

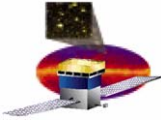
GLAST Large Area Telescope

Instrument Flight Software

**LAT Monthly
July 26, 2005**

Terry Schalk

U. C. Santa Cruz



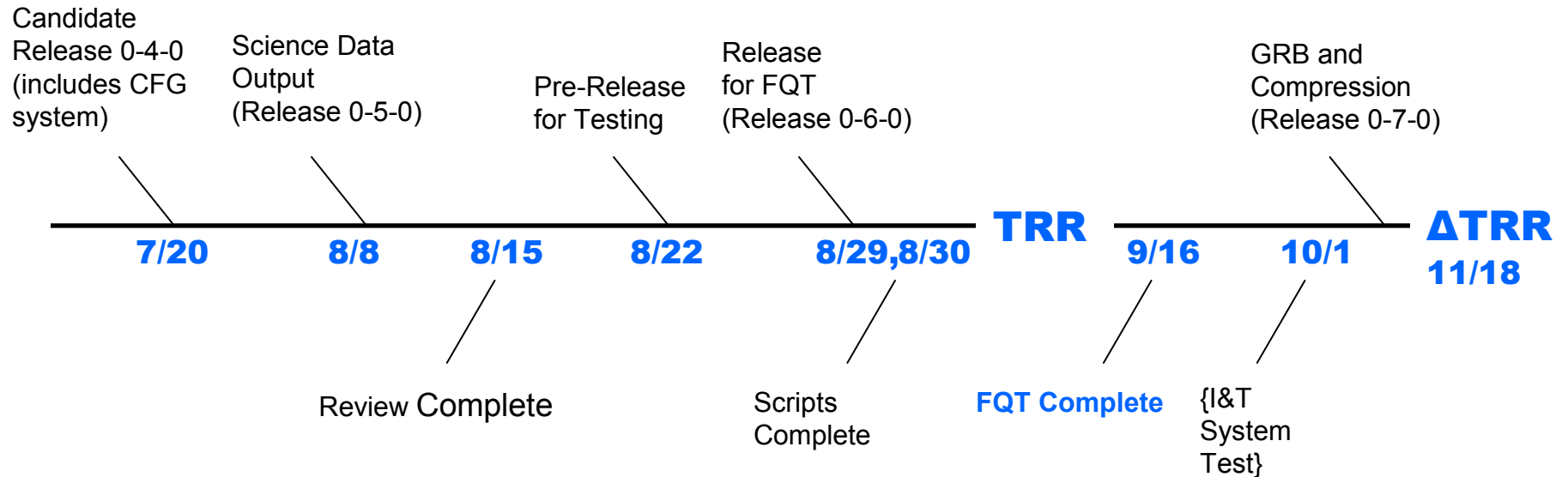
FSW Overview

- **We have had our 4-th incremental FSW build, most pkgs are under CCB control**
- **Recently added configuration functionality**
- **Science output to SSR to be added in next build**
- **Have a new layout for activities between now and the FQT and systems testing in Bldg 33 (Oct 1)**
- **Have a lien list for included pkgs that CCB has started to comb**

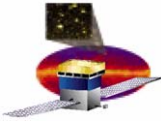


FSW Development and Test Milestones for FQT

FSW Development

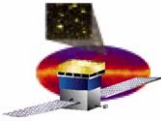


FSW Test



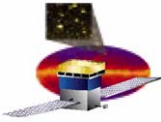
FSW Development and Test Milestones for FQT

FSW Development	Milestone Date	FSW Test	Milestone Date
Candidate Release 0-4-0 (includes CFG system)	7/20 (Was scheduled for 12-th)		
Science Data Output	8/8		
		Internal Review Complete	8/15
Pre-Release for Testing	8/22		
Release for FQT	8/29	Test Scripts Complete	8/30
		Test Readiness Review	8/31
		FQT Complete	9/16
Compression (?) and GRB	11/18	ΔTRR	



