

# **GLAST Large Area Telescope**

**Instrument Flight Software  
Development Team**

**Functional Demonstration  
October 1, 2004**

**Stanford Linear Accelerator Center**



# Demonstration Agenda

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Demo Agenda Item	Presenter
1. Overview of the Demonstration	Ed Bacho
2. Science Data Interface Demo	Steve Mazzoni
3. LAT Communications Board Driver Demo	Ed Bacho
4. Questions from Attendees	NA



# Demonstration Overview

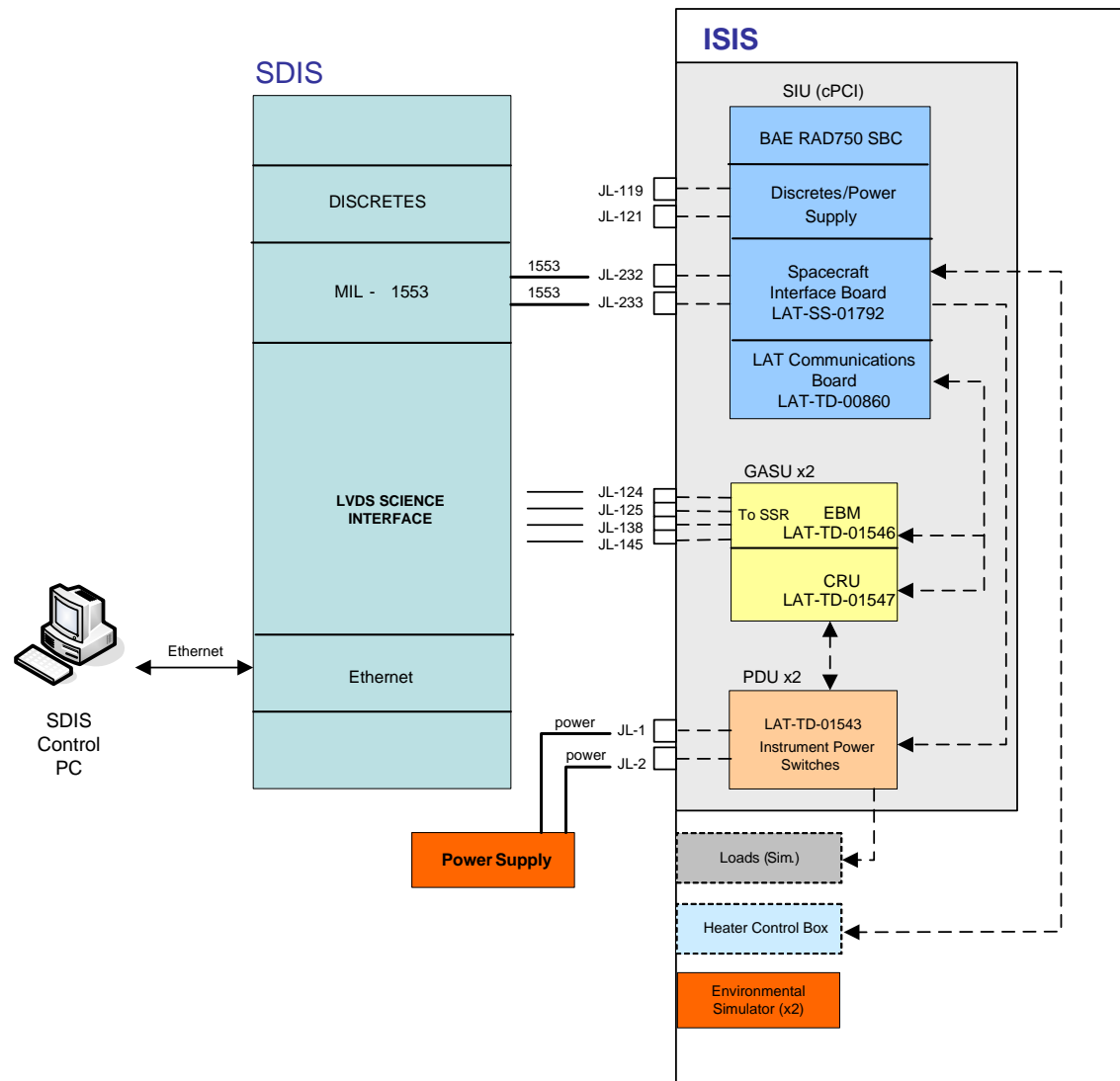
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- Today's demonstration builds on Science Data Interface functionality provided in the ISIS and used in the Flight Unit as well:
  - The ISIS FSW can deliver science over the LVDS interface:
    - Properly formatted as CCSDS packets
    - Properly addressed to the "SSR"
  - Generation of science data meets all ISIS requirements for adjustable:
    - data pattern
    - duration of transmission
    - packet length
    - delivery rate
  - Hardware platform used: SDIS and ISIS
- The demo also covers the re-designed LAT Communications Board Driver and its test suite:
  - The new driver is able to control LCB to LCB (i.e., CPU to CPU) transmission of data
    - An important step on the way to the final, multi-CPU system
  - The LCB test suite rigorously exercises the driver and hardware:
    - PCI register tests
    - Command/response fabric tests
    - Stress testing with high volume of event data moving between LCBs
  - Hardware platform used: test bench with 2 VME crates and a GASU



