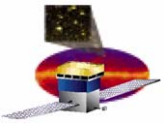Gamma-ray Large
Area Space
Telescope

GLAST Large Area Telescope

Instrument Flight Software

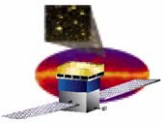**Monthly Status Review**
March 3, 2005

Jeff Fisher
FSW Manager

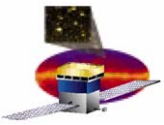**Stanford Linear Accelerator Center**

February Issues

- **Test Team Lead Resigned**
  - **Need to reallocate tasks among existing staff**
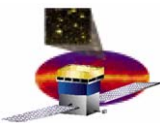 - **Sergio Maldonado appointed technical lead**

February Activities

- **Four demonstrations conducted:**
  - **Multiple boot images in SUROM**
  - **Attitude processing**
  - **Time hack processing**
  - **Thermal control system**

- **Inter-task Communications System (ITC, LCS, CTS)**
  - **Excellent progress made**

- **Housekeeping (LHK)**
  - **Revised limit checking to match latest draft of SRS**
  - **Updated code to include new memory dump statistics and 1553 driver statistics**

- **Front End Simulator (FES)**
  - **Developing a Web-based control system.**
  - **Conducted a training session for Test Team**
  - **A user manual is being written for the FES**

- **Analyzed LTX (FSW test executive) changes required to support use of Virtual Spacecraft (VSC)**
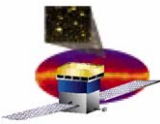
February Activities (2)

- **File and Memory Management (LFS, FILE, MEM)**
  - **Completed CPU monitoring package (monitoring idle cycles, memory usage, etc)**
  - **MEM package update to support new CPU register metrics**

- **Telecommand and Telemetry Database**
  - **Minor adjustments to FSW command and telemetry formats to compensate for bugs in AstroRT**

- **Thermal Control (LTC)**
  - **Held a successful demo of thermal control algorithm. Implementation in FSW is complete**
  - **Telecommands for this system are being implemented**

- **LAT Communications Board Driver (LCBD)**
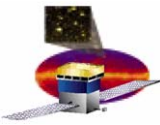 - **Very stable, minor bug fixes only**

February Activities (3)

- **Attitude/Time Processing (LSM)**
  - **Demoed attitude processing and time hack processing**

- **Instrument Physics (LPA)**
  - **Event delivery framework written, tested, and now in production as EDS package**
  - **Event filter code extended for additional offline uses**
    - **GLEAM and the Testbed**
  - **Extensive testing of filter code this month**

- **Charge Injection Calibration (LCI)**
  - **Calibration design document written and internally reviewed**
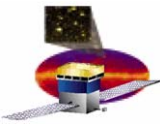 - **Detailed schedule defined that outlines remaining coding**

Development Status/Schedule

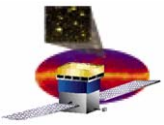| Function	Planned Code/Unit Testing Complete	Status	Remaining Effort (person weeks)	Forecast Code/Unit Testing Complete	Continuing Activities
Processor Basic Services (PBS, VXW)	Complete	100% coded	0	Complete	None
Primary Boot	10/30/04	100% coded	0	Complete	Testing
Multiple Boot Image, Checksum	1/21/05	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)	3/14/05	90% coded	1	3/07/05	Coding in progress
Command and Telemetry/1553 Service (CTS)	3/21/05	90% coded	1	3/07/05	Coding in progress
Abstract/Inter-task Communications (ITC)	3/14/05	90% coded	1	3/07/05	Coding in progress
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)

