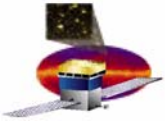




## GLAST LAT System Engineering

### LAT Test Planning Meeting

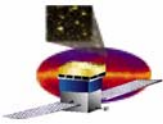
*Rich Baun  
SLAC  
rbaun@slac.stanford.edu  
(650) 926-3520*



# Agenda

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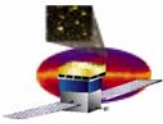
- ❑ LAT Level Test Strategy
- ❑ Performance & Ops Test Plan Schedule
- ❑ Proposed LAT Level Test Cases



# LAT Level Test - Strategy

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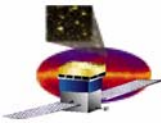
- An initial set of LAT Level test cases based on Subsystem tests has been identified (ACD, CAL, FSW, PWR, and TKR)
  - Support needed from ELX to identify test cases to verify T&DF functionality
    - Current approach has the ETE Test Cases, but additional tests are needed
  - Support needed from all Subsystems, FSW, and I&T to convert test cases to LAT Level and to identify possible efficiencies through use of FSW
- Will utilize FSW capabilities to test the LAT like it is flown
  - Plan to use modified FSW tests to conduct many LAT Level tests
  - Support from FSW is needed to
    - Provide detailed info on FSW capabilities and their use
    - Work with I&T and SE to modify FSW scripts so they sell the necessary requirements and run at the LAT Level
    - Work with SE and Subsystems on FSW capabilities (e.g. Diagnostic and Charge Injection) to support test
- Refine testing based on experience gained during integration
  - Support needed from Subsystems and I&T to identify and apply lessons learned
- Utilize Working Groups to define test details and present at weekly Test Planning Meeting for review



# Performance & Ops Test Plan - Schedule

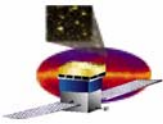
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<b>□ LAT Level Test Version</b>	<b><u>ECD</u></b>
- Identify requirements and functionality to be verified	1 April 05
- Identify FSW capabilities that will efficiently perform subsystem and LAT level test cases	15 April 05
- CPT, LPT, and test sequence definition	29 April 05
- Test case definitions	3 June 05
• "Phased" Test Case Definition Plan	
- LAT Initialization	15 April 05
- LAT Power Off	22 April 05
- LAT Telemetry (Narrowband, Wideband, Alert, Diagnostic)	22 April 05
- LAT Command & Command Response	29 April 05
- LAT File Management	29 April 05
- LAT GRB Handling	6 May 05
- LAT Event Filtering	6 May 05
- LAT Calibration	14 May 05
- LAT/Spacecraft Interface Test	14 May 05
- Calorimeter Subsystem Test Cases	21 May 05
- Tracker Subsystem Test Cases	21 May 05
- ACD Subsystem Test Cases	27 May 05
- T&DF Subsystem Test Cases	27 May 05
- Power Subsystem Test Case	3 June 05
- First Draft available for review	17 June 05
- Initial release	15 July 05



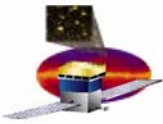
# LAT Level Test Matrix (1 of 5)

Group	Test Title	SLAC			NRL																						
		Baseline CPT	Light-Tight Test	Pre-Ship LPT	Post-Ship CPT	Pre Sine Vibe LPT	Post X-Axis Sine Vibe LPT	Post Y-Axis Sine Vibe LPT	Post Z-Axis Sine Vibe LPT	Post Radiator Install LPT	Pre-EMI/EMC LPT	EMI/EMC LPT	Pre-Acoustic LPT	Post-Acoustic LPT	Pre-TV CPT	Thermal Balance	Cold CPT	Cold LPT	Cold to Hot LPT	Hot CPT	Hot LPT	Hot Muon Survey	Hot to Cold LPT	Final CPT	Pre-Ship LPT		
<b>LAT Level Tests</b>																											
LAT Level	LAT001 – LAT Config 1 Initialization	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LAT Level	LAT002 – LAT Config 2 Initialization	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LAT Level	LAT003 – LAT Config 3 Initialization	X			X										X		X			X					X		
LAT Level	LAT004 – LAT Config 4 Initialization	X			X										X		X			X					X		
LAT Level	LAT005 – LAT Config 5 Initialization	X			X										X		X			X					X		
LAT Level	LAT006 – LAT Config 6 Initialization	X			X										X		X			X					X		
LAT Level	LAT011 – LAT Config 1 Power Off	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LAT Level	LAT012 – LAT Config 2 Power Off	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LAT Level	LAT013 – LAT Config 3 Power Off	X			X										X		X			X					X		
LAT Level	LAT014 – LAT Config 4 Power Off	X			X										X		X			X					X		
LAT Level	LAT015 – LAT Config 5 Power Off	X			X										X		X			X					X		
LAT Level	LAT016 – LAT Config 6 Power Off	X			X										X		X			X					X		
LAT Level	LAT021 – LAT Config 1 Reinitialization	X			X										X		X			X					X		
LAT Level	LAT022 – LAT Config 2 Reinitialization	X			X										X		X			X					X		
LAT Level	LAT023 – LAT Config 3 Reinitialization	X			X										X		X			X					X		
LAT Level	LAT024 – LAT Config 4 Reinitialization	X			X										X		X			X					X		
LAT Level	LAT026 – LAT Config 6 Reinitialization	X			X										X		X			X					X		
LAT Level	LAT031 – LAT Config 1 Narrowband Telemetry	X		X	X	X		X							X	X	X		X	X	X		X	X		X	X
LAT Level	LAT032 – LAT Config 2 Narrowband Telemetry	X		X	X	X		X							X	X	X		X	X	X		X	X		X	X
LAT Level	LAT033 – LAT Config 3 Narrowband Telemetry	X			X			X							X	X	X		X		X				X		
LAT Level	LAT034 – LAT Config 4 Narrowband Telemetry	X			X			X							X	X	X		X		X				X		
LAT Level	LAT035 – LAT Config 5 Narrowband Telemetry	X			X			X							X	X	X		X		X				X		
LAT Level	LAT036 – LAT Config 6 Narrowband Telemetry	X			X			X							X	X	X		X		X				X		