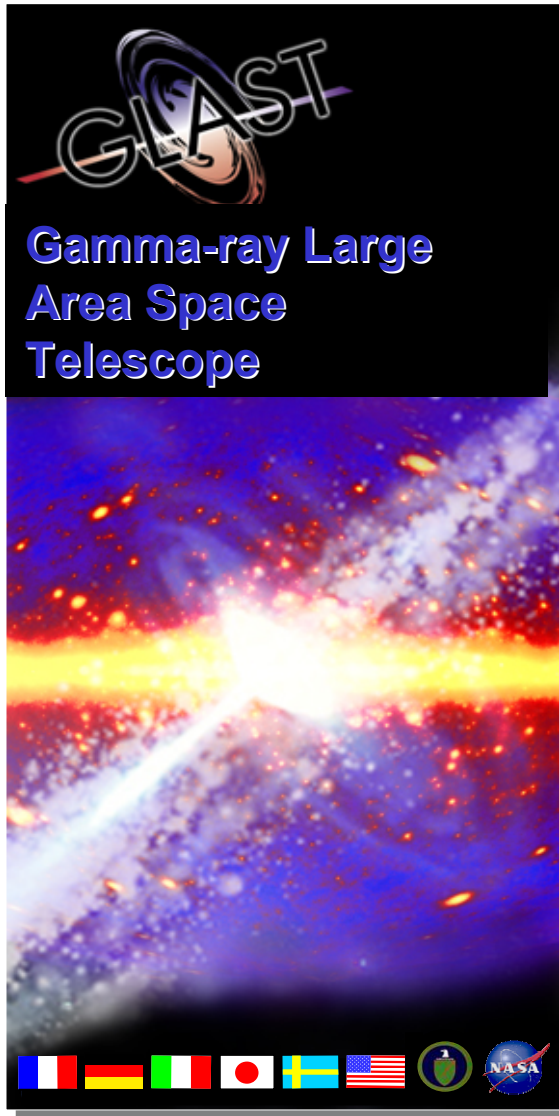
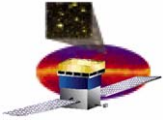
June Activities

- Reorganized FSW constituents to give clean separation of the code that will need to be exported to the offline/ISOC .
- LIM Physics modes (TOO, ARR, and PHYSICS) now in test.
- Burned an Upgraded VXW package into RAD750 EEproms.
- Added TEM dead-time counters
- Installed new FES firm/software (slave as well as master mode) to allow testing of the calibration code
 - Tested the FES running in calibration mode at 1 KHz.
- Most of the FILTER/EVENT handling is done.
 - Working on output data packing
 - handling of evolving constants (can now handle multiple sources as well as method to report which constants have been used).



June Activities

- **We now have a new configuration system. Packages are now being retrofitted.**
- **Discussed at F2F with users how to configure the instrument and flight software.**
 - **The goal is to organize all this configuration information.**
 - **Updated the LAT register description files used for configuration such that All registers now carry meta-information for the managing entity.**
 - **ISOC to help with config files management**
 - **Added Joanne**

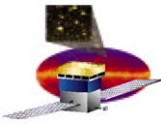


Testing



Test Suite Status

Test Suite	# Tests	Tester	Build	Procedure Milestones			Script Milestones		
				Draft Complete	FSW Review Complete (avail for IV&V)	FSW CCB Approval	LAT Approved	Initial Dry Run	Script Peer Review
FSW Initialization (FSWINI)	15	IK	0-4-0	√	√	8/2/2005	7/29/2005		
Memory Management (MEMMGT)	2	SC	0-4-0	√	√	√	√		
File Management (FILMGT)	1	SC	0-4-0	√	8/4/2005	8/8/2005	8/12/2005		
Wideband Telemetry Verification (WBTLMV)	3	IV	0-4-0	√	√	8/2/2005	8/15/2005		
Command Functional (CMDFNC)	3	SC	0-4-0	√	√	√	8/12/2005		
Charge Injection Calibration (FECALB)	7	IV	0-4-0	8/4/2005	8/11/2005	8/17/2005	8/22/2005		
Thermal Control System (THRMCS)	14	LJ	0-4-0	√	8/4/2005	8/11/2005	8/12/2005		
Time Signal Processing (TIMPRC)	4	SM	0-4-0	√	7/25/2005	8/2/2005	8/2/2005		
Vehicle Signals Interface Verification (VSGIFV)	3	LJ	0-4-0	√	7/25/2005	8/2/2005	8/8/2005		
CPU-CPU Communications (IPCFNC)	1	IK	0-4-0	8/4/2005	8/11/2005	8/15/2005	8/21/2005		
Event Filtering (EVTFIL)	4	IV	0-4-0	7/29/2005	8/1/2005	8/8/2005	8/16/2005		
Instrument Configuration via the SIU (SIUCFG)	4	IK	0-5-0	8/4/2005	8/11/2005	8/15/2005	8/18/2005		
Event Performance Monitoring and Operations (EVTPMO)	4	IV	0-5-0	7/29/2005	8/1/2005	8/8/2005	8/15/2005		
Operational Modes (OPMODE)	11	IK	0-4-0	√	7/28/2005	8/1/2005	8/8/2005		
Narrowband Telemetry Verification (NBTLMV)	3	SC	0-4-0	√	√	8/1/2005	8/8/2005		

