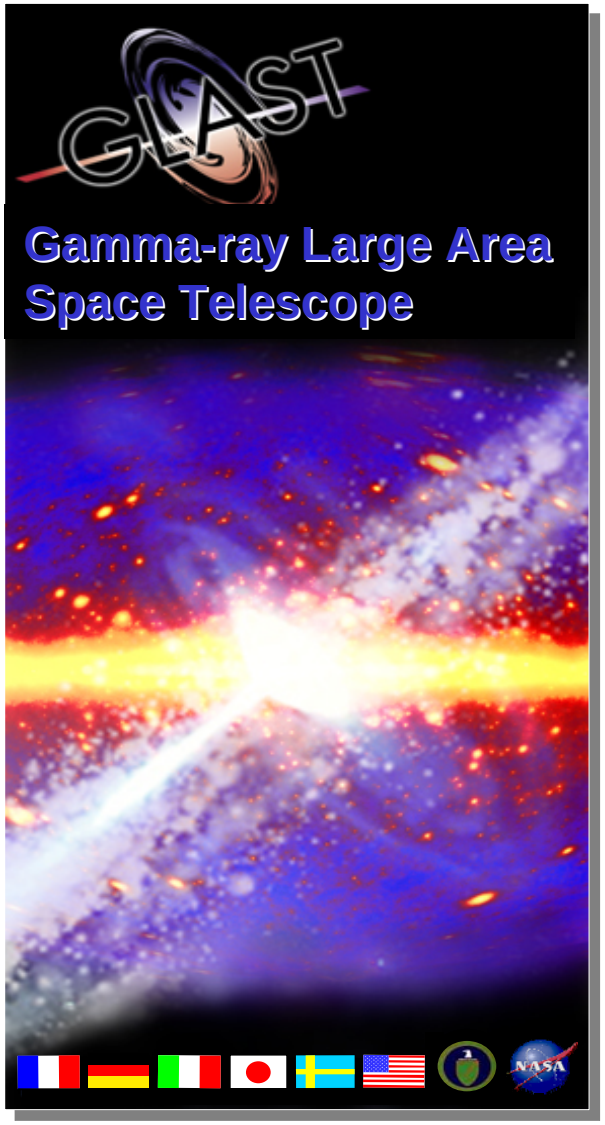


GLAST Large Area Telescope
Instrument Science Operations Center

Monthly Status Review
29 October 2007

Rob Cameron
ISOC Manager

ISOC Highlights

- **Recent Events**
  - ISOC Operations Simulation #1: 8-12 October
  - LAT training to FOT: 22 October
    - Material in Docushare:
      - Home>> Instrument Operations Teams>> LAT ISOC>> Presentations
  - Instrument Commissioning Sim 1A: 23-25 October
    - L&EO power on for LAT
    - Apply HV biases to CAL/TKR/ACD
    - Exercise SAA transits
    - All LAT roles and responsibilities exercised at MOC
      - calling the PROCs, monitoring telemetry, communicating with the IM, logging the events, and communicating with SLAC
    - Successful training of people and shift handover meetings
      - LAT ISOC staffed with 5 people @ MOC and ~ 10 @ SLAC
        - » Flight and Science Ops teams on rotation basis
    - Recommendation to have at least 2 more instrument sims before launch
- **Upcoming Events**
  - End-To-End test 3
    - TRR on 29 October
  - DITL test
    - LAT ATS inputs for DITL delivered to GSSC & MOC
    - Data will be processed through flight-path pipeline at SLAC
  - LAT Collaboration Meeting: 13-16 November 2007
  - Two more LAT/ISOC Operations Simulations planned
    - Next operations sim (#2) is planned for March 2008
  - A LAT analysis workshop, jointly held between Calibration and Analysis Methods science group and ISOC Science Operations, including coverage of L&EO studies: Bari, 5-8 February 2008

