

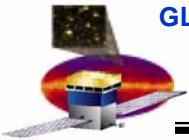
LAT Monthly Management Review

February 25, 2004

Design Integration and Analysis

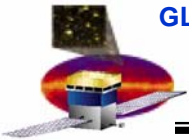
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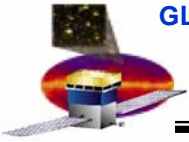
Tracker Design and Analysis

- **Tracker design and analysis**
 - Responsibility for design and analysis activities for the TKR subsystem have been moved to DI&A group
 - Responsibility for TKR environmental test planning and execution now falls with the LAT thermal and structural leads
- **Bottom tray re-design**
 - **Bottom tray design details have been checked and revised as needed**
 - Thorough tolerance review has led to changes to ensure correct fit-up during assembly
 - Assembly jiggling and processes have been factored into the tray details and reviewed in person with assembly team at INFN
 - **Titanium flexures and corner brackets**
 - Detailed designs checked for accuracy and quality, and vetted with assembly team in Pisa to assure that the design and assembly plans are consistent
 - Drawings are in the release cycle for all titanium parts
 - Preliminary structures review is complete, and final review and analysis checking by LAT analysts is being done using these drawings
 - RFP went out on 2/23 for this order
 - Expect award of contract by early next week
 - Planning for one drawing revision following detailed discussion with fabricator
 - Qualification test design and analysis has been tasked to LAT structures group and work is just starting to define tests, run pre-test analysis, and help write test procedures
 - **Close-outs and Bottom Tray Assembly**
 - Detailed models and drawings have been checked for accuracy and tolerance review has resulted in some design changes
 - Close-out and tray assembly plans have been reviewed with assembly team at Pisa
 - Close-out detailed models and drawings are currently being updated → no ECD



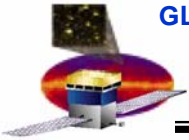
Tracker Design and Analysis (cont. 1)

- **Flex Cable re-design**
 - **IDD stay-clear dimensions of cables have been checked against Grid chaseway details and confirmed to fit**
 - **Detailed review of flex cable hardware design has been completed, and a number of detailed issues have been compiled**
 - **Cable re-design effort is underway in earnest**
 - **C0 cable re-work is complete and cable drawings are in final check with manufacturer and LAT groups**
 - **C1 cable re-work is complete and drawings are underway**
 - **C4 cable re-modeling has started--working with TKR, Elec, Prod Engin to resolve design problems**
 - **Remaining 5 cables are much more straightforward**
 - **Interface changes include modification of cut-outs in the Grid flange and change to top of TKR stay-clear**
 - **These are being tracked with Mech Systems and IDD mark-ups capture this**
- **Top tray design**
 - **Plan to start thorough design check of this once bottom tray is complete**
 - **Worked tray design and use issues as related to tower assembly with INFN team**
 - **“Top hat” optical surveying fixture**
 - **Lift fixture design and interface**
 - **Lifting load cases discussed → LAT structures group will define load cases and do analysis**
 - **Fly-away instrumentation mounting and cable routing will be incorporated into top tray design as part of this effort**
- **Tower design**
 - **Assembly plans and tolerance assessment started but not yet complete**
 - **LAT thermal group is checking detailed component design and supporting T-vac test**



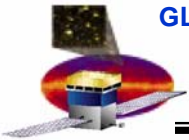
Tracker Design and Analysis (cont. 2)

- **Sine/random vibe testing**
 - Hytec and SLAC have agreed to transfer TKR FEA models to SLAC for use by LAT structures group
 - EM re-test planning will start soon
 - Will use QC'd Hytec FEA model
 - Plan to include results of Swales updated pre-test analysis with new notching scheme
- **Interface changes are being tracked with Mech Systems and IDD marked-up**



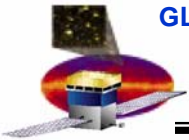
SC-LAT Flexure Interface Design

- **Structural evaluation of the proposed change to bolt pattern spread is underway**
 - This cannot be completed without updated interface loads from Spectrum and agreement with changes to safety factors and margins
 - Decreasing bolt spread reduces margin of safety from 0.20 to 0.04 in the Grid near the shear pin
 - Decreasing bolt spacing requires change to a large ID Keensert to accommodate the 7/16" bolt
 - FS against gapping must be reduced and bolt pre-load increased slightly beyond "GSFC standard" to produce $MS > 0$ on joint gapping
 - This analysis is based on the earlier interface loads values → updated loads are expected today for a final run-through of these margins
- **Impact to Grid has been assessed**
 - Grid solid model (used for CNC programming) and drawings need modification
 - Change to Keensert part number → both Keensert types had already been bought in anticipation of this day
 - New need date for drill fixture from Spectrum is early April → still need to clarify use of this fixture with new narrower hole spread
 - Grid structural analysis report needs formal updating to accommodate this change
- **Interface documentation modification**
 - LAT-DS-00040 will be changed once exact numbers have been agreed to
 - LAT Environmental Spec needs updating with new interface loads