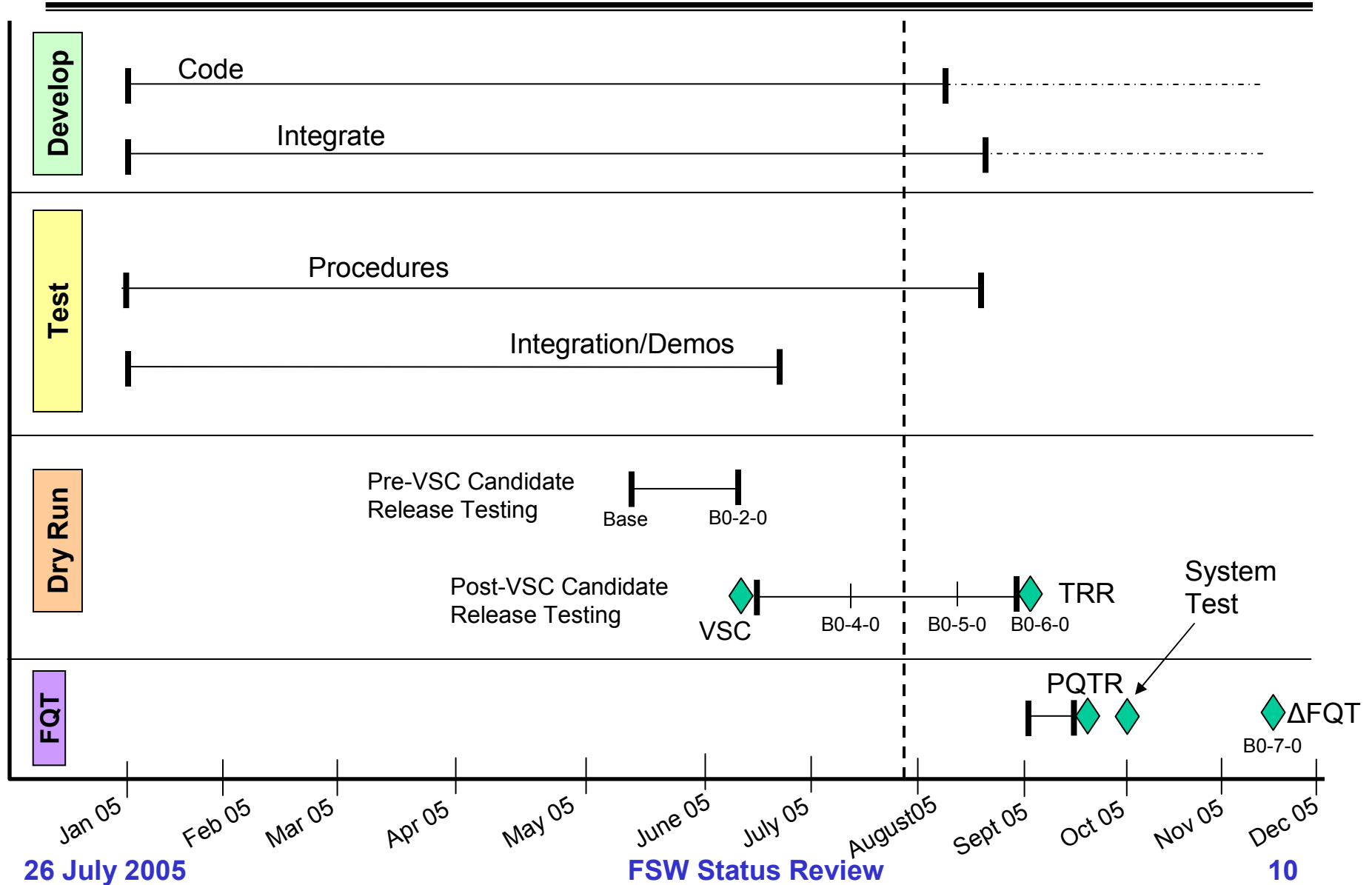


Script dry runs to demonstrate remaining requirements

Function (# of requirements)	Planned Date
Secondary boot checksum (1)	7/29/2005
Charge injection (22)	8/22/2005
Thermal control (8)	8/12/2005
SIU to EPU file copy (1), Commands + 1553 interface (10), Science data (2)	8/12/2005
Configuration (3)	8/18/05
Discrete interfaces (3)	8/8/05
Event filtering (4)	8/16/05
HSK anomaly response (1)	8/8/05
Mode control (14)	8/8/05
Event monitoring and deadtime (7)	8/15/05
Diagnostics (18)	8/22/05
26 July 2005	FSW Status Review
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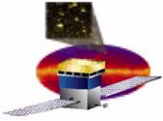
FSW Develop and Test Schedule Through FQT



