
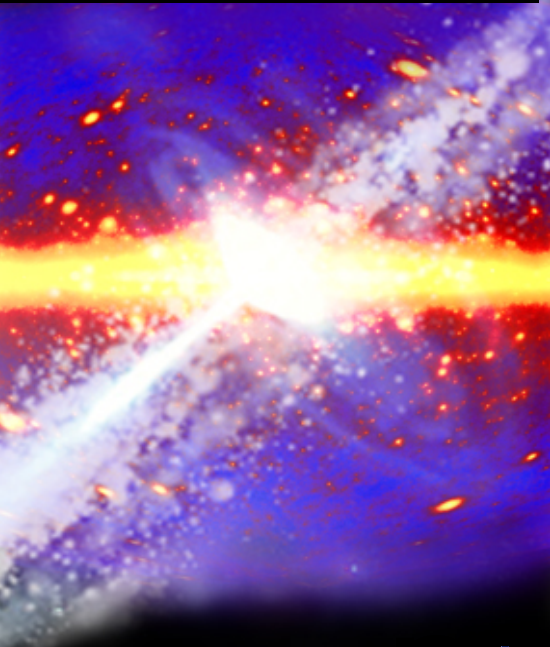


**Gamma-ray Large  
Area Space  
Telescope**



A vertical banner for the GLAST mission. At the top is the GLAST logo, which consists of the word 'GLAST' in a stylized, metallic font with a satellite dish-like shape behind it. Below the logo is the text 'Gamma-ray Large Area Space Telescope' in a blue, sans-serif font. The main part of the banner is a vibrant image of the cosmic microwave background, showing a bright yellow and orange band across the center, surrounded by a field of blue and purple galaxies. At the bottom of the banner is a row of small icons representing the international partners: the flags of France, Germany, Italy, Japan, Sweden, and the United States, followed by the European Space Agency (ESA) logo and the NASA logo.

# **GLAST Large Area Telescope**

## **Instrument Flight Software**

**Monthly Status Review  
January 27, 2005**

**Jeff Fisher  
FSW Manager**

**Stanford Linear Accelerator Center**



# January Issues

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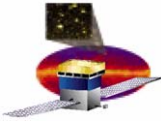
- **AstroRT Debugging**
  - Debugging and provided workarounds for instances where Astro-RT does not properly handle various ITOS records.
  - Analysis and characterization of issues continues to absorb time



# January Activities

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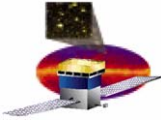
- **Charge Injection Calibration (LCI)**
  - **Good progress on CAL charge injection calibration**
    - **Have used the code to pulse a CAL module (electronics only, no logs) and get calibration data back**
    - **Now analyze physical limitations of the hardware (cross-talk and deteriorating DAC output at high pulse rates)**
  - **Once CAL complete, move on to TKR and ACD**
- **Inter-task Communications System (ITC, LCS, CTS)**
  - **Development delayed because of ISIS integration and AstroRT testing**
  - **Scheduled to finish in February**
- **Housekeeping (LHK)**
  - **Minor bug fixes**
  - **Data set expanding to include new CPU performance metrics**
- **Front End Simulator (FES)**
  - **FES management utilities are complete**
  - **Now focus on generating a more realistic event data stream**
    - **Rather than flat or Poisson event rate, simulate pile-ups and otherwise get the stream to look more like the GLEAM data**
- **Primary Boot Code (PBC)**
  - **Multiple boot code image checksum and selection code complete**



## January Activities (2)

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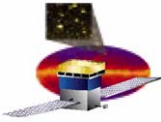
- **File and Memory Management (LFS, FILE, MEM)**
  - **NRL verified that memory management differs in important ways between the RAD750 evaluation and flight boards**
    - **Will produce a version of primary boot code for each board**
- **Telecommand and Telemetry Database**
  - **Minor adjustments to FSW command and telemetry formats to compensate for bugs in AstroRT**
- **LAT Instrument Manager (LIM)/Mode Controller**
  - **J. Fisher, M. DeKlotz investigating Spacecraft hardware states and their possible implications for mode control**
- **Thermal Control (LTC)**
  - **New control algorithm received from Lockheed**
    - **Implementation in FSW is complete**
  - **Telecommands for this system are being implemented**
- **LAT Communications Board Driver (LCBD)**
  - **Errors encountered during LCB initialization have been corrected**



# January Activities (3)

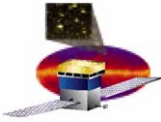
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- **LAT Diagnostics Framework (LDF)**
  - **Work in progress**
  - **To be reassigned, and work will follow completion of the Calibration code**
  
