Thermal Engineering Activities

Gamma-Ray Large Area Space Telescope
Thermal Engineering Activities – Completed 1/2

1. Design Engineering and Support
   - LAT Instrumentation Plan, supported latest released version
   - Held meeting with Spectrum Astro to define MLI Interfaces between LAT and S/C
   - Conversations with ACD to define MLI Interfaces between LAT and ACD

2. LAT Level Thermal Analysis and Tests
   - Thermal-Vacuum Test Plan: initiated update/revision
   - Added EMI skirt to thermal math model
   - Added S/C actual solar array to thermal math model

3. Subsystem Support and Oversight
   - Electronic Box Detailed Thermal Analyses
     * GASU completed, within specs
   - Reviewed Proto-Flight Tower A TVAC Test Procedures
   - Reviewed/approved final design for the inner guard shield for Tower A TVAC tests
   - Revised test temperature limit for Tracker Subsystem Tray Panel Thermo Vacuum Test Procedure, 85C to 65C
4. LAT Thermal Control System
   - TCS algorithm reviewed with LM and revised to simplify
   - Grid top flange heat exchanger, design concept finalized

5. Lockheed-Martin Thermal Control System Hardware
   - Witnessed Acceptance Test for VCHP Gas Charge Verification (Cold)

NASA Review of LAT Instrument Performance Verification Plan
   - RFA #23 from CDR closed
   - RFA # 7 from CDR closed (Wrote Explanation of TCS Performance Verification Plan)
Thermal Engineering Activities – Current 1/2

1. Design Engineering and Support
   - Environmental Specification – change Tracker Acceptance Level Tests (35°C to 40°C)
   - LAT MLI concept

2. LAT Level Thermal Analysis and Tests
   - GRID geometric model

3. Subsystem Support and Oversight
   - Electronic Box Detailed Thermal Analyses
     * PDU in progress
   - Tracker Tower A TVAC tests
     * Test Plan and Test Procedures in preparation
     * Thermal Math Model being used for predictions of test thermal profile
     * Test orientation/setup for towers defined, MGSE for Tower A being fabricated; tests postponed indefinitely
   - Grid top flange heat exchanger detailed design in progress
4. **LAT Thermal Control System**
   - Development tests for VCHP assembly/disassembly procedure, issue is thermal conductance at triple joint
   - Update *LAT Test Thermal Requirements* –TD-00997; add description of auxiliary heat exchangers (X-LAT and Grid)

5. **Lockheed Martin Thermal Control System Hardware**
   - Radiator thermal math model, TVAC test configuration
   - Radiator Acceptance Test Plan
     *Overall testing concepts agreed by LM, SLAC and NASA/GSFC*
   - X-LAT Plate test procedures in preparation
Thermal Engineering Activities - Planned

1. Design Engineering and Support
   - Finalize MLI interface to ACD, S/C and radiators in conjunction with MLI design concepts
   - Detailed design and fabricate MLI blankets

2. LAT Level Thermal Analysis and Tests
   - Thermal Math Model, Ver. 6.1, reduced node
   - Thermal Math Model, Ver. 6.2, LAT TVAC test configuration
   - LAT Thermal Vacuum Test Procedure
   - Correlate integrated Thermal Math Model after LAT TVAC tests
   - 200 Node Launch Vehicle Thermal Math Model

3. Subsystem Support and Oversight
   - Flight Tracker Nos. 1-16, thermal vacuum test configuration concept finished, detailed designs for MGSE to start in August
   - Supervise TVAC tests of Tower A and first flight tracker

4. LAT Thermal Control System
   - Preliminary verification in LM Radiator Acceptance Tests
   - Verified in LAT TVAC tests, 8-10/05

5. Lockheed Martin Thermal Control System Hardware
   - X-LAT Plate Test Plan final version
   - X-LAT Plate Test Procedures
   - Radiator TVAC Test Plan, TVAC Test Procedure

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