Narrative Procedure Development

- Total of 109 NPs
  - All at level 1 (draft) or higher
  - 100 at level 3 (ready for PROC development) or higher
  - 9 remaining NPs not at level 3 are for contingency use
    - 1 identified as high priority for contingency use
      - L-LFS-10 File System Format
    - 1 identified as medium priority for contingency use
      - L-LFS-11 File System Mount
    - 7 are low priority for contingency use
      - L-LFS-09 File System Repair
      - L-MEM-08 Dump PCI Device Header in Boot
      - L-MEM-09 Write PCI Device Header
      - L-MEM-10 Write PCI Device Header in Boot
      - L-MEM-11 Access RAD750 CPU Register
      - L-MEM-13 Write RAD 750 CPU Register
      - L-MEM-12 Memory Write in Boot

Narrative Procedure Status

Status by ETE									
ETE	Date	# of Procedures	Level						
			1	2	3	4	5	6
ETE 1a	Apr-07	2	0	0	0	0	2	0
ETE 1b	Jul-07	9	0	0	0	0	9	0
ETE 2	Jul-07	20	0	0	0	12	8	0
ETE 3	Oct-07	31	0	0	18	13	0	0
ETE 4	Jan-08	47	9	0	37	1	0	0
		109	9	0	55	26	19	0

Schedule				
	Planned Draft	Draft Actual	Planned Level 3	Level 3 Actual
Apr	3	4	0	0
May	7	8	0	0
Jun	9	5	0	0
Jul	4	0	2	2
Aug	6	8	1	1
Sep	4	9	11	11
Oct	6	7	12	11
Nov	12	11	8	16
Dec	13	12	2	1
Jan	8	7	15	10
Feb	2	2	9	9
Mar	2	1	3	0
Apr	3	1	0	0
May	7	11	0	2
Jun	3	4	13	13
Jul	13	8	12	14
Aug	6	5	14	2
Sep	1	3	6	1
Oct	0	3	1	7
	109	109	109	100

Cumulative NP Progress				
	Planned Draft	Draft Actual	Planned Level 3	Level 3 Actual
Apr	3	4	0	0
May	10	12	0	0
Jun	19	17	0	0
Jul	23	17	2	2
Aug	29	25	3	3
Sep	33	34	14	14
Oct	39	41	26	25
Nov	51	52	34	41
Dec	64	64	36	42
Jan	72	71	51	52
Feb	74	73	60	61
Mar	76	74	63	61
Apr	79	75	63	61
May	86	86	63	63
Jun	89	90	76	76
Jul	102	98	88	90
Aug	108	103	102	92
Sep	109	106	108	93
Oct	109	109	109	100

PROC Development

PROC	Not Started	Draft	Not complete	Coded	Needs Update	Ready for test	Tested	Validated	Total
ETE1	0	0	0	0	0	0	0	13	13
ETE2	0	0	0	0	0	5	11	20	36
ETE3	0	0	0	0	0	0	38	0	38
ETE4	14	7	0	2	0	5	7	0	35
ETE5	10	0	0	0	0	0	0	0	10
Total	24	7	0	2	0	10	56	23	132

ETE3 Test Status

- Status of NPs and PROCs
  - NP development complete
  - PROC development and testing complete
- SW versions to be used
  - FSW B1-0-1 with B1-0-1.dbx files (already in the MOC)
  - ISOC release 4.0
- LAT Activities Summary
  - LAT fast turn-on by the MOC
  - Physics Acquisition Runs
    - File Management Activities, including File Upload, Memory & Diagnostic commands, and LTC Operations will be performed during these runs
  - LCI Calibration Runs
  - One TOO Observation (with TOO Cancel)
  - 3 LAT-initiated GRBs using the on-board GRB Simulation Package
  - Detection of GBM-triggered GRBs
  - LAT Power Down, followed by a Load Shed by the MOC
  - 59 PROCs to be exercised (40 to be verified for the first time)
- LAT staff will support the test at SLAC and the MOC

