GLAST Large Area Telescope

Instrument Flight Software Development Team

Functional Demonstration
July, 30 2004

Stanford Linear Accelerator Center

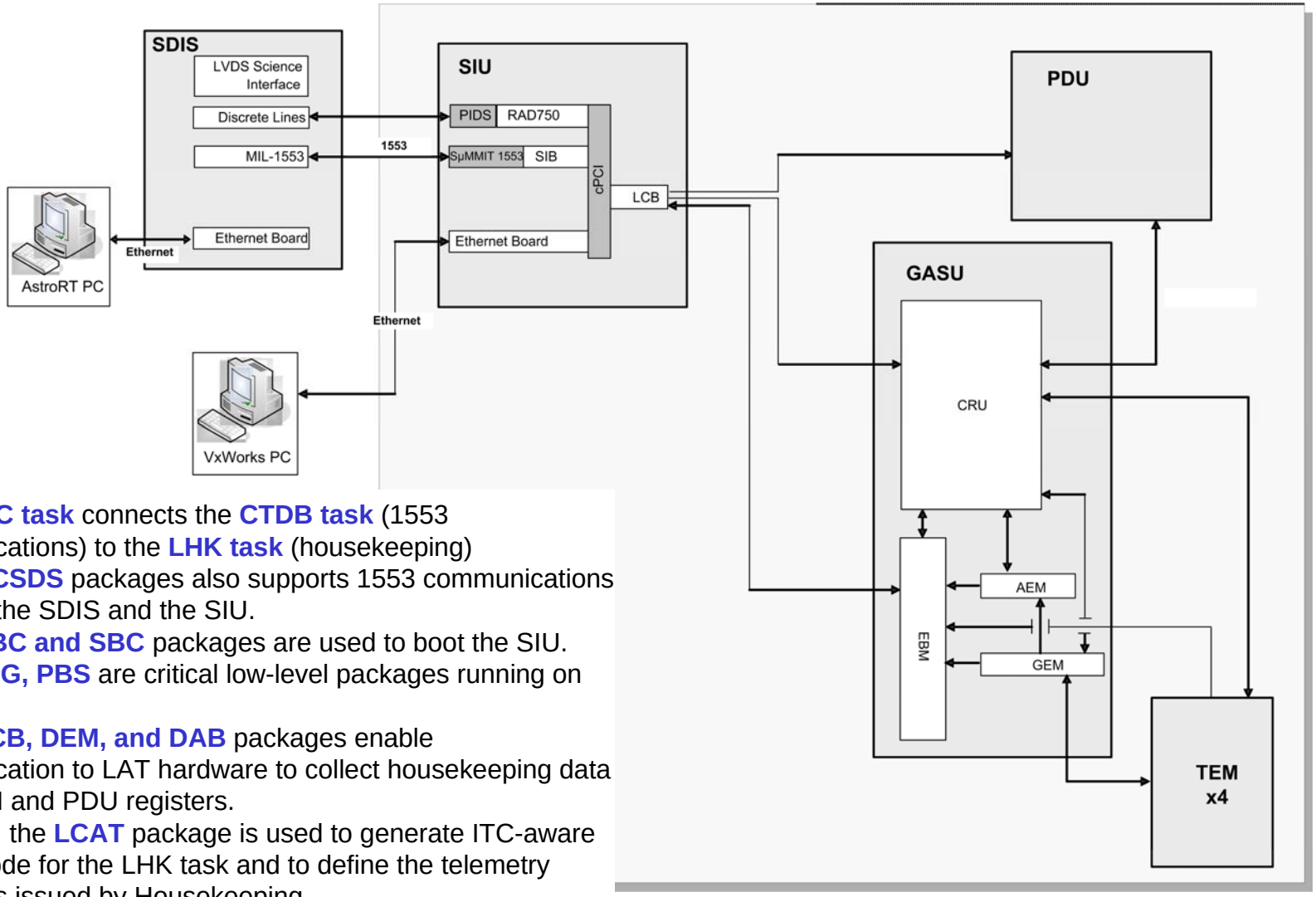
Demonstration Agenda

Demo Agenda Item	Presenter
1. Overview of the Demonstration	Eric Hansen
2. SIU Inter-task Communications Demo	Eric Hansen
3. Questions from Attendees	NA

