

GLAST Large Area Telescope:

Electronics, Data Acquisition &
Flight Software W.B.S 4.1.7

October Status 10-29-03

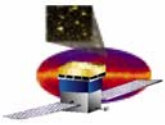
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Last Month's Accomplishment, PDU

- **Function of Power Distribution Unit**
 - Switches power to TEM's, GASU, EPU crates
 - Digitizes temperatures to be used for thermal control
- **Accomplishment/Status**
 - Assembled full PDU box (prim and redundant)
 - Succeeded in
 - communication LCB->GASU->PDU using flight-software
 - programming HW/SW to turn on TEM via PDU using flight-software
 - Updated flight-schematics
 - Jan: In layout queue
 - FEB UPDATE: layout finished, stat of fabrication
 - Sent schematics to SAI for comments, interface to SC
 - Jan: Finalize input PDU filter, common and diff. mode
 - FEB UPDATE: still doing analysis
 - Engineer finished design of test-box for PDU flight acceptance testing
 - Jan: Is in layout queue
 - FEB UPDATE: started layout
 - Plan to connect SAI Power-Regulation Unit (PRU) EM to LAT test-bed in March 04
 - Working out details
 - Added RA E. Delange to write test-scripts for PDU HW/SW tests
- **Concern**
 - no technical concern, schedule looks ok, driven by need for test-bed and ISIS delivery, not LAT flight hardware delivery



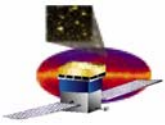
Last Month's Accomplishment, GASU

- **Function:**
 - global trigger, event builder, command-response unit, ACD control/monitoring/data-readout
- **Accomplishment/Status:**
 - Assembled full GASU box (prim and redundant) including all wiring
 - Succeeded in communication LCB->GASU->TEM using flight-software
 - Succeeded in taking trigger inputs, generating trigger message, triggering TEM
 - Succeeded in configuring AEM and EB
 - Succeeded communication LCB->GASU->FREE card (ACD front-end) for configuration/read-back
 - Succeeded assembling event with GEM message and receipt in LCB
 - Jan: Working on getting TEM events and ACD sub-system events readout and assembled with GEM message
 - FEB UPDATE: Succeeded in assembling TEM and ACD events in EBM and transmission to LCB
 - Added RA Asim to write test-code for HW/SW tests
 - FEB UPDATE: Completed flight schematic, is in checking
 - FEB UPDATE: need to modify GASU AEM FPGA code to incorporate fix to enable ACD FREE "fix" Interacting with software to find best solution



Last Month's Accomplishment, GASU (2)

- **FEB UPDATE: GASU is assembled for ACD, software is written, still need testing/debug**
 - **Plan**
 - Huffer, Claus, Panetta go to GSFC March 1 to explain software which was described in doc previously sent
 - After; GSFC engineers come to SLAC, maybe around the 10th, with a BEA to test at SLAC with GASU
 - After: take the GASU to GSFC
- **Concern:**
 - **Schedule, not for flight, but for test-bed, ISIS, and ACD EGSE test-setup delivery**



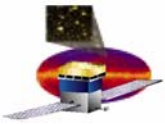
Last Month's Accomplishment, GASU Power Supply

- **Function: Generate power for GASU DAQ board and ACD front-end electronics from 28V**
- **Accomplishment/Status**
 - **Fabricated/assembled more boards for GASU's**
 - **In process of making another copy to send to ACD to connect to FREE's**
 - **FEB UPDATE: Sent one supply to ACD**
- **Concern:**
 - **none**



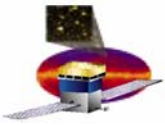
Last Month's Accomplishment, TEM

- **Function of Tower Electronics Module**
 - control/readout/monitoring of TKR and CAL sub-system
- **Accomplishments/Status:**
 - Continue testing, still works including ASIC's
 - Schematic and Layout is final
 - Jan: Difference to flight: none
 - FEB UPDATE: UTMC flight part lead-forming vendor required slight footprint change for LVDS transmitter; finished modification
 - Have enclosure with TEM integrated
 - Working on flight acceptance test code
 - Finalizing bid package/drawings for fabrication/assembly of qual/flight model
 - FEB UPDATE: package released, writing PR for flight, first article qual
 - Working on performance test/thermal cycle/vibration/TV test procedure documents
 - Ordering capacitors: still need 1 cap which has long delivery
- **Concern:**
 - **Schedule for flight:**
 - RFP process
 - Receipt of components for TEM assembly