- **Attitude/Time Processing (LSM)**
  - **At NRL, records from a pre-built attitude data set are successfully transmitted via 1553 from a simulated Spacecraft to a simulated LAT CPU**
    - **Lookup tables of this attitude data successfully built on the LAT CPU**
  - **Similar work underway at SLAC for the time data**
  
- **Instrument Physics (LPA)**
  - **Event delivery and filter code has been updated**
    - **Code to traverse and unpack events has been adapted to match the newest structure of the data**
    - **Large (> 4K) events are frequently split up by the hardware**
      - **Event delivery code now handles reassembly**
    - **Properly-formatted GLEAM data sets are now available, via OSU, to use as gold standard comparison for FES data**
    - **Delivery and filter code soon to be put into production and used on the Testbed with the FES**
  
- **Demo Plan laid out again**
  
- **Integration Plan updated**



# Development Status/Schedule

Function	Planned Code/Unit Testing Complete	Status	Remaining Effort (person weeks)	Forecast Code/Unit Testing Complete	Continuing Activities
Processor Basic Services (PBS, VXW)	Complete	100% coded	0	Complete	None
Primary Boot	10/30/04	100% coded	0	Complete	Testing
Multiple Boot Image, Checksum	1/21/05	100% coded	0	Complete	N/A
Secondary Boot	10/30/04	100% coded	0	Complete	None
LAT Communications Board Driver (LCBD)	12/15/04	100% coded	0	Complete	None
LCB Service (LCS)	11/30/04	80% coded	2	2/28/05	Interrupted by ISIS & AstroRT testing
Command and Telemetry/1553 Service (CTS)	11/30/04	80% coded	1	2/28/05	Interrupted by ISIS & AstroRT testing
Abstract/Inter-task Communications (ITC)	10/30/04	90% coded	2	2/28/05	Interrupted by ISIS & AstroRT testing
Instrument Configuration (LATC)	12/01/04	100% coded	0	Complete	None
Command and Telemetry Data Dictionary (LCAT)	1/10/05	LCAT tool complete	0	Complete	None



## Development Status/Schedule (2)

Function	Planned Code/Unit Testing Complete	Status	Remaining Effort (person weeks)	Forecast Code/Unit Testing Complete	Continuing Activities
File and Memory Mgmt (LFS, File/Object)	11/30/04	100% coded	1	Complete	Unit testing underway
Housekeeping (LHK)	10/15/04	95% coded	1	1/14/05	Needs minor update after ITC complete
Thermal Control (LTC)	12/01/04	80% coded	1	2/09/05	Coding resumed this month, on track for Feb completion
Spacecraft Interfaces (LSM)	11/15/04	90% coded (attitude processing complete)	2	2/11/05	N/A
Watchdog (LSW)	11/15/04	70% coded	3	3/04/05	Reassigned
Mode Control (LIM)	11/15/04	Coding begins after ITC	3	3/10/05	No progress made due to ISIS, AstroRT testing
Power/Initialize GASU (PIG, part of Basic Services layer)	11/15/04	100% coded	0	Complete	Bug fixes.