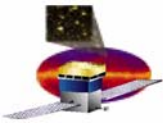
# LAT Level Test Matrix (2 of 5)

Group	Test Title	SLAC			NRL																					
		Baseline CPT	Light-Tight Test	Pre-Ship LPT	Post-Ship CPT	Pre Sine Vibe LPT	Post X-Axis Sine Vibe LPT	Post Y-Axis Sine Vibe LPT	Post Z-Axis Sine Vibe LPT	Post Radiator Install LPT	Pre-EMI/EMC LPT	EMI/EMC LPT	Pre-Acoustic LPT	Post-Acoustic LPT	Pre-TV CPT	Thermal Balance	Cold CPT	Cold LPT	Cold to Hot LPT	Hot CPT	Hot LPT	Hot Muon Survey	Hot to Cold LPT	Final CPT	Pre-Ship LPT	
<b>LAT Level Tests</b>																										
LAT Level	LAT041 – LAT Config 1 Cmd & Cmd Response	X	X	X	X				X				X	X	X		X	X		X	X				X	X
LAT Level	LAT042 – LAT Config 2 Cmd & Cmd Response	X	X	X	X				X				X	X	X		X	X		X	X				X	X
LAT Level	LAT043 – LAT Config 3 Cmd & Cmd Response	X		X					X				X	X	X		X			X					X	
LAT Level	LAT044 – LAT Config 4 Cmd & Cmd Response	X		X					X				X	X	X		X			X					X	
LAT Level	LAT045 – LAT Config 5 Cmd & Cmd Response	X		X					X				X	X	X		X			X					X	
LAT Level	LAT046 – LAT Config 6 Cmd & Cmd Response	X		X					X				X	X	X		X			X					X	
LAT Level	LAT051 – LAT Config 1 Wideband Telemetry	X	X	X	X				X				X	X	X		X	X		X	X				X	X
LAT Level	LAT052 – LAT Config 2 Wideband Telemetry	X	X	X	X				X				X	X	X		X	X		X	X				X	X
LAT Level	LAT053 – LAT Config 3 Wideband Telemetry	X		X					X				X	X	X		X			X					X	
LAT Level	LAT054 – LAT Config 4 Wideband Telemetry	X		X					X				X	X	X		X			X					X	
LAT Level	LAT055 – LAT Config 5 Wideband Telemetry	X		X					X				X	X	X		X			X					X	
LAT Level	LAT061 – LAT Config 1 File Management	X		X											X										X	
LAT Level	LAT062 – LAT Config 2 File Management	X		X											X										X	
LAT Level	LAT071 – LAT Config 1 Diagnostic Mode	X		X											X										X	
LAT Level	LAT072 – LAT Config 2 Diagnostic Mode	X		X											X										X	
LAT Level	LAT081 – LAT Config 1 Safe Mode	X		X											X										X	
LAT Level	LAT082 – LAT Config 2 Safe Mode	X		X											X										X	
LAT Level	LAT091 – LAT Config 1 Calibration	X		X	X				X				X	X	X	X	X	X	X	X	X			X	X	X
LAT Level	LAT092 – LAT Config 2 Calibration	X		X	X				X				X	X	X	X	X	X	X	X	X			X	X	X
LAT Level	LAT101 – LAT Config 1 Science Modes	X		X											X										X	
LAT Level	LAT102 – LAT Config 2 Science Modes	X		X											X										X	
LAT Level	LAT111 – LAT Config 1 GRB Handling	X		X											X										X	
LAT Level	LAT112 – LAT Config 2 GRB Handling	X		X											X										X	
LAT Level	LAT121 – LAT Config 1 Event Filtering & Pointing	X	X	X	X				X			X	X	X	X	X	X	X	X	X	X				X	X
LAT Level	LAT122 – LAT Config 2 Event Filtering & Pointing	X	X	X	X				X			X	X	X	X	X	X	X	X	X	X				X	X
LAT Level	LAT131 – LAT/Spacecraft Interface Config 1 Test	X																								
LAT Level	LAT132 – LAT/Spacecraft Interface Config 2 Test	X																								
LAT Level	LAT140 – LAT Survival Heater Test																X									
LAT Level	LAT141 – LAT Config 1 Temp Control	X		X	X				X	X			X	X	X	X	X	X	X	X	X			X	X	X
LAT Level	LAT142 – LAT Config 2 Temp Control	X		X	X				X	X			X	X	X	X	X	X	X	X	X			X	X	X



