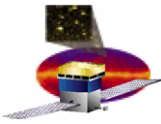


Fermi Large Area Telescope Instrument Science Operations Center

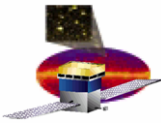
ISOC Operations Status

Robert Cameron
ISOC Manager
rac@slac.stanford.edu

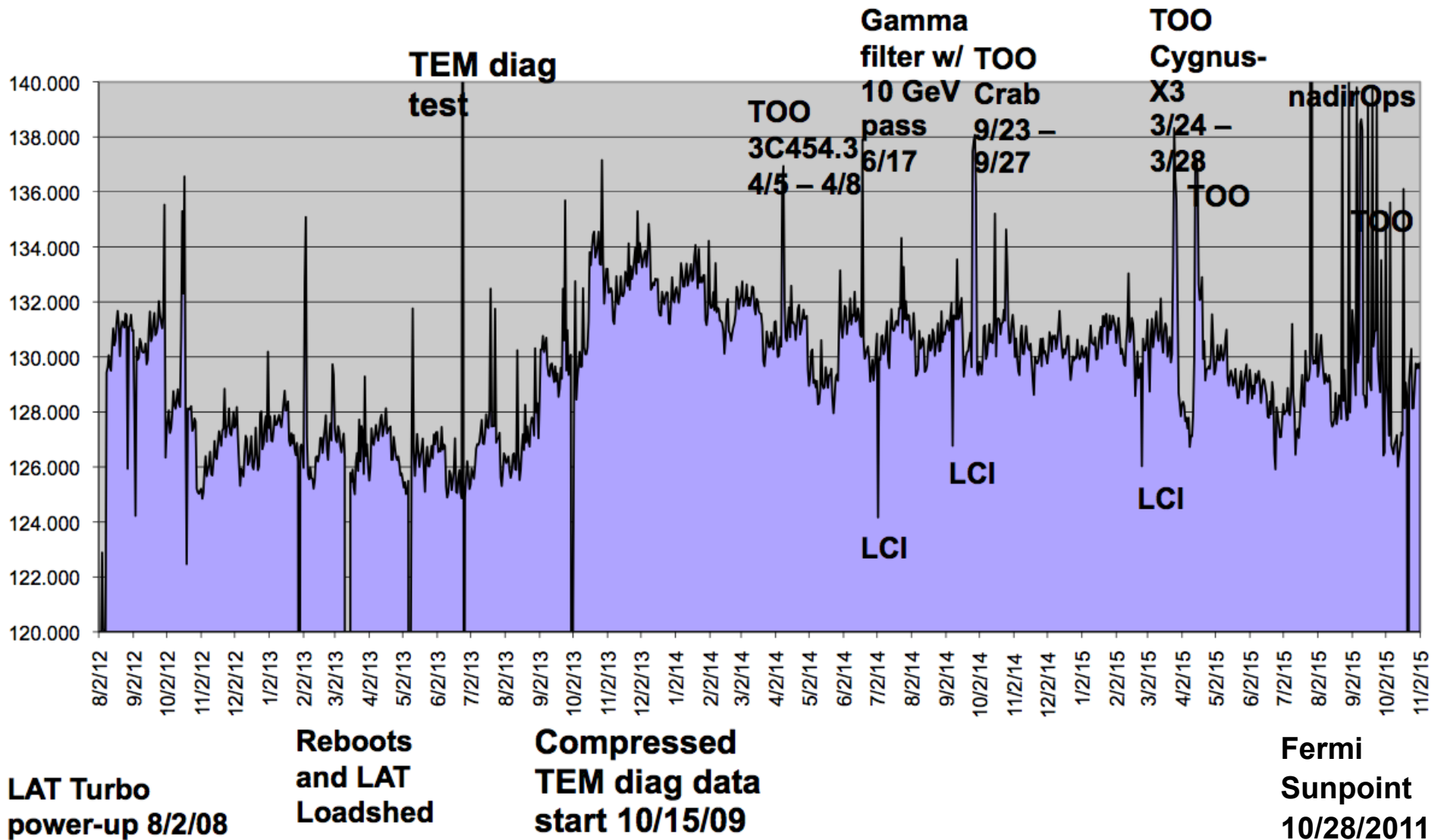


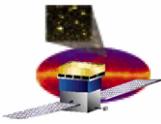
ISOC Flight Operations Highlights

- ❑ Performed routine charge-injection calibrations (2011-04-21)
- ❑ Updated LAT on-board autonomous fault protection (2011-05-05)
 - Better protection of LAT at hot temperatures, for example, during a reboot
- ❑ Two upgrades of on-board TKR hot strip masking
 - 2011-06-02 and 2011-08-11
- ❑ Nadir observations of TGFs
