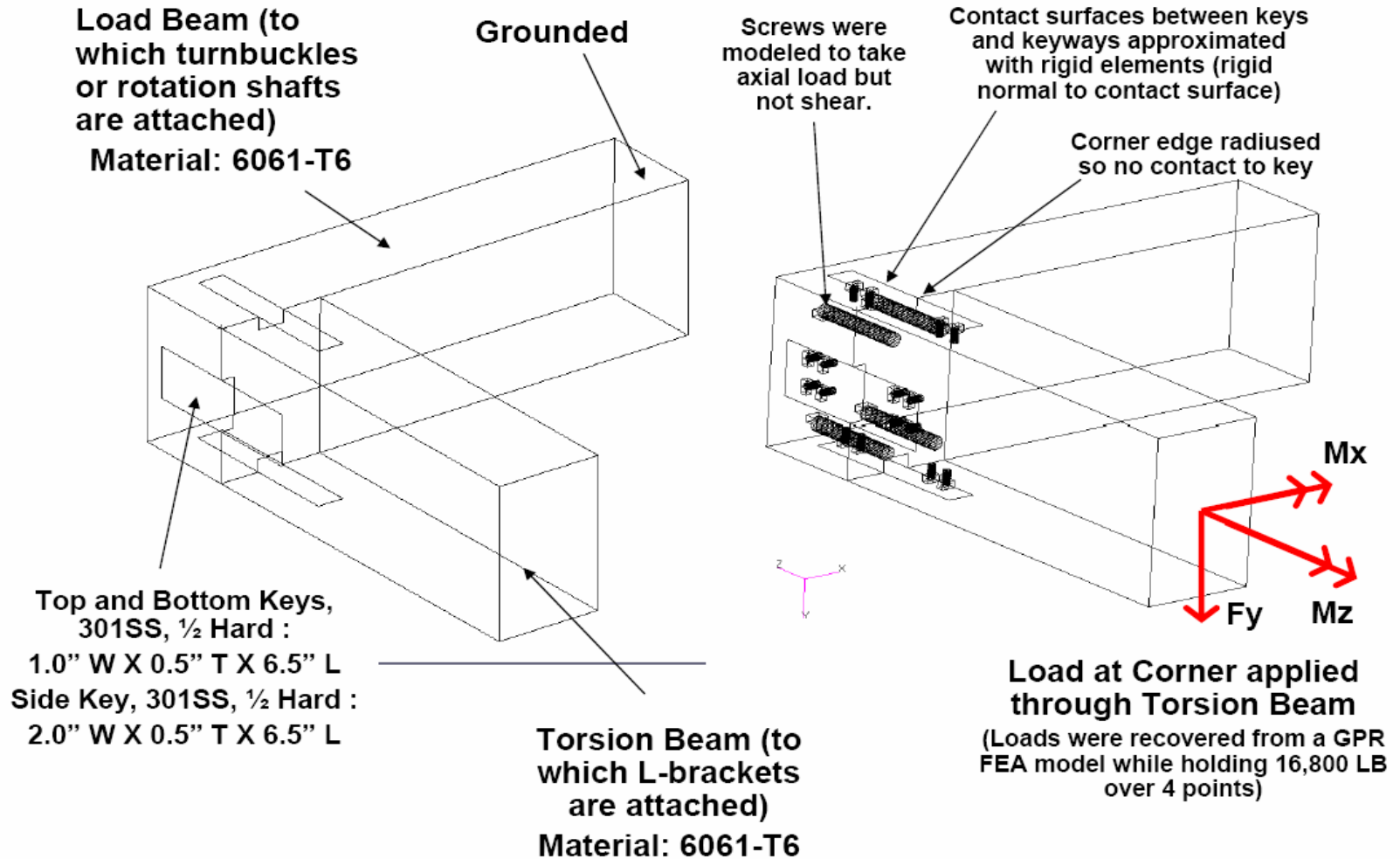
Option 3

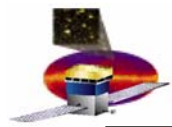


2-Steel Shear Keys 1"x 0.5"x 4"