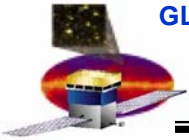
Other Systems Integration Issues

- **Cabling and cable routing**
 - **SC cable routing and connector interfaces have been defined**
 - Putting together document for inclusion in ICD
 - Next step is to complete internal LAT review
 - Cable routing and strain-relieving has been worked out
 - Working on LAT internal review now
 - Update to ICD is final step
 - **Heater Control Box**
 - Cable interference with MGSE handling has been resolved
 - Bracket design modified to clear one of the two cables
 - Connector backshell changed to right-angle → this is pending final electronics approval
- **MLI blanketing**
 - No status change on this—LAT thermal group is working this design, and will focus on it after TKR T-Vac planning is complete
 - This affects ACD, Grid, X-LAT, Radiator, and SC
- **Ground cooling of LAT**
 - Water cooling is baselined on X-LAT Plate and Grid wings
 - Concern has been voiced about risks associated with water around flight hardware
 - LAT thermal group will evaluate feasibility of gas cooling
 - Initial look shows that X-LAT cooling tube size will need to increase from 1/4" to 3/4"
 - This impacts structural response of X-LAT and opens up stay-clear problems
 - Systems engineering will assess water risks



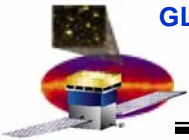
Other Analysis and Test Planning Activities

- **LAT FEA model**
 - LAT v10.07 model and report have been posted and are under review by Swales
 - LAT v10.08 is in progress—includes bolt spacing change
- **Thermal-Mechanical analysis**
 - LAT v10.07S model and report have been posted and are under review by Swales
 - Mapping of thermal to structural model nodes has been completed and checked
 - Completed initial check-out run of hot-case sky-survey analysis with results pending
 - Working to establish configuration control of thermal models and finalize quality check protocols for analyses
- **Grid structural analysis report**
 - Second draft of report is in review at Swales
 - Final release waiting finalization of TKR-Grid interface analysis and SC-LAT interface loads and analysis
- **LAT Environmental Spec update**
 - Updated loads from Swales incorporated into Spec
 - Working with CAL and ACD to advance their load info for test planning
 - Draft is in edit now, with first draft available by March 1 for review
- **LAT Modal/Vibe Test Planning**
 - LAT dynamics analysts visited NRL to work details of proposed test plan
 - Working on finalizing proposed test baseline of modal frequency identification testing, only. This will be performed on NRL vibe table
 - Pre-test analysis and test plan update are in work, but on the back burner until integration MGSE analysis support ramps down



Other Analysis and Test Planning Activities (cont.)

- **Acoustic analysis**
 - Reviewed acoustic analysis status and test plans with Swales analysts and Env Test group
 - Tasked Swales to investigate viability of LAT-sideways test configuration and impact on STE design concept → this is in-work now
- **LAT thermal test plans**
 - No progress planned on this until after TKR T-vac test is complete



Summary of Milestones for the Next 3 Months

- **TKR**
 - Release TKR IDD (2/25 status: waiting bottom tray re-design completion)
 - Close stay-clear issues at top of TKR (2/25 status: waiting designer availability)
- **CAL**
 - Release revision of CAL IDD (2/25 status: drawing complete, waiting final check)
 - Complete first draft of CAL Outline drawing (2/25 status: no progress)
- **Radiators**
 - Release revised Radiator IDD (2/25 status: IDD update underway)
- **X-LAT Plate**
 - Release X-LAT SCD (2/25 status: drawing complete, in release cycle)
- **LAT Integration and Test Planning**
 - Release LAT Integration Sequence document (2/25 status: no progress)
 - Complete draft of LAT Environmental Test Plan and distribute (2/25 status: draft out March 1)
- **Structural analysis**
 - Complete modal survey plan and update LAT Dynamics Plan (2/25 status: underway at reduced level)
 - Complete LAT thermal-mechanical analysis (2/25 status: modeling complete, analysis underway)
- **Thermal analysis**
 - Complete T-Vac Test Plan revision (2/25 status: on hold until after TKR T-vac)
 - Spec out ground cooling plans (2/25 status: evaluation started, but on hold until after TKR T-vac)