



GENERAL DYNAMICS

Advanced Information Systems

Integrated Space Systems

GLAST Pre-Ship Review (PSR) LAT Payload I&T Review

CONTRACT NO. NAS5-00110, D.O. NO. 11, CDRL NO. 24

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1-2 November 2007

LAT Presentation Overview



- **LAT Status**
 - Project Milestones
 - LAT Configuration Summary
- **LAT Test Summary**
 - LAT QAR Status
 - LAT RFA/Waiver Status
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- **Conclusion**

LAT Project Milestones

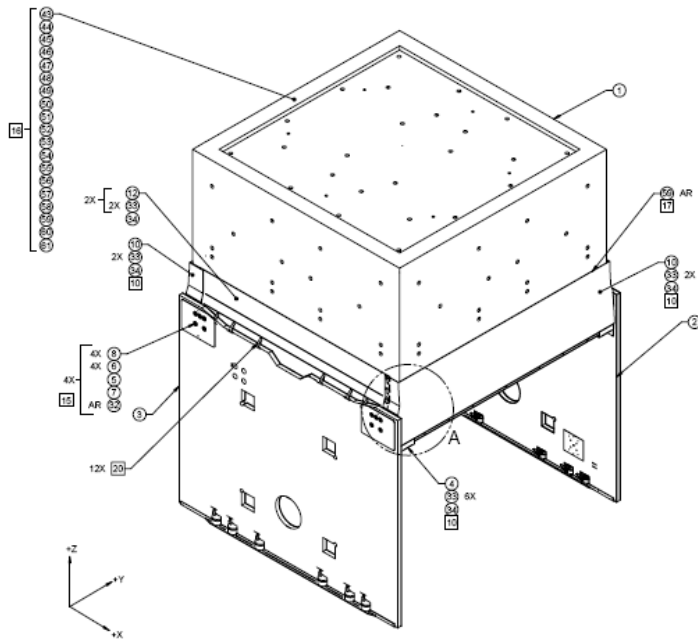


First International GLAST Meeting	August-94
GLAST Mission Concept Study	March-95
GLAST NASA SR&T Program	February-96
GLAST Advanced Technology Development Program	August-97
GLAST Mission Proposal to NASA	November-99
GLAST Mission Selection	February-00
Preliminary Design Review	January-02
Critical Design Review	May-03
First Flight Tracker and CAL Modules Installed in GRID	April-05
All 16 towers and Anticoincidence Detector installed on LAT	November-05
All flight DAQ modules installed on LAT	February-06
LAT Pre Environmental Test Review	May-07
LAT Pre Ship Review	September-06
LAT Integration with Observatory	December-06
Post Integration Functional Test Complete	January-07
First Observatory CPT	March-07
Observatory pre-Environmental Review	April-07
Observatory NRL pre-Ship Review	November-07

Current Configuration



- As built configuration
 - LAT-DS-1624 LAT Top Assembly
 - Radiators flight installed
 - LAT MLI closeout (ECD prior to TVAC)



LAT Summary Status



- **LAT is integrated with the spacecraft and has successfully completed EMI/EMC, Sine Vibe, Acoustic tests**
 - Verified by the successful completion of 3 CPT's
- **No major failures or environmental susceptibilities have been identified**
- **No significant performance changes throughout the program**
- **LAT requirement verification sell off is in progress**
 - 411 of 458 Total Requirements Verified
 - Additional requirements will be closed by:
 - Completion of TVAC test

LAT Unit Run Time



- As of Oct 26, 2007 the LAT passed 700 operating hours since the timer fix was installed
- FSW B1.0.1 has 281 operating hours

LAT Unit Operating Time (Hrs)												
SIU-P	SIU-R	GASU-P	GASU-R	EPU-P0	EPU-P1	EPU-R	CAL/TKR /TEM	ACD	ACD HV1	ACD HV2	PDU-P	PDU-R
2011	2080	1970	2121	2101	3963	2118	4091	4091	1994	2097	2016	2075

- Note that the EPUs are 2 for 3 redundant and most test time is in configurations 1 and 2. Since EPU-P1 is on in both of those configurations it has double the run time of the other EPUs

