

# **GLAST Large Area Telescope**

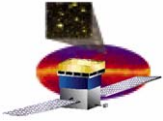
## **Monthly Mission Review**

### **LAT Flight Software Status**

**August 1, 2007**

**Jana Thayer**

**Stanford Linear Accelerator Center**



# FSW Status

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- No reboots
  - 610 reboot-free hours since fix was installed (B0-9-0)
- B1-0-1 on the LAT is *still* working beautifully – no major issues
  - 190 hours with B1-0-1
- Problem during LAT ACD power up traced to PPS
  - (see Pat's presentation)
- Testing of GRB algorithm continues with new Monte Carlo
- B1-0-2 will be released on 8/17/07

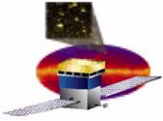


# GRB testing

- Received new MC sample from Richard Dubois in mid-July
  - Uncovered a bug in the list of gammas passed to localization algorithm  
Learned that performance of the algorithm could be greatly improved
  - Performance improvements in CPU usage (FSW-966) were achieved through modifications in the structure of —
    - the code that updates the clusters
    - the code that scans the clusters looking for clusters over threshold
- Performance varies greatly with cluster size and input rate:
  - Cluster sizes: 80 photons, 200 photons, 500 photons
  - Input rates: 200 Hz, 400 Hz
- *Caveat lector:*
  - *Non-linear effects could push these numbers up or down*
  - *These measurements are derived from basic time measurements, not measurements of CPU usage (as reported by housekeeping)*

Estimated time to do the cluster update for maximum cluster size = 80:

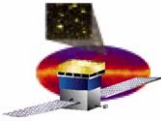
	Old	New
200 Hz	10.2%	1.75%
400 Hz	20.4%	3.5%



# Scheduled FSW builds

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- **B1-0-2:**
  - **Build date: 8/15/07**
  - **Testing: 8/15 – 8/17**
  - **Release date (available for upload to LAT): 8/17**
  - **Build contents:**
    - **FSW-305, FSW-806, FSW-934 (leftover from B1-0-1)**
    - **FSW-966, FSW-952, FSW-954, FSW-953 (newly approved)**
- **B2-0-0: First post-launch build**
  - **Phase in B2-0-0 JIRAs in small incremental builds prior to launch:**
    - **B1-0-3 (FSW internal, tentatively 10/07)**
      - **LCI updates**
    - **B1-0-4 (FSW internal, tentatively 12/07)**
      - **LATC updates**
    - **B2-0-0 (tentatively, 1/07)**
      - **Remainder of JIRAs**
- **Of course, if the opportunity presents itself, FSW is more than happy to upload any “FSW internal” build to the LAT.**



# B1-0-2

## Changes to onboard flight software:

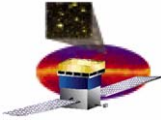
<a href="#">FSW-305</a>	Summary/statistics telemetry stream needs to be created for on-board event processors	LPA
<a href="#">FSW-934*</a>	Add telemetry to report on LAT power state and state/configuration of physics data acquisition	FSW-918,944-951
<a href="#">FSW-954</a>	In command confirmations, the "signalled" bit should always be suppressed	ITC
<a href="#">FSW-953</a>	Incorrect designation of some GARC registers	LRA
<a href="#">FSW-952</a>	Decompression Failures discovered during Observatory EMI	LSE , QSE
<a href="#">FSW-966</a>	GRBP bug fixes and performance improvements	GRBP

## Changes to ground software constituents:

<a href="#">FSW-959</a>	Allow LATC exception specifications to inherit default values	LATC
<a href="#">FSW-960</a>	B1-0-1lat_tlm_itos.dbx mnemonic issues	LCAT
<a href="#">FSW-964</a>	LPA Config packets 0x2e0-0x2e3 contain identical mnemonics	LCAT
<a href="#">FSW-961</a>	Do CAL single-range readout when performing ACD and TKR calibrations	LCI
<a href="#">FSW-958</a>	Potentially misleading LCI XML tag <auto_range>	LCI
<a href="#">FSW-965</a>	Misspelled ITOS mnemonics in file-system-status packet.	LFS
<a href="#">FSW-957</a>	Inconsistent bitfield definition of LFSDEMPTFILE in dbx output	LFS
<a href="#">FSW-962</a>	GRB Alert, Update, Closeout packets have duplicate mnemonics	LPA

