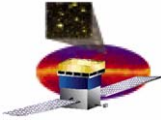


GLAST Large Area Telescope

**Instrument Flight Software
Development Team**

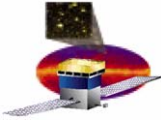
**Functional Demonstration
November 3, 2004**

Stanford Linear Accelerator Center



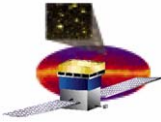
Demonstration Agenda

Demo Agenda Item	Presenter
1. Overview of the Demonstration	Don May
2. Boot Status Signaling Over Discretes	Don May
3. EPU Boot	Don May
4. Questions from Attendees	NA

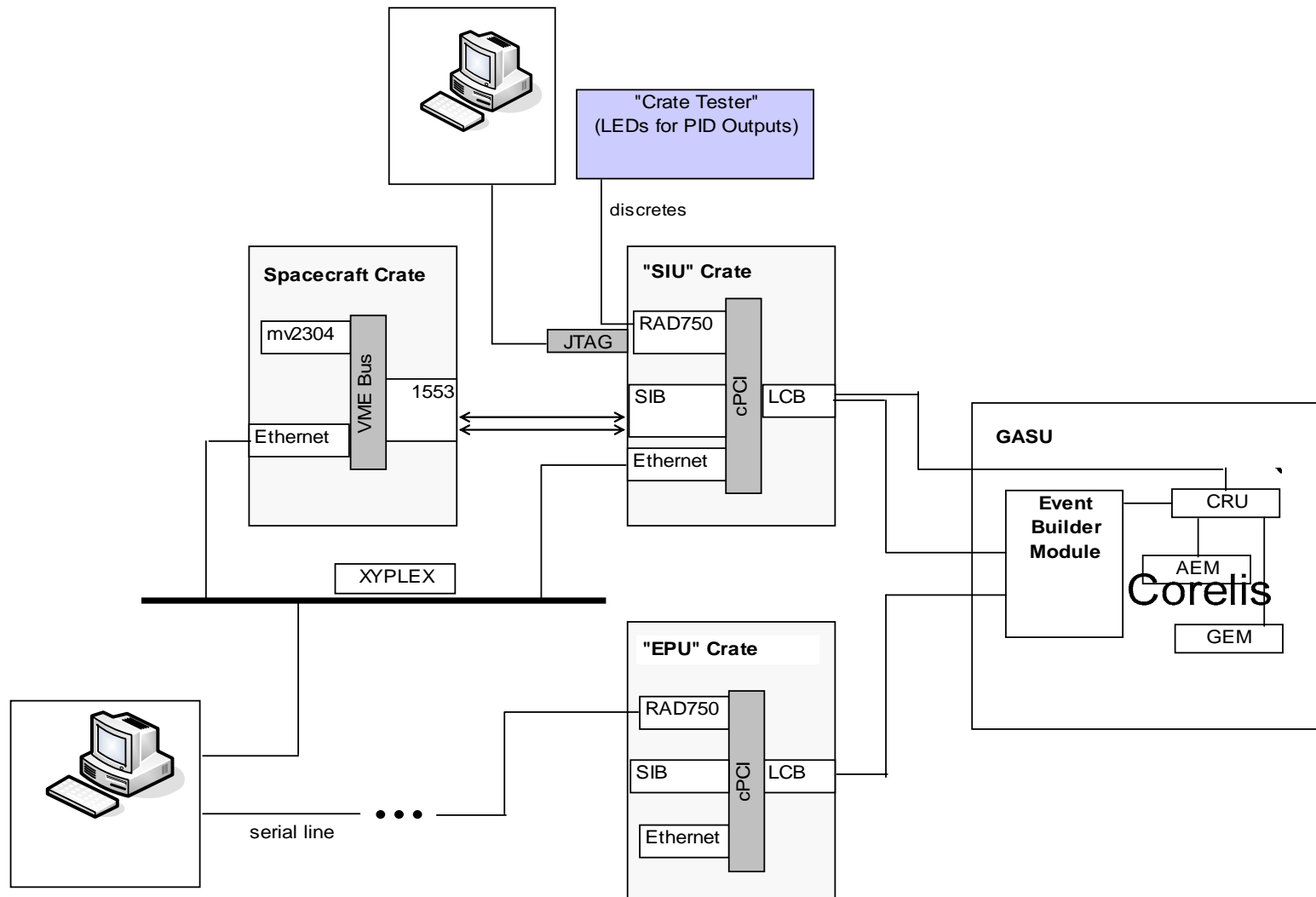


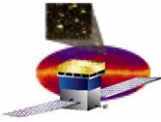
Demonstration Overview

- Today's demonstration covers reporting of Boot Status over the Discrete Lines:
 - On the SIU, boot code must be able to control 2 discrete lines and use them to indicate the status of the boot process
 - The discrettes are a backup signaling path, used in case of a serious memory or communications error
- The demo also covers the EPU Boot Process:
 - EPU boot code must satisfy several requirements:
 - EPU FSW must provide a controllable boot process
 - Commanded reboots
 - Commanded secondary boot
 - EPU FSW must store boot errors and other diagnostic data for use in troubleshooting and make this data available for retrieval
 - EPU FSW must issue boot housekeeping telemetry, and the telemetry must include errors and diagnostic data
 - EPU FSW must provide memory scrubbing capability
- A total of 9 boot-related FSW requirements will be demonstrated.



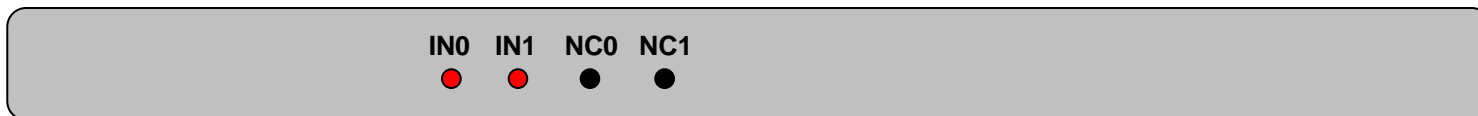
Hardware Context for the Demonstrations



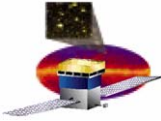


Signal Boot Status on Discretes Demo

- 5.3.1.8 Boot Status
 - SIU FSW shall indicate boot status over the discrete interface lines. The value states of the discrete lines and their meanings are defined in Table 5-1 of FSW Software Requirements Specification (LAT-SS-00399-04).
- During the demo, deliberate memory and comm errors are introduced using a Corelis debugging tool
- The discrete signals are shown on the “crate tester” device, with “IN0” and “IN1” LEDs indicating signals on PID5 and PID6, respectively

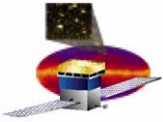


PID 5 Value	PID 6 Value	Status
0	0	No error.
0	1	Memory test indicates hard error in boot region of SDRAM.