Demonstration Overview

- **Today's demonstration returns to Inter-task Communications (ITC):**
  - **In May, the FSW Team demonstrated ITC using simple test-code tasks to field ITC messages.**
  - **This month, ITC is used to interconnect real FSW tasks through commands and telemetry -- in this case, it connects the CTDB (1553 communications) and LHK (Housekeeping) systems.**
  - **Improvements in the ITC package and the LCAT (command and telemetry database) tool make it possible to deploy complex, interconnected sets of FSW.**
    - **Commands and telemetry can be defined for all FSW tasks.**
    - **LCAT generates ITC-aware source code, which developers can use to easily integrate their software into the ITC framework.**
  - **This ITC infrastructure is key to delivering the ISIS and all future FSW releases.**
- **As shown on the next slide, a very significant collection of hardware and flight software is in place to support the demo:**
  - **The Spacecraft is represented in these demonstrations by the Spacecraft Data Interface Simulator (SDIS), a Spacecraft simulator provided by Spectrum Astro, Inc.**
  - **The LAT is represented by the Testbed, which currently provides a large collection of flight-like data acquisition hardware including a flight-like SIU (cPCI), a complete GASU, a PDU, and multiple TEMs.**
  - **A correspondingly large collection of supporting FSW is in place to drive this hardware set.**

