GLAST Monthly PSR

Safety and Mission Assurance

January 2004

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Safety & Mission Assurance Manager

Accomplishments

- ***Software***
  - **Attended the MOC design review.**
  - **Reviewed the latest spacecraft flight software metrics package. No measurements warrant concern.**
  - **Reviewed the MOC Performance and Functional Requirements Document. Reviewed the MOC Development Plan.**
  - **Attended Flight Software Code Reviews. Spectrum's code review process is well run.**

  There are no issues on software at this time.

Accomplishments

- ***Safety***
  - **Working with Spectrum Astro Launch Vehicle Interface Manager to complete changes to the PHA and submit to the Range.**
  - **The Orbital Debris Report is on hold pending the final decision on the propulsion system.**
  - **Safety is now the point of contact on the National Environmental Protection Act (NEPA) documentation. The initial spacecraft checklist is under review with Code 250.**

Issues/Problems

- **Possible lifting of the Observatory using lifting points below the center of gravity (CG). Design of a lifting fixture that will effectively lift from above the CG is under way at Spectrum Astro. Sharon and the Mechanical group is looking at this lifting fixture design.**

Accomplishments

- ***Reliability***
  - **Received the first draft report of the final FMEA for the LAT instrument from SLAC.**
  - **Initiated an independent GSFC assessment of the GPS receiver reliability associated with the CTE mismatch identified in the new L1 antenna patch design. A list of required information needed for this study has been made and forwarded to General Dynamics, the GPS receiver supplier, through SAI.**
  - **Made ACD reliability model modifications to better examine sensitivity associated with potential PMT failures. Work in on-going in this area.**

Issues/Problems

- ***Reliability***
  - ***S&MA personnel need to finalize corrective actions for the potential Betatronix potentiometer noise issue. New tests results appear to indicate that gold wiper fix does not resolve the problem (awaiting for the test report from Chuck Powers in Materials). In parallel, Tony DiVenti/Reliability is working with Russ Cox/Operations to more clearly define the extent that potentiometer noise that can be tolerated by the Ku band drive without causing a problem.***
  - ***More detailed information is needed to verify the latest PRU reliability analysis results provided to us from SAI. Tony DiVenti/Reliability is in the process of setting up a telecon with SAI reliability to discuss this topic in addition to the following : PRU reliability, C&DH cross-strapping and switching reliability, applicability of PPL-21 derating requirements, and applicability the the NASA fastener integrity specification on the bolts that attach the instruments to the spacecraft. The meeting will include Tom McCarthy/ Thermal, Art Whipple/ Systems, and Ed Gaddy/ Power.***
  - ***Arranging a launch-site, helium purge, discussion meeting with representatives from the GPO, GBM, and LAT instruments. This meeting is expected to take place in the January time-frame.***
  - ***The LAT FMEA report needs to be finalized and placed on the SLAC website.***

Upcoming Events

- ***Reliability***
  - ***Assist SLAC in finalizing the LAT FMEA report.***
  - ***Complete analysis and verification for the spacecraft PRU reliability.***
  - ***Hold meeting to insure necessary helium contamination controls are in place.***
  - ***Assist Len Wang/Materials in completing the independent assessment of the GPS receiver L1 antenna patch design.***
  - ***Work with Erik Andrews and Joe Callender to have the spacecraft PRA cover memory errors or boot errors that could potentially cause the solar array to not point at the Sun.***
  - ***Work with the mission operations team to incorporate credible event sequences into the mission PRA.***

Accomplishments

- ***Parts & Materials***
  - **Sponsored weekly radiation telecons between SLAC, NRL, ACD, Code 561 and Code 562 and issued the meeting minutes for each.**
  - **Participated in Parts Control Board (PCB) meetings for the various GLAST subsystems.**
  - **Two connector lots procured from Amphenol for ACD were rejected during screening because of bin markings on the contacts. These parts were procured to the GSFC 453 suffix for low outgassing connectors which specifies contacts without any type of paint markings. Four parts from a third Amphenol lot were rejected due to lose inner seals in the receptacles. This was caused by insufficient adhesive applied by the manufacturer.**
  - **JANTXV1N6642US diodes (D/C 0201) manufactured by Microsemi were rejected at DPA because of voids > 50% along the die attach interface area. The remaining flight parts were subsequently subjected to 100% thermal impedance testing which is the standard mitigation when die attach is suspect.**

Accomplishments

- ***Parts & Materials (Continuing)***
  - **Qualification testing of the Omnetics nano type connectors was completed with the shock/vibration testing performed in Bldg. 7. Parts passed, so these connectors are considered qualified for flight use despite reported quality problems with production lots.**
  - **Updated GSFC S-311-320-LATACD-0004 to Revision B to change the test method and inductance limit for these parts. This specification is for the filter inductor used on the ACD FREE board.**
  - **Attended the all day laser testing session at NRL on Tuesday, December 16th. Parts tested included the MAX145 ADC, MAX5121 DAC, the CALORIMETER GCRC5 digital ASIC and the GCFE9A front-end ASIC. The purpose of this testing was to better understand the radiation test results obtained last month at Texas A&M. Results are currently being used to plan the next radiation test session for the ACD GARC digital ASIC whose behavior at TAMU in November during radiation testing is still unexplained.**

