GLAST Large Area Telescope

Instrument Flight Software Development Team

Functional Demonstration
January 28, 2005

Stanford Linear Accelerator Center

Demonstration Agenda

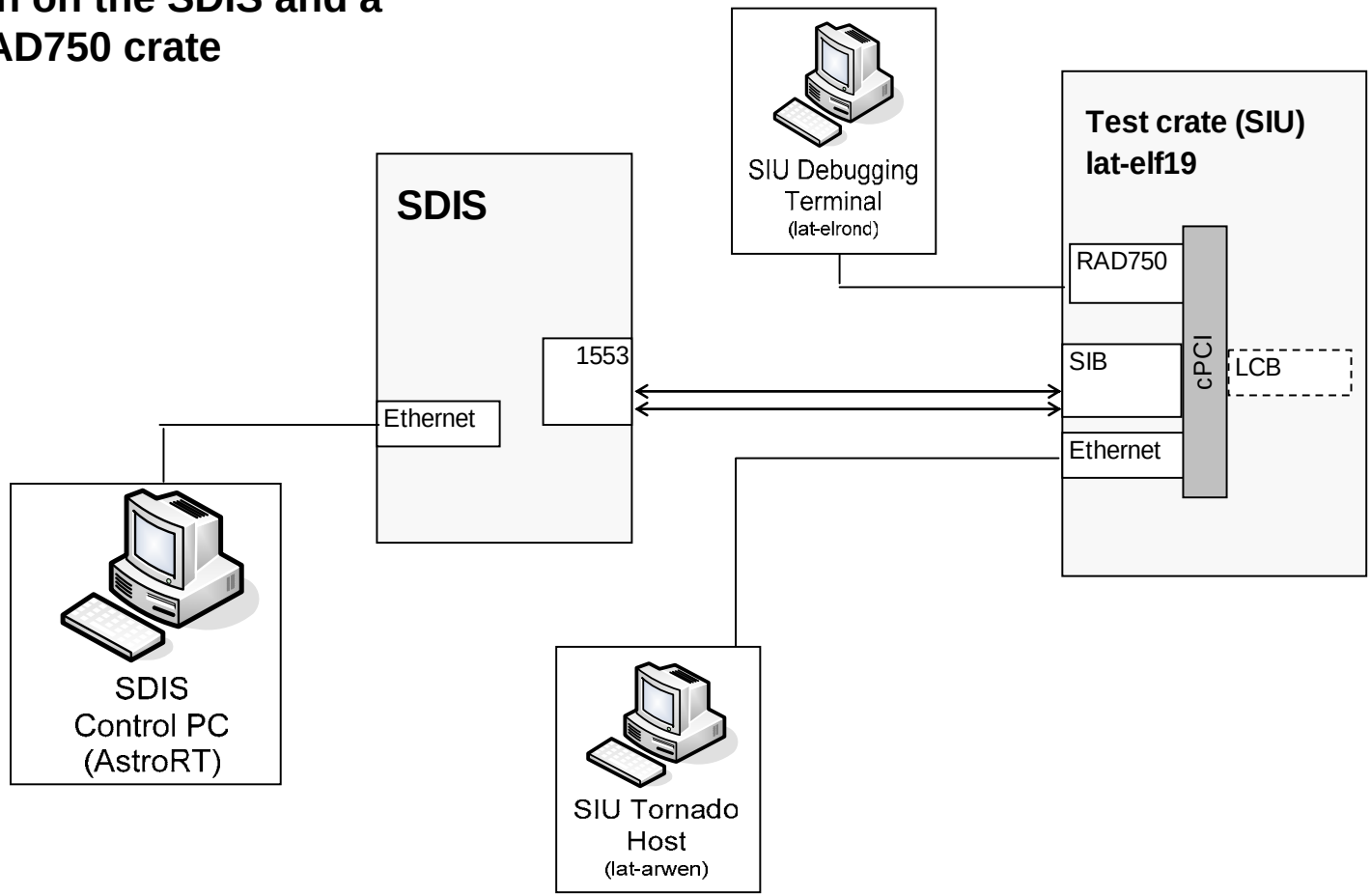
Demo Agenda Item	Presenter
1. Overview of the Demonstration	Lawrence Jeung
2. File Management	Lawrence Jeung
3. Questions from Attendees	NA

Demonstration Overview

- **Today's demo covers File Management:**
  - **The demonstration addresses application (post-boot) file management operations**
    - **File uploads and upload cancellation during boot have already been demonstrated**
    - **Other file management functionality for the boot phase is being investigated**
  - **12 of 14 file management requirements will be fully demonstrated**
    - **Copying files from the SIU to EPU will be shown in a future demo**
    - **Requirement 5.3.7.6.2, File Dump Cancel, is pending removal from the next version of the SRS**
  - **The File Management FSW is capable of:**
    - **Creating and deleting directories in storage devices**
    - **Dumping directory contents to telemetry**
    - **Handling file uploads from the ground**
      - **File uploads can also be cancelled**
    - **Copying files within a CPU**
    - **Dumping file contents to telemetry**
    - **Deleting files from storage devices**
    - **Dumping a report of file system status to telemetry**