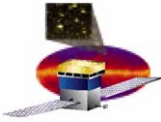
## New configurations

<a href="#">FSW-917</a>	Implement the filter parameters described in TD-08805-01	XFC_DB
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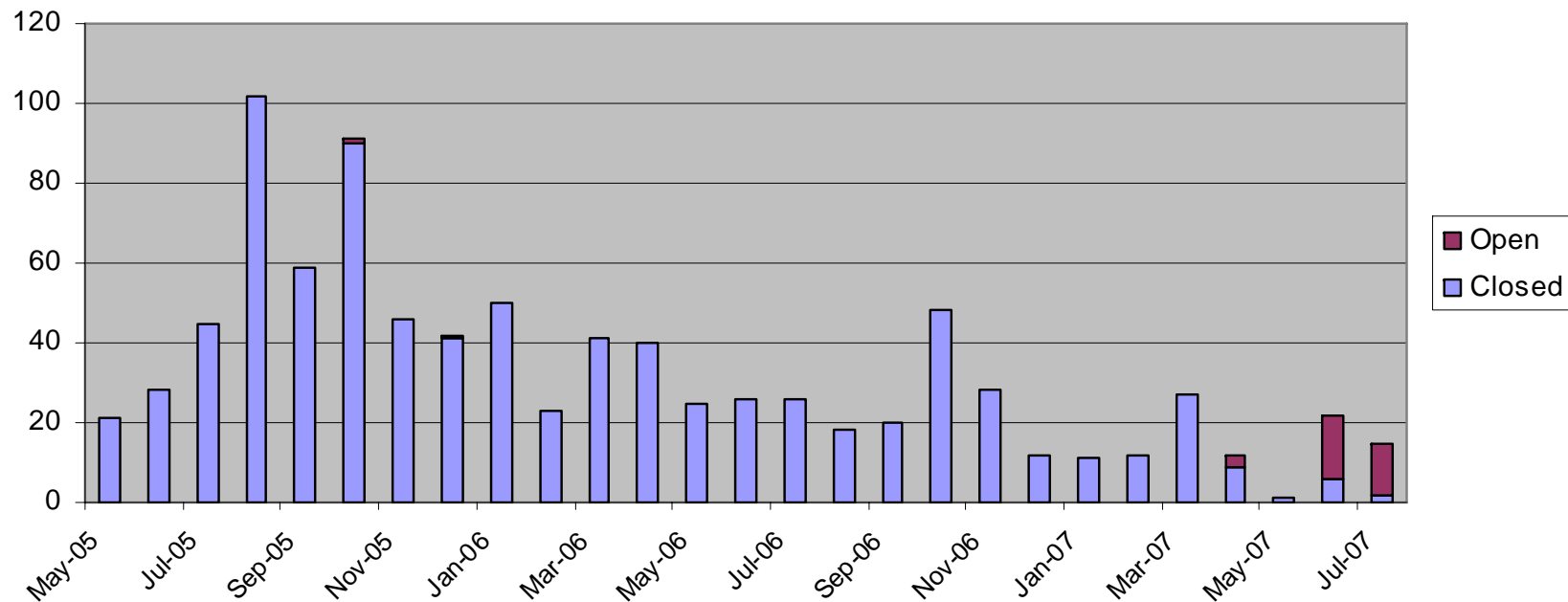


# B1-0-3, B1-0-4, B2-0-0

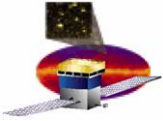
Key	Summary	Component/s
<a href="#">FSW-872</a>	Illegal memory reference in LCBD after request list fetch error	LCBD
<a href="#">FSW-287</a>	Anti-flooding for MSG	MSG
<a href="#">FSW-931</a>	Increase number of housekeeping schedule slots	LHK
<b>LCI improvements:</b>		
<a href="#">FSW-790</a>	Tracker calibration doesn't work correctly with uneven splits	LCI
<a href="#">FSW-576</a>	Bug in CAL data compression algorithm	LSEC
<a href="#">FSW-789</a>	LCI event data is inconsistent if TEM errors or diagnostics present	LSEC, QSEC
<a href="#">FSW-419</a>	If LSEC cannot encode an event, nothing is placed into the datagram.	LSEC
<b>LATC improvements:</b>		
<a href="#">FSW-582</a>	Capture of layer splits in LATC does not consider the FE mode registers	LATC
<a href="#">FSW-729</a>	LATC verify error response	LATC
<a href="#">FSW-538</a>	There is no way to ignore the AEM when the LATC_verify operation is performed.	LATC
<a href="#">FSW-791</a>	High and low splits are not separately ignorable	LATC
<b>PIG improvements:</b>		
<a href="#">FSW-414</a>	Add internal resources to PIG and eliminate the LEM_micr argument present in most function prototypes/	LIM, PIG
<a href="#">FSW-280</a>	CAL and ACD bias voltage settings	LEM
<b>Survey</b>		
<a href="#">FSW-838</a>	PPC compiler is treating a char as an unsigned quantity rather than a signed	
<a href="#">FSW-703</a>	Ensure all registers are set	PIG
<a href="#">FSW-562</a>	Make sure that PIG's power sequence is still correct	PIG



