GLAST Large Area Telescope: Performance & Safety Assurance

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TEM & TEM-PS MRR – Part 3

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Quality System Requirements

- General Technology Corporation (GTC) is Certified to ISO 9001:2000 and AS9100-B in accordance with AIR5359B
  - GTC has provided a copy of their Quality Assurance Manual (GTC-1000) Rev. B
  - Applicable 2nd tier documents include:
    - GTC-1007, Customer Supplied Product
    - GTC-1008, Material and Product Identification
    - GTC-1009, Process Control
    - GTC-1010, Inspection and Testing
    - GTC-1011, Calibration Control
    - GTC-1013, Nonconformal Material and Product
    - GTC-1014, Corrective and Preventive Action
    - GTC-1015, Material Control
    - GTC-1022, Quality Planning
TEM & TEM-PS Assemblies QA Activities

- TEM assembly vendor qualification
  - A quality survey was performed June 15-16 at General Technology Corp. in Albuquerque, New Mexico
    - Survey team included LAT QA and GSFC QE
    - No issues were identified
      - Excerpt from Survey Report
        » “General Technology Corporation (GTC) has demonstrated their ability to fabricate a flight worthy product through their process and quality controls.”

- Technical Exchange Meeting took place at General Technologies on June 30th
  - LAT QA, Electronics Engineering, and Manufacturing Engineering met with General Technologies technical staff to review and discuss technical requirements

- On-site Quality Assurance and source inspection
  - LAT Quality Assurance Engineer will be on site, full time for source inspection and oversight at General Technologies
    - Individual will participate in Technical Exchange Meetings
    - Full time throughout all phases of hardware assembly and test
Workmanship Standards

- **ESD**
  - GTC-2004 Electrostatic Discharge Sensitive (ESDS) Material Handling Procedure for Protection of Electronic Parts and Assemblies
    - MIL-STD-1686 Electrostatic Discharge Control Program
    - MIL-HDBK-263 Electrostatic Discharge Control Handbook
  - **Training**
    - All personnel who handle ESDS components are required to complete an ESD training course
    - Annual training is provided and documented
  - **Facilities**
    - Work Stations equipped with means for operator to connect with ground
    - Work Stations equipped with static dissipative work surface and inspected on monthly basis
Workmanship Standards

- IPC/EIA J-STD-001C Requirements for Soldered Electrical and Electronic Assemblies.
  - Personnel trained and certified by in-house instructor.
- IPC J-STD-001CS Space Applications Electronic Hardware Addendum to Requirements for Soldered and Electrical and Electronic Assemblies.
  - Personnel trained and certified by in-house instructor.
- NASA STD 8739.4 Crimping, Interconnecting Cables, Harnesses and Wiring.
  - Individual operator certification to NASA STD is not required. GTC’s internal workmanship standards have been approved.
  - Excerpt from NASA QE Survey Report
    - “The criteria for implementing NASA 8739.4 can be included in the statement of work and would require no further action.”
Inspection Requirements

- GTC will perform Receiving Inspection, In-Process Inspections and Final Inspections per their internal inspection plan and procedures.
  - SLAC Quality Assurance Engineer will approve plan prior to any assembly activities
- Mandatory Inspection Points (MIP’s) to be performed by SLAC Source Inspector. MIP’s will be documented on GTC’s traveler and stamped by the SLAC Source Inspector after the inspection/witness activity.
  - 100% Prior to conformal coat
  - 100% Post conformal coat
  - Witness of environmental test activities
  - Witness of functional and acceptance electrical test
  - Final Inspection and End Item Data Package review
Oversight and Surveillance Activities

- Surveillance
  - SLAC Source Inspector on-site full time with full access to all production activities associated with GLAST.
    - Conformance to drawing specifications, SOW, GTC procedures and workmanship standards
    - Polymeric material shelf life dates
    - Adhesive mix records
    - Mate/Demate logs
    - Calibration records
    - Torque Logs
    - ESD
Oversight and Surveillance Activities

- Audits
  - SLAC Source Inspector has the right to conduct audits with prior coordination with GTC.
MRB Process

Documents

- GTC-1013  Nonconforming Material and Product
- NCMR  Nonconformance Material/RMA report

Procedure

- GTC will identify, segregate, document and report all parts, materials, CCA’s and electronic assemblies/units which do not meet drawing or specification requirements.
  - Defects that can not be reworked using approved procedures
  - Receipt of SLAC supplied material
  - Failures or anomalies
  - Nonconformances found at final Inspection
MRB Procedure

- GTC will provide immediate notification to SLAC source inspector of NCMR initiated
  - Description of nonconformance
    - Violation of drawing or specification
    - IS and S/B conditions
  - Location by drawing reference zones
  - Part number
  - Serial number
  - Quantity
  - Corrective/Preventive Action as available

- SLAC Source Inspector will convene a MRB with SLAC within 24 hours
  - Darren Marsh, LAT Performance Assurance
  - Gunther Haller, LAT DAQ Subsystem Manager (or designee)
  - LAT Manufacturing Engineering (as applicable)
MRB Procedure

- **Disposition**
  - Quality Manager from GTC receives disposition instructions from SLAC Source Inspector.
    - Use as Is
    - Repair
    - Scrap
End Item Data Package

- Certifications of Compliance for each assembly
- Copies of travelers/shop orders
- Nonconformance Reports
- As-Built drawing and parts list
- As-Built configuration record
- In process and final test reports
- End Item acceptance test data including environmental test
- Inspection reports as applicable
- Mate/Demate log for flight connectors
- Digital Photos