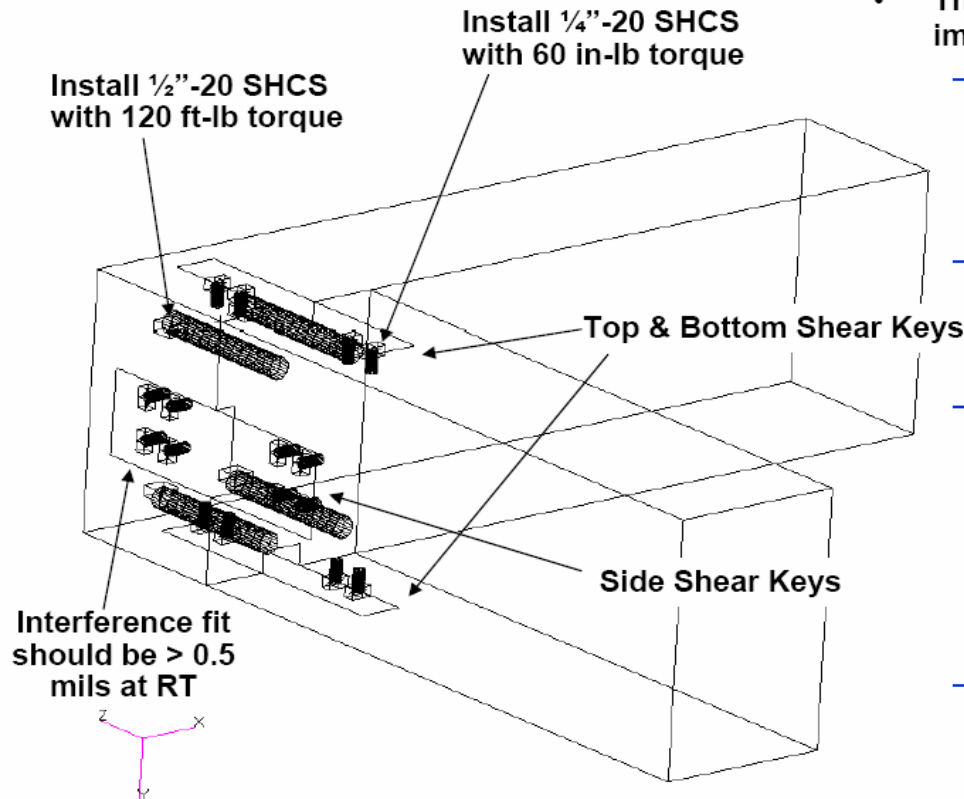


Shear Key Loads and Boundary Conditions

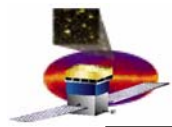




Shear Key Design Concept Description

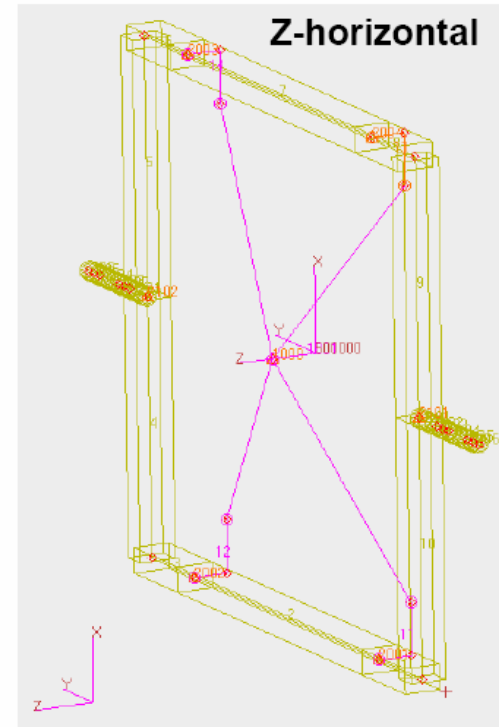
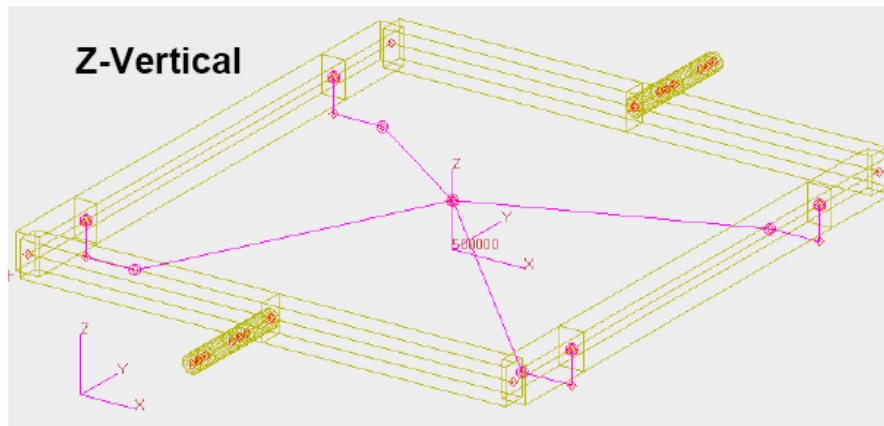