# JIRA Metrics as of 31 July 2007



- **Open issues are divided as follows**
  - **30 items planned for B1-0-2**
    - **16 items associated with a single housekeeping JIRA; split into 16 for tracking purposes**
    - **8 items are changes to ground software**
  - **2 being investigated**
  - **2 on Project CCB agenda**
- **Note: graph no longer includes candidate post-launch items (i.e., “Deferred”, “B2-0-0”)**



# GLAST Large Area Telescope

## Monthly Mission Review

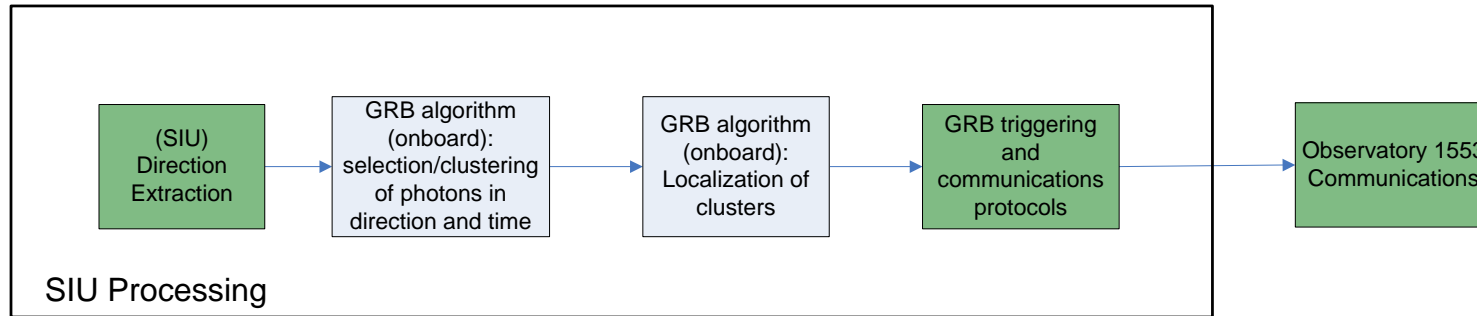
# Backup

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# GRB algorithm performance improvements

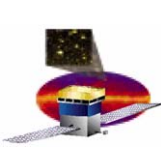


**Performance is sensitive to cluster size and input rate.**  
**Cluster sizes: 80 photons, 200 photons, 500 photons**  
**Input rates: 200 Hz, 400 Hz**

***Caveat lector:***

- *There are non-linear effects which could push these numbers up or down.*
  - *These measurements are derived from basic time measurements, not measurements of CPU usage (as reported by housekeeping)*

	80 photons		200 photons		500 photons	
Rate	Old	New	Old	New	Old	New
200 Hz	3.4%	1.3%	N/A	3.6%	50%	10%
400 Hz	6.8%	2.6%	N/A	7.2%	100%	20%



Configuration file changes



Addition to housekeeping – tracked as individual JIRAs

## B1-0-1 leftovers

Key	Summary
<a href="#">FSW-305</a>	Summary/statistics telemetry stream needs to be created for on-board event processors
<a href="#">FSW-806</a>	Revisit rate counter implementation
<a href="#">FSW-789</a>	LCI event data is inconsistent if TEM errors or diagnostics present
<a href="#">FSW-582</a>	Capture of layer splits in LATC does not consider the FE mode registers
<a href="#">FSW-938</a>	LMC Delta timestamp telemetry field description is incorrect
<a href="#">FSW-917</a>	Implement the filter parameters described in TD-08805-01
<a href="#">FSW-948</a>	Add LPA_DB instance ID to housekeeping
<a href="#">FSW-946</a>	Add LATC info to housekeeping telemetry
<a href="#">FSW-950</a>	Add GRB GBM and EPU states in housekeeping
<a href="#">FSW-949</a>	Add default values of LATC, LPA_DB and LATC ignore files for physics acquisitions to housekeeping
<a href="#">FSW-947</a>	Add LCI program file ID to housekeeping
<a href="#">FSW-945</a>	Add PDU/GASU power and CRU Configuration register info to housekeeping
<a href="#">FSW-944</a>	Add LHK configuration files in use to housekeeping
<a href="#">FSW-943</a>	Put LRA in charge of tracking GEM sent, prescaled, discarded, livetime, deadzone for housekeeping
<a href="#">FSW-942</a>	Add simulating/not simulating info for THS time tone and time hack to housekeeping
<a href="#">FSW-941</a>	Add memory scrub info to housekeeping
<a href="#">FSW-918</a>	Include Run ID in housekeeping
<a href="#">FSW-934</a>	Add telemetry to report on LAT power state and state/configuration of physics data acquisition
<a href="#">FSW-951</a>	Add "dirty" flag in housekeeping to indicate non-nominal configuration change