GLAST Large Area Telescope

WBS 4.1.B
Instrument Science Operations Center
Monthly Status Review
2 March 2005

Rob Cameron
rac@slac.stanford.edu
650-926-2989
Management

- Current planning activity, for FY2006 and beyond
  - LAT operations and staffing profile is being reworked to align with SLAC funding allocation model
    - Clear separation of LAT operations activity from LAT science activity at SLAC, although some people will work in both areas
  - Ensure continuity of LAT program from development phase to operations phase. Specific tasks:
    - Accommodate project rebaseline and associated schedule change. Applies to both activity and transition of people from project funds to ops funds
    - Ensure no necessary tasks are delayed or missed
    - Avoid cost spike in FY2006 during the transition
    - Coordinate work performed external to SLAC, at NRL, GSFC, Italy, France, ...
ISOC Facility

- **Present**
  - Offices in Building 210 now being used by ISOC for staff and development lab
  - First 2 ISOC development workstations have been delivered, and installed in 210 development lab. ITOS, LATTE, and other software is proceeding

- **Future**
  - Costing process has been completed for ISOC facility in new KAVLI: $135K for barewalls build out of area
  - working on Plan B: to use office space in Building 84 vacated by KIPAC, plus additional lab space for operations area
  - working with SLAC management about utility of KAVLI build-out for other purposes, e.g. LAT scientist and visitor accommodation
February Activity

- **ISOC software systems design**
  - Review of ISOC data flow diagrams has been completed. These diagrams are now being used to guide allocation of software development tasks, and also estimate developer FTE needs.

- **Supported Ground Operations TIM at GSFC**
  - Progress on definition of ground tests with MOC, GSSC
  - ISOC schedule refined to better match ground tests and LAT schedule
  - Planning development of LAT procedures and scripts to be used by ISOC and MOC for: routine ops; LAT activation and checkout; LAT contingency ops
  - Defining LAT GSE reqts (hardware and software) in MOC: Coordinate inputs from sub-systems via Systems Eng and I&T
## ISOC Development Schedule

### ISOC Development Schedule

<table>
<thead>
<tr>
<th>Phase / Milestone</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITOS/Latte setup/config.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DB/Web/Logging Dev</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plotting/Trending Dev</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipeline/File Transfer Tool Dev</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mission Planning Dev</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostic Tool Dev</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITOS/Latte Verif. with VSC/Testbed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demos</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Challenges</td>
<td>1</td>
<td>2</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SW Testing &amp; Releases</td>
<td></td>
<td>1</td>
<td>5/17</td>
<td></td>
<td>12/9</td>
<td>3/17</td>
<td>11/30</td>
<td></td>
<td>6</td>
<td>5/17</td>
<td>7/12</td>
<td>5/1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Ground Readiness Tests</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
<td>8</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End-to-End Tests</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental tests at NRL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISOC available to I/F with LAT (front-door only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mission Simulations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major Milestones</td>
<td>1/17</td>
<td></td>
<td></td>
<td>2/15</td>
<td>FOR</td>
<td>GS Freeze</td>
<td>Launch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Updated 23 Feb 05*
February Activity (cont.)

- **Fastcopy**
  - Fastcopy has been successfully installed on GLAST02 and GLAST03 servers. No testing to other GLAST elements outside SLAC yet.

- **ITOS and ITAR**
  - exploring option of limited-function ITOS, to potentially avoid ITAR issues
  - rely on CCSDS packet transmission of commands and telemetry
  - compatible with VSC interface
  - not compatible with SIIS interfaces
  - technical details being worked, before addressing ITAR issues

- **System development**
  - Moving data from Building 33 to the pipeline: ISOC is cooperating with I&T/Online to have I&T data transferred in flight-like CCSDS format, to exercise realistic data ingest and processing
  - Stage 1: move HK data into ISOC HK db using pipeline ✔
  - Stage 2: Process HK data in CCSDS/L0 format
  - Stage 3: Process Science data in CCSDS/L0 format
  - Ideally, this process should continue for LAT at NRL and SASS
  - See Demo
SAA region definition using TPM radiation model from SEE group at NASA/MSFC
- installed and tested
- advertised as being more accurate than older AP8 model
- but not ideally constructed for GLAST needs
- TPM runs in 2 stages:
  - 1. An orbit propagator takes orbit elements and generates a binary file of the propagated orbit
  - 2. Binary orbit file is input to model code to generate trapped proton fluxes for each orbit position
- large discontinuities seen in output orbit position data, which prevents mapping the complete SAA region
- further investigation is in progress
Issues and Concerns

- LAT diagnostic data
  - FSW uses diagnostic APIDs for TCS monitoring, HK dwell, command echo and potentially other purposes
  - potential conflict of continuous diagnostic telemetry with real-time alert telemetry on alert-initiated TDRSS MA downlink, causing delay of alert data
  - limits to use of LAT diagnostic data?
  - other technical solutions: separate priorities of alert and diagnostic APIDs?

- PROC development and validation platform
  - need an agreed platform for pre- and post-launch PROC development
  - Hotbench + ISIS may not be adequate
    - uncertain long term joint availability
    - ISIS is not a complete LAT emulation
Near Future Activities

- ISOC software release #1: 15 May 2005
  - scoped to support GRT #2, #3
- GRT #2: 15 June 2005
- GRT #3: 15 August 2005
- Also support for interface tests with GSSC (GSTs)