

LAT Monthly Status Review

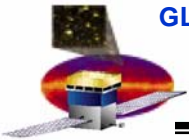
30 June 2005

Design Integration and Analysis

Martin Nordby

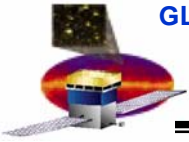
John Ku

Jack Goodman



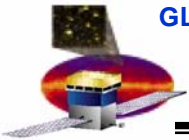
Design Support Status

- **Flight/fly-away hardware designs (all remaining hardware listed)**
 - √ Accelerometer mount brackets: drawings released
 - √ Temp Sensor Brackets : drawings released
 - √ Accelerometer mount brackets: drawings released
 - MLI blankets: detailed drawings in-work (ECD: 7/15)
 - External fly-away instrumentation cables: in-work
 - TKR accel mount bracket: in-work
- **Assembly drawings**
 - LAT-DS-05210-01 Cable Installation Kit
 - Put in release cycle this month
 - LAT-DS-02561-01 LAT Tower and Electronics Assembly
 - Released this month
 - LAT-DS-06721 External Cable Installation Kit
 - New assembly-level drawing to capture all external cabling details
 - In work: updating external cable routing
 - LAT-DS-02563-01 LAT Instrument Assembly
 - Modeling complete, drafting awaits completion of External Cable Install Kit drawing
- **Interface Drawings**
 - LAT-DS-00309-04 ACD-LAT IDD
 - Released this month



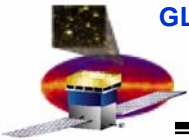
Integration Planning

- **LAT Integration Sequence (LAT-MD-00676-03)**
 - **Convened review committee to revise this with current thinking for post-tower integration and test work**
- **Configuration drawings**
 - **LAT Instrument Configuration Assembly**
 - **Drawing on hold pending completion of ACD lift fixture—waiting design support (need date is Oct)**
- **Integration MGSE (all remaining integration MGSE listed)**
 - **LAT auxiliary cooling**
 - **Chill Bar assemblies: completed this month**
 - **Parts, assembly, procedures: completed this month**
 - **Chiller: delivered and commissioned this month**
 - **System is in-use on LAT**
 - **ACD Lift Fixture**
 - **Design still on the drawing board**



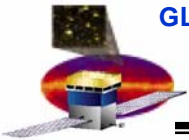
Environmental Test Planning

- **LAT Environmental Test Sequence**
 - Release held up to resolve LAT functional testing issues
 - In release cycle again—expect release any day
- **Dynamics Test Plan**
 - In second review at GSFC/Swales
 - Instrumentation fully specified and purchased
 - Release is imminent
- **EMI/EMC Test Plan**
 - Final draft ECD is this week
 - Instrumentation fully specified and available at NRL
 - Still working on updating test parameter requirements with Fred Blanchette
- **T-Vac Test Plan**
 - Held follow-on PDR on thermal test plans this month
 - Finalized LAT environmental control plans: cal-rod heater cages and passively cooled sink plates
 - Test Plan has been revised, including updated instrumentation list and test sequence
 - Instrumentation 95% specified: completion waiting on completion of STE design
 - Release is imminent



Environmental Test MGSE/STE

- **Transport Container**
 - Source Control Drawings and Statement of Work: completed this month
 - RFP is due back this week—then we will place the order ASAP
- **Test Interface Plate**
 - Parts drawings completed this month
 - Parts: out for fabrication
 - Assembly drawing: completed this month; considerable work in spec'ing out Spectrum's flexure interfaces to the Grid and our test plate (this is not well-documented at Spectrum)
- **Test Stand**
 - Conceptual design in structural analysis now—will likely need minor mod's
 - Specifying hardware now
 - Extension Beam design just started
 - This is critical path for MGSE, since Pathfinder program needs this in mid-October
- **T-Vac Sink Plates and Cal-Rod Cage**
 - Conceptual design completed this month: uses existing NRL power supplies with all-passive cooling
 - Detailed thermal and electrical design started
 - Mechanical design to be started in early July
- **Spreader Bars**
 - Design started
 - Awaiting structural analysis



Structural Analysis: Accomplishments

- **LAT System Level**

- **T** Continued LAT Static test plan development

- **T** Continued LAT Environmental test planning

- Completed draft of Test Plan

- **I** **T**

- Completed analysis of TIP (Test Interface Plate)

- Completed first look at Test Stand (design/analysis iteration stage)

- Verified ACD Instrumentation set

- Researched overall allowable cable lengths (s.b. < 100 ft total from accel to computer)

