GLAST Large Area Telescope
Monthly Mission Review

LAT Flight Software Status

March 6, 2007

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Stanford Linear Accelerator Center
FSW - Overall Status

- Currently operating LAT with B0-9-0:
  - Uploaded to LAT 2/22/07
  - ~50 hours of regression testing with this build
  - Compression bug fixes (error rate < 1 in $80 \times 10^6$ muon events)
  - Resolution for watchdog reboots (~100 hours since last reboot)

- B1-0-0: GRB algorithm (In progress)
  - GRB detection algorithm: B1-0-0
    - 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
  - FSW Standards (verified as part of B1-0-0 after GRB detection algorithm is implemented)
    - 5.4.1 System of Units (metric system)
    - 5.4.2.x Coordinate Systems (3 requirements)
    - 5.4.3 Resource Margin
Plan forward

- Internal FSW build: B0-10-0
  - Available on Testbed 3/14/07
  - Will allow FSW, FSW test, and I&T to begin developing/testing LAT-GBM interface and mode tests
    - Can we upload to the LAT?
  - Includes
    - FSW-893: LAT-GBM interface modifications to allow for testing
    - FSW-843: Modify LIM behavior to favor ARR over TOO and to always obey LPASTART and LPASTOP
    - FSW-808: Allow periodic triggers to run with event filters
    - FSW-747: LPA sweep event

- Build plan for B1-0-0 (for details, see next two slides)
  - Build contents:
    - FSW-292: GRB detection algorithm
    - Other JIRAs approved for B1-0-0
  - Target build date: 4/23/07
  - Target Delta-FQT-B: 4/30/07
  - Upload to LAT: ~5/1/07 (1 month prior to Observatory TVAC)
Implementing GRB algorithm (1/2)

• Implementation of GRB algorithm can be split up into three pieces:
  1. Internal FSW infrastructure for handling a GRB (complete)
  
  2. Infrastructure for testing GBM/LAT interface (complete, needs tweaking)
     • Existing code needs some modification (FSW-893)
       – Ability to trigger algorithm indicating LAT detected GRB via telecommand to test messaging protocols
  
  3. GRB algorithm - detecting a burst (work in progress)
     • Algorithm has been defined by science groups
     • Porting the algorithm to an onboard environment has begun
     • FQT test to be written using testbed/FES
Implementing GRB algorithm (2/2)

• **Timeline:**
  – 12/06: GRB detection algorithm received from science groups
  – 1/06: Algorithm implemented in onboard computing environment
    • Complexity and scalability evaluated
    • Changes proposed to original algorithm to make it more suitable to online environment
  – 2/06: Feedback passed to science groups
  – 2/22/07: “Simplified” algorithm received
  – 3/6/07: Proposed algorithm evaluated, partially implemented

• **Status:**
  – First iteration of the process is complete
  – Estimate two more iterations with 2 week timescales
  – Expected availability 5/1/07

• **Testing:**
  – GRB detection algorithm can only be tested on Testbed using Monte Carlo
  – Tests are already being defined and implemented using a “dummy” algorithm
JIRA Metrics as of 5 March 2007

- **Open issues are divided as follows**
  - 19 planned for B1-0-0
  - 13 planned for B2-0-0 (post L+60)
  - 14 deferred indefinitely
  - 14 unscheduled
    - 10 being assessed by FSW team (new IVV code review)
    - 4 awaiting Project CCB adjudication
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Backup

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B1-0-0 JIRAs

• Major open issues
  – FSW-292: Implement GRB detection algorithm
  – FSW-305: Summary/statistics telemetry stream needs to be created for on-board event processors
  – FSW-893: Augment LPASETGRB telecommand to allow testing of messaging protocols
  – FSW-843: Modify LIM behavior to favor ARR over TOO and to always obey LPASTART and LPASTOP
  – FSW-808: Enabling periodic triggers with event filters
  – FSW-747: Correct two separate errors with the extended counters
• Other issues
  – FSW-811: Modify the sample parameters of the Gamma, MIP, and Heavy Ion filters
  – FSW-833: SIU exception occurs during LAT power down
  – FSW-789: LCI event data is inconsistent if TEM errors or diagnostics present
  – FSW-582: Capture of layer splits in LATC does not consider the FE mode registers
  – FSW-164: Add LATC Telecommand Interface to LIM
  – FSW-732: Task messaging configuration report
  – FSW-723: LATC (and RIM) XML contains duplicate tag names
  – FSW-693: Command confirmation configuration report
• Green indicates B0-10-0
B2-0-0 JIRAs

- FSW-872: Illegal memory reference in LCBD after request list fetch error
- FSW-838: PPC compiler is treating a char as an unsigned quantity rather than a signed (survey ongoing)
- FSW-799: Decide on desired level of command execution verification, ability to determine commanded configuration changes
- FSW-791: High and low splits are not separately ignorable
- FSW-790: Tracker calibration doesn't work correctly with uneven splits
- FSW-729: LATC verify error response
- FSW-703: Ensure all registers are set
- FSW-699: Create report to identify configuration files in use
- FSW-562: Make sure that PIG's power sequence is still correct
- FSW-538: There is no way to ignore the AEM when the LATC_verify operation is performed.
- FSW-419: If LSEC cannot encode an event, nothing is placed into the datagram.
- FSW-414: Add internal resources to PIG and eliminate the LEM_micr argument present in most function prototypes/
- FSW-287: Anti-flooding for MSG
- FSW-280: CAL and ACD bias voltage settings
- FSW-271: Logical/physical descriptions
Unscheduled

- **IVV:** just received and pending FSW review
  - FSW-763: EFC IVV code issues
  - FSW-884: EMP package IVV2 code issues
  - FSW-882: LATC package IVV2 code issues
  - FSW-881: RIM package IVV2 code issues
  - FSW-890: ITC package IVV2 code issues
  - FSW-887: EDS package IVV2 code issues
  - FSW-886: LCM package IVV2 code issues
  - FSW-885: LCI package IVV2 code issues
  - FSW-889: LHK package IVV2 code issues
  - FSW-883: Remove error and status register information from LATC dumps

- **Pending CCB review:**
  - FSW-892: Improved speed and infrastructure of reboot trace information
  - FSW-891: Error and status register dump contains extraneous data
  - FSW-880: Add some configuration registers as parameters to LCI
  - FSW-879: Define the ACD hit map delay as an iterable in LCI
Deferred

- FSW-824: CLONE - Disable memory controller Maximum Bank Active Timeout
- FSW-832: CLONE - Need unique access to all cache lines of LCB I/O buffers during hardware operation
- FSW-626: LATC dumps have unexpected GTFE masks on LATC verify error dumps only
- FSW-875: IVV TIM 1635 - LAT FSW Boot Code (PBC): Duplication of APID definitions in header & source code files may lead to execution errors
- FSW-876: Include LATC ignore file used as part of the run configuration data
- FSW-239: vxw_flight RTOS constituent still has the serial console device enabled
- FSW-540: Addition of AEM/EBM memory relocation register control
- FSW-697: Set the range for all padded fields to 0-0
- FSW-474: Sharpen the definition of the extended counters so that completely accurate bookkeeping can be done even when there are dropped datagrams
- FSW-689: Split LFSFILEID into device, directory, and file name
- FSW-724: QSEC does not update the event-time fields in the standard context correctly
- FSW-526: NCR 794, problem 6: Add debugging code to LCBD code to trace intermittent failure
- FSW-636: NCR 882: CPU should apply a reset to the LCB after it powers the GASU and before it checks the LCB for data presence
- FSW-753: ACD calibration PHA threshold is not being iterated
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