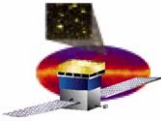


FSW Outstanding Issues

- **CR 0-5-0 Release 8/8 ...tight time line...**
 - **Provide event output to SSR**
 - **basic science data output format**
 - **Startline finalization**
- **Finish retrofitting FSW startup/configuration**
- **Completion of high priority Lien list items**
- **How to Drive FSW**
 - **Individual FSW applications have table-driven configurations**
 - **Large number of configuration parameters**
 - **Over the next 2 months, user groups can begin taking ownership of the configuration tables affecting their subsystems and define appropriate sets of operational parameters**

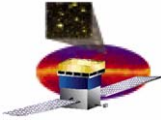


Glossary



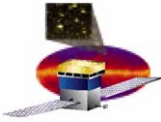
Glossary of FSW Terms

Term	Definition
ATT	Attitude Processing (package)
CCSDS	CCSDS Packet Utilities (package)
CFG	FSW Configuration and Initialization (package)
CR	Candidate releases: series of software builds with increasingly complete suite of FSW.
CTS	Command and Telemetry Service (package)
CTDB	Command and Telemetry Data Bus (1553) Driver (package)
EDS	Event Delivery Service
EFC	Event Filter Code
FILE	File Upload (package)
FQT	Formal Qualification Testing
GRB	Gamma Ray Burst
IMM	Instrumented Memory Manager (package)
ITC	Inter-task Communications Toolkit (ITC)
LATC	LAT Configuration (LTC)
LCBD	LAT Communications Board Driver (package)
LCM	LAT Computer Manager (package)
LCI	LAT Charge Injection Calibration (package)
LCS	LCB Communications Service (package)



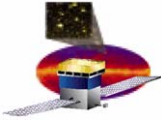
Glossary of FSW Terms (2)

Term	Definition
LDF	LAT Diagnostics Framework (package)
LFS	LAT File System (package)
LHK	LAT Housekeeping (package)
LIM	LAT Instrument Manager (package)
LMC	LAT Multiplexed Counters (package)
LPA	LAT Physics Acquisition
LSM	LAT Spacecraft Messages (package)
LSW	LAT Software Watchdog (package)
LTC	LAT Thermal Control (package)
Magic 7	Set of data messages sent from Spacecraft to SIU: Attitude message (at 5 Hz), Timetone message (1 Hz), Ancillary message (1 Hz)
MEM	Memory Management (package)
MON	CPU Monitor (package)
MSG	FSW internal error messaging (package)
PBC	Primary Boot Code (package)
PBS	Processor Basic Services (package)
PIG	Power-up and Initialize GASU (package)
PQTR	Post Qualification Test Review



Glossary of FSW Terms (3)

Term	Definition
RAD750	RAD750 Board Support (package)
SBC	Secondary Boot Code (package)
SIB	SIB Board Driver (package)
THS	Time Hack Services (package)
TRR	Test Readiness Review
VSC	Virtual Spacecraft: Spacecraft simulator constructed at SLAC
VXW	VxWorks BSP (package)
ZLIB	ZLIB Compression Tools (package)



FSW Ground Software

- **LCAT (LAT Command and Telemetry tool)**
 - Generates ITOS data definitions for ISOC and corresponding C code structures for FSW developers.
 - Development of the tool is complete. Periodic minor upgrades.
- **SCP (Spacecraft Control Program) and LCP (LAT Control Program)**
 - Developer tools used to simulate the SC and LAT sides of the flight environment
- **LCBT (LAT Communications Board Test suite)**
 - Comprehensive LCB test suite
 - No further development effort required
- **SIIS (Spacecraft to Instrument Interface Simulator)**
 - Utilities for creating and manipulating MOC Level 0 data files, and reading AstroRT archive files
 - No further development anticipated
- **CLI (Command Line Interface), GRL (GNU Readline)**
 - Very low level developer utility packages
 - No development or maintenance effort involved with these package