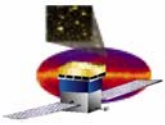
Last Month's Accomplishment, DAQ ASICs

- TEM Tracker Cable Controller ASIC (GTCC1)
- TEM Calorimeter Cable Controller ASIC (GCCC1)
- GLAST LVDS Translator Chip ASIC (GLTC2)
- Accomplishment/Status
 - Flight production received from packaging at ASAT (T31D run)
 - SEL/SEU testing done
 - Total Ionizing Dose testing is waiting for burn-in of devices before testing can be done
 - Burn-in board schematic final and board is in layout
 - FEB UPDATE: Layout finished
 - Awaiting final approval of screening/qual doc from PCB
 - FEB UPDATE: qual/screening will be done at GSFC, SLAC supplied test and burn-in boards
- Concern:
 - flaw might be detected while more testing is going on
 - Schedule for ASIC screening



Last Month's Accomplishment, TPS

- **Function of Tower Power Supply**
 - Supply voltages to TKR, CAL sub-system and to TEM from 28V
- **Accomplishment/Status:**
 - Engineering Module is working
 - Received updated enclosure (was modified from original box to match EM board)
 - Working on finalizing and getting approved drawing package for flight RFP (first article fab is used for qual)
 - FEB UPDATE: still in review
 - Ordered most capacitors, 2 are long lead, looking for options
 - FEB UPDATE: still looking for parts
- **Concern:**
 - **Schedule for flight:**
 - RFP process
 - Receipt of components for TEM PS assembly



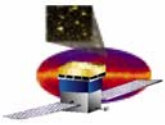
Last Month's Accomplishment, SIU/EPU (1)

- **EPU and SIU cCPI crate the same except**
 - **RAD750 boot code different**
 - **Storage Interface Card loaded different**
 - **Status combined**
- **cCPI crate contains**
 - **Enclosure**
 - **Backplane**
 - **Lat Communication Board (LCB)**
 - **Storage Interface Board (SIB)**
 - **Crate Power Supply Board (CPS)**



Last Month's Accomplishment, SIU/EPU (2)

- Enclosure (cPCI crate)
 - Expecting additional crates for test-bed (have only one) end of this month
 - FEB UPDATE: received 2 additional Crates
- Custom Backplane
 - Have version in lab at SLAC, awaiting SIB before making next modified version, minor mods
 - FEB UPDATE: updated layout, ready for fab
- LCB (Control/event interface from processor to LAT)
 - Found/fixed problem with PCI core in respect to STOP signal behavior
 - Code from PMC version is ported to cPCI version (has discrete flight FIFO's as opposed to FPGA integrated)
 - Schematic was updated to include modifications from debugging
 - Is in layout
 - FEB UPDATE: Layout finished, fabricating 4 more boards
 - Need documentation, drawing package for flight RFP



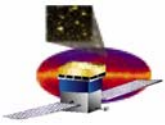
Last Month's Accomplishment, SIU/EPU (3)

- **SIB (MIL1553 interface to Spacecraft, EEPROM storage for code, control circuit for VCHP heaters)**
 - **First SIB was fabricated/loaded/debugged incl flight-software**
 - **Is now at SLAC for integration in SIU crate**
 - **Board booted with BAE750, turned-on PDU/GASU power from SIB using flight-software**
 - **Ordering flight components**
 - **Some concerns about Honeywell SRAM power sensitivity, may change to different Honeywell package which would require layout changes**
 - **FEB UPDATE: No need for package change**
- **CPS (Generate crate supplies (5V/3.3V) from 28V)**
 - **Debugged module, tested with backplane and LCB, all ok**
 - **Awaits fully loaded crate test**
- **CPU**
 - **BAE 750 boards boots in crate**
 - **Designed/laid-out/fabriated/loaded/tested cPCI adapter board to translate TTL serial BAE interface to standard RS232 for debugging**