 - Created, tested, and evaluated candidate configurations for the nadir observations
 - Successfully planned 10 nadir observations
- ❑ B2-3-2 activated on LAT (2011-10-12)
 - 2 small fixes for improved on-board GRB detection & response
 - Changes GRB ARR latency to 30 seconds
 - Fixed a bug in handling of GRB messages
- ❑ Released LAT Component Manager, a tool to simplify on-board file management in LAT EEPROMs
 - Builds file control commands for on-board FSW and configuration files
 - Using it for major on-board file cleanup before FSW B3-0-0 is loaded
- ❑ LAT has triggered 203.9 billion times since launch



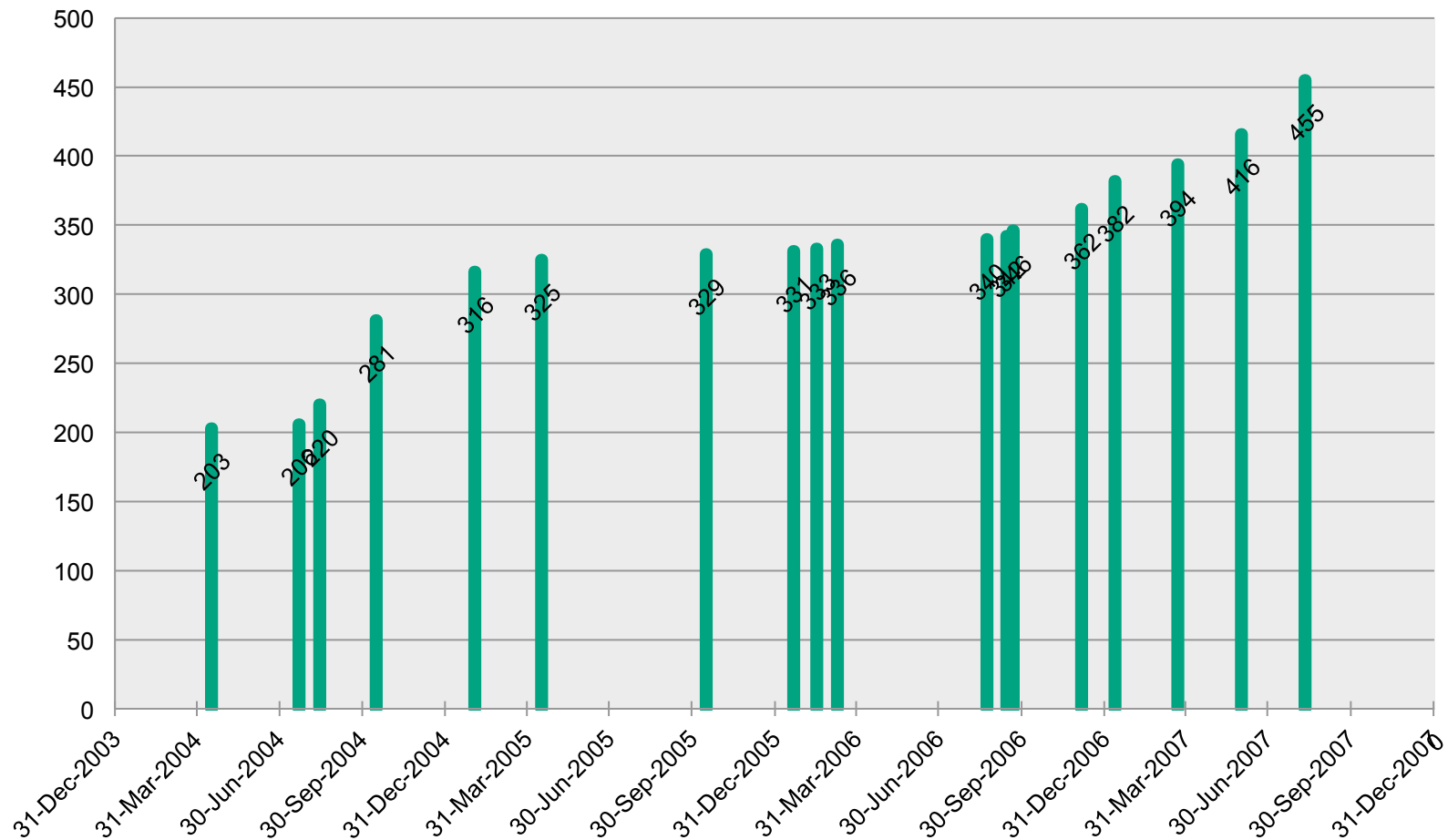
LAT Science Data Rate (Gbits per day)