Flight Operations Software Progress

- FOS 4.0 in place for Instrument Commissioning Sim 1A
  - Awaiting input from the MOC for the one requirement not yet implemented:
    - Process anomaly notifications from the MOC
- FOS 4.1 release preparation
  - Goal is to have it in place before ETE 3
- In progress:
  - Mission Plan Request method
  - Mission Planning Tool updates
  - More data types added to the non-event data handling chain
  - Tool/infrastructure improvements
  - MOOT development for handling of FSW CDB files
- Completed:
  - Web based Telemetry and Diagnostic Monitor
  - Mnemonic details GUI and integration with TelemetryTableGUI
  - Tracking of LAT configuration history
- Extra development computers set up
  - Allows V&V process without interfering with production systems
  - Provides platform to test out contingency ISOC functions
- LAT computer at the MOC used for Instrument Commissioning Sim 1A

FOS JIRA issues (as of 10/27)

Package	Issues opened since 10/3	Issues closed since 10/3	Total # of issues currently open
Core	78	64	74
Monitor: FASTcopy	0	0	3
Monitor: Logging	1	0	4
Ops Facility	17	17	2
Packages & Installers	1	1	2
Trending: Calibration	0	0	3
Trending: Telemetry	0	0	3
LAT T&C	1	0	3
Totals	98	82	94

Current Developments in Science Ops

- LAT Operations Simulation 1 was held at SLAC October 8-12
  - 78 registered attendees. Some participated remotely; of 53 at SLAC, 20+ were from LAT collaborating institutions
  - Details on Confluence at http://confluence.slac.stanford.edu/display/ISOC/ISOC+Operations+Simulation+1
- The Level 1 pipeline (reconstruction, classification, and monitoring aspects) worked in real time during the Ops Sim; the aspects of the ASP that were relevant for time scales <=1 day were also run in real time
- Duty Scientist and Shift Coordinator trainees worked shifts in the ISOC Mission Support Room
- Simulations did not include housekeeping data, but included monitoring the processing of the data, monitoring the LAT through the data, and monitoring the high-level processing; all realistically

Ops Sim 1 (cont)

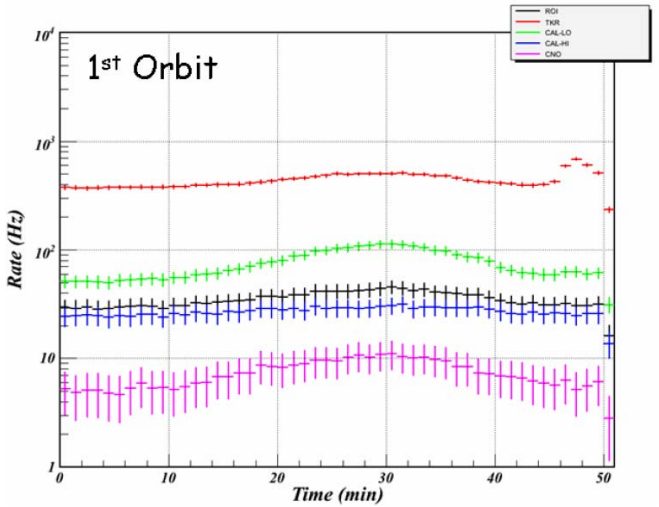
- Many, many details of the configurations and the sky model, improvements in the processing, monitoring, and data handling systems, and development of operations procedures (including refinement of the LAT CCB process) came together to make Ops Sim 1 possible
- Combined ISOC activities with LAT collaboration science effort
  - Exercised Burst Advocate and Flare Advocate process
  - The excitement and enthusiasm of the attendees and of the members of the GRB and AGN science groups who worked late to analyze the transient sources found by ASP made the Ops Sim rewarding
- The workshop ended with a session on lessons learned and analysis results

Ops Sim 1 (cont)

