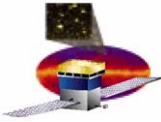


GLAST Large Area Telescope

Instrument Flight Software

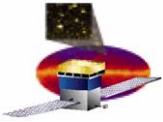
**Functional Demonstration
May 2004
(actual date, 2 June 2004)**

Stanford Linear Accelerator Center



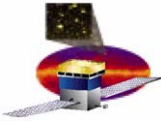
Demonstration Agenda

Demo Agenda Item	Presenter
1. Introductions	NA
2. Overview of the Demonstrations	Tony Waite
3. Receive/Process Ancillary, Attitude, Time Tone Messages Demo	Tony Waite
4. Inter-task Communications Demo	Tony Waite
5. Questions from Attendees	NA



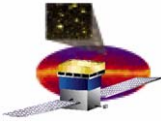
Demonstration Overview

- **Today's demonstration exercises much of the planned hardware and software interface between the Spacecraft and the Spacecraft Interface Unit (SIU).**
 - **The Spacecraft is represented in these demonstrations by:**
 - **An mv2304 CPU crate.**
 - **A Spacecraft Data Interface Simulator (SDIS), recently delivered by Spectrum Astro, Inc.**
 - **The SIU is represented by a RAD750 flight crate running the boot code demonstrated last month.**
- **Today's demonstrations show that:**
 - **A FSW infrastructure exists that allows an SIU to receive and perform simple processing on ancillary, attitude, and time tone data messages.**
 - **FSW that provides inter-task communication and can successfully route Spacecraft messages to software tasks is operational.**



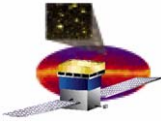
Receive/Process Ancillary, Attitude, Time Tone Messages Demos

- The Spacecraft sends the LAT several classes of utility data messages over the 1553 interface.
 - Ultimately, seven messages per second will be sent: 5 attitude messages, 1 time-tone, and 1 ancillary (containing orbit information and status info)
- Concept and organization of the demo:
 - The demo procedure is straightforward:
 - Software running on the Spacecraft crate will issue ancillary, attitude, and time tone messages, wrapped in CCSDS packets and transmitted over 1553 lines, to the RAD750 flight crate.
 - Software running on the flight crate will dump the messages to demonstrate they were received and that they contain the ancillary, attitude, and time tone data sent by the Spacecraft.
- As simple as this demo sounds, it actually shows that considerable progress on the Spacecraft/SIU interface has been made:
 - It shows that a robust structure for 1553 communications is in place, in the form of the CCSDS and CTDB FSW packages.
 - It highlights the functionality of a newly-developed FSW package, LSM, to receive and handle Spacecraft messages.
 - It partially or fully demonstrates progress against 8 separate ancillary, attitude, and time tone data requirements from Version 3 of the FSW SRS. The demonstrated functionality is being tracked against FSW requirements.