- Three shear keys would be implemented at each corner
 - Two shear keys on the top and bottom faces
 - Key Material = 15-5PH
 - Size = 1" Wide X 0.5" Thick X 6.5" Long
 - One shear key on the side face
 - Key Material = 15-5PH
 - Size = 2" Wide X 0.5" Thick X 6.5" Long
 - The keys would be attached to the GPR beams via countersunk 0.25" SHCS, 4X per Key
 - These fasteners provide seating pressure to help prevent key twist or wallowing out
 - The fasteners should be torqued to 60 in-lb
 - The required room temperature interference should be greater than or equal to 0.5 mils
 - If there is a 1 mil tolerance on the parts, then the nominal design interference is 2.5 mils



Load Case Determination

- Load cases examined
 - 4-point lift
 - Z-horizontal while mounted to rotation stand through shafts
 - Z-vertical while mounted
- 4-Pt Lift poses worst case loads to corner joint shear/slippage loads
- Z-Horizontal rotation poses worst case corner prying loads

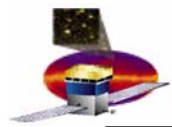


These are the combined corner loads applied to the detailed model

Load	Lift		Rotation		Comments
	4-Pt-Lift	Z-Vert	Z-Vert	Z-Horiz	
Mx [in-lb]	62287	57482		6574	Prying Moment
T [in-lb]	35007	29392		4450	Torsion at friction interface
Mz [in-lb]	0	0		37280	Moment to skew corner
Vx [lb]	0	0		3732	Clamp direction shear
Vy [lb]	0	0		3821	Friction Joint Shear force
Vz [lb]	4303	3732		882	Friction Joint Shear force

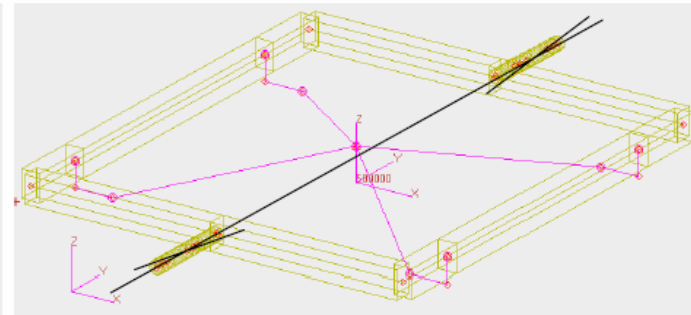
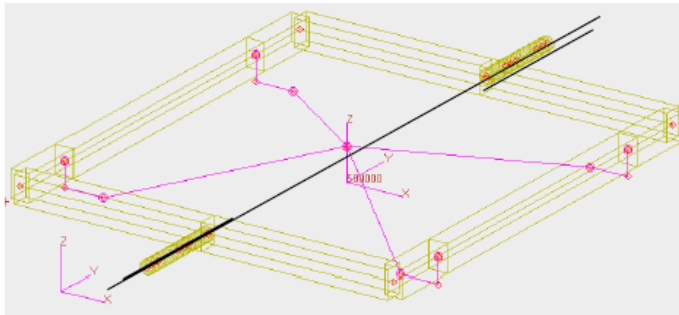
LAT-TD-05924-01

Page 4

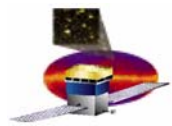


Shaft Misalignment Load Cases

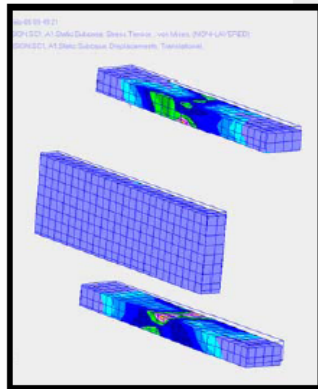
- Three additional load cases were examined to understand ramifications to shaft misalignment
- 1) Offset of 0.030" (no rotational misalignment)
- 2) Rotational misalignment of 0.006 radian shaft to shaft misalignment
- 3) Full weight supported by inner bearings



Load	Offset [in]		Rotation [rad]		Inner Bearing		Comments
	Dx	Dz	Rx	Rz	Gx	Gz	
Mx [in-lb]	0	772	7368	0	5572	43305	Prying Moment
T [in-lb]	0	91	0	0	14843	14697	Torsion at friction interface
Mz [in-lb]	531	0	0	1414	7796	0	Moment to skew corner
Vx [lb]	17	0	0	0	1866	0	Clamp direction shear
Vy [lb]	0	0	0	340	866	0	Friction Joint Shear force
Vz [lb]	0	17	0	0	362	1866	Friction Joint Shear force