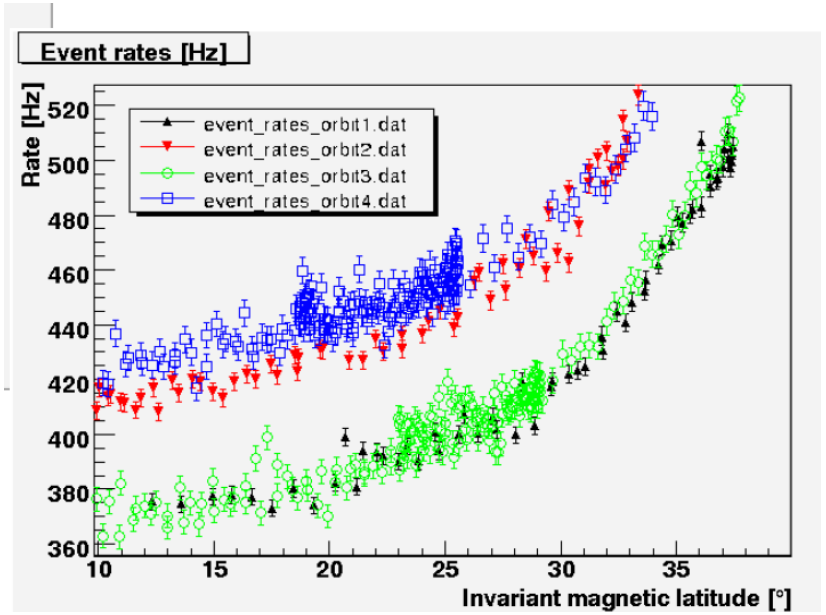
- **Among the lessons learned:**
  - **Recognizing additional environmental information needed by Duty Scientists, such as trending of geomagnetic cutoff, to use in interpreting short-term performance of the LAT**
  - **Recognizing what needs improving regarding communication of operations information between operations shifts and on-call experts and LAT collaborators in general, and refining the roles of the Duty Scientists and Shift Coordinators**
  - **For the higher-level analysis, additional standard data products, like short-term exposure maps, are needed to support rapid assessment of transient sources**

Ops Sim 1 (cont)

- **Example analysis results (among the many documented in Confluence)**



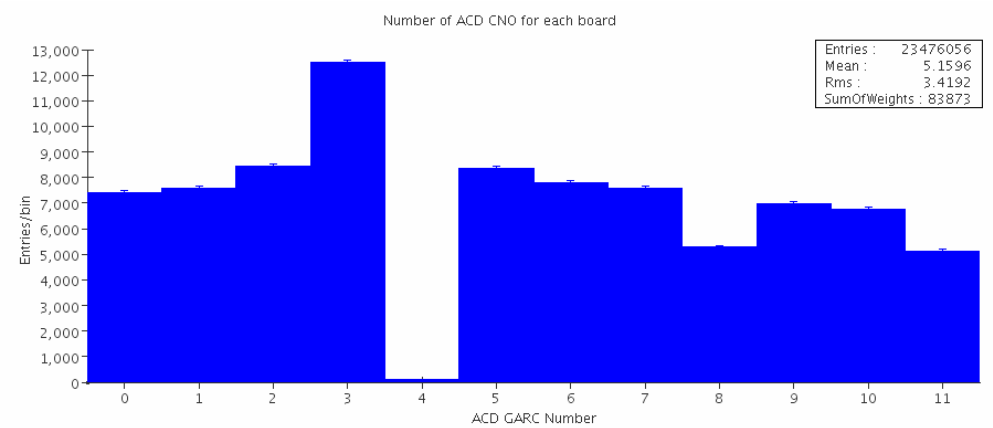
Trigger rates by trigger type for orbit 1, showing that the spike near the end is entirely TKR-related (N. Mazziotta, INFN Bari)