Accomplishments

- ***QE Resident at SLAC***
  - **Attended an Manufacturing readiness Review for the Flight Heat Pipes Fabricated at Lockheed Martin . Approval was given to start production.**
  - **Attended a Manufacturing Readiness Review for the Flight 1x4 Grid. Approval was given to start fabrication.**

Issues/Problems

- ***QE Resident at SLAC***
  - **Design and manufacturing issues were discovered with the Omnetics connectors. A SLAC Tiger team has been assembled to address the connector issues.**
  - **Design and fabrication issues have been discovered with a Flight set of Bare boards used on the Tracker Multi-Chip Modules. The Flight Boards have been scrapped and the issues are being resolved with board Manufacturer(DDI).**
  - **Vibration Testing on the tracker tower was terminated after the full level X axis was completed due to the corner flexure bolts losing their torque. An engineering team is reviewing the design issue for cause and correction. The tower itself did not sustain any damage and resonated at the expected frequencies.**

Upcoming Events

- ***QE Resident at SLAC***
  - **Production Readiness Review to be held at Teledyne Microelectronics in Jan 04.**
  - **Quality Audit to be held at SLAC 1/19/04 thru 1/23/04.**

Accomplishments

- ***QE Resident at Spectrum***
  - Resident QAE continued reviewing plans, and procedures in addition to any Material Review Board (MRB), and or Failure Review Board (FRB) actions.
  - Performed on-site process audit for the solar cell arrays at Emcore due to failures of the Development Test Panel. Determined Root cause to be failure to use correct resistance wattage of 48 watts, 40 watts was used and caused welds to fail. Corrective Action is in process due within 30 days. Recovery undetermined at this point.

Issues/Problems

- ***QE Resident at Spectrum***
  - Star Trackers - 2 of 3 failed vibration testing at Goodrich.
    - One Star Tracker has been fixed (memory chip with no underfill) and has passed acceptance testing. SA still waiting for the results of Owego's (Board House) root cause analysis on why all of these chips did not have underfill (due in mid-January).
    - The second Star Tracker still has an unverified failure. SA is discussing sending a team to Goodrich to work on identifying the root cause of these failures. The decision will be made on the week of 12/5. The preliminary information seem to indicate that the cause of the failure of Tracker S/N1003 was that the BAE static RAM chip was not bonded onto the board prior to soldering the leads. Further investigation revealed that about 25% of the chips on the board were also not bonded. A look at other boards from the same lot showed 11 other boards that had the same problem. It seems to be a process problem that will be follow-up by the GSFC resident QE at Spectrum. The root cause of the second Tracker failing functional testing at X-Axis vibe is still unknown and will be reported when it becomes available.

Issues/Problems

- ***QE Resident at Spectrum***
  - CGPS Receiver - Tin plated cover on MDI converters. GLAST will have these tin plated covers replaced. Still waiting on disposition from Goldfish and NFIRE. These programs may not have the schedule luxury of replacing the tin covers.
  - Derating Issue on Linear ICs in C&DH and EPS Boxes. Above maximum junction temperature per PPL-21 (Preferred Parts list). Will send copy of QAR 1196-3201 to GSFC for approval to use these parts.
  - Semicoa Transistors in Ithaco ACS components. Sending two magnetometers back to Ithaco for rework and retest. The reaction wheels (also use Semicoa transistors from same lot) are still at Ithaco and will have the parts replaced. SA was made aware of this problem when NFIRE reaction wheels failed functional testing. Determined cause was Semicoa transistors. GLAST ACS components use transistors from the same lot. They will be removed and replaced.

Anticoincidence Detector (ACD)

– The ACD QE attended an ACD TSA (Tile Shell Assembly) fit check and source inspection on Dec 15th through 17th at Canyon Composites. The fit check and source inspection activities were considered successful and requirements for shipment were met.

– 5 side panels were delivered to GSFC on 12/23 from Canyon. An incoming inspection was performed on all panels. Results of the findings were documented on a Problem Report for serial numbers 001,002,003 and 004 side panels. Some of the defects included delaminated tabs, face sheet chipped,un-repaired ply damage and Core not trimmed. These were a result of poor preparation of the panels prior to shipment to GSFC, but most of the defects can be repaired and are not show stoppers.

– Top and spare panels were received at GSFC on Tuesday January 5th. These parts arrived damaged. ACD composite engineers are evaluating the degree of damage.

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