1	0	The primary communications channel (1553 or LCB) could not be initialized.
1	1	Reserved.



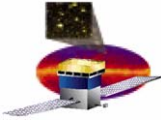
EPU Boot Demo: Controlling Boot

- **Controlling Reboot and Secondary Boot on the EPU**
 - **5.3.1.4.3: Event Processor Reboot**: The EPU FSW shall perform a primary reboot on command from the SIU.
 - **5.3.1.10.1: Initiating EPU Secondary Boot**: At the conclusion of the primary boot, the EPU shall be commandable by the SIU to perform the secondary boot. This command may be issued by the ground and implemented via the SIU.
- **During the demo:**
 - **Commands will be issued via the SIU**
 - **The EPU will return housekeeping telemetry, reporting the cause of any reboot**



EPU Boot Demo: Viewing Boot Error Data

- **Viewing Boot Diagnostics Data**
 - **5.3.1.4.4: Reset Source**: SIU and EPU FSW shall store the source or cause of a reboot in an error log that can be retrieved after primary boot is complete.
 - **5.3.1.5: Store System Errors**: SIU and EPU FSW shall store any system errors occurring during primary boot in an error log.
 - **5.3.1.6: Automatically Send Errors**: In addition, FSW shall include data in the boot housekeeping telemetry regarding system errors occurring during primary boot.
 - **5.3.1.7: Retrieve System Errors**: Upon command, the log of system errors occurring during primary boot shall be sent to the ground via telemetry.
 - **5.3.1.9: Boot Housekeeping**: During primary boot of a unit, the FSW shall send Boot Housekeeping telemetry to the spacecraft via the CTDB, as defined in the LAT FSW Telecommand and Telemetry Formats handbook. Note that EPUs depend on SIUs to forward this data to the spacecraft.
- **The demo will employ boot commands and boot housekeeping telemetry to show how detailed error information stored during the EPU boot process can be accessed.**



EPU Boot Demo: Memory Scrubbing

- **Monitoring the Progress of Boot Memory Scrubbing**
 - **5.3.1.12: LAT Memory Scrubbing: FSW shall configure memory scrubbing of processor memory. Details may be found in the Appendix of the RAD750 Board Hardware User's Manual.**
- **Memory scrubbing has been a feature of the boot code for several months**
 - **In the demo, the progress of the memory scrubbing operation will be reported in boot housekeeping telemetry**