## Development Status/Schedule (3)

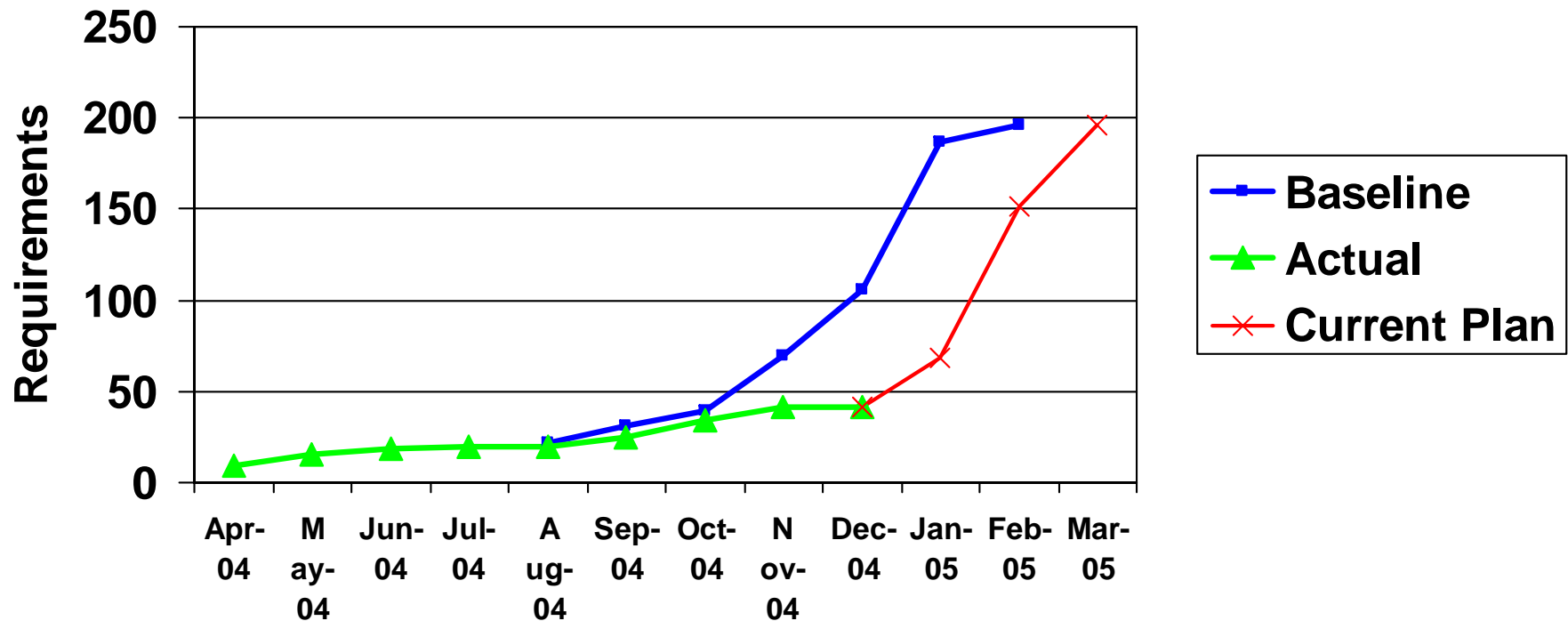
Function	Planned Code/Unit Testing Complete	Status	Remaining Effort (person weeks)	Forecast Code/Unit Testing Complete	Continuing Activities
Charge Injection Calibration (LCI)	12/15/04	50% coded	4	2/18/05	Good progress made this month
Diagnostics (LDF)	11/15/04	Being reassigned	4	2/28/05	Related to calibration; will continue after calibration completed
Event Integrity and Delivery (part of LPA)	1/07/05	90% coded	1	2/11/05	Good progress made; code nearing production status
Event Filtering (part of LPA)	1/07/05	90% coded	1	2/11/05	Good progress made; code nearing production status
GRB Detection and Response (part of LPA)	1/07/05	60% coded	2	4/15/05	Deferred until completion of filter & diagnostics





# Requirements-to-Demo Mapping

## Status thru December





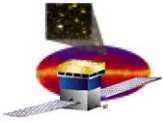
# FSW Test Readiness Status/Schedule

Test Name	Test Number	Responsible Eng.	Planned Script Development	Actual Script Development
1553 Interface Test	1	Shantha	Sep-04	8 of 8
FSW and LAT initialization	9a	Igor K.	Sep-04	19 of 22
Command Functional	2a	Shantha	Oct-04	15 of 15
FSW and LAT re-initialization and recovery	9b	Igor K.	Oct-04	5 of 5
File Management and Memory Upload and Dump Verification	2b	Shantha	Nov-04	22 of 22
LAT Pointing Calculations	10a	Igor V.	Nov-04	0 of 2
Vehicle Signals Interface Verification	5	Mark Mao	Jan-05	3 of 5
Electronic Calibration	8b	Igor K.	Feb-05	0 of 4
Narrowband Telemetry Verification	3	Shantha	Feb-05	
SIU/EPU CPU-to-CPU Communications Functional Test	6a	Igor K.	Feb-05	0 of 1
LAT Thermal Control System (TCS)	15	Eric	Feb-05	
Event Filtering – Reception of Events and Verification of Filtering Algorithm	8a	Igor V.	Mar-05	