# Science Data Interface Demonstration: Hardware and FSW Context

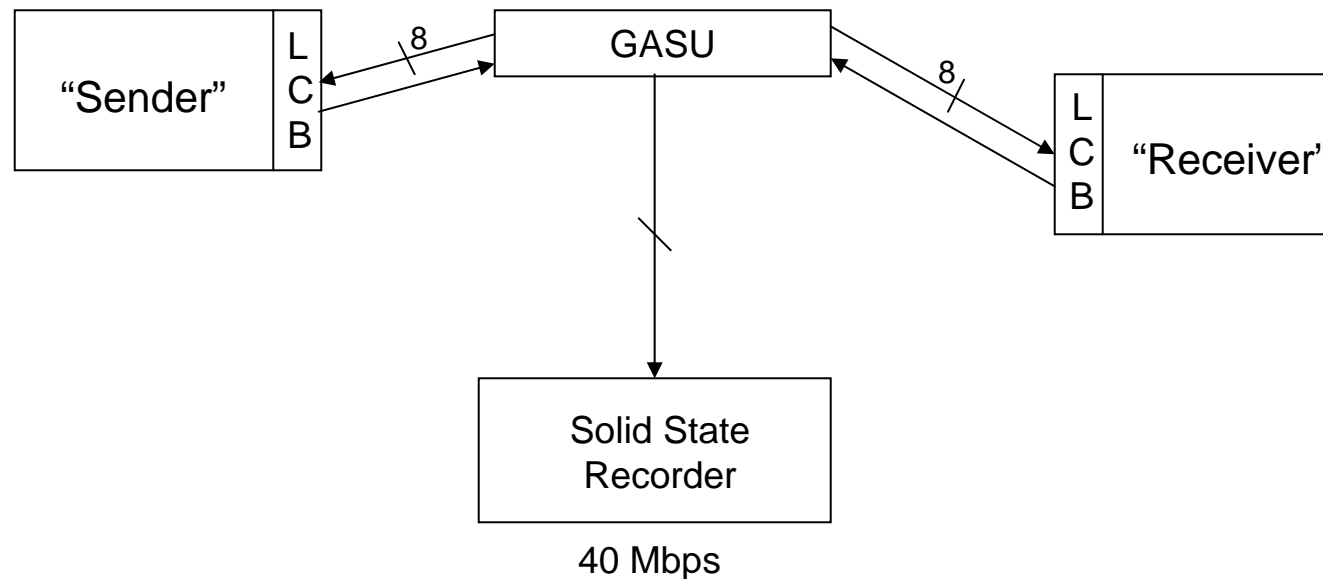
- Today's focus:
  - The LVDS Science Interface
  - Following a path from the SIU to the EBM, then over LVDS to the SDIS.
- The LCB driver pushes data along this path:
  - A separate ISIS-specific library generates the required science data patterns





# LCB Driver Demonstration

- The LCB demo will cover:
  - “Loop back” testing of a single LCB board sending command/response and event data to itself
  - CPU-to-CPU testing in which a “sender” LCB crate transmits event data to a “receiver” LCB crate
  - SSR pathway not demonstrated with new driver, but shown during science data interface demo using the previous LCB driver





