

LAT Monthly Status Review

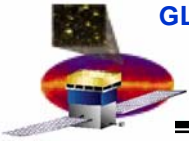
27 Sep 2005

Design Integration and Analysis

Martin Nordby

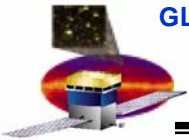
John Ku

Jack Goodman



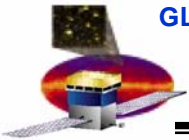
Design Support Status

- **Flight/fly-away hardware designs (all remaining hardware listed)**
 - **MLI blankets: draft drawings out for check (with Marc Campell)**
 - **TKR accel mount bracket: drafts checked; ECD: Sep 30**
 - **Cable support brackets: drafts checked; ECD: Sep 30**
 - **Heat Pipe shims, spacers: drafts checked; ECD: Sep 30**
- **Assembly drawings (all remaining assembly drawings listed)**
 - **LAT-DS-06721 External Cable Installation Kit**
 - **First draft complete and in check with Electronics**
 - **LAT-DS-02563-01 LAT Instrument Assembly**
 - **First draft checking finished; updates in work; pushing for Sep 30 ECD**
 - **LAT-DS-01624-01 LAT Top Assembly**
 - **Model up-to-date, but drawing not yet started**
- **Interface Drawings**
 - **All interface drawings released and up-to-date with no known liens**



Integration Planning

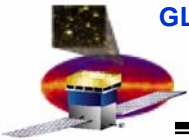
- **LAT Integration Sequence (LAT-MD-00676-04)**
 - Updated revision released in Sep—this included early ACD integration option that was not exercised
 - Plan to reconvene integration working group to investigate early ACD integration options
- **Configuration drawings**
 - **LAT Instrument Configuration Assembly**
 - Will be released with LAT Instrument Assembly flight hardware drawing
 - Both are waiting final info on heat pipe 3-way joint design
- **Integration MGSE (all remaining integration MGSE listed)**
 - **ACD Lift Fixture**
 - Lift Fixture fabricated, assembled, and proof tested in September
 - No problems with this
 - Drawings still in release cycle: [Fouts](#), Cullinan, Ortiz, Ku
 - **EM-SIU Mount Plate**
 - Parts in fabrication now—needed for early SIU integration, if this is implemented



Environmental Test: Plan-Level Documents and Status

- The following documents (in total) form the technical bases for LAT environmental testing

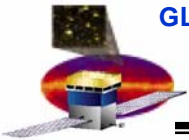
Document	Title	Status	ECD
LAT-MD-02717-01	LAT Environmental Test Sequence		Released
LAT-MD-01196-03	LAT Dynamics Test Plan	In release cycle (<u>Fouts</u> , Bloom, N. Johnson, Dizon, Ku, Hascall)	
LAT-MD-00276-02	LAT EMI/EMC Test Plan	In release cycle (<u>Bloom</u> , Fouts, Dizon, Ku, Lovellette, Hascall, Cullinan, Horn)	
LAT-MD-01600-03	LAT Thermal-Vacuum Test Plan		Released
LAT-SS-06640-01	LAT Environmental Test MGSE/STE Requirements	In release cycle (<u>Ku</u> , Dizon, Hascall)	
LAT-PS-06898-01	LAT Environmental Test Implementation Plan	Final draft in work	ECD: Sep 30
LAT-MD-06560-01	Plan for Integrating and Testing the LAT on the Observatory	Updated based on Spectrum F2F meeting Out for review at Spectrum	



Environmental Test: Configuration Drawings and Status

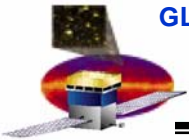
- These show flight hardware and MGSE/STE in their test configuration
 - Includes all information needed to support test set-up procedures
 - Shows all mechanical test and handling equipment that is used for the test
- Configuration Assemblies being worked in conjunction with finalizing MGSE designs for the tests

Drawing	Title	Status	ECD
LAT-DS-06186	Handling Configuration Assembly	First draft completed in July Draft on hold (3 rd priority)	
LAT-DS-06184	Transport Configuration Assembly	Waiting Transport Container final design	
LAT-DS-06187	Horizontal Vibration Test Configuration Assembly	Modeling completed in Aug Drafting on hold (2 nd priority)	
LAT-DS-06190	Vertical Vibration Test Configuration Assembly	Modeling completed in Aug Drafting on hold (2 nd priority)	
LAT-DS-06189	EMI/EMC Test Configuration Assembly	EGSE cable lengths finalized at NRL F2F Drafting on hold (3 rd priority)	
LAT-DS-06188	Acoustic Test Configuration Assembly	Modeling completed in Aug MGSE design in work Drafting underway (1 st priority)	Early Oct
LAT-DS-06185	Thermal-Vacuum Test Configuration Assembly	Thermal STE design reviewed at NRL F2F Drafting underway (1 st priority)	Mid Oct