# LAT Level Test Matrix (3 of 5)

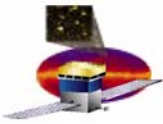
Group	Test Title	SLAC				NRL																					
		Baseline CPT	Light-Tight Test	Pre-Ship LPT	Post-Ship CPT	Pre Sine Vibe LPT	Post X-Axis Sine Vibe LPT	Post Y-Axis Sine Vibe LPT	Post Z-Axis Sine Vibe LPT	Post Radiator Install LPT	Pre-EMI/EMC LPT	EMI/EMC LPT	Pre-Acoustic LPT	Post-Acoustic LPT	Pre-TV CPT	Thermal Balance	Cold CPT	Cold LPT	Cold to Hot LPT	Hot CPT	Hot LPT	Hot Muon Survey	Hot to Cold LPT	Final CPT	Pre-Ship LPT		
<b>Subsystem Tests</b>																											
<b>ACD</b>																											
ACD	LAT301 – ACD Config 1 CPT	X			X										X		X			X						X	
ACD	LAT302 – ACD Config 2 CPT	X			X										X		X			X						X	
ACD	LAT303 – ACD Config 3 CPT																										
ACD	LAT304 – ACD Config 4 CPT																										
ACD	LAT305 – ACD Config 5 CPT																										
ACD	LAT306 – ACD Config 6 CPT																										
ACD	LAT311 – ACD Config 1 LPT			X		X		X		X	X	X	X				X			X						X	
ACD	LAT312 – ACD Config 2 LPT			X		X		X		X	X	X	X				X			X						X	
ACD	LAT313 – ACD Config 3 LPT	X			X									X		X			X						X		
ACD	LAT314 – ACD Config 4 LPT	X			X									X		X			X						X		
ACD	LAT315 – ACD Config 5 LPT	X			X									X		X			X						X		
ACD	LAT316 – ACD Config 6 LPT	X			X									X		X			X						X		
<b>Calorimeter</b>																											
Calorimeter	LAT401 – Calorimeter Config 1 CPT	X			X										X		X			X						X	
Calorimeter	LAT402 – Calorimeter Config 2 CPT	X			X										X		X			X						X	
Calorimeter	LAT403 – Calorimeter Config 3 CPT																										
Calorimeter	LAT404 – Calorimeter Config 4 CPT																										
Calorimeter	LAT405 – Calorimeter Config 5 CPT																										
Calorimeter	LAT406 – Calorimeter Config 6 CPT																										
Calorimeter	LAT411 – Calorimeter Config 1 LPT			X		X		X		X	X	X	X				X			X			X			X	
Calorimeter	LAT412 – Calorimeter Config 2 LPT			X		X		X		X	X	X	X				X			X			X			X	
Calorimeter	LAT413 – Calorimeter Config 3 LPT	X			X									X		X			X						X		
Calorimeter	LAT414 – Calorimeter Config 4 LPT	X			X									X		X			X						X		
Calorimeter	LAT415 – Calorimeter Config 5 LPT	X			X									X		X			X						X		
Calorimeter	LAT416 – Calorimeter Config 6 LPT	X			X									X		X			X						X		
Calorimeter	CALF_PEDESTALS_CI – Compute CAL Pedestals		X																								