# FSW Requirements Demonstrated

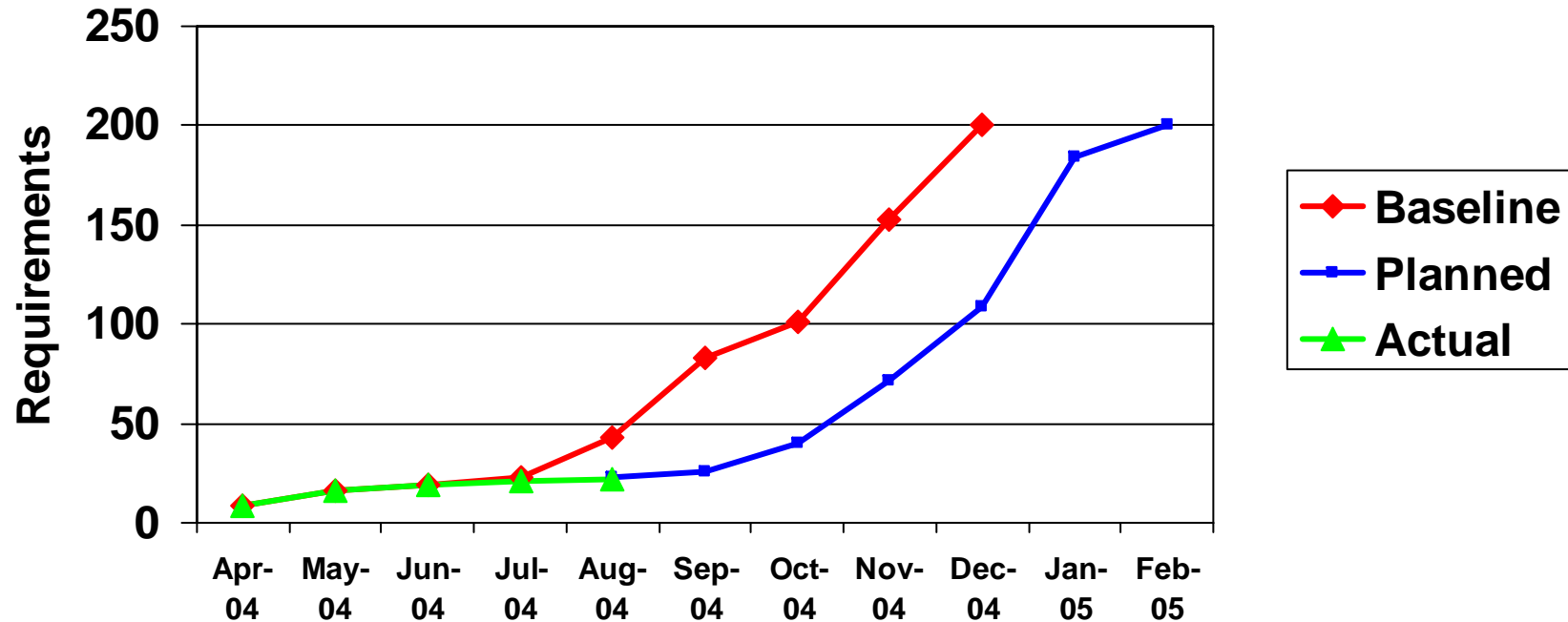
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- **5.2.1.3 Science Data Interface to the Event Builder**
  - **5.2.1.3.1 Science Data Rate**
    - The FSW shall accommodate LAT science data interface data transfer rates up to 40 Mbps to SC storage via the Event Builder.
  - **5.2.1.3.3 Science Data Packet Format**
    - FSW shall format data into CCSDS telemetry packets tagged with application IDs (APIDs) in the same manner as the CTDB telemetry, as specified in the GLAST 1553 ICD.
  - **5.2.1.3.4 Science Data Packet Synchronization Word**
    - Each CCSDS source packet shall be preceded with a synchronization word, to aid in data recovery.
- **5.2.1.4 Command, Configuration, and Data Collection Interface to the Instrument Subsystems**
  - The SIU FSW shall communicate with the LAT instrument subsystems for the purposes of configuration and retrieval of housekeeping and low rate science data (rate counters), using pre-defined custom command and response hardware and software serial data protocols.



# Progress on Demonstrations

## Demo Status thru September



- ~13% requirements will be demonstrated as of today's demo
  - 4 new requirements covering science data interface; command, configuration, and data collection interfaces
- Only fully demonstrated requirements shown in graph