Hardware Context for the Demonstration

•The demonstrations are run on the SDIS and a RAD750 crate



General Sequence of the Demonstration

- AstroRT software running on the SDIS is responsible for sending commands over the 1553 connection
  - AstroRT keeps a complete log of commands and telemetry in an archive file
  - In past demonstrations, AstroRT GUI windows have been used to issue commands and display telemetry
  - However, AstroRT can also be controlled using Perl scripts instead of a GUI.
- The sequence of events for today, therefore, will be as follows:
  - The demonstrator will issues a long sequence of Perl commands to execute scripts that handle the telecommanding
    - Results of these operations will NOT initially be displayed
    - However, commands and telemetry will be logged to the archive file
  - Once all the Perl scripts have been run, specialized tools will be used to retrieve records from the AstroRT archive file and display the telemetry involved in the file management operations

File Management Demo: Directory Ops

- **Creating and Listing Directory Contents:**
  - **5.3.7.1: Directory Create: In order to create a directory, the FSW shall receive as input, from the spacecraft via the CTDB, a command that includes directory identifier, device identifier, and unit identifier.**
  - **5.3.7.7.1.1: File Directory Dump Command: In order to dump a file directory, the FSW shall receive as input, from the spacecraft via the CTDB, a command that includes directory identifier, device identifier, and unit identifier.**
  - **5.3.7.7.1.2: File Directory Dump Data: In response to receiving a File Directory Dump command, the FSW shall transmit the requested data to the spacecraft, including: device identifier, directory identifier, file identifier, setting of read-only flag, archive flag setting, most recent update time, byte size, and number of blocks for each file and subdirectory in the requested directory.**

- **During the demo:**
  - **2 directories will be created, 1 in each of the 2 EEPROM file system "devices" and the directory contents will be listed in telemetry**
    - **FSW has organized EEPROM so only 1 layer of directories is possible**
  - **The demo uses Perl scripts to send the LLFSDIRCREATE and LLFSDIRDUMP telecommands, issued from the SDIS.**
  - **LLFSROOTLIST and LLFSDIRLIST telemetry packets are returned.**
  - **Contents of the telemetry packets are retrieved from an AstroRT archive file and displayed as formatted text**

File Management Demo: File Uploads

- **Uploading Files to EEPROM:**
  - **5.3.7.9: File Loads: After entering the boot shell, the FSW processors shall be commandable by the SIU to perform file loads. Further design details are provided in [12].**
  - **5.3.7.10: Upload Cancellation: The FSW shall be commandable to cancel an active file load.**

- **During the demo:**
  - **A simple text file will be prepared by dumping a Unix man page entry to a file**
    - **This test file, echo.txt, will be uploaded, then manipulated throughout the rest of the demo**
  - **A Perl script will issue the LFILUPLSTART, LFILUPLDATA, and LFILUPLCOMMIT commands to upload the test file.**
  - **The LLFSDIRDUMP command will be used to confirm the file was uploaded to the correct directory and device**
  - **The file will be uploaded a second time; however, the LFILUPLCANCEL command will be used to cancel the upload operation**

File Management Demo: Copying Files within a CPU

- **Copying Files on the ISIS SIU:**
  - **5.3.7.4: File Copy within a Processor: In order to copy a file within a processor, the FSW shall receive as input, from the spacecraft via the CTDB, a command that includes source file identifier, source directory identifier, source device identifier, unit identifier, destination file identifier, destination directory identifier, and destination device identifier.**

- **During the demo:**
  - **The LLFSFILECOPY command is used to copy echo.txt from a directory on device ee0 to a directory on device ee1**
  - **LLFSDIRDUMP is used to dump the directory contents and show the file was copied**

File Management Demo: Dumping File Contents to Telemetry

- **Sending the Contents Down:**
  - **5.3.7.6.1.1: File Dump Command: In order to dump a file, the FSW shall receive as input, from the spacecraft via the CTDB, a command that includes file identifier, directory identifier, device identifier, and unit identifier.**
  - **5.3.7.6.1.2: File Dump Data: In response to receiving a File Dump command, the FSW shall transmit the requested file data to the spacecraft.**

- **During the demo:**
  - **The LLFSFILEDUMPC command is used to dump the contents of echo.txt down in a series of LLFSDUMPCTDB telemetry packets**

File Management Demo: Deleting Files

- **Deleting:**
  - **5.3.7.3: File Delete: In order to delete a file, the FSW shall receive as input, from the spacecraft via the CTDB, a command that includes file identifier, directory identifier, device identifier, and unit identifier.**

- **During the demo:**
  - **The LLFSFILEDELETE command is used to delete both copies of echo.txt from EEPROM**
    - **The file was previously copied from device ee0 to ee1**
  - **The LLFSDIRDUMP command is issued to dump the directory listing and confirm the deletions**

File Management Demo: Reporting File System Status

- **Checking Things Out:**
  - **5.3.7.8.1.1: File System Status Dump Command: The FSW shall receive as input, from the spacecraft via the CTDB, a command to dump the file system status for a specific unit.**
  - **5.3.7.8.1.2: File System Status Dump Data: In response to receiving a File System Status Dump command, the FSW shall transmit the requested data to the spacecraft, including: total block size, blocks used, and blocks free for the requested unit.**

- **During the demo:**
  - **The LLFSSYSTATUS command is issued to request the status info, which comes down as LLFSSYSLIST telemetry**

File Management Demo: Deleting Directories

- **Cleaning Up:**
  - **5.3.7.2: Directory Delete: In order to delete a directory, the FSW shall receive as input, from the spacecraft via the CTDB, a command that includes directory identifier, device identifier, and unit identifier.**

- **During the demo:**
  - **The LLFSDIRDELETE command is issued to perform the deletion.**
  - **LLFSDIRDUMP is used to list the contents of the root directory on each device.**
    - **Since a root directory is being dumped, LLFSROOTLIST telemetry packets are returned, then examined to confirm that the directories are indeed deleted**