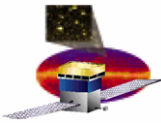




LAT TRACKER Si Strip Masking

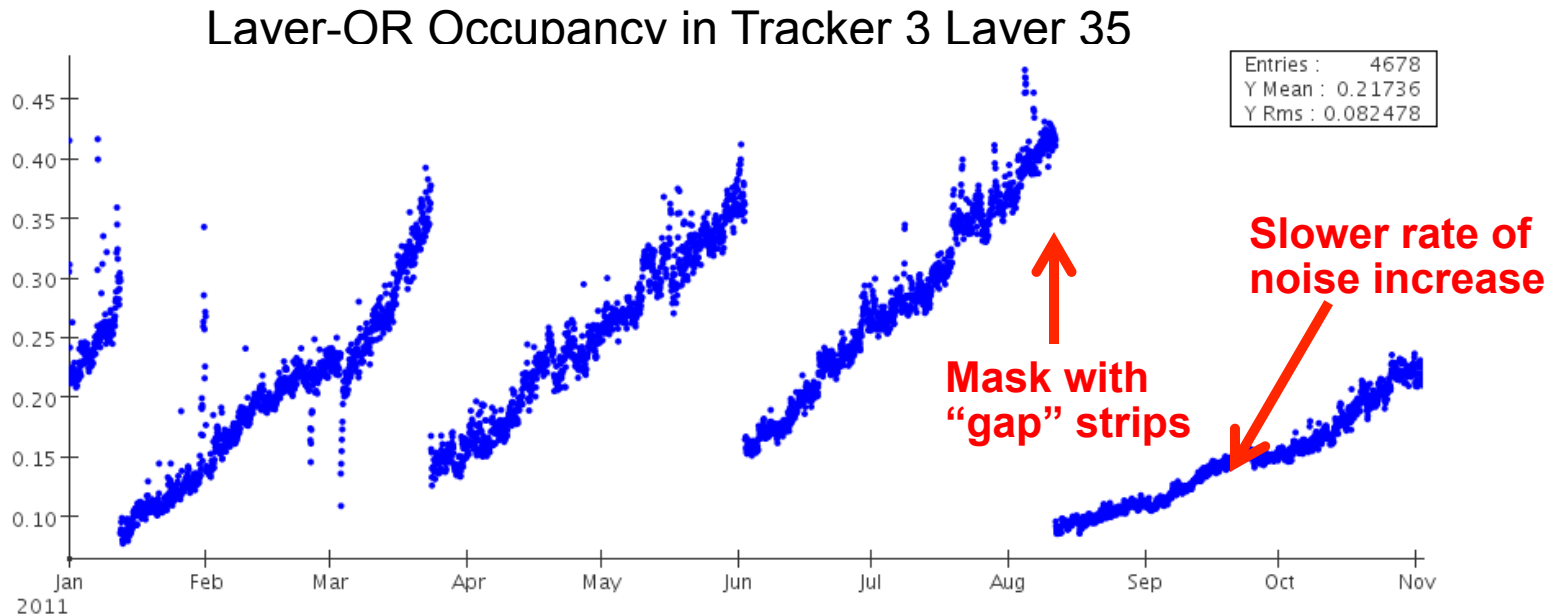
- 252 strips masked since launch (61 masked since last IFC meeting)
 - 93 on Tower 0 (first year) and 132 on Tower 3 (117 since 2010)
- Total number of masked strips = 455 of 884,736 = 0.051%

