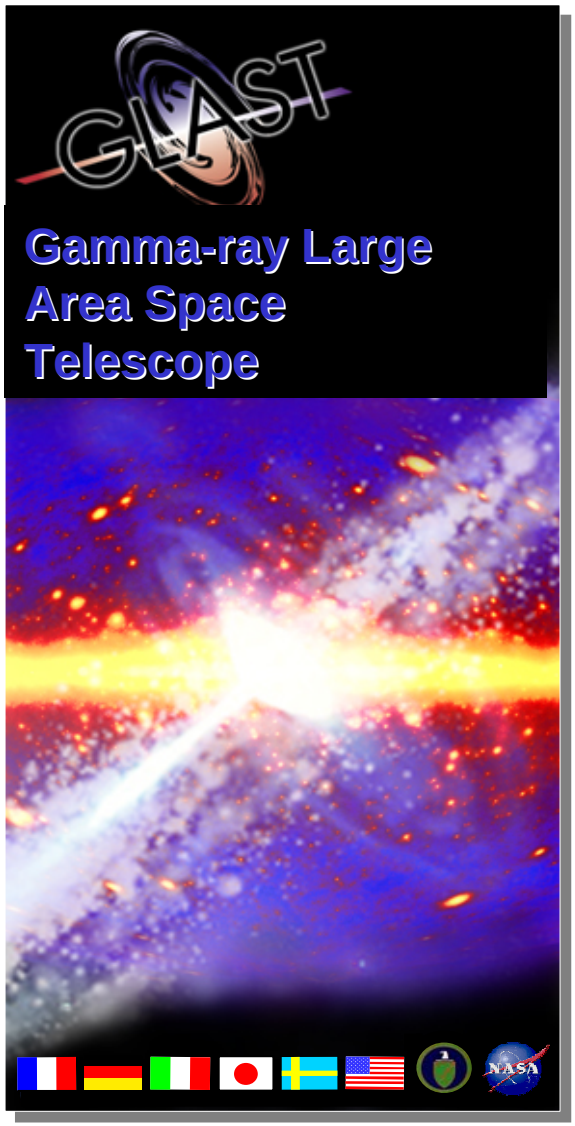

GLAST Large Area Telescope

WBS 4.1.B
Instrument Science Operations Center
Manager's Face to Face Meeting
16 February 2005

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LAT Operations Planning

- **Current planning activity, for FY2006 and beyond**
  - **LAT operations and staffing profile is being reworked to align with SLAC funding allocation model**
    - **Need 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**
    - **At the same time, try to avoid spike in costs in FY2006 during the transition**
    - **Coordinate work performed external to SLAC, at NRL, GSFC, Italy, France, …**

Interdependencies

- ISOC + I&T coordination
  - 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
- ISOC + Systems + I&T coordination
  - Through GOWG & Ground Operations TIM at GSFC in early Feb, ISOC is working with MOC on several flight ops needs:
    - 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 SysEng and I&T
- ISOC/FSW/Online/Offline coordination
  - Configuration control of the LAT is a complex issue - several groups are involved in generation and use of LAT config and calib data.
  - Plan: keep existing methods in place; provide glue where necessary
- ISOC Testing

An ISOC Test Environment

- **Objective: summarize the required LAT ISOC development and test environment, specifically EGSE and testbed resources to be shared with other project elements**
  - **ISOC development and test envionment requirements, both function and schedule, are dictated by the scope and schedule of ISOC software releases and GLAST Ground System tests (GRTs)**
  - **The ISOC schedule shows that the ISOC must develop its software elements in parallel to other LAT development and test activities. ISOC cannot postpone access to a development environment until other program elements are completed.**
  - **Primary need: a LAT simulator, with communication via FSW.**
  - **Three phases planned for ISOC testing. Increasing fidelity for LAT command handling and telemetry generation (HK, Diag, Science) will be needed in each phase.**