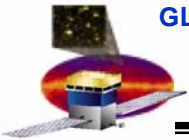
Environmental Test MGSE/STE

- **Transport Container**
 - **Second-round design review planned for first week in October**
- **Test Interface Plate**
 - **Complete**
- **Test Stand/Spreader Bars**
 - **Contract being placed now**
 - **3 drawings updated based on vendor comments—in release cycle now**
- **T-Vac Sink Plates and Cal-Rod Cage**
 - **Design complete—reviewed at NRL F2F**
 - **Drawings in work now—ECD is Sep 30**
- **Acoustic Simulator**
 - **Detailing underway—completion waiting designer availability (ECD: Oct 7)**
- **Mass Properties Plate**
 - **Not started**



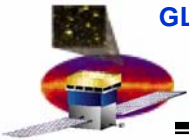
Thermal Engineering Activities – Completed

- **Design Engineering and Support**
 - N/A
- **LAT Level Thermal Analysis and Tests**
 - Simple analysis model completed to determine feasibility of using purge grooves for cooling air space between Trackers and ACD during non-TVAC ground testing
- **Subsystem Support and Oversight**
 - Supported TKR 11, 12, 13 and 14 TVAC test at Alenia, 5 Sept – 16 Sept
- **LAT Thermal Control System**
 - Radiator Protoqual test completed
- **Lockheed Thermal Control System Hardware**
 - Radiator Protoqual test completed.



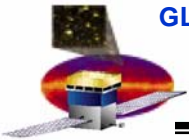
Thermal Engineering Activities – Current

- **Design Engineering and Support**
 - Environmental Specification – change Tracker Acceptance Level Tests (35C to 45C)
 - Reviewing electrical grounding scheme for MLI blankets with NASA/GSFC
 - Reviewing designs for TVAC specialized thermal test equipment
- **LAT Level Thermal Analysis and Tests**
 - Thermal math model for LAT TVAC Test almost complete; LAT support stand GSE will be incorporated into model when time becomes available
 - Modification of orbit thermal model to predict ground operation temperatures with integrated ACD. Evaluate ground cooling schemes
 - Comparison of heat pipe subroutines – LM and C&R – in LAT thermal math model with intent to replace LM with C&R so model is not LM proprietary
- **Subsystem Support and Oversight**
 - Reviewing ACD thermal vacuum test report
- **LAT Thermal Control System**
 - Correlation of radiator Protoqual test data with LAT thermal math model, in progress
- **Lockheed Thermal Control System Hardware**
 - Radiators being prepared for shipment to SLAC



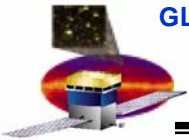
Thermal Engineering Activities - Planned

- **Design Engineering and Support**
 - Complete detailed MLI design
 - Review, then fabricate MLI blankets; two sets, one set for tests and other for flight
- **LAT Level Thermal Analysis and Tests**
 - Thermal Math Model, Ver. 6.1, reduced node
 - Thermal Math Model, Ver. 6.2, LAT TVAC test configuration and test predictions.
 - Document analysis of LAT transition from Survival to Operating Mode
 - 200 Node Launch Vehicle Thermal Math Model
- **Subsystem Support and Oversight**
 - Support TVAC tests of all eboxes
- **LAT Thermal Control System**
 - TCS verified in LAT TVAC tests at NRL
- **Lockheed Thermal Control System Hardware**
 - Deliver Radiators to SLAC



Structural Analysis: Accomplishments

- **LAT System Level**
 - **Grid Static Load Test (GSLT)**
 - Reviewed NTS test frame drawings
 - **Continued LAT Environmental test planning**
 - Acoustic test: Worked on radiator strut support stiffness issue
 - Created TIP reduced stiffness model for use in pre-test analyses
- **LAT Subsystem Level**
 - **MGSE**
 - Some additional calculations performed to complete ACD lift fixture analysis
 - Completed spreader bar analysis
 - Completed assessment of test stand weldment for critical welds – none present
 - **Mechanical Subsystem**
 - Supported Radiator PSR



Structural Analysis: Near-term Milestones and Status

- **LAT System Level**
 - **LAT Static Testing**
 - Complete Pre-test analysis: predictions, fixture evaluation, package out 10/11; hold TRR 10/13/05
 - Support testing end of October (approx two weeks after TRR)
 - **LAT Dynamics Testing**
 - Update LAT vibration test predictions – ECD = Nov 2005
 - Work with GSFC on test levels
 - Support Pathfinder activities at NRL – ECD = ongoing through Nov 2005
 - Continue planning with I&T and NRL for LAT environmental testing – ECD=ongoing through test
 - **MGSE for I&T: augment MGSE analysis with additional I&T needs, as required**
 - Check rest of test stand assembly for critical welds ECD=09/30/05
 - Tune Radiator strut stiffness if needed (need input from GSFC on sensitivity) ECD=10/03/05
- **LAT Subsystem Level**
 - Develop strength test plan for radiators ECD=10/07/05
 - Support radiator static tests @ SLAC ECD=10/28/05
 - **EBOX Subsystem**
 - Complete TEM/TPS Vibration test report
 - Support GASU and PDU Protoflight tests