Status of LAT Related QARs



QAR	Date Opened	Affected Hardware	Problem Description	Category	LAT NCR	Resolution
11964895	10/17/06	Mech	Replace modified ACD to LAT blankets	Hardware Discrepancy	942	Close at launch base
11964896	10/17/06	DAQ	ACD FREE board 5 not responsive after power up	CND	946	Monitor
11964897	10/17/06	DAQ	LATC verify occasionally reports errors in CRC, SPT, ARC	CND	855	Monitor
11965169	4/11/07	DAQ	Grid radiator interface thermistors were swapped in Observatory telemetry database	Software Change	N/A	Close before ship to NRL
11965239	6/04/07	DAQ	One heat pipe temp sensor showed occasional erroneous readings	Hardware Discrepancy	N/A	Use as is
11965246	6/19/07	Mech	Areas of contamination observed on ACD blanket	Hardware Discrepancy	N/A	Area cleaned pre-Dynamics test. Reinspect post-TVAC
11965333	8/20/07	Mech	Small indentation on +Y radiator surface after contact with solar array	Hardware Discrepancy	N/A	Use as is
11965409	10/10/07	Mech	Found two broken ground wires (X-LAT blanket and LAT shorting plug)	Hardware Discrepancy	N/A	Repair/rework

RFA/Waiver Status



- **RFAs from previous LAT reviews**
 - PDR RFAs all closed
 - dPDR RFAs all closed
 - CDR RFAs all closed
 - PER RFAs all closed
 - PSR RFAs all closed
 - Observatory PER RFA's all closed
- **Waiver status change since PER**
 - 3 New LAT Waivers

CCR #	Title	Description	Status
466-0505	RS103 CAL Susceptibility	Observed excess calorimeter triggers and occupancy near 280MHz..	Approved
466-0506	RS103 Temp Sensor Susceptibility	Observed a susceptibility in a subset of LAT RTD's during the 30-100MHz sweep	Approved
466-0511	Use of 50V Capacitors in under 10V applications without screening	Ceramic 50V capacitors used in <10V applications were not screened prior to use per MIL-C-123 Group B, Subgroup 2.	Approved

LAT Risk Summary



- No new LAT risks identified
 - All LAT risk items remain low

LAT Level Verification Status



Category	Verification Method					Totals	
	Test	Demo	Analysis	Inspection	Children	Complete	% Comp
	# Comp	# Comp	# Comp	# Comp	# Comp		
Requirement Identified	105	63	209	37	44	458	100.0%
Flow Down Complete	105	63	209	37	44	458	100.0%
Draft Verification Plans	105	63	209	37	44	458	100.0%
Final Verification Plans	105	63	209	37	44	458	100.0%
Verification Plans Executed	104	63	194	35	15	411	89.7%
Verification Reports Submitted	104	63	194	35	15	411	89.7%
Requirements Sold	104	63	193	35	15	410	89.5%
Expect Compliance	0	0	0	0	0	0	0.0%
Verifications Plan Deferred	1	0	15	2	29	47	10.3%
Requirements Issues	0	0	0	0	0	0	0.0%
Total VPs	105	63	209	37	44	458	

- All 458 VPs are Final
- 410 of 411 VPs planned for execution have been approved by GSFC
 - 1 SRD VP (Background Rejection) in work by GSFC
- **Status**
 - VCRM version 27 released
 - All deferred GRB reqts will be sold post FSW B1.0 installation

LAT Instrument Performance Summary



- **LAT detector status**
 - **LAT instruments fully functional on the Spacecraft**
 - **Performance measured at GD-AIS prior to integration**
 - **LAT Baseline performance confirmed**
 - **Post-integration performance measured at GD-AIS**
 - **Baseline functional performance confirmed**
 - **Awaiting pre-TV calibration**
 - **Post EMI/EMC performance verified at GD-AIS**
 - **Baseline functional performance confirmed by CPT**
 - **Post Dynamics test performance verified at GD-AIS**
 - **Baseline functional performance confirmed by CPT**
 - **Integrated LAT is ready for TVAC test**

LAT FSW Summary



- **FSW B1-0-1 meets all 183/183 requirements**
 - > 200 hours of run time with this build
- **Spontaneous reboots resolved**
 - > 700 reboot-free hours since FSW fix installed
 - Reboot problem had minimal impact on LAT and Observatory testing
- **No LAT FSW liens**

Conclusion



- LAT testing after integration with the spacecraft successfully completed
- LAT performance after EMI/EMC and Dynamics test verified by test.
- No liens open which preclude shipment to NRL
- LAT is ready for Observatory TVAC test