# LAT Level Test Matrix (4 of 5)

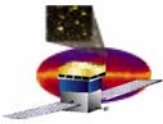
Group	Test Title	SLAC			NRL																					
		Baseline CPT	Light-Tight Test	Pre-Ship LPT	Post-Ship CPT	Pre Sine Vibe LPT	Post X-Axis Sine Vibe LPT	Post Y-Axis Sine Vibe LPT	Post Z-Axis Sine Vibe LPT	Post Radiator Install LPT	Pre-EMI/EMC LPT	EMI/EMC LPT	Pre-Acoustic LPT	Post-Acoustic LPT	Pre-TV CPT	Thermal Balance	Cold CPT	Cold LPT	Cold to Hot LPT	Hot CPT	Hot LPT	Hot Muon Survey	Hot to Cold LPT	Final CPT	Pre-Ship LPT	
<b>Subsystem Tests</b>																										
<b>Power</b>																										
Power	LAT501 – Power Config 1 CPT	X			X									X		X			X					X		
Power	LAT502 – Power Config 2 CPT	X			X								X	X		X			X					X		
Power	LAT503 – Power Config 3 CPT																									
Power	LAT504 – Power Config 4 CPT																									
Power	LAT505 – Power Config 5 CPT																									
Power	LAT506 – Power Config 6 CPT																									
Power	LAT511 – Power Config 1 LPT			X	X		X	X	X	X	X				X			X		X				X		
Power	LAT512 – Power Config 2 LPT			X	X		X	X	X	X	X				X			X		X				X		
Power	LAT513 – Power Config 3 LPT	X			X									X		X		X		X				X		
Power	LAT514 – Power Config 4 LPT	X			X									X		X		X		X				X		
Power	LAT515 – Power Config 5 LPT	X			X									X		X		X		X				X		
Power	LAT516 – Power Config 6 LPT	X			X									X		X		X		X				X		
<b>Tracker</b>																										
Tracker	LAT601 – Tracker Config 1 CPT	X			X									X		X		X		X				X		
Tracker	LAT602 – Tracker Config 2 CPT	X			X									X		X		X		X				X		
Tracker	LAT603 – Tracker Config 3 CPT																									
Tracker	LAT604 – Tracker Config 4 CPT																									
Tracker	LAT605 – Tracker Config 5 CPT																									
Tracker	LAT606 – Tracker Config 6 CPT																									
Tracker	LAT611 – Tracker Config 1 LPT			X	X		X	X	X	X	X				X			X		X				X		
Tracker	LAT612 – Tracker Config 2 LPT			X	X		X	X	X	X	X				X			X		X				X		
Tracker	LAT613 – Tracker Config 3 LPT	X			X									X		X		X		X				X		
Tracker	LAT614 – Tracker Config 4 LPT	X			X									X		X		X		X				X		
Tracker	LAT615 – Tracker Config 5 LPT	X			X									X		X		X		X				X		
Tracker	LAT616 – Tracker Config 6 LPT	X			X									X		X		X		X				X		
Tracker	TE301 – Gain and Noise Measurement		X																							





# LAT Level Test Matrix (5 of 5)

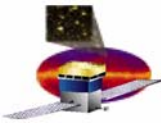
Group	Test Title	SLAC			NRL																					
		Baseline CPT	Light-Tight Test	Pre-Ship LPT	Post-Ship CPT	Pre Sine Vibe LPT	Post X-Axis Sine Vibe LPT	Post Y-Axis Sine Vibe LPT	Post Z-Axis Sine Vibe LPT	Post Radiator Install LPT	Pre-EMI/EMC LPT	EMI/EMC LPT	Pre-Acoustic LPT	Post-Acoustic LPT	Pre-TV CPT	Thermal Balance	Cold CPT	Cold LPT	Cold to Hot LPT	Hot CPT	Hot LPT	Hot Muon Survey	Hot to Cold LPT	Final CPT	Pre-Ship LPT	
<b>Subsystem Tests</b>																										
<b>T&amp;DF</b>																										
T&DF	LAT701 – T&DF Config 1 CPT	X			X										X		X				X				X	
T&DF	LAT702 – T&DF Config 2 CPT	X			X										X		X				X				X	
T&DF	LAT703 – T&DF Config 3 CPT																									
T&DF	LAT704 – T&DF Config 4 CPT																									
T&DF	LAT705 – T&DF Config 5 CPT																									
T&DF	LAT706 – T&DF Config 6 CPT																									
T&DF	LAT711 – T&DF Config 1 LPT			X		X			X		X	X	X	X				X			X				X	
T&DF	LAT712 – T&DF Config 2 LPT			X		X			X		X	X	X	X				X			X				X	
T&DF	LAT713 – T&DF Config 3 LPT	X			X										X		X			X					X	
T&DF	LAT714 – T&DF Config 4 LPT	X			X										X		X			X					X	
T&DF	LAT715 – T&DF Config 5 LPT	X			X										X		X			X					X	
T&DF	LAT716 – T&DF Config 6 LPT	X			X										X		X			X					X	
<b>SVAC Tests</b>																										
SVAC	LAT801 – SVAC Config 1 Test	X			X										X		X					X			X	
SVAC	LAT802 – SVAC Config 2 Test	X			X										X		X					X			X	
SVAC	LAT803 – SVAC Config 3 Test																									
SVAC	LAT804 – SVAC Config 4 Test																									
SVAC	LAT805 – SVAC Config 5 Test																									
SVAC	LAT806 – SVAC Config 6 Test																									