Related Testing Issues

- **Test configuration requirements**
  - **The ISOC operations development lab will be based in Building 210 until early 2006. Optimally, the ISOC workstations should be able to interface to the LAT testbed remotely from 210, which will demonstrate the ability to support remote testbed control for flight operations. In addition, the ISOC could use a test-stand version of the VSC+LAT emulation located in the ISOC ops lab in 210.**
- **I&T support**
  - **the ISOC will benefit from participating in I&T activities, both at the instrument and observatory levels. Flow of telemetry from the LAT to the ISOC, while the LAT is in Building 33, at NRL, and at SASS is helpful for ISOC development and staff training.**
- **The VSC**
  - **the ISOC supports the concept of the VSC, since it provides a complete model of the LAT integrated on GLAST and supports both the ITOS and LATTE operating environments.**

Near Term Testing: Now – May 2005

- **Drivers:**
  - ISOC software release #1: 28 April 2005
  - GRT #2: 15 June 2005
- **Test Objectives**
  - Demonstrate interface compatibility between CHS software (ITOS, LATTE) and FSW
  - Provide a RT data source to stimulate prototype ISOC tlm displays
  - Provide a source of example recorded HK data to support data exchange testing among MOC, GSSC, ISOC
- **Requirements**
  - Use a LAT simulator executing limited FSW functions to generate RT HK CCSDS telemetry packets, and to ingest and dispatch CCSDS command packets
  - High fidelity telemetry contents not needed, could be supported by FSW elements running on non-SIU host, but needs 1553+CCSDS interface support
  - Extended simulator time needed to quickly move through development, test and debug cycles
  - Two simulators would aid parallel development activities

Mid Term Testing: May 2005 – Oct 2005

- **Drivers:**
  - ISOC software release #2: 14 Sep 2005
  - GRT #4: 1 Nov 2005
- **Objectives**
  - Develop operational CHS display pages and tlm monitoring tasks
  - Develop and validate routine ops procedures and PROCs, for file upload, SAA entry/exit cmds and ATS/RTS command sequences
  - Develop and validate an ISOC LAT configuration control/tracking system
  - Support PROC development activities for the MOC
  - Process Level 0 HK data from MOC
- **Requirements**
  - Use a LAT simulator executing the complete FSW image
  - Mostly or totally complete T&C database
  - Extended simulator time, needed to quickly move through development, test and debug cycles
  - Two LAT simulators would aid parallel development/test activities

Long Term Testing: Beyond October 2005

- **Drivers:**
  - ISOC software release #3: 19 Jan 2006
  - GRT #5: 17 Jan 2006
  - Flight Operations
- **Objectives**
  - Exercise instrument and FSW configuration and control
  - Provide simulated LAT science data to MOC
  - Exercise ISOC with realistic HK and science data streams
  - Test ISOC software releases
  - Evaluate proposed instrument configuration changes
  - Support LAT flight operations
- **Requirements**
  - Use a LAT model capable of executing the complete FSW image, and capable of supplying science tlm with correct ancillary tlm (e.g. testbed in Data Flow Lab + FES), and spacecraft HK containing LAT-related data (e.g. analog channels)
  - Complete T&C database
  - Extended test time, needed to quickly move through development, test and debug cycles

GLAST Ground System Test Schedule

DC2 →

Date	What	Release	Required ISOC capabilities
15-Jun-05	GRT 2	ISOC 1 (28 Apr 05)	receive real-time HK data from MOC, provide basic LAT P&S (Planning & Scheduling)
15-Aug-05	GRT 3	"	level 0 data processing on science data, Process LAT science level 0 data into level 1 products
1-Nov-05	GRT 4	ISOC 2 (14 Sep 05)	receive level 0 data from MOC
17-Jan-06	GRT 5	"	provide level 1 and 2 data products to GSSC, provide more complex LAT P&S, provide LAT file uploads to GSSC, provide simulated science data
8-Feb-06	ETE 1	ISOC 3 (19 Jan 06)	provide Level 1 data products to GSSC, receive Level 0 files from MOC (post-test)
17-May-06	GRT 6	"	contingencies added
4 May-06	ETE 2	"	provide instrument commands and file loads, support memory dumps of instrument
12-Jul-06	GRT 7	"	clean-up and regression tests
1-May-06	Mission Sims	"	full ISOC capabilities to support Mission Sims
15-Jun-06	ETE 3	"	support basic observatory operations
24-Aug-06	ETE 4	ISOC 4 (21 Sep 06)	instrument turn on
16-Oct-06	ETE 5	"	regression test and contingencies
1-Feb-07	ETE 6	"	final ETE at launch facility