GLAST Large Area Telescope
Monthly Mission Review

LAT Flight Software Status

May 2, 2007

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Stanford Linear Accelerator Center
FSW Status

- **B0-10-1 available for upload to LAT**
  - Successfully built, installed and regression tested on Testbed
  - LCI bug that causes occasional loss of LCI data is corrected in this build
  - Functionality includes resolutions to some long-awaited LIM, LATC, event filter, compression, and LAT-GBM interface JIRAs
- **B1-0-0:**
  - Tasks have been split up among several developers to expedite delivery
  - Build contents:
    - Includes all B0-10-1 functionality
    - **FSW-292: GRB detection algorithm**
      - 5.3.10.2.1 GRB Location Accuracy
      - 5.3.10.2.2 Modification of GRB criteria
      - 5.3.11.3.3 Process Attitude Data
      - 5.3.11.6 GRB Alert Message Latency
      - 5.3.11.7 LAT GRB Repoint Request Message to SC
      - 5.4.1 System of Units (metric system)
      - 5.4.2.x Coordinate Systems (3 requirements)
      - 5.4.3 Resource Margin
  - **Target build date: 5/25/07**
  - **Target Delta-FQT-B: 6/26/07**
  - **Upload to LAT: week of 6/26/07**
GRB Processing and Detection Dataflow

**EPU Processing**
- Event filtering
- Science Datagram Build
- SSR Transport
- GRB Additional Filtering
- Track finding
- Multi tower track projections
- Select “best” track(s)
- Format data structure and transport to SIU

**SIU Processing**
- (SIU) Direction Extraction
- GRB algorithm (onboard): selection/clustering of photons in direction and time
- Estimated: 5/1/07
- GRB algorithm (onboard): Localization of clusters
- GRB triggering and communications protocols
- Clean up: 5/25/07
- Observatory 1553 Communications

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On second iteration

Completed: 3/2/07

Completed: 3/2/07

Completed: 3/6/07

Completed: 3/23/07

Completed: 4/9/07

Completion: 5/7/07

You are here
- Completed and part of B0-9-0
- FSW
- OSU
JIRA Metrics as of 29 April 2007

- Open issues are divided as follows
  - 14 planned for B1-0-0
  - 15 planned for B2-0-0 (post L+60)
  - 12 deferred indefinitely
  - 3 unscheduled
    - 1 being assessed by FSW team
    - 2 awaiting Project CCB adjudication
- GRB algorithm is FSW’s highest priority
  - All JIRAs not relating to GRB are worked in parallel where work will not impede GRB
  - JIRAs requiring a resource currently assigned to GRB are lower in priority
  - Several of the open JIRAs are trivial changes and will be addressed during a GRB lull
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Backup

Stanford Linear Accelerator Center
## B1-0-0 JIRA issues (in order of priority)

<table>
<thead>
<tr>
<th>Key</th>
<th>Summary</th>
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<tbody>
<tr>
<td>FSW-292</td>
<td>Implement GRB detection algorithm</td>
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<tr>
<td>FSW-899</td>
<td>Configure onboard gamma filter to PASS any event with raw calorimeter energy above a certain (configurable) value</td>
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<tr>
<td>FSW-305</td>
<td>Summary/statistics telemetry stream needs to be created for on-board event processors</td>
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<tr>
<td>FSW-693</td>
<td>Command confirmation configuration report</td>
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<tr>
<td>FSW-732</td>
<td>Task messaging configuration report</td>
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<tr>
<td>FSW-806</td>
<td>Revisit rate counter implementation</td>
</tr>
<tr>
<td>FSW-880</td>
<td>Add some configuration registers as parameters to LCI</td>
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<tr>
<td>FSW-582</td>
<td>Capture of layer splits in LATC does not consider the FE mode registers</td>
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<tr>
<td>FSW-789</td>
<td>LCI event data is inconsistent if TEM errors or diagnostics present</td>
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<tr>
<td>FSW-917</td>
<td>Implement the filter parameters described in TD-08805-01</td>
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<tr>
<td>FSW-456</td>
<td>EMP and LCM do zlib compress with malloc/free, should use MBA_alloc/free</td>
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</tbody>
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Changes to ground software or configurations
Calibration Issues

• Statement of problem
  – Several calibration runs did not return all of the data requested
    • Previous calibration runs were successful
    • Subsequent calibration runs were unsuccessful
  – Mitigation: restart LCI task
• Root cause is a race condition in LCI
  – A semaphore is being set twice and taken once
  – Successfully able to duplicate problem in dataflow lab with debug code that exacerbates race condition
• Fixed in B0-10-1
Testing GRB detection algorithm

- Diagram below shows dataflow and highlights the missing pieces of infrastructure
  - Diagram does \textit{not} show testing of LAT-GBM interface which has already been done during FQT-A
  - Test scripts are being written by FSW to
    - analyze science data to evaluate performance of GRB detection algorithm
    - analyze telemetry to obtain CPU utilization (needed to satisfy resource margin requirements)
- Testing begins when GRB algorithm is delivered

![Diagram of GRB detection algorithm dataflow and infrastructure](image)