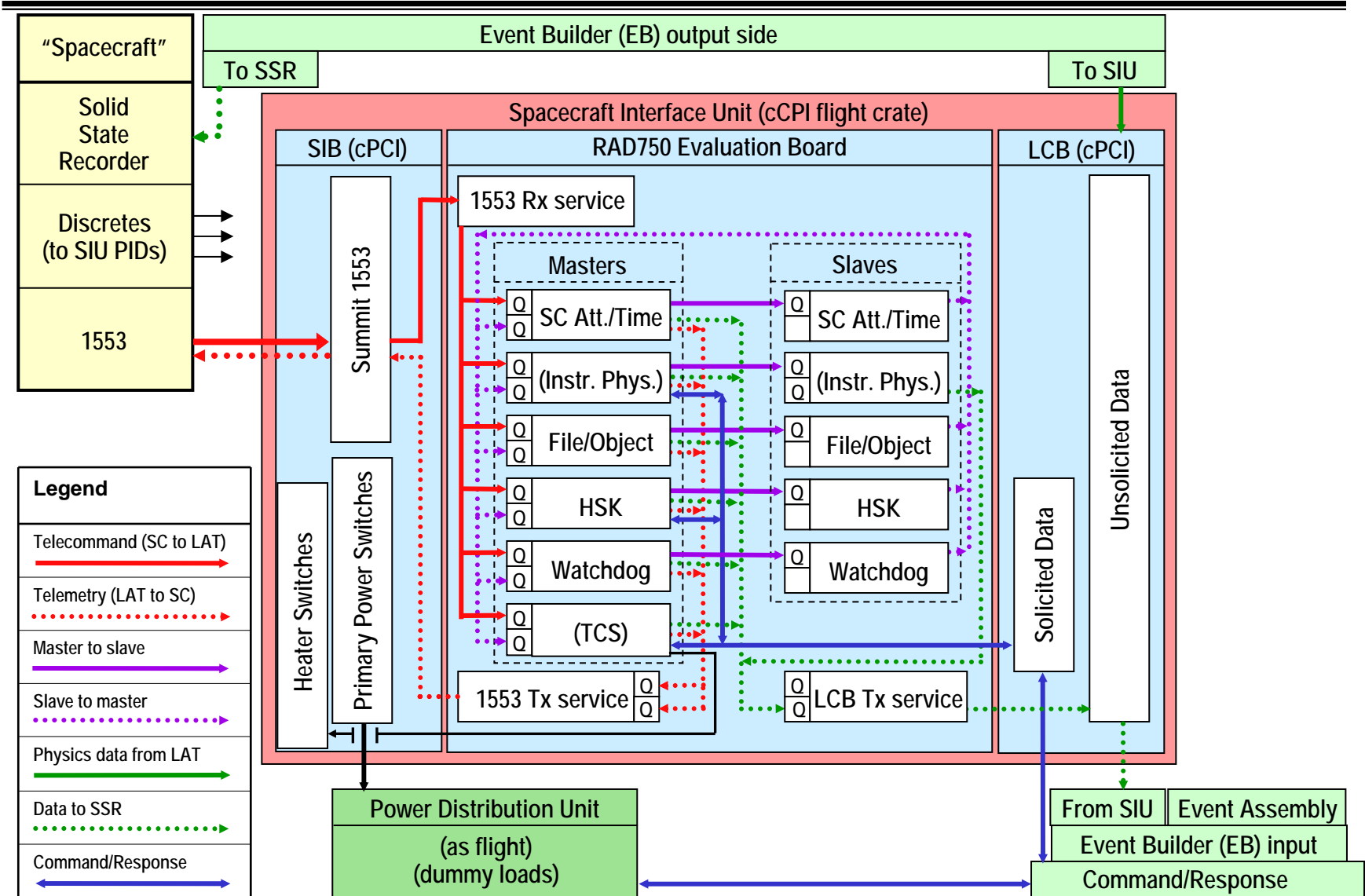


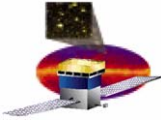
Inter-task Communications Demo

- The Inter-task communications (ITC) system provides registration services for incoming message queues for all FSW tasks.
 - Messages are dispatched using a two-tiered dispatch system. In Tier 1, APIDs define which queue must receive messages. In Tier 2, function codes define which subroutines/functionality contained within the task are executed.
 - The following slide shows message paths among FSW tasks in an EM2-like configuration.
- Concept and organization of the demo:
 - The demonstrator will issue 1553 commands from the Spacecraft crate. These commands, which contain test payloads, are targeted to particular tasks according to APID and function code, according to the design for ITC.
 - The demonstrator purposefully specifies invalid APIDs, function codes, and payload types for tasks running on the flight crate.
 - The ITC system, which as designed is routing according to APIDs and function codes, generates errors when the flight crate receives improperly addressed messages.
- The demo shows the following progress on Inter-task communications code:
 - The ITC package is under development but already provides some of the basic functionality required.
 - The demo partially or fully demonstrates progress against 3 command processing requirements from Version 3 of the FSW SRS. Again, the demonstrated functionality is being tracked against FSW requirements.



Inter-task Communications





Evaluating the Demonstrations

- Links to documentation for the systems demonstrated today are available on the FSW Web site. Follow the “Monthly Functional Demonstration” link.
- Refer to the Demonstration Guidebook for details:
 - Progress against specific FSW requirements
 - Expected outputs of each demonstration
 - Hardware and software context of each demonstration
 - Procedures followed for each demonstration
- A tracking spreadsheet is currently being used to chart progress of the demonstrations against FSW requirements. This spreadsheet will soon be posted on the FSW Demonstrations Web page.
- Comments and evaluation are welcome.