Demonstration Overview: Hardware and FSW Context

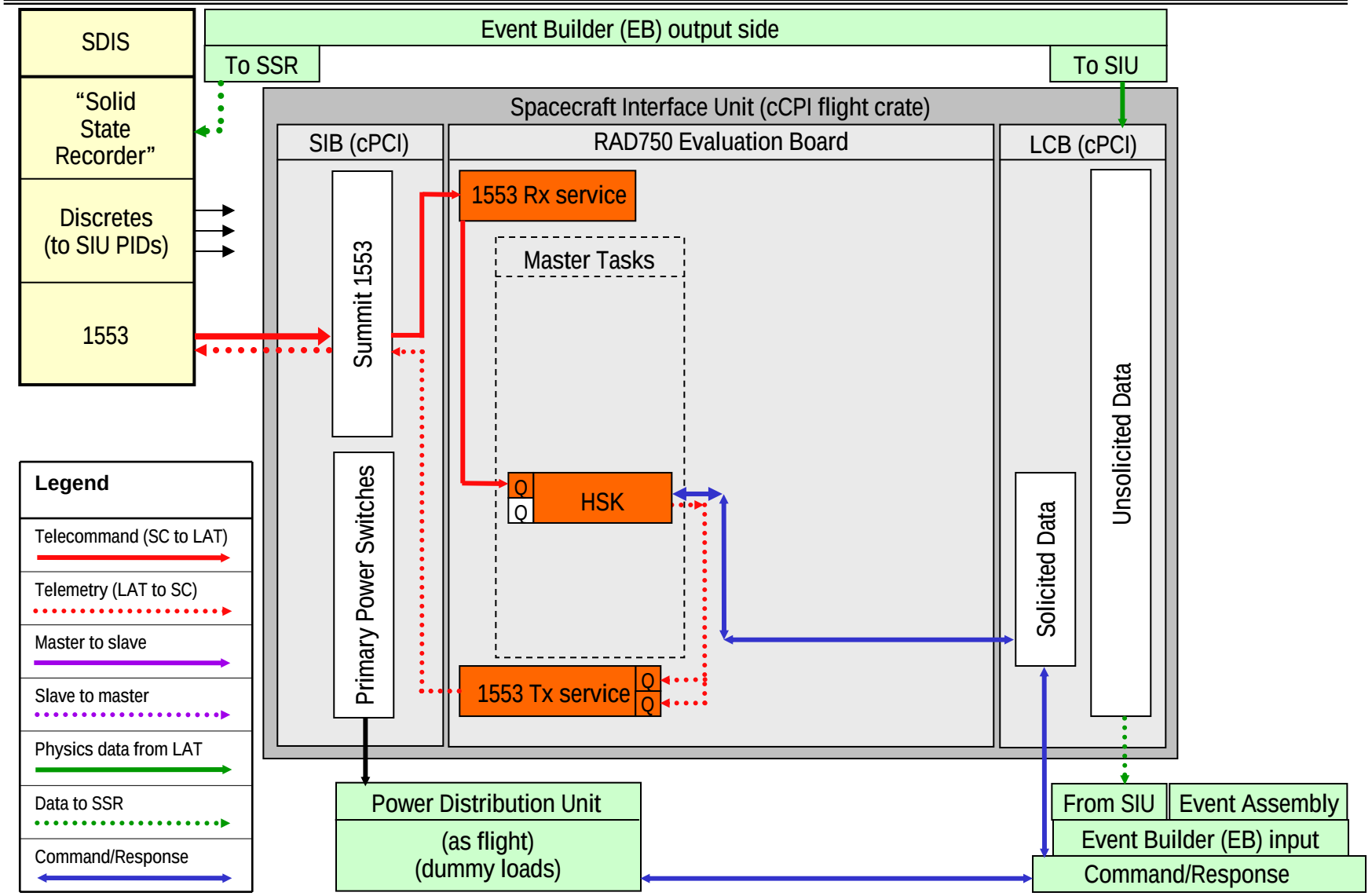


1) The **ITC task** connects the **CTDB task** (1553 communications) to the **LHK task** (housekeeping)
2) The **CCSDS** packages also supports 1553 communications between the SDIS and the SIU.
3) The **PBC and SBC** packages are used to boot the SIU. **CMX, MSG, PBS** are critical low-level packages running on the SIU.
4) The **LCB, DEM, and DAB** packages enable communication to LAT hardware to collect housekeeping data from TEM and PDU registers.
5) Offline, the **LCAT** package is used to generate ITC-aware source code for the LHK task and to define the telemetry messages issued by Housekeeping.

The SIU ITC Demo

- **Quick Refresher: 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 the ITC dispatch paths connecting the CTDB (1553 Service) and the LHK (Housekeeping master task) for today's run-through.**
- **Concept and organization of the demo:**
  - **The demonstrator will issue 1553 commands from the SDIS. These commands control the boot process on the SIU.**
  - **Housekeeping telemetry packets are dispatched via ITC from the Housekeeping task to the CTDB task (both running on the SIU), which forwards them over the 1553 interface to the SDIS, where they are displayed in AstroRT application windows.**

ITC Connects the 1553 Services to HSK



Progress on ITC Demonstrations

- **Progress on FSW Requirements:**
  - **The SRS lists a total of 11 requirements related to ITC:**
    - **1 EPU-SIU Interface Requirement in Section 5.2.1.1**
    - **10 Command Processing requirements in Section 5.3.3**
  - **Today's demo shows partial progress on 4 of 10 of the Command Processing requirements.**
- **The schedule for demonstrating full progress on ITC-related requirements is shown below.**
- **Consult the tracking sheet on the FSW Monthly Functional Demonstrations Web page for details on progress of demonstrations against requirements.**

General Requirement Category	July	Aug	Sept	Oct	Nov	Dec	Jan 2005
5.2.1.1: EPU-SIU Interface -- 1	0%	0%	100%				
5.3.3: Command Processing -- 10	0% (several partial demos)	0%	70%	70%	100%		