LAT Monthly Status Review

26 April 2005

Design Integration and Analysis

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Design Support Status

• Flight/fly-away hardware design (all remaining hardware listed)
  √ X-Side Blanket Bar and mount brackets: drawings in release cycle
  √ X-Side Connector Panels: drawings in release cycle
  √ Y-Side Connector Panel: drawings in final check
  √ Internal cables: drawings complete and released
  – External cables: revisions of ACD cable length in final check
  – Accelerometer mount brackets: design complete, drawings in first check
  – MLI blankets: working design and interface details in prep for SASS meeting in mid-May
  – External fly-away instrumentation cables: in queue after above work is finished

• LAT-DS-02560-01 LAT Tower Assembly
  – Released this past month

• LAT-DS-05210-01 Cable Installation Kit
  – First-round check print ECD 4/29

• LAT-DS-02561-01 LAT Tower and Electronics Assembly
  – Second-round check print out for broad review
  – Release ECD 5/6

• LAT-DS-02563-01 LAT Instrument Assembly
  – Modeling largely complete
  – Drafting awaiting completion of flight hardware detailing

• LAT-DS-00309-04 ACD-LAT IDD
  – Drawing completed this month, and out for review
  – Release waiting on telecon review of changes
Integration Planning

• LAT Integration Sequence (LAT-MD-00676-03)
  – Complete
  – Revision not yet started to address post-tower integration sequence updates

• Configuration drawings
  – LAT Tower Configuration Assembly
    • Drawing complete and released
    • All ancillary MGSE fixturing design complete, released, and hardware built
  – LAT Instrument Configuration Assembly
    • Drawing in-work (ECD: 5/13)
    • Associated miscellaneous MGSE hardware in-work now (ECD: 5/6)

• Integration MGSE (all remaining integration MGSE listed)
  – Test Interface Plate: check print complete; analysis and final check in-process (ECD: 5/13; need date: ~7/15)
  – Chill Bars: design complete; getting quotes on fab (ECD: ~5/16; need date: ~5/16)
  – Chiller: on-order (ECD: not confirmed with supplier; need date: ~5/16)
  – Auxiliary cooling plumbing: in-work; tubing will likely be tall poll
  – Heat Pipe locating jig: conceptual design complete (ECD: 6/1; need date: ~8/1)
  – Heat Pipe mount plates: conceptual design complete (ECD: 6/1; need date: ~8/1)
  – ACD Lift Frame: conceptual design and analysis in-work (ECD: 6/15; need date: ~9/1)
Environmental Test Planning

• Environmental Test planning
  – Planning and Design review planned for May 3-4 at NRL
  – Drafts of all Test Plans are in-work and will be available for review by this review

• High-level issues being worked
  – T-Vac test cabling
    • Agreed on a cabling concept for T-Vac → starting to work on implementation
  – Test support MGSE
    • Conceptual design of support structure complete
    • Test Interface Plate design is complete: analysis in-work; drawings in check
    • Test Stand design is nearly complete: analysis not yet started; drawings in check
Structural Analysis: Accomplishments

- LAT System Level
  - Continued LAT Static test plan development
    - Support of MGSE designs (MGSE identified and almost complete)
    - Load configurations and cases defined, but final analysis still in-work
  - Continued LAT Environmental test planning
    - Dynamics test plan is very mature with a draft release this week
    - All outstanding action items have defined closure paths and will be tracked on a weekly basis
  - Completed miscellaneous MGSE analyses
    - TIP (Test Interface Plate) for LAT environmental testing
  - Integrated the test-correlated ACD model into LATv10.09 FEA model
  - MLI Support bar analysis completed

- LAT Subsystem Level
  - TKR Subsystem
    - Continued support of TKR testing at Alenia
    - Reviewed all TKR vibration test reports from INFN/Bari
  - Mechanical Subsystem
    - Supported RAD test plan discussions
  - EBOX Subsystem
    - Special Box Test procedure completed, in signature cycle
    - TEM/TPS Test procedure completed
    - TEM/TPS Shipping container drop test report