# Preliminary LPT/CPT Definitions (1 of 8)

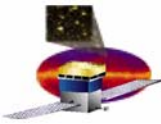
Group	Test Title	S/S Config 1 Test	S/S Config 2 Test	S/S Config 3 Test	S/S Config 4 Test	S/S Config 5 Test	S/S Config 6 Test
<b>Subsystem Tests</b>							
<b>ACD Limited Performance Test (LPT)</b>							
ACD	AcdInitCurrent – ACD Init/Current Measure	1	1	1	1	1	1
ACD	AcdGarcRegInit – ACD GARC Register Initialization	1	1	1	1	1	1
ACD	AcdGafeRegInit – ACD GAFE Register Initialization	1	1	1	1	1	1
ACD	AcdPwr – ACD FREE Card Power Measurement	1	1	1	1	1	1
ACD	AcdGarcRegRdWr – ACD GARC Register Read/Write	1	1	1	1	1	1
ACD	AcdGafeReg – ACD GAFE Register Read/Write	1	1	1	1	1	1
ACD	AcdBroadcast – ACD Broadcast Commands	1	1	1	1	1	1
ACD	AcdGarcParityErr – ACD GARC Parity Error Detection	1	1	1	1	1	1
ACD	AcdGafeParityErr – ACD GAFE Parity Error Detection	1	1	1	1	1	1
ACD	AcdGafeTest – ACD FREE Card GAFE/GARC Characterization	X	X	2	2	2	2
ACD	AcdPhaThresVer – ACD PHA Threshold Verification	X	X	2	2	2	2
ACD	AcdHvbsPmtAlive – ACD HVBS/PMT Aliveness	X	X	2	2	2	2
ACD	AcdPedestal – ACD Pedestal Measurement	X	X	2	2	2	2
ACD	AcdTriggeredOp – ACD Tile Detector Assembly Performance	X	X	2	2	2	2
ACD	AcdLongAccumSpectra – ACD Long Data Accumulation	X	X	2	2	2	2

- Notes:**
1. Test part of LAT Initialization, not part of Subsystem LPT or CPT.
  2. Cross-strap tests not required for DAQ to Detector interfaces. That is, since the Detectors are internally redundant, only functions, performance, and operations need to be verified in Configuration 1 (all prime) and Configuration 2 (all redundant). Therefore testing done in the cross-strapped config is limited.
  3. Tests not part of CPT as they consist of executing the scripts AcdInitCurrent, AcdGafeRegInit, AcdGafeRegRdWr, AcdGafereg, AcdGafeTest, AcdHitmapTiming and AcdHvbsPmtAlive while varying supply voltages (ACD Power Supply Rail Test) or input clock frequencies (ACD Multiple Clock Frequency Test)
  4. Tests may require breakout box if telemetry not available.
  5. Test part of SVAC Tests, not Subsystem LPT or CPT.
  6. Test part of LAT Reinitialization, not T&DF LPT or CPT.



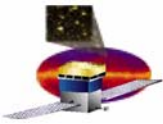
# Preliminary LPT/CPT Definitions (2 of 8)

Group	Test Title	S/S Config 1 Test	S/S Config 2 Test	S/S Config 3 Test	S/S Config 4 Test	S/S Config 5 Test	S/S Config 6 Test
<b>Subsystem Tests</b>							
<b>ACD Comprehensive Performance Test (CPT)</b>							
ACD	AcInitCurrent – ACD Init/Current Measure	1	1	1	1	1	1
ACD	AcGarcRegInit – ACD GARC Register Initialization	1	1	1	1	1	1
ACD	AcGafeRegInit – ACD GAFE Register Initialization	1	1	1	1	1	1
ACD	AcPwr – ACD FREE Card Power Measurement	1	1	1	1	1	1
ACD	AcGarcRegRdWr – ACD GARC Register Read/Write	1	1	1	1	1	1
ACD	AcGafeReg – ACD GAFE Register Read/Write	1	1	1	1	1	1
ACD	AcBroadcast – ACD Broadcast Commands	1	1	1	1	1	1
ACD	AcGarcParityErr – ACD GARC Parity Error Detection	1	1	1	1	1	1
ACD	AcGafeParityErr – ACD GAFE Parity Error Detection	1	1	1	1	1	1
ACD	AcMaxPha – ACD Max Number of Pulse Height Amplitude (PHA) Word Handling	X	X	2	2	2	2
ACD	AcPhaEnDis – ACD PHA Enable/Disable	X	X	2	2	2	2
ACD	AcPhaThresVer – ACD PHA Threshold Verification	X	X	2	2	2	2
ACD	AcGafeTest – ACD FREE Card GAFE/GARC Characterization	X	X	2	2	2	2
ACD	AcHitmapTiming – ACD Hitmap Timing	X	X	2	2	2	2
ACD	AcVetoHitmapPha – ACD Hitmap/PHA to VETO Counter Comparison	X	X	2	2	2	2
ACD	AcVetoAdcXTalk – ACD VETO/PHA Crosstalk	X	X	2	2	2	2
ACD	AcHvbsPmtAlive – ACD HVBS/PMT Aliveness	X	X	2	2	2	2
ACD	AcPedestal – ACD Pedestal Measurement	X	X	2	2	2	2
ACD	AcTriggeredOp – ACD Tile Detector Assembly Performance	X	X	2	2	2	2
ACD	AcLongAccumSpectra – ACD Long Data Accumulation	X	X	2	2	2	2
ACD	AcLongAccumSpectraExtTrig – ACD Long Data Accumulation using External Trigger	X	X	2	2	2	2
ACD	ACD Power Supply Rail Test	3	3	2	2	2	2
ACD	ACD Multiple Clock Frequency Test	3	3	2	2	2	2