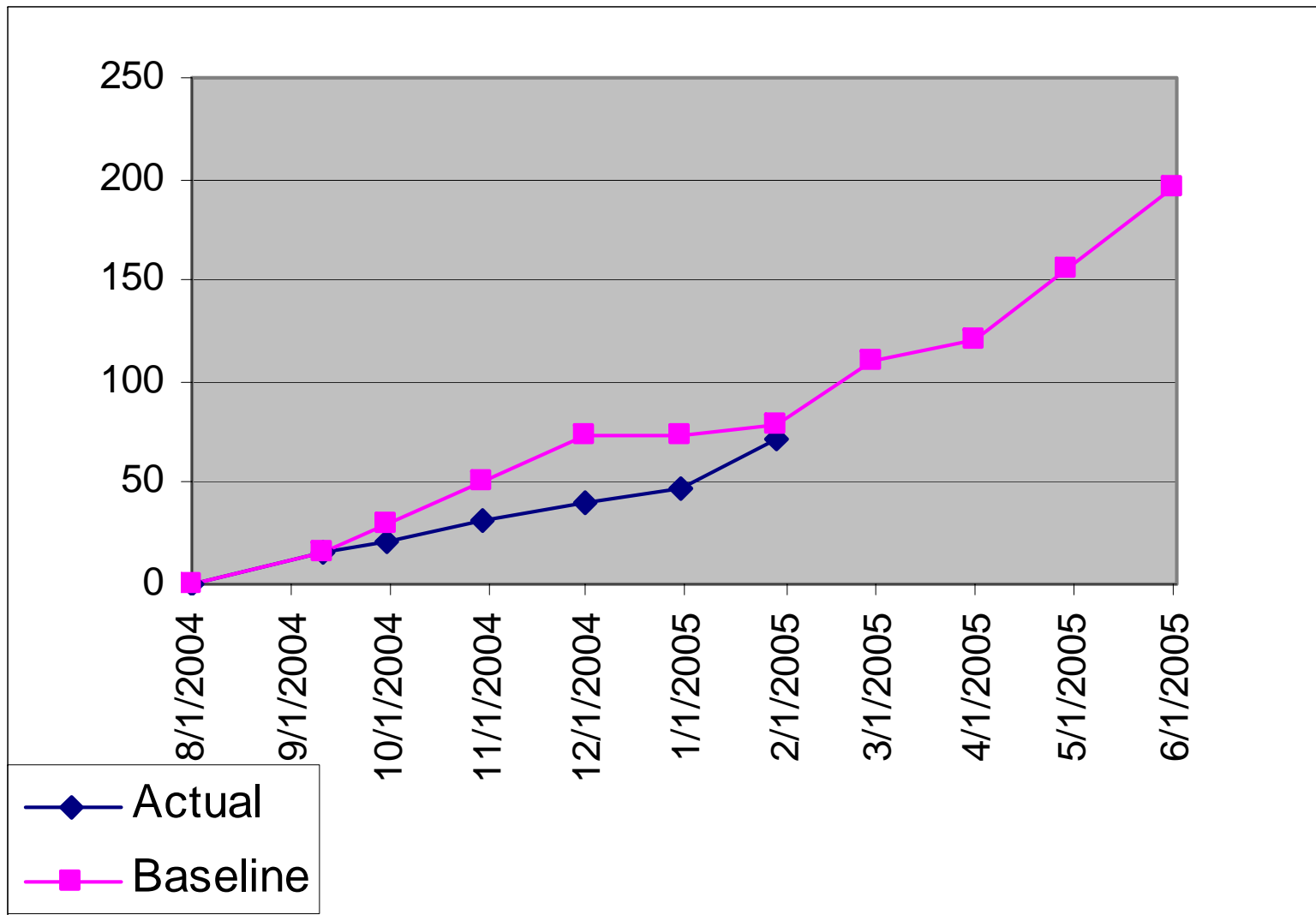


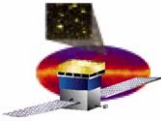
# FSW Test Readiness Status/Schedule

Test Name	Test Number	Responsible Eng.	Planned Procedure/Script Development	Actual Procedure/Script Development
Additional Science Processing – Repointing Logic	12b	Igor V.	Mar-05	
EPU Internal Configuration Test	6b	Igor K.	Mar-05	
LAT Time Signal Processing	10b	Igor K.	Mar-05	
Wideband Telemetry Verification	4	Igor V.	Apr-05	
GRB Handling/Repointing Requests	11	Igor V.	Apr-05	
T&DF, TKR, CAL, and ACD Internal Configuration Test	7	Igor K.	Apr-05	
Additional Science Processing – GRB detection and location	12a	Igor V.	Apr-05	
Operational Modes – Safe Modes	13a	Eric	Apr-05	
Operational Modes – Science Modes	13b	Eric	Apr-05	
LAT Diagnostic and Calibration Modes	14	Eric	Apr-05	
LAT Event Performance Monitoring and Operations	16	Igor V.	May-05	



# FSW Test Script Progress





# FSW Develop and Test Schedule Through FQT