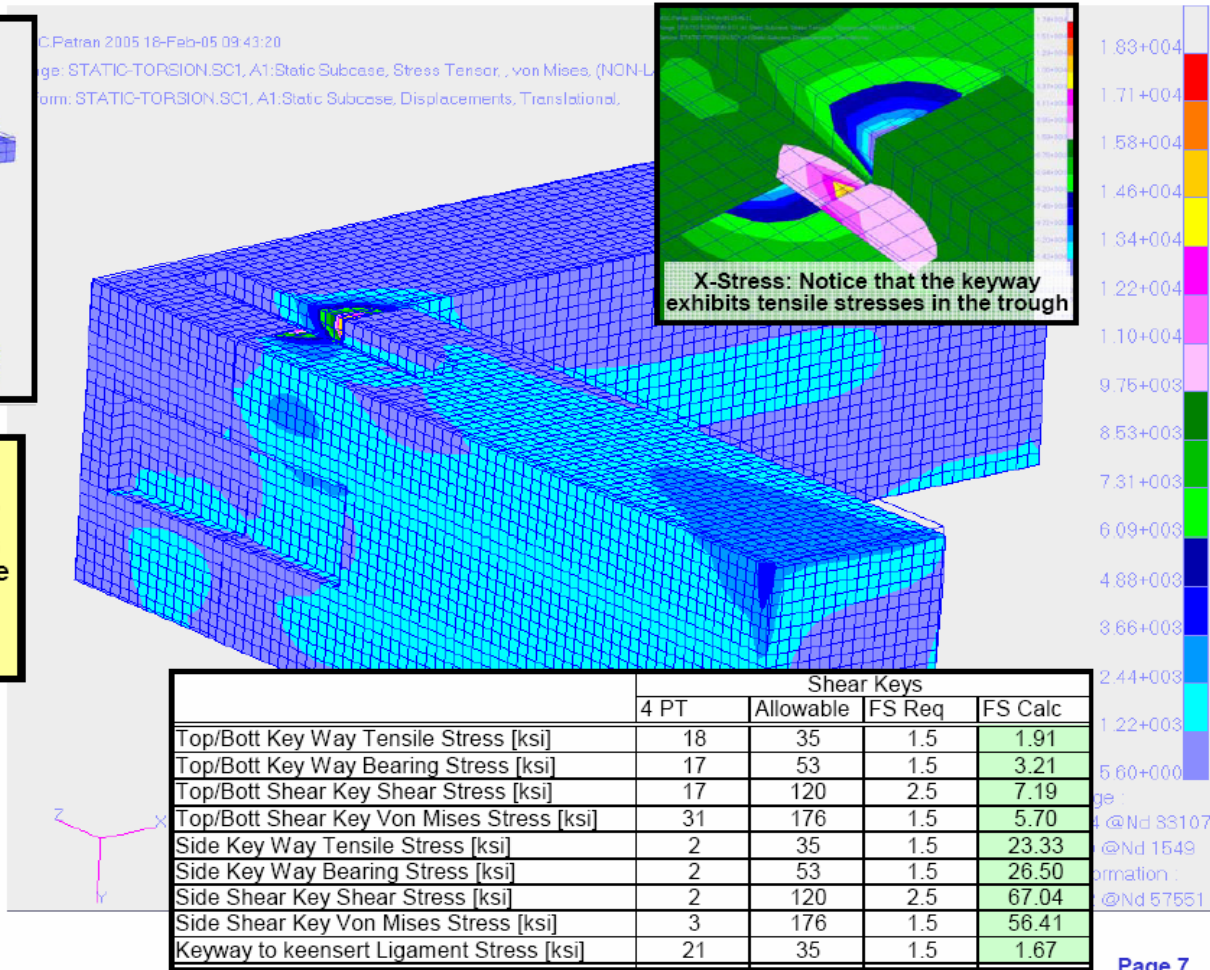
Shear Key and Keyway Stresses

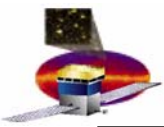


Resultant stresses due to 4-pt lift operations and LAT turnover load cases are within acceptable levels, and meet all safety factor requirements