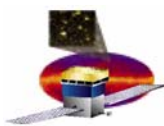
# Preliminary LPT/CPT Definitions (3 of 8)

Group	Test Title	S/S Config 1 Test	S/S Config 2 Test	S/S Config 3 Test	S/S Config 4 Test	S/S Config 5 Test	S/S Config 6 Test
<b>Subsystem Tests</b>							
<b>Calorimeter LPT</b>							
Calorimeter	CALU_INIT – Calorimeter Initialization	1	1	1	1	1	1
Calorimeter	CALF_EXR_P01 – Exercise Calorimeter Registers	1	1	1	1	1	1
Calorimeter	CALF_PEDESTALS_CI – Compute CAL Pedestals	X	X	2	2	2	2
Calorimeter	CALF_MU_OPTICAL – CAL Muon Optical Response	X	X	2	2	2	2
Calorimeter	CALF_MU_TREND – CAL Muon Optical Response Trending	X	X	2	2	2	2
<b>Calorimeter CPT</b>							
Calorimeter	CALU_INIT – Calorimeter Initialization	1	1	1	1	1	1
Calorimeter	CALF_EXR_P01 – Exercise Calorimeter Registers	1	1	1	1	1	1
Calorimeter	CALF_PEDESTALS_CI – CAL Pedestal Computation	X	X	2	2	2	2
Calorimeter	CALF_MU_OPTICAL – CAL Muon Optical Response	X	X	2	2	2	2
Calorimeter	CALF_MU_TREND – CAL Muon Optical Response Trending	X	X	2	2	2	2
Calorimeter	CALF_SHP_P01 – CAL Slow Shaper/Optimal T-Ack Calibration	X	X	2	2	2	2
Calorimeter	CALF_GAIN_P01 – CAL Electronic Gain Calibration	X	X	2	2	2	2
Calorimeter	CALU_COLLECT_CI_SINGLEX16 – CAL Collect Charge Injection	X	X	2	2	2	2
Calorimeter	CALF_ADC_P02 – CAL Front-End Integral Non-Linearity & Noise Determination	X	X	2	2	2	2
Calorimeter	CALU_COLLECT_CI – CAL Front-End Integral Non-Linearity & Noise Measurement	X	X	2	2	2	2
Calorimeter	CALF_ADC_P05 – CAL Front-End Droop Evaluation	X	X	2	2	2	2
Calorimeter	CALU_COLLECT_CI_SINGLEX16 – CAL Collect Charge Injection	X	X	2	2	2	2
Calorimeter	CALF_TRG_P01 – CAL-LO/CAL-Hi Trigger Enable/Disable	X	X	2	2	2	2
Calorimeter	CALF_TRG_P04 – CAL FLE/HLE Trigger Time Characterization	X	X	2	2	2	2
Calorimeter	CALF_SUPP_P01 – CAL LAC DAC Setting Characterization	X	X	2	2	2	2
Calorimeter	CALF_SUPP_P02 – CAL LAC DAC Setting Determination	X	X	2	2	2	2
Calorimeter	CALF_RNG_P01 – CAL ULD DAC Setting Characterization	X	X	2	2	2	2
Calorimeter	CALF_OVR_P01 – CAL Overload Recovery Evaluation	X	X	2	2	2	2
Calorimeter	CALF_DTM_P01 – CAL Event Deadtime Estimate	X	X	2	2	2	2



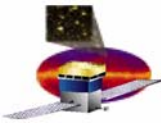
# Preliminary LPT/CPT Definitions (4 of 8)

