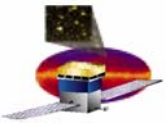


# GLAST Large Area Telescope: I&T Test Readiness Review

I&T Test History and Plans  
November 4, 2005

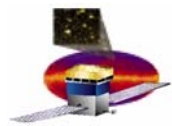
Larry Wai  
IFCT Manager  
SLAC



# Tests Executed to Date

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- “short tests”
  - Receiving tests
  - 10,12,14 bay tests
  - NCR related tests
  - STR tests
- Major test series
  - Single bay tests
  - 2-tower tests
  - 4-tower tests
  - 6-tower tests
  - 8-tower tests
  - 16-tower tests

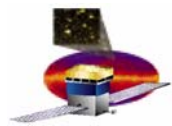


# LAT CPT – TKR History

**Module level CPTs  
executed through 6-  
tower tests**

**Acquisition in  
parallel from all  
modules from 8-  
tower tests**

LAT Integration Phase Valid LATTE TKR CPT Runs								
Rev. 10/28/05								
bay/config	TKR Receive	2-lower TKR	4-lower TKR	6-lower TKR	8-lower TKR	16-Tower TKR	GASU 1120	w/ ACD
Data Acquire (parallel)						135004819- 135004825		
Bay 0	132000044- FMA+FM104	135001317- 135001325	135002324- 135002331	135003127- 135003134	136001005- 136001011	132000154- 132000160		
Bay 1	133002242- FM2+FM103		135002362- 135002370	135003136- 135003143	140001996- 14002002	133002852- 133002858		
Bay 2	FM14+FM117					136001251- 136001257		
Bay 3	FM8+FM118					137000280- 137000286		
Bay 4	132000063- FMB+FM105	135001326- 135001334	135002271- 135002278	135003195- 135003202	134000962- 134000968	139005991- 139005997		
Bay 5	133002232- FM1+FM102		135002284- 135002292	135003118- 135003125	139005513- 139005519	134001403- 134001409		
Bay 6	141000313- FM12+FM115					132000165- 132000171		
Bay 7	141000321- FM13+FM116					133002859- 133002865		
Bay 8	133002323- FM5+FM107			135003186- 135003193	133002649- 133002655	139006000- 139006006		
Bay 9	133002252- FM3+FM106			135003658- 135003665	134000982- 134000983	139006014- 139006020		
Bay 10	141000198- FM7+FM111					134001410- 134001416		
Bay 11	141000208- FM9+FM112					133002866- 133002872		
Bay 12	141000170- FM6+FM110				140002003- 140002009	137000287- 137000293		
Bay 13	133002481- FM4+FM108				133002656- 133002662	139006007- 139006013		
Bay 14	141000263- FM10+FM113					133002874- 133002880		
Bay 15	141000303- FM11+FM114					132000173- 132000179		

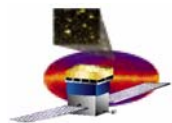


# LAT CPT – CAL History

**Module level CPTs  
executed through 6-  
tower tests**

**Acquisition in  
parallel from all  
modules from 8-  
tower tests**

LAT Integration Phase Valid LATTE CAL CPT Runs									
Rev. 10/28/05									
bay/test	CAL Receive	CAL Met.	2-tower CAL	4-tower CAL	6-tower CAL	8-tower CAL	16-tower CAL	GASU T120	w/ ACD
Data Acquire (parallel)							135004800- 135004815		
Bay 0	133002117	136000187-	135001391-		135003013-	136001012-	136001204-		
FMA+FM104		136000188	135001416		135003021	136001026	136001218		
Bay 1	133002091	135002227-		135002382-	135003210-	136001027-	132000108-		
FM2+FM103		135002252		135002407	135003218	136001041	132000122		
Bay 2	133002567-						133002824-		
FM14+FM117	133002594						133002838		
Bay 3	133002596-						137000250-		
FM8+FM118	133002623						137000264		
Bay 4	133002143	133002206-	135001420-		135003054-	140002023-	139005945-		
FMB+FM105		133002229	135001445		135003061	140002037	139005959		
Bay 5	133002058	135002181-		135002295-	135003222-	140002028	134001373-		
FM1+FM102		135002206		135002320	135003230		134001387		
Bay 6	133002537-	139005786-					141000365-		
FM12+FM115	133002564	139005804					141000379		
Bay 7	133002491-	139005807-					136001219-		
FM13+FM116	133002518	139005825					136001233		
Bay 8	133002153-	135002819-			135002933-	139005533	132000123-		
FM5+FM107	133002176	135002844			135002941		132000137		
Bay 9	133002181-	135002787-			135002973-	136001042	132000138-		
FM3+FM106	133002204	135002811			135002981		132000152		
Bay 10	133002364-	139005603-					139005960-		
FM7+FM111	133002389	139005621					139005974		
Bay 11	133002393-	139005669-					134001308-		
FM9+FM112	133002418	139005687					134001402		
Bay 12	133002335-					137000030	135004826-		
FM6+FM110	133002360						135004840		
Bay 13	133002296-	136000806-				133002673	137000265-		
FM4+FM108	133002321	136000831					137000279		
Bay 14	133002426-	139005716-					139005975-		
FM10+FM113	133002450	139005734					139005989		
Bay 15	133002455-	139005737-					136001234-		
FM11+FM114	133002479	139005755					136001284		