**Load Case:
4-Pt Lift**

LAT-TD-05924-01





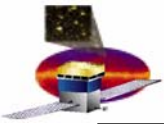
GPR Joint Analysis Summary

- A detailed FEA model has been used to accurately evaluate the loads in the GPR corner joint
 - Contact surfaces modeled
 - Screw and clearance holes accounted for
 - Combined loading case derived from GPR/LAT system model for lift and rotation configurations and worst case shaft misalignments
- The GPR corner has been evaluated for all handling load cases
 - The Shear keys provide enough torsional capacity even if there is no joint friction
 - The bolts provide enough clamping force to prevent joint gapping
- The shear key design creates a stiff joint (>5X less motion at the joint than the other options analyzed)
- The stresses in the keyways (GPR beams) and keys are acceptable and result in positive margins against required safety factors
 - The margins presented below are conservative because no friction in the joint is accounted for. In reality, the frictional force is likely sufficient to prevent joint slippage, and hence even larger stress margins

	Peak Load	Allowable	FS Req	FS Calc
Top/Bott Key Way Tensile Stress [ksi]	20	35	1.5	1.71
Top/Bott Key Way Bearing Stress [ksi]	18	53	1.5	2.87
Top/Bott Shear Key Shear Stress [ksi]	17	120	2.5	7.19
Top/Bott Shear Key Von Mises Stress [ksi]	31	176	1.5	5.70
Side Key Way Tensile Stress [ksi]	2	35	1.5	23.33
Side Key Way Bearing Stress [ksi]	2	53	1.5	26.50
Side Shear Key Shear Stress [ksi]	2	120	2.5	67.04
Side Shear Key Von Mises Stress [ksi]	3	176	1.5	50.37
Keyway to keensert Ligament Stress [ksi]	23	35	1.5	1.52
Corner joint gapping [lbf]	5642	10800	1.5	1.91
Corner joint failsafe [lbf]	7105	10800	1.5	1.52

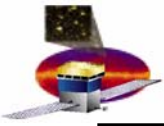
LAT-TD-05924-01

Page 12



GPR Return to Green

- **Grid Beams are being Reworked at SLAC**
 - Rework required opening up counter bores at the joint for better distribution of fastener clamping at the joint.
 - Stainless Steel Keys are being machined outside
- **GPR Assembly and Machining of Keyways**
 - The Beams will be delivered to Tapemation 3/3/05.
 - The GPR will be assembled and squared up on the machine.
 - Keyways will be machined.
 - SLAC provided shearkeys will be installed at Tapemation.
 - GPR return to SLAC 3/8/05
- **Resume proof test at SLAC. ECD 3/11/05**

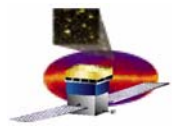


I&T Schedule Recovery

- **Current Schedule - GPR RFI by 3/22/05**
- **Conclusion of two tower test moves from 4/30 to 5/7**
- **Working Saturdays from late March until start of two tower tests and test 24 hrs when possible pulls completion of two tower tests back to 4/30.**

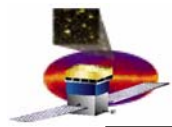
I&T Schedule (1 of 3)

ID	Task Name	Duration	Start	Finish	Qtr 1, 2005			Qtr 2, 2005		
					Jan	Feb	Mar	Apr	May	Jun
1	LAT Integration Plan	287.5 days?	3/19/04	5/31/05	[Gantt bar from Jan to Jun]					
2	Receive Grid	0 days	11/3/04	11/3/04	[Gantt bar at end of Jan]					
3	X-LAT Thermal Plate RFI	0 days	2/9/05	2/9/05	[Gantt bar in Feb]					
4	Radiators RFI	0 days	5/31/05	5/31/05	[Gantt bar at end of Jun]					
5	Tracker Receiving	29.25 days?	1/14/05	2/28/05	[Gantt bar from Jan to Feb]					
6	Tracker A	13.63 days?	1/14/05	2/4/05	[Gantt bar in Jan]					
16	Tracker B	10 days	2/14/05	2/28/05	[Gantt bar in Feb]					
25	Calorimeter Receiving	41.56 days?	11/10/04	1/14/05	[Gantt bar from Jan to Feb]					
26	Calorimeter A	36.63 days	11/10/04	1/7/05	[Gantt bar in Jan]					
31	Calorimeter B-FM105	4 days?	1/10/05	1/14/05	[Gantt bar in Jan]					
38	Electronics Receiving	269.19 days	3/19/04	5/3/05	[Gantt bar from Jan to Jun]					
39	Cables	3.75 days	11/15/04	11/19/04	[Gantt bar at end of Jan]					
58	TEM Assemblies	4.69 days	2/16/05	2/23/05	[Gantt bar in Feb]					
61	TEM PS Assemblies	4.69 days	2/16/05	2/23/05	[Gantt bar in Feb]					
64	Electronic Boxes	269.19 days	3/19/04	5/3/05	[Gantt bar from Jan to Jun]					
72	Grid Mechanical in I&T	112.88 days	9/15/04	3/7/05	[Gantt bar from Jan to Jun]					
73	Receive Grid	0 days	11/3/04	11/3/04	[Gantt bar at end of Jan]					
74	Receive EMI Skirt Assy	0 days	11/3/04	11/3/04	[Gantt bar at end of Jan]					
75	Grid Box Base Assembly Operations	38.75 days	11/17/04	1/19/05	[Gantt bar from Jan to Feb]					
82	Grid Box Base Assembly Thermal Control System Operations	6.75 days	9/15/04	9/24/04	[Gantt bar at end of Jan]					
89	Bakeout Grid	3 days	2/7/05	2/10/05	[Gantt bar in Feb]					
90	Grid Box Base Assy	16 days	2/10/05	3/7/05	[Gantt bar in Feb]					
99	Grid RFI	0 days	3/7/05	3/7/05	[Gantt bar in Feb]					