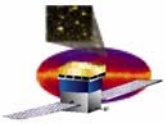
Last Month's Accomplishment, Misc

- **Point-to-point cables (“Harness”)**
 - Ordered complete set of cables for test-bed
 - Started to add cable-ways on test-bed so one can fit-check cables
 - Need to make sure that it is ok with installation sequence during I&T
 - Need to finalize fly-away sensors and cabling since they live in same space
- **Heater Control Box**
 - Finished schematic of Heater Control Box circuit
 - In layout
 - **FEB UPDATE: finished layout, fabricated PCB**



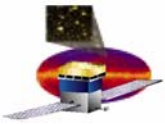
Last Month's Accomplishment, Simulator

- **Function of Front-End Simulator (FES)**
 - **Simulates TKR and/or Calorimeter front-end electronics on test-bed, connects to TEM like subsystem and to PC (later for downloading data-patterns)**
- **Accomplishment/Status**
 - **Modified schematic to include modifications from first EM test**
 - **Finished layout**
 - **Fabricated boards**
 - **Received first article back from loading**
 - **Is in test**
 - **If ok fab/load boards for test-bed**
 - **FEB UPDATE: fabricated 45 boards, are in assembly**
 - **FEB UPDATE: assembling cables from TEM to FES**



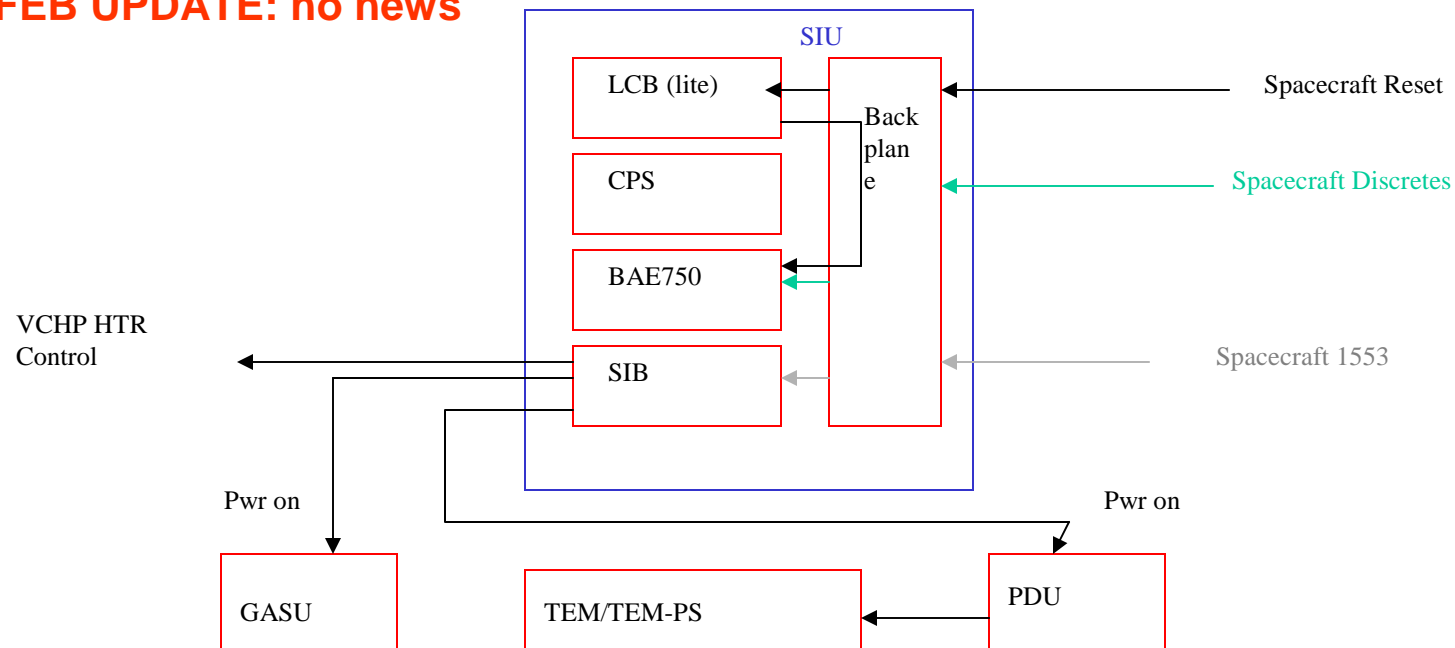
Last Month's Accomplishment, EGSE

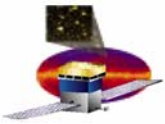
- **Function:**