Group	Test Title	S/S Config 1 Test	S/S Config 2 Test	S/S Config 3 Test	S/S Config 4 Test	S/S Config 5 Test	S/S Config 6 Test
<b>Subsystem Tests</b>							
<b>Power LPT</b>							
Power	calibTest – TEM/TPS Calorimeter Calibration High Voltage	4	4	2	2	2	2
Power	calibTest – TEM/TPS Tracker Calibration High Voltage	4	4	2	2	2	2
Power	calibTest – TPS Calibration Tower Current	4	4	2	2	2	2
Power	baisTest – TEM/TPS Margin and Bias Monitor	4	4	2	2	2	2
Power	tempTest – TEM/TPS Temperature Monitor	1	1	1	1	1	1
Power	basicTest – TEM Basic Function Test	1	1	1	1	1	1
Power	temFETest – TEM CAL/TKR Front End Connectivity	1	1	1	1	1	1
Power	temFIFOTest - TEM FIFO Functional Test	1	1	1	1	1	1
Power	funcTest – TEM Register Functional Test	X	X	X	X	X	X
Power	funcTest – TEM Calorimeter Noise Test	4	4	2	2	2	2
Power	funcTest – TEM Tracker Noise Test	4	4	2	2	2	2
Power	None – Heater Control Box Functional Test	X	X	X	X	X	X
Power	PduPowerGuiTest – PDU Load In-Rush, Total Power, and Over Current Protection	X	X	X	X	X	X
Power	PduControlTest – GASU Control & Monitor of PDU	1	1	1	1	1	1
Power	PduHardResetTest – PDU Power On Reset	1	1	1	1	1	1
Power	PduWLoadBoardTest – PDU Power Output & Telemetry Monitor Test	1	1	1	1	1	1
Power	PduControlStandAloneTest – Control/Selection of PDU Power Outputs	1	1	1	1	1	1



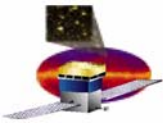
# Preliminary LPT/CPT Definitions (5 of 8)

Group	Test Title	S/S Config 1 Test	S/S Config 2 Test	S/S Config 3 Test	S/S Config 4 Test	S/S Config 5 Test	S/S Config 6 Test
<b>Subsystem Tests</b>							
<b>Power CPT</b>							
Power	calibTest – TEM/TPS Calorimeter Calibration High Voltage	4	4	2	2	2	2
Power	calibTest – TEM/TPS Tracker Calibration High Voltage	4	4	2	2	2	2
Power	calibTest – TPS Calibration Tower Current	4	4	2	2	2	2
Power	baisTest – TEM/TPS Margin and Bias Monitor	4	4	2	2	2	2
Power	tempTest – TEM/TPS Temperature Monitor	1	1	1	1	1	1
Power	basicTest – TEM Basic Function Test	1	1	1	1	1	1
Power	temFETest – TEM CAL/TKR Front End Connectivity	1	1	1	1	1	1
Power	temFIFOTest - TEM FIFO Functional Test	1	1	1	1	1	1
Power	funcTest – TEM Register Functional Test	X	X	X	X	X	X
Power	funcTest – TEM Calorimeter Noise Test	4	4	2	2	2	2
Power	funcTest – TEM Tracker Noise Test	4	4	2	2	2	2
Power	None – Heater Control Box Functional Test	X	X	X	X	X	X
Power	PduPowerGuiTest – PDU Load In-Rush, Total Power, and Over Current Protection	X	X	X	X	X	X
Power	PduControlTest – GASU Control & Monitor of PDU	1	1	2	2	2	2
Power	PduHardResetTest – PDU Power On Reset	1	1	2	2	2	2
Power	PduEnvTest – PDU Environmental Register Test	X	X	X	X	X	X
Power	PduWLoadBoardTest – PDU Power Output & Telemetry Monitor Test	1	1	2	2	2	2
Power	PduControlStandAloneTest – Control/Selection of PDU Power Outputs	1	1	2	2	2	2
Power	PduVoltageCal – PDU Voltage Monitoring Accuracy	X	X	X	X	X	X
Power	PduThermistorRtdCal – PDU Thermistor Monitoring Accuracy	X	X	X	X	X	X