I&T Schedule (2 of 3)

ID	Task Name	Duration	Start	Finish	Qtr 1, 2005			Qtr 2, 2005		
					Jan	Feb	Mar	Apr	May	Jun
100	MGSE	29.56 days?	2/2/05	3/17/05						
101	Single Bay Proof Test	1.94 days?	2/8/05	2/10/05						
105	CAL-TEM XY Location Tool	3 days?	2/7/05	2/10/05						
108	TKR Lift Fixture	2.81 days?	2/2/05	2/7/05						
111	Integration Stand	26.75 days?	2/7/05	3/17/05						
112	Integration Stand Proof Test	5 days	2/7/05	2/14/05						
113	GPR Corner Redesign	6 days	2/11/05	2/21/05						
114	GPR disassembly/Inspection in B25	1 day	2/16/05	2/17/05						
115	GPR Corner Rework/Remachine	11 days	2/18/05	3/8/05						
116	GPR Integration and Proof Test	3 days	3/8/05	3/11/05						
117	HEEC, ESC Committee Review	1 day?	3/11/05	3/14/05						
118	Grid Perimeter Ring to Grid Fit-up	3 days	3/11/05	3/16/05						
119	Integration Stand move to Bldg 33	1 day	3/11/05	3/14/05						
120	Integration Stand Training and Checkout	1 day	3/16/05	3/17/05						
121	Install Grid in GPR	2 days	3/17/05	3/21/05						
122	Grid Survey	1 day	3/21/05	3/22/05						
123	TEM to Calorimeter	14.13 days?	2/15/05	3/8/05						
124	Calorimeter A	3 days?	2/15/05	2/18/05						
128	Calorimeter B	2 days	3/3/05	3/8/05						
129	Install Calorimeter into Metrology Bay	1 day	3/3/05	3/4/05						
130	Install TEM and Shim	1 day	3/7/05	3/8/05						
131	Calorimeter/Tracker/TEM/TEM-PS Test	35.63 days?	2/4/05	3/30/05						
132	Tower A	21.5 days?	2/4/05	3/8/05						
138	Tower B	15 days	3/8/05	3/30/05						
139	Install Tracker & Cal/TEM/TEM-PS into Single Bay	3 days	3/8/05	3/11/05						
140	Single Tower CPT TRR	2 days	3/11/05	3/15/05						
141	Test TKR/CAL/TEM/TEM-PS	10 days	3/15/05	3/30/05						



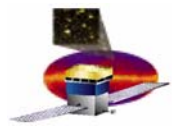
I&T Schedule (3 of 3)

ID	Task Name	Duration	Start	Finish	Qtr 1, 2005			Qtr 2, 2005		
					Jan	Feb	Mar	Apr	May	Jun
142	Tower Installation	31.13 days	3/22/05	5/7/05						
143	Install Tower A	9.56 days	3/22/05	4/6/05						
144	Grid/Integration Stand Need Date	0 days	3/22/05	3/22/05						
145	Instal Tracker into Grid	3 days	3/22/05	3/25/05						
146	Install Calorimeter	2 days	3/28/05	3/30/05						
147	Electrical Test	10 days	3/30/05	4/6/05						
148	Install Tower B	12.19 days	4/6/05	4/23/05						
149	Instal Tracker into Grid	5 days	4/6/05	4/13/05						
150	Install Calorimeter	2 days	4/13/05	4/15/05						
151	Electrical Test	12 days	4/15/05	4/23/05						
152	Two Tower CPT TRR	0 days	4/23/05	4/23/05						
153	2 Tower Tests	21 days	4/23/05	5/7/05						