# LAT Operational Tests (pre-ACD)

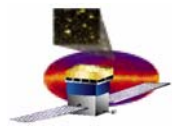
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## System configurations

1. Timing (first 8 bays only)
  - Trigger request alignment
  - Trigger acknowledge optimization
2. Trigger thresholds (first 8 bays only)

## Data Collection

1. Calibration (first 8 bays only)
  - Charge injection data
  - Cosmic ray trigger data
2. Efficiency (first 8 bays only)
  - Muon Telescope
3. End-to-end (first 2 bays only)
  - Various rates, configs



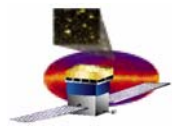
# Open Test NCRs

**Open test NCRs reviewed by I&T, systems, QA, ELX, TKR, CAL, ACD**

**All agree – OK to install ACD**

**More in Pat's talk**

Open I&T Test NCRs				QA review	onl. Rev	need MRB	need ana.	need test	in stall	ACD	OK
NCR#	date opened	description of problem and completed activities	status								
Rev. 11/02/05 L.Wai											
281	1/16/2005 12:00	FMA AVDDB current is 176mA for C45 (out of family); TKR says use-as-is	QA reviewing closure	√							√
297	1/29/2005 18:45	TE702 trigger jitter > 250 ns	online CCB approved mods							√	√
432	4/15/2005 8:05	Resistance to ground >2.5mOhm for FMA & FMB	QA reviewing closure	√							√
443	4/27/2005 16:53	CAL file difficulties in trigger tests near noise threshold	Martin modified his script	√							√
458	5/10/2005 9:07	vhdl bug in TEM;very low error rate; Gunther says "use as is"	needs w riteup by Mke	√							√
477	5/16/2005 14:22	TEM FIFO overflow error events	L.Wai to analyze TKR+ACD				√				√
487	5/23/2005 17:24	CAL register test failure; Ric thinks it's housekeeping interference	test is obsolete	√							√
529	6/16/2005 13:51	TKR GTFE readback error in bay 9; freq. scans done; res. Meas. Done	no more action for now	√							√
532	6/16/2005 21:59	TIC mux_config readback error due to housekeeping verified by test	resolved	√							√
535	6/20/2005 8:15	Duty cycle margin failure in FM4 (see NCR516, closed TKR NCR)	need QA review	√							√
539	6/20/2005 18:27	TKR trig diag. not latched in TkrDataTaking; schema fixed, runs retaken	QA reviewing closure	√							√
549	6/27/2005 14:53	Tracker alarm over temperature, out of family temps, and telemetry glitches	need MRB			√					√
550	6/27/2005 15:24	TEM errors were observed during TE704 test set up; no errors on rerun	need QA to review this	√							√
562	7/14/2005 13:09	GLAT 1752 / 1753 TEMTPS assys have not been reworked	bays 0/4 TPS replaced	√							√
592	7/29/2005 16:52	thermistors for the odd numbered bays are rotated 180 degrees	need MRB			√					√
604	8/11/2005 10:06	bay 4 TkrReadingConfigurationTest failure on x0, FE0; pass w / lights off	resolved	√							√
607	8/12/2005 14:33	LAT CPT - CAL section, data acquisition TEM errors - test software mods	online CCB approved mods	√							√
608	8/12/2005 14:39	LAT CPT - CAL section, range disc. scan, some miss transition	online CCB approved mods	√							√
609	8/12/2005 14:45	LAT CPT - CAL section, FLE disc. scan analysis, fail on fit parameter	need algorithm tweaking	√							√
617	8/17/2005 16:39	LAT CPT - TKR section, bay 12 TkrLayerTriggerRate failure - new hot strip	same cause as NCR700	√							√
618	8/22/2005 16:32	ACD CPT - software CNO counters show excess counts from injection	resolved; online modifying		√						√
624	8/27/2005 15:11	ACD Thermistor reading fluctuating between 5 degrees to a negative 50	need MRB			√					√
625	8/27/2005 15:14	AcidVetoHitmapPha - Garc11 Gafe17 High TCI HW Count of 2 (expect 0)	need trend analysis				√				√
626	8/27/2005 15:16	rates exceeded 1 kHz between -10 C to -15 C in tile 320	need MRB			√					√
648	9/13/2005 15:38	ACD CPT - AcidGafeNoise algorithm fails to find 10% and 90% levels	Lester is doing it		√						√
652	9/13/2005 16:28	ACD triggered ops show s event number skipping between events	look for this w / GASU1120				√				√
654	9/13/2005 16:36	ACD Triggered Ops, single adc hit tiles	L.Wai to analyze TKR+ACD				√				√
667	9/20/2005 22:53	GEM discarded events due to CAL trigger requests during deadtime	no more action for now	√							√
684	10/3/2005 9:10	bay 14 TKR layer X11 show s transient large occupancy in low est ladder	Hiro is analyzing data				√				√
685	10/3/2005 14:42	ACD. AcidHidCal causes large excess counts in GARC11, GAFE13	no pmt?				√				√
689	10/6/2005 11:18	ADCs in bay 9 TEM show commanding problems	resolved (bad conn.saver)	√							√
700	10/18/2005 9:52	incompatibility between TKR CPT scripts on hot strip definition	hot strip list locked down	√							√
706	10/18/2005 16:38	excessive ACD veto retriggers after injection of "large" charge levels	Mike will study in his lab				√				√
711	10/21/2005 15:07	Power on current measurement for grid 16 tower, exceeded limits.	Rick Bright is studying				√				√
712	10/24/2005 9:05	16 Tower performance test data acquisition crashes (same as NCR709)	resolved	√							√