 - Provides test-setups for CAL, TKR, DAQ HW & SW effort
- **Accomplishments/Status:**
 - Ordered (to arrive at a total of 60 test-stands)
 - VME crates
 - VME single-board computers
 - VME SLAC custom transition board
 - Custom PCI Mezzanine Card (PMC) LCB's
 - Connectors for cables
 - TEM enclosures
 - Tower Power Supply enclosures
 - Tower electronics modules
 - TEM DAQ boards
 - 28V-power supplies
 - **FEB UPDATE: received most of the items**
 - Released first draft of EGSE description/test procedures to CAL for comment
 - **FEB UPDATE: no comments so releasing document and proceeding with test**
 - Working on modification of ORACLE data-base to be able to enter LAT components before assembly of test-stands
 - **FEB UPDATE: finished most mods, is being used for inventory**
 - Send write-up describing ACD G3 test-stand to ACD
 - **FEB UPDATE: sent to ACD**
- **Concern:**
 - CRYSTEK CAL/TKR connectors were due 12/1/03, but have received 51-pin connectors only mid January. Still no 69-pin connectors (both used for TEM) CRYSTEK had some problems with supplier.
 - **FEB UPDATE: received 69-pin pig-tails (for TEM-FES cables) but not yet 69-pin board mount for TEMs**
 - Started to assemble TEM test-stands with limited number of fully-loaded TEM's



Last Month's Accomplishment, Testbed (1)