D = Flight Design
I = Integration Prep
T = LAT/SS Test Prep
Structural Analysis: Near-term Milestones and Status

• LAT System Level
  - LAT Static Testing: complete pre-test analysis and review with mechanical branch
  - LAT Dynamics Testing
    • Finalize external accelerometer locations and cable routing – ECD = 6/1/05
    • Update LAT vibration test predictions – ECD = 9/1/05
    • Continue planning with I&T and NRL for LAT environmental testing – ECD=ongoing through test
  - MGSE for I&T: augment MGSE analysis with additional I&T needs, as required
    • LAT Test Stand MGSE and associated test environments – ECD = 5/15/05
    • Shipping Container Analysis needs to be redone for new handling configuration – ECD = 5/15/05

• LAT Subsystem Level
  - TKR Subsystem
    • Continue to support testing in Italy (help from GSFC is lined up)
  - Mechanical Subsystem
    • Proof Test Spectrum provided flexures TRR – ECD = 6/10/05
    • Shear plate qualification test report – ECD = 6/17/05
    • Grid Static Load Test procedures, STE, TRR – ECD = 6/17/05
    • Support RAD and XLAT issues, as needed
  - EBOX Subsystem
    • Complete TEM/TPS Vibration test report – (Need to get data from Wyle)
    • Analyze cable support tray analysis

D= Flight Design
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Thermal Engineering Activities – Completed (from last month)

- **Design Engineering and Support**
  - Supported LAT level TVAC MGSE conceptual design

- **LAT Level Thermal Analysis and Tests**
  - Completed evaluation of concepts to reduce transient times between thermal cycling
  - Auxiliary HEX is the best, but added complexity → planning review to close this out

- **Subsystem Support and Oversight**
  - Completed TKR 1 and TKR 2 TVAC Acceptance Test successfully
  - Supported TVAC test for TEM/TPS qual unit

- **LAT Thermal Control System**
  - Completed: LAT-TD-05956-01, GLAST LAT Radiator VCHP Reservoir Heater Control Algorithm

- **Lockheed Thermal Control System Hardware**
  - Identified alternate vacuum chamber for TVAC radiator tests; evaluated reduction in TVAC test scope for X-LAT plate – no decision yet.
Thermal Engineering Activities – Current (from last month)

- Design Engineering and Support
  - Environmental Specification – change Tracker Acceptance Level Tests (35oC to 45oC)
- LAT Level Thermal Analysis and Tests
  - Thermal math model for LAT TVAC Test almost complete; awaiting final design of LAT support GSE.
  - Evaluating TVAC set-up thermal design
  - Finishing T-Vac Test Plan document—spec’ing test requirements on MGSE, EGSE, facility → clean draft out Apr 8
- Subsystem Support and Oversight
  - TKR 1 and TKR 3 double TVAC test—test planned for 11 April ‘05.
  - Continued support of TVAC tests for eboxes
  - Support of ACD TVAC test
- LAT Thermal Control System
  - Planning for test to measure thermal conductance of VCHP triple joint using mold release material proceeding
  - Evaluating test simulation set-up for TCS verification
- Lockheed Thermal Control System Hardware
  - One radiator complete except for attachment of wiring harness
  - Second radiator few weeks behind first
Thermal Engineering Activities – Planned (from last month)

- **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
  - LAT Thermal Vacuum Test Plan – finalize
  - LAT Thermal Vacuum Test Procedure – begin
  - 200 Node Launch Vehicle Thermal Math Model

- **Subsystem Support and Oversight**
  - Support TVAC tests of all eboxes
  - Support TVAC tests of TKR 3 -16
  - Support ACD TVAC test

- **LAT Thermal Control System**
  - Preliminary verification in LM Radiator Acceptance Tests
  - Finalize definition of LM TVAC tests for TCS
  - TCS verified in LAT TVAC tests at NRL

- **Lockheed Thermal Control System Hardware**
  - X-LAT Plate TVAC Test Procedures, begin writing
  - Radiator Acceptance Test Plan, finalize
  - Radiator TVAC Acceptance Test Procedures, begin writing