- **I** **T**

- **Completed LAT10.09 FEA Model**

- Incorporated new ACD model

- Updated Grid model for changes since delta-CDR

- Other minor model clean-up

- **LAT Subsystem Level**

- **I** **T**

- **MGSE**

- ACD Lift frame analysis complete

- Evaluated margins of safety for Observatory lift by the LAT

- **T**

- **TKR Subsystem**

- Continued support of TKR testing at Alenia

- Continued to review all TKR vibration test reports from INFN/Bari

- **T**

- **Mechanical Subsystem**

- Supported radiator test readiness reviews

- **D**

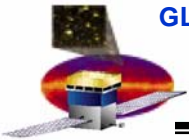
- **EBOX Subsystem**

- Completed Cable Tray analysis

D = Flight Design

I = Integration Prep

T = LAT/SS Test Prep



Structural Analysis: Near-term Milestones and Status

- **LAT System Level**

- **T** **LAT Static Testing**

- Visit NTS on Wednesday 6/29/05
 - Review test philosophy and load cases with mechanical branch on Thursday 6/30/05

- **I****T** **LAT Dynamics Testing**

- Define flexure strain gauge locations to facilitate load input calculation – ECD = 7/22/05
 - Update LAT vibration test predictions – ECD = 9/1/05
 - Continue planning with I&T and NRL for LAT environmental testing – ECD=ongoing through test

- **I** **MGSE for I&T: augment MGSE analysis with additional I&T needs, as required**

- LAT Test Stand MGSE and associated handling procedures and test environments – ECD = 7/8/05

- **LAT Subsystem Level**

- **T** **TKR Subsystem**

- Continue to support testing in Italy (help from GSFC is lined up)

- **T** **Mechanical Subsystem**

- Get Instron back online in order to proof test flexures – ECD = 7/14/05
 - Proof Test Spectrum provided flexures TRR – ECD = 7/15/05
 - Shear plate qualification test report – ECD = 7/15/05
 - Grid Static Load Test procedures, STE, TRR – ECD = 8/5/05
 - Support radiator acoustic and sine vibe tests (over the next month) – ECD 7/29/05

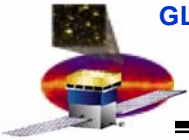
- **I****T** **EBOX Subsystem**

- Complete TEM/TPS Vibration test report
 - Support GASU and PDU Protoflight tests

D = Flight Design

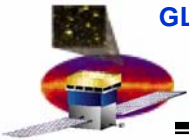
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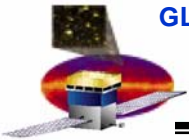
Thermal Engineering Activities – Completed

- **Design Engineering and Support**
 - Supported test design to measure thermal conductance of HP bonded triple joint.
 - Finalized MLI blanket outer layer design (0.003” Kapton) between SLAC, LM and SAI
 - Supported design and installation of Grid heat exchangers for room temperature cooling
- **LAT Level Thermal Analysis and Tests**
 - LAT TVAC S/C bus simulation, ACD and radiator sink plates thermal design finished – heater circuit design will start this week
 - LAT TVAC Test Plan document finished
- **Subsystem Support and Oversight**
 - Supported ACD request to eliminate thermal balance testing
- **LAT Thermal Control System**
- **Lockheed Thermal Control System Hardware**
 - X-LAT Plate Protoqual Test completed
 - Ultrasonic tests of heat pipe bond joints before and after 12 thermal cycles
 - Minor/negligible de-bonds found, MRB planned for discussion of results
 - Radiator Protoqual Test Plan finished



Thermal Engineering Activities – Current

- **Design Engineering and Support**
 - Environmental Specification – change Tracker Acceptance Level Tests (35oC to 45oC)
 - Reviewing electrical grounding scheme for MLI blankets with NASA/GSFC
- **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 - after radiator/TCS protoqual tests
 - TVAC Test Procedures document started
- **Subsystem Support and Oversight**
 - Continued support for TKR TVAC Acceptance Testing; TKR 6 and 7 early July?
- **LAT Thermal Control System**
 - Test setup to measure thermal conductance of VCHP triple joint using mold release material in progress; test scheduled to start 7/1
- **Lockheed Thermal Control System Hardware**
 - Radiator/TCS Protoqual Test planned for July 2005
 - TVAC Test Procedures in progress
 - MGSE design finished; fabrication/assembly to begin early July
 - EGSE to run TCS software/hardware to be finished and delivered to LM early/mid-July



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
 - 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
 - Support TVAC tests of TKR 6 -16
 - Support ACD TVAC test
- **LAT Thermal Control System**
 - Preliminary verification during LM Radiator Protoqual Tests
 - TCS verified in LAT TVAC tests at NRL
- **Lockheed Thermal Control System Hardware**
 - Ship X-LAT Plate to SLAC