# 16 Towers + ACD tests (pre-FSW)

**Pre-test review at 2pm,  
Tuesday Nov.8**

16 Tower w/ACD Test Plan (pre-FSW)					
Rev. 11/4/05 L.Wai					
Sub-Series	Test	Purpose	Time (hr)	Totals	Time (hr)
ACD Integration	safe-to-mate	LAT interface safe-to-mate	8	ACD Integration:	8
LAT CPT	AEM/ACD Clock Phase Bit Test	ACD/DAQ clock	4		
LAT CPT	GASU register test	ACD register test	4		
LAT CPT	register test - redundant	Check for TEM errors	4		
LAT CPT	register test - primary	Check for TEM errors	4		
LAT CPT	ACD CPT	Baseline LAT CPT	16		
LAT CPT	LAT CPT - TKR Section	Baseline LAT CPT	8		
LAT CPT	LAT CPT - CAL Section	Baseline LAT CPT	8	LAT CPT:	48
TRIGGER	ACD Map Uniformity w / charge injection	Check ROI arrival times	4		
TRIGGER	ACD TREQ timing w / external trigger	Check ROI arrival times	8		
TRIGGER	FLE Threshold minimization	reduce walk in CAL FLE	4		
TRIGGER	tower TREQ scan using ACD trigger	TREQ alignment for all towers	8		
TRIGGER	ACD hit delay and stretch scans	ACD data latch optimization	4		
TRIGGER	ACD TACK scan	ACD TACK optimization	8		
TRIGGER	tower TACK scan (last 8 towers)	tower TACK optimization	8		
TRIGGER	Muon Run w / ACD veto	ACD veto functionality	4		
TRIGGER	TKR, CAL, ACD Efficiency Runs	subsystem efficiency	4	TRIGGER:	52
CALIB	CalibDac (CAL discriminator scans)	CAL thresholds calibration	5		
CALIB	CalibGen (CAL charge injection scan)	CAL ADC calibration	3		
CALIB	MuTrig (CAL muon data)	CAL energy calibration	8		
CALIB	TE601 (TKR threshold scan)	TKR threshold calibration	4		
CALIB	TE602 (TKR full range charge injection scan)	TKR TOT calibration	4		
CALIB	TE604 (TKR charge scan at threshold)	TKR threshold dispersion	4	CALIB:	28
TKR perf.	TE702 (TKR trigger jitter)	tracker performance test	4	TKR Perf:	4
SVAC	e2e B-2, B-10, B-13 (1 minute ea.)	Configuration Validation	2		
SVAC	e2e B-13 (15 min)	SVAC data collection	2		
SVAC	e2e B-10 (15 hours)	SVAC data collection	20		
SVAC	e2e B-2 (4 hours)	SVAC data collection	6	SVAC:	30
				TOTAL:	170
Sign-off:	I&T Management	_____			
	Systems Engineering	_____			
	Quality Assurance	_____			



# 16 Towers + ACD tests (LICOS/FSW)

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Pre-test review ~11/23 will cover:

- LATTE tests w/ LICOS-compatible CPT scripts
- LICOS/FSW tests

EGSE

- Mobile computing rack (Linux)
- LATTE (backdoor)
- LICOS/FSW/SIU/VSC/associated EGSE