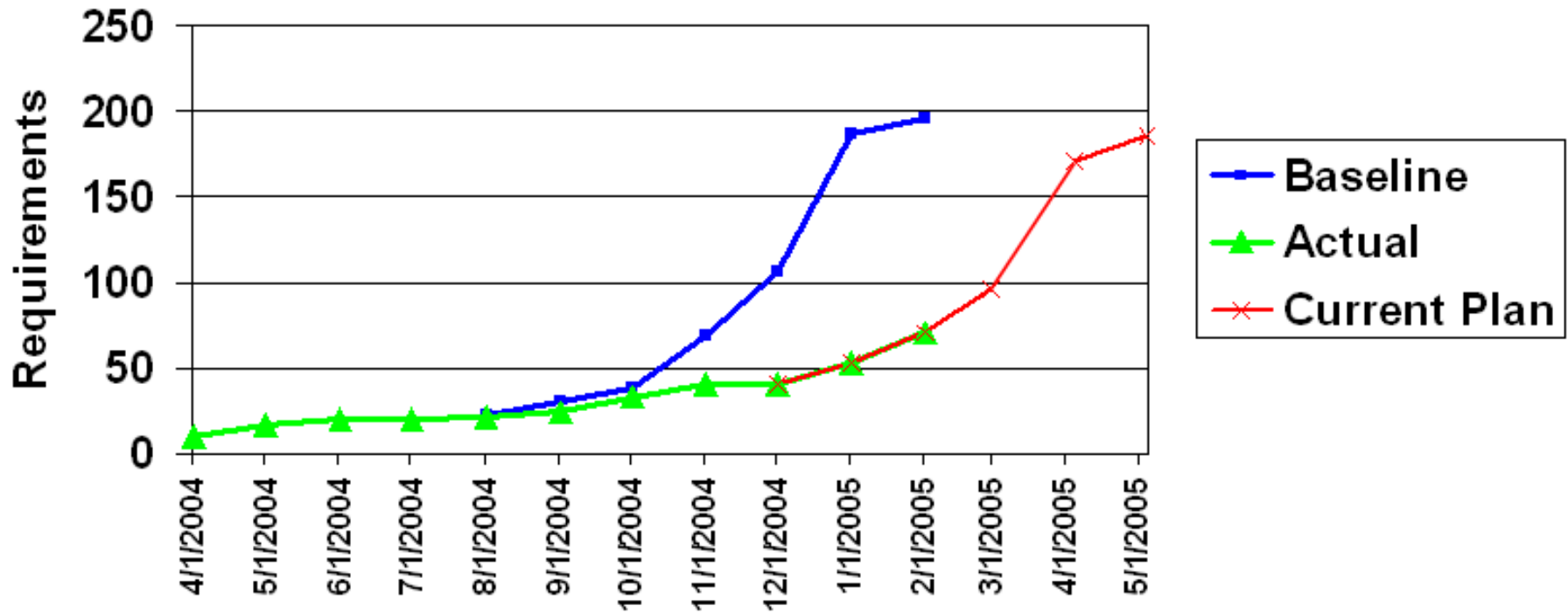| Function	Planned Code/Unit Testing Complete	Status	Remaining Effort (person weeks)	Forecast Code/Unit Testing Complete	Continuing Activities
File and Memory Mgmt (LFS, File/Object)	11/30/04	100% coded	1	Complete	Unit testing underway
Housekeeping (LHK)	3/22/05	95% coded	1	3/22/05	Needs minor update after ITC complete
Thermal Control (LTC)	3/22/05	95% coded	1	3/22/05	Complete except for T&C interface
Spacecraft Interfaces (LSM)	3/15/05	95% coded (attitude processing complete)	2	3/15/05	
Watchdog (LSW)	4/15/05	70% coded	3	4/15/05	Reassigned
Mode Control (LIM)	4/30/05	Coding begins after ITC	3	4/30/05	Queued up behind ITC
Power/Initialize GASU (PIG, part of Basic Services layer)	11/15/04	100% coded	0	Complete	Bug fixes.

Development Status/Schedule (3)

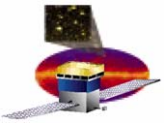| Function	Planned Code/Unit Testing Complete	Status	Remaining Effort (person weeks)	Forecast Code/Unit Testing Complete	Continuing Activities
Charge Injection Calibration (LCI)	4/18/05	50% coded	6	4/18/05	Good progress made this month
Diagnostics (LDF)	5/15/05		4	5/15/05	Related to calibration; will continue after calibration completed
Event Integrity and Delivery (part of LPA)	3/22/05	90% coded	1	3/22/05	Good progress made; code nearing production status
Event Filtering (part of LPA)	3/22/05	90% coded	1	3/22/05	Good progress made; code nearing production status
GRB Detection and Response (part of LPA)	5/15/05	60% coded	2	5/15/05	Deferred until completion of filter & diagnostics

Requirements-to-Demo Mapping

Status thru February

FSW Test Readiness Status/Schedule

Test Name	Test Number	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	24 of 25
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	Waiting for Cal code
Narrowband Telemetry Verification	3	Shantha, Mark Mao	Feb-05	In process
SIU/EPU CPU-to-CPU Communications Functional Test	6a	Igor K.	Feb-05	Needs ITC
Additional Science Processing – Repointing Logic	12b	Igor V.	Mar-05	
Event Filtering – Reception of Events and Verification of Filtering Algorithm	8a	Igor V.	Mar-05	code underway