# Preliminary LPT/CPT Definitions (6 of 8)

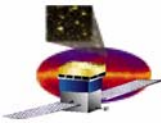
Group	Test Title	S/S Config 1 Test	S/S Config 2 Test	S/S Config 3 Test	S/S Config 4 Test	S/S Config 5 Test	S/S Config 6 Test
<b>Subsystem Tests</b>							
<b>Tracker LPT</b>							
Tracker	TE100 – Tracker Power Consumption	1	1	1	1	1	1
Tracker	TE201 – GTRC Config Register and Read-Back	1	1	1	1	1	1
Tracker	TE202 – GTFE Register Load and Read-Back	1	1	1	1	1	1
Tracker	TE203 – Readout Configuration Test	1	1	1	1	1	1
Tracker	TE301 – Gain and Noise Measurement	X	X	2	2	2	2
Tracker	TE302 – Single Strip Noise Occupancy	X	X	2	2	2	2
Tracker	TE307 – TREQ Check	X	X	2	2	2	2
Tracker	TE401 – Self-Triggering Test	X	X	2	2	2	2
<b>Tracker CPT</b>							
Tracker	TE100 – Tracker Power Consumption	1	1	1	1	1	1
Tracker	TE201 – GTRC Config Register and Read-Back	1	1	1	1	1	1
Tracker	TE202 – GTFE Register Load and Read-Back	1	1	1	1	1	1
Tracker	TE203 – Readout Configuration Test	1	1	1	1	1	1
Tracker	TE301 – Gain and Noise Measurement	X	X	2	2	2	2
Tracker	TE302 – Single Strip Noise Occupancy	X	X	2	2	2	2
Tracker	TE303 – GTFE Noise Occupancy Scan	X	X	2	2	2	2
Tracker	TE305 – Layer Trigger Threshold Scan	X	X	2	2	2	2
Tracker	TE306 – TOT Test	X	X	2	2	2	2
Tracker	TE307 – TREQ Check	X	X	2	2	2	2
Tracker	TE401 – Self-Triggering Test	X	X	2	2	2	2
Tracker	TE403 – Efficiency, Resolution, and Alignment	5	5	2	2	2	2
Tracker	TE601 – Threshold Calibration	5	5	2	2	2	2
Tracker	TE602 – TOT Conversion Parameter Calibration	5	5	2	2	2	2
Tracker	TE603 – MIP Calibration	5	5	2	2	2	2
Tracker	TE604 – Threshold Dispersion	5	5	2	2	2	2
Tracker	TE702 – Trigger Jitter Measurement	X	X	2	2	2	2
Tracker	TE703 – Dead Time Measurement	X	X	2	2	2	2
Tracker	TE704 – Noise Occupancy with Readout in Progress	X	X	2	2	2	2



# Preliminary LPT/CPT Definitions (7 of 8)

Group	Test Title	S/S Config 1 Test	S/S Config 2 Test	S/S Config 3 Test	S/S Config 4 Test	S/S Config 5 Test	S/S Config 6 Test
<b>Subsystem Tests</b>							
<b>Trigger &amp; Data Flow (T&amp;DF) LPT</b>							
T&DF	SIU/EPU Power-Up Test	1	1	1	1	1	1
T&DF	SIU/EPU Warm Boot, via Hardware Reset	6	6	6	6	6	6
T&DF	SIU/EPU Warm Boot, via Watchdog Timer Expiration	6	6	6	6	6	6
T&DF	SIU/EPU Cold/Warm Boot, via Command	6	6	6	6	6	6
T&DF	LAT Power On	1	1	1	1	1	1
T&DF	LAT Configuration	1	1	1	1	1	1
T&DF	GEM Timing Alignment	X	X	2	2	2	2
T&DF	Subsystem TACK Delay	X	X	X	X	X	X
T&DF	FLE Muon Scan	X	X	2	2	2	2
T&DF	Trigger Efficiency	X	X	2	2	2	2
T&DF	Trigger Window Test	X	X	2	2	2	2
T&DF	Nominal-rate CR	X	X	X	X	X	X
T&DF	CAL nominal-rate CR	X	X	X	X	X	X





# Preliminary LPT/CPT Definitions (8 of 8)

Group	Test Title	S/S Config 1 Test	S/S Config 2 Test	S/S Config 3 Test	S/S Config 4 Test	S/S Config 5 Test	S/S Config 6 Test
<b>Subsystem Tests</b>							
<b>T&amp;DF CPT</b>							
T&DF	SIU/EPU Power-Up Test	1	1	1	1	1	1
T&DF	SIU/EPU Warm Boot, via Hardware Reset	6	6	6	6	6	6
T&DF	SIU/EPU Warm Boot, via Watchdog Timer Expiration	6	6	6	6	6	6
T&DF	SIU/EPU Cold/Warm Boot, via Command	6	6	6	6	6	6
T&DF	LAT Power On	1	1	1	1	1	1
T&DF	LAT Configuration	1	1	1	1	1	1
T&DF	GEM Timing Alignment	X	X	2	2	2	2
T&DF	Subsystem TACK Delay	X	X	2	2	2	2
T&DF	FLE Muon Scan	X	X	2	2	2	2
T&DF	Trigger Efficiency	X	X	2	2	2	2
T&DF	Trigger Window Test	X	X	2	2	2	2
T&DF	Baseline CR	X	X	2	2	2	2
T&DF	Condition Scan CR	X	X	2	2	2	2
T&DF	Baseline CR trigger sub-tests	X	X	2	2	2	2
T&DF	Nominal-rate CR	X	X	2	2	2	2
T&DF	Nominal-rate condition scan CR	X	X	2	2	2	2
T&DF	CAL nominal-rate CR	X	X	2	2	2	2
T&DF	Baseline CR data volume sub-tests	X	X	2	2	2	2
T&DF	Nominal-rate CR data volume sub-tests	X	X	2	2	2	2
T&DF	VDG two-rate tests	X	X	2	2	2	2
T&DF	Deliberate Introduction of errors	X	X	2	2	2	2