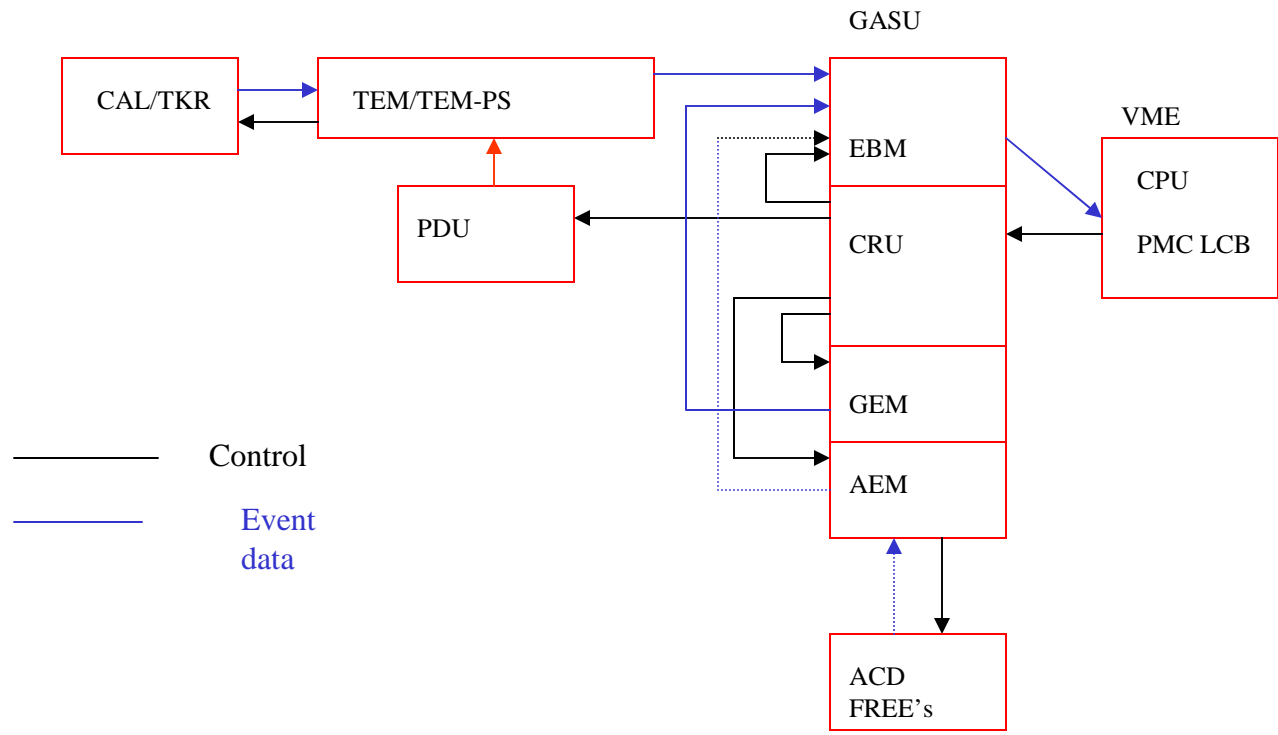
- Started system tests for software test-bed components (flight software components/packages/functions)
 - BAE750 successful boot in real SIU enclosure with SIU custom backplane, SIB, CPS, LCB lite (reset, clock/2 for BAE750 PID's)
 - FSW communicated via MIL1553(prim & red) with SIU crate-> SIB -> BAE750
 - FSW turned-on GASU and PDU power under BAE750 control via SIB
 - BAE750 turned on/off heaters via SIB
 - Spacecraft discrettes connected to BAE750, FSW received signals (e.g. sys-clock/2 into BAE750 PID's for time-stamp)
 - FEB UPDATE: no news

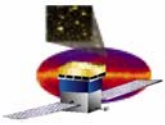




Last Month's Accomplishment, Testbed (2)

- Started system tests for software test-bed components (flight software components/packages/functions)
 - LCB controls EBM, CRU, GEM, AEM, configuration/read-back with FSW code
 - Controls PDU to turn-on/off cliets (TEM's)
 - Event-builder builds events (TEM/GEM) and get to CPU via LCB
 - Next: Event data from ACD FREE-> AEM-> EBM -> LCB
 - FEB UPDATE: successful read out ACD
 - FEB UPDATE: installed 16 load boards on test-bed simulating CAL/TKR loads to TEMs





Manpower

- In process of adding engineer for EGSE (interviewed promising candidate)
 - **FEB UPDATE: added engineer to help R. Rodriguez in testing of EGSE**
- Adding assembly technician (in interview process)
 - **FEB UPDATE: added assembler**
- Adding ISIS (Instrument Spacecraft Interface Simulator) engineer, will start in 3 weeks (gave notice to Loral Spacecraft)
 - **FEB UPDATE: engineer Eric Hansen has started**
- Adding 2 post-doc physicist/software developer to test system. Offer went out, expect decision this week. Start April 1.
 - **FEB UPDATE: Jana and Gregg Thayer have accepted, start April 1**
- Adding software developer/physicist A. Parazzo (presently on SLAC BaBar on-line) to help testing. Will start mid February
 - **FEB UPDATE: Amadeo has started**
- **FEB UPDATE: added technical writer to support Mike Huffer**
- To do:
 - Adding man-power for qual/flight screening
 - Still looking



Schedule/Budget

- **Total budget: \$20,195**
- **Work Scheduled up to date: \$9,399**
- **Work Performed: \$9,997**
- **Actuals: \$10,595**
- **Schedule Variance \$596k (ahead)**
 - **Some flight components were delivered earlier than expected**
- **Cost Variance: -\$598k (over budget)**
 - **Additional liens (e.g. FES and TEM) still on book, not submitted yet**