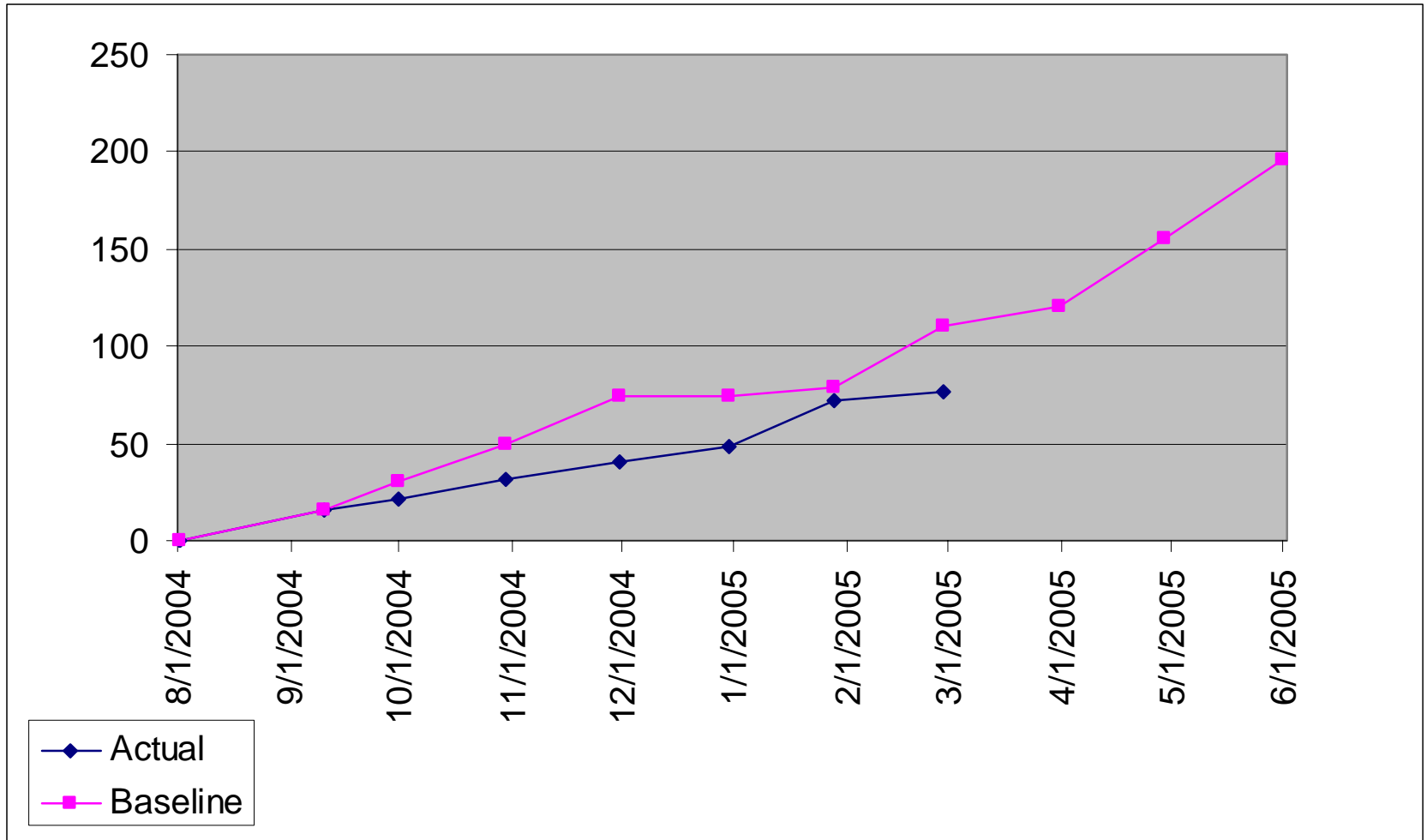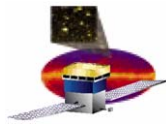# FSW Test Readiness Status/Schedule

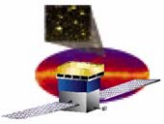| Test Name	Test Number	Eng.	Planned Procedure/Script Development	Actual Procedure/Script Development
EPU Internal Configuration Test	6b	Igor K.	Mar-05	
LAT Time Signal Processing	10b	Igor K.	Mar-05	
LAT Thermal Control System (TCS)	15	Shantha	Apr-05	reassigned
Wideband Telemetry Verification	4	Igor V.	Apr-05	code underway
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	Igor K.	Apr-05	reassigned
Operational Modes – Science Modes	13b	Igor K.	Apr-05	reassigned
LAT Diagnostic and Calibration Modes	14	Igor K.	May-05	reassigned
LAT Event Performance Monitoring and Operations	16	Igor V.	May-05	

FSW Test Script Progress
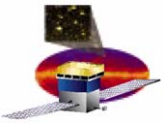
Upcoming demos with target dates

Demo	Number of Requirements	Date
• Inter-task Communications *	7	3/11/05
• Secondary Boot Code and Watchdog	5	3/15/05
• Housekeeping	3	3/18/05
• Diagnostic Telemetry	1	3/18/05
• Alert Telemetry	1	3/18/05
• File and Memory Management	2	3/18/05
• Event Filtering/ Deadtime Monitoring	6	3/23/05

* *denotes initial release based upon completion of ITC Service Layer*

Upcoming demos (2)

Demo	Number of Requirements	Date
• Event Filter Reprogramming	1	4/8/05
• LAT Communications Board Driver, 1553 Communications Driver, and Spacecraft Interfaces	9	4/15/05
• Mode Control and Instrument Safety, and Thermal Control System	21	4/22/05
• Charge Injection Calibration and Configuration	20	4/29/05
• Event Integrity and Delivery, and Diagnostics	26	5/8/05
• GRB Detection and Response	14	5/20/05

FSW Develop and Test Schedule Through FQT