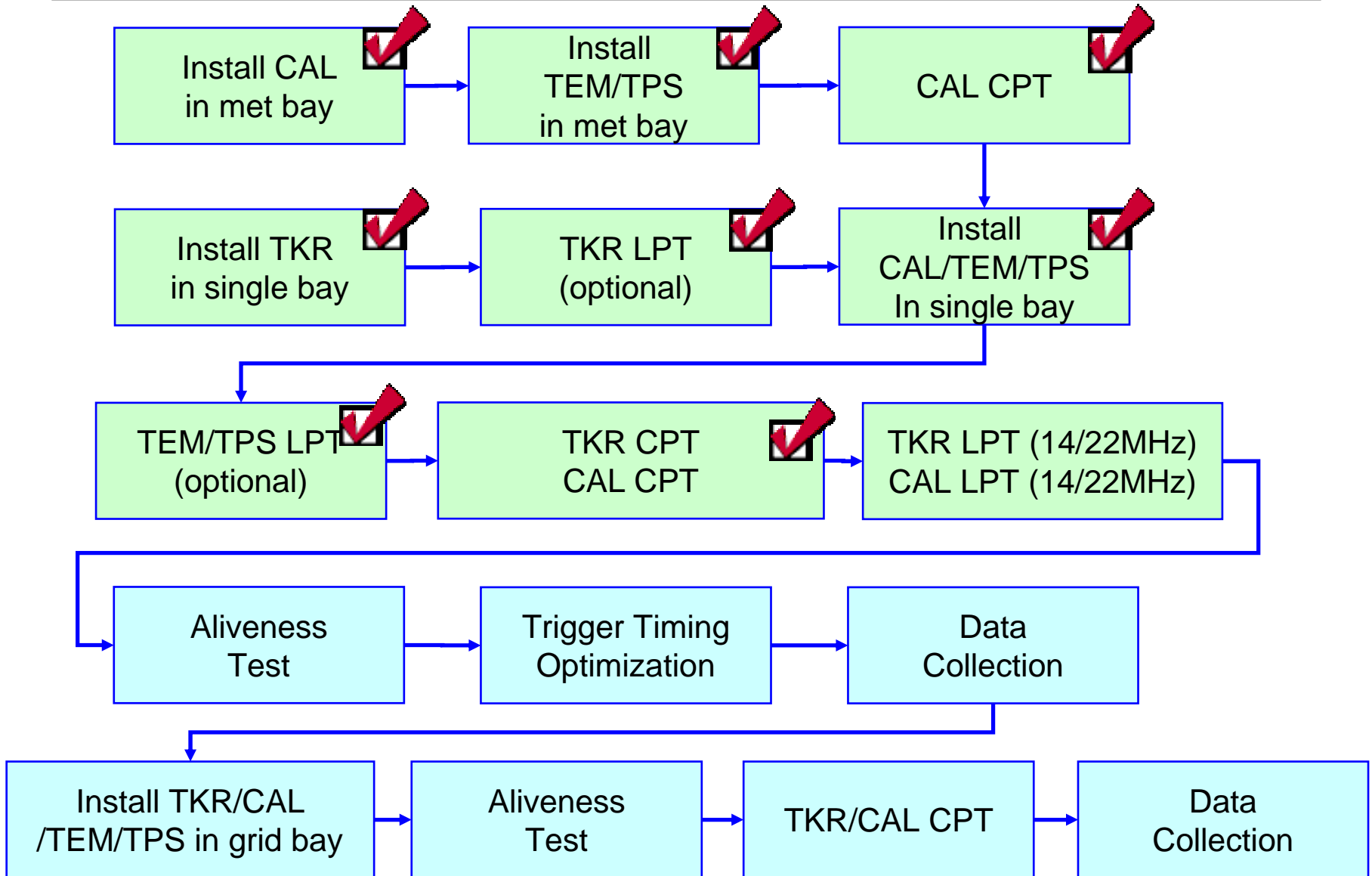
Baseline I&T Plan

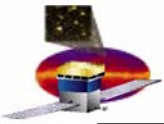
ID	Task Name	Duration	Start	Finish	Qtr 1, 2005			Qtr 2, 2005		
					Jan	Feb	Mar	Apr	May	Jun
142	Tower Installation	54 days	3/22/05	4/28/05						
143	Install Tower A	17 days	3/22/05	4/2/05						
144	Grid/Integration Stand Need Date	0 days	3/22/05	3/22/05						
145	Instal Tracker into Grid	3 days	3/22/05	3/24/05						
146	Install Calorimeter	2 days	3/24/05	3/25/05						
147	Electrical Test	12 days	3/25/05	4/2/05						
148	Install Tower B	17 days	4/2/05	4/14/05						
149	Instal Tracker into Grid	5 days	4/2/05	4/6/05						
150	Install Calorimeter	2 days	4/6/05	4/7/05						
151	Electrical Test	10 days	4/7/05	4/14/05						
152	Two Tower CPT TRR	0 days	4/14/05	4/14/05						
153	2 Tower Tests	20 days	4/14/05	4/28/05						

I&T Recovery Plan (6 day wk)



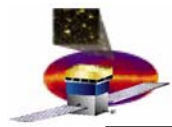
Single Tower I&T Sequence





Two Tower Test Preparation

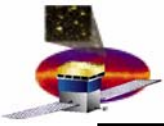
- Meeting scheduled for Thursday 3/3 to determine baseline two tower test configuration with ELX and Mechanical Systems.
- Open Items
 - PDU GASU support in the grid.
 - Cable terminations at grid interface to EGSE
 - EGSE locations (Test Crate and power supply).
 - PDU Operational Constraints without SIU.
 - Harness routings and tie downs



Cost and Schedule Status

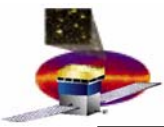
	WBS	Description	BAC	BCWS	BCWP	ACWP	SV \$	CV \$	%BCWS	%BCWF	%ACWF	SPI	CPI	SPI	CPI	Cpi_Fcst	CpiSpi_Fcst
65	4.1.9	I&T	8,013	6,398	5,858	6,162	-540	-304	79.84	73.11	76.90	↔	↔	0.916	0.951	8,429	8,638

- **Cumulative Schedule Variance (end of January)**
 - **Work Scheduled: 6398 k\$; Work Performed: 5858 k\$**
 - **Schedule Variance: -540 k\$ (-8%)**
 - **-141 k\$ in MGSE**