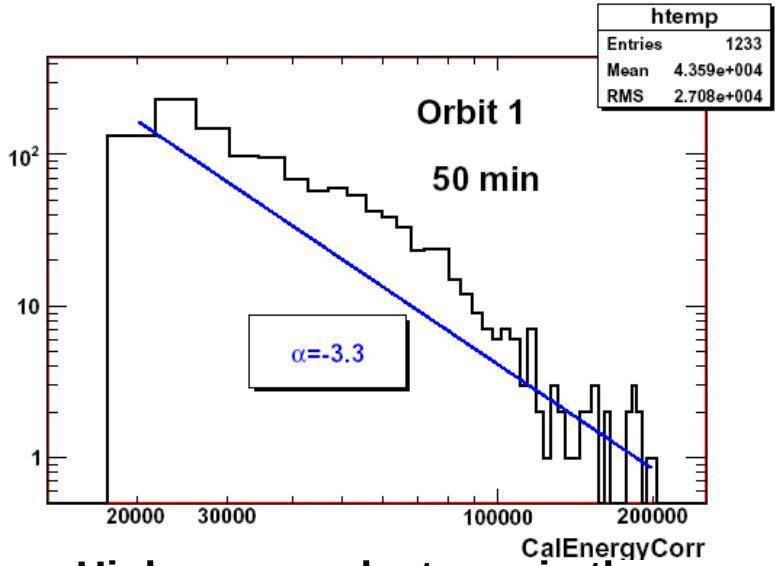
From a study of the relative background trigger rates in the first 4 orbits (M. Ackermann, SLAC)

Ops Sim 1 (cont)

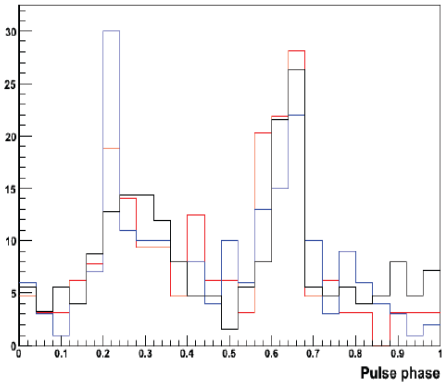
- More example analysis results



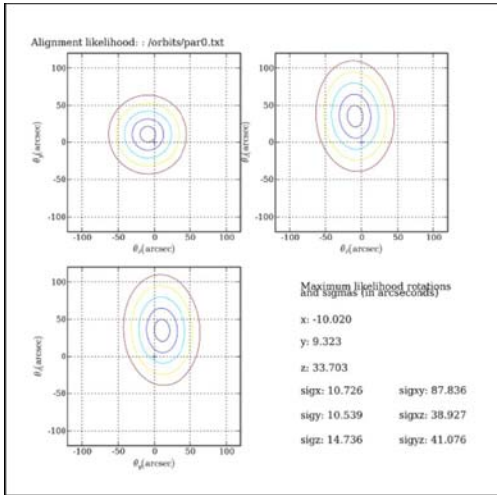
Identification of failure of GARC 4 board in ACD during orbits 14 & 15 (F. Gargano, INFN Bari)



High-energy electrons in the data set for Orbit 1 (A. Moiseev, NASA/GSFC)