 - Receive LAT Gnd Tst Heat Exchanger, Receive LAT Misc Equip and Fixtures, Receive LAT Vibration Test Fixture, Receive Misc LAT Transport Containers, Receive LAT Low Humidity Tent, Proof Test-LAT 4x4 Stand, Receive Rad & X-LAT Plate Lift Fixtures, Receive Ship Cont for LAT Vibe Test Equip, Prep and Proof Test 1 X 4, 1x1 Grid Lift Fixture
 - **-399 k\$ in IFCT department**
 - Receive/Inspect TKR Tower A,B,1, 2,3,4,5,6,7,8,9,10,11,12,13,14,15, Receive/Inspect Cal Module 2,4,5,6,7,8,9,10,11,12,13,14,15,16, Receive/Inspect Tower Electronics A,B,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16, Receive/Inspect Cross-LAT Thermal Plate, Receive/Inspect Flight ACD, Receive/Inspect LAT-wide electronics, Integrate Flight TKR/Cal Towers A,B,1, 2,3,4,5,6,7,8,9,10,11,12,13,14, Functional Test Tower A,B,1, 2,3,4,5,6,7,8,9,10,11,12,13,14, Survey and Alignment Support of Inspection, Prep Flight Grid for Integration, IFCT Custom Connector Mate Tool – Fab, IFCT Power Supplies & Bus Protection Unit, Comprehensive Test procedure development.
- **Cumulative Cost Variance (end of January)**
 - **Work Performed: 5858 k\$; Actual Cost: 6162 k\$**
 - **Cost Variance: -304 k\$ (-5%)**



Zero Schedule Variance Actions

- **Complete MGSE tasks that are in flow for two tower and LAT build.**
- **Zero baseline variance requires matching I&T schedule to hardware deliveries. Current rebaseline will correct variances.**



Issues & Concerns

ISSUES

- **Availability of flight assembly hardware.**
 - Shortages identified by I&T and being worked with Subsystems.
 - Flight Cables
 - Flight Attachment Hardware
- **MGSE Delivery Schedule**
 - Schedule impact of the GPR rework

CONCERNS

- **Two Tower Test Planning**
 - Test Configuration Definition
- **I&T Procedure Development**
 - Tracker Integration Procedure for Grid Installation. (3/22/05 Need date).
 - Two tower test procedure (4/15/05 Need date)
 - TKR and ACD MOU's require input from Subsystems.