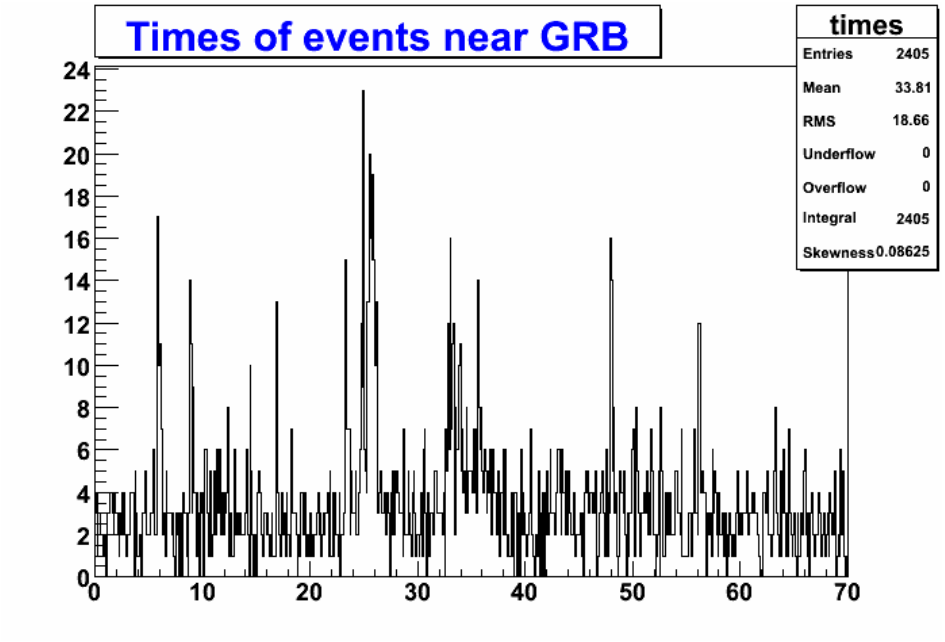


Light curves of Vela for the first 6 orbits, showing stability of absolute timing (Lemoine-Goumard, CEA Bordeaux)

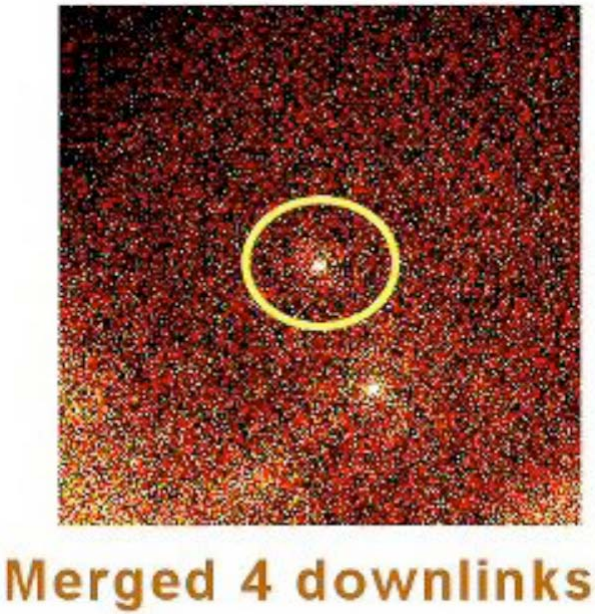


Source location contours for bright point sources (12 orbits), showing no evidence for misalignment of LAT wrt GLAST (M. Roth, UW)

Ops Sim 1 (cont)



Light curve for GRB 090103b (N. Omodei, INFN Pisa)



Map in vicinity of flaring blazar detected in Ops Sim 1 (G. Tosti, INFN Perugia)

SAS Status

- **Service Challenge Work**
  - 55 day run main processing completed
  - ASP being run on it
  - To be ingested into GSSC and LAT DataServers this week
  - GlastRelease v13 series underway
    - Improvements to TriggerAlg
    - Root 5.16
  - Now preparing for the Big Run: 1 orbit year
    - Start validation sims this week - complete in early January!
    - Will run some 200,000 batch jobs and fill 40 TB of disk
    - Infrastructure: event collections and xrootd
  - Leverage OktoberTest orbit sims
    - 15 orbits, all with different configurations
    - Replay them to test tweaks to L1 processing file handling
    - Working with SLAC computing services to optimize

SAS: Sundry Items

- Our 400 cores are being put to good use
  - Asking SCS for additional cores for Big Run
- ASDC web tools, for ASP & catalog products
  - Visit from Paolo Giommi and Roberto Primavera (ASDC)
  - Follow-on from cross-catalogue tools developed for DC2
  - Tools ported to SLAC machines and first prototype done
  - Plans for next round of functionality hashed out, with update at collaboration meeting
- Xrootd
  - devoting all Big Run disk to xrootd
    - Will load balance disk usage
    - Tape archive
    - Final push before Big Run for xrootd
- Pipeline2 @ Lyon
  - First test task successful last week
  - Still have a few details to work out, but almost there