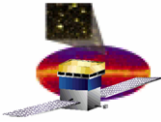




Noise in Tracker Tower 3, Layer 35

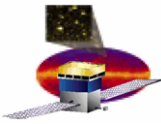
- ❑ Latest hot strip update applied on LAT on 11 August included 25 hot strips plus 14 “gap” strips in TKR 3 Layer 35
- ❑ The “gap” strips were suspected hot strips, but which were below the masking threshold. They were selected as either single or double strips below threshold surrounded by adjacent hot strips
- ❑ The rate of noise increase has slowed since latest mask was applied
 - Hopefully we are approaching the bounds of the problem





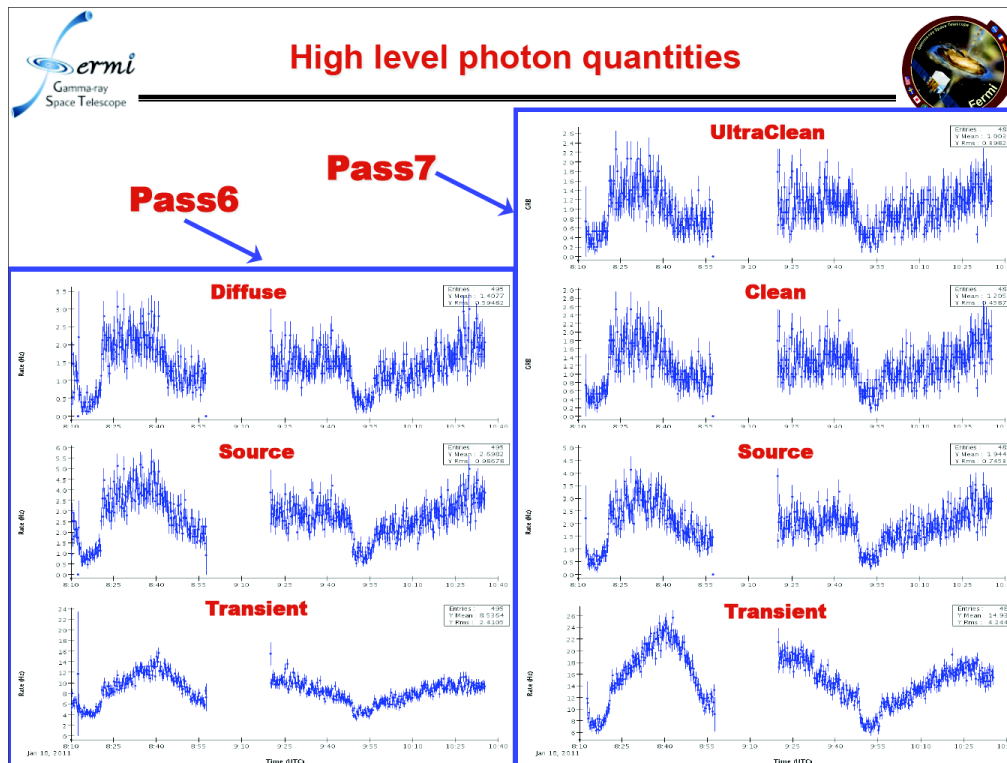
LAT FSW Development

- ❑ B3-0-0 status
 - Development and Build
 - Upgraded most packages to include RHEL4, RHEL5, RHEL6 tags
 - Streamlined offline interface: down from ~25 packages to 7 packages
 - Cleaned up dependencies
 - Successfully built on sun-gcc, mv2304, rad750, RHEL4/5/6-32/64
 - Test – In final stages
 - Flight Qualification Tests run on testbed
 - Compression testing
 - Filter stand-alone testing
 - Targeted testing against testbed using ITOS
 - Ground tool “Q pkg” testing on RHEL5 32/64 platforms
 - Long-range stress test on testbed
 - Package and Export
 - Export mechanism is in place
 - B3-0-0 has been exported to offline: offline integration is in work
- ❑ B3-0-1: 2 minor FSW bugs waiting to be fixed
- ❑ B3-X-X: Background rejection filter for better on-board GRB detection
 - Needs time commitment from shared developers

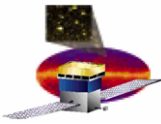


ISOC Science Operations: Highlights

- Smooth L1 processing transition to Pass7 on 1 August 2011
 - New data products and photon and particle classes
 - New plots and alarm thresholds for Data Quality Monitoring
 - Added LLE (LAT Low Energy) monitoring for GRBs
- Nadir processing:
 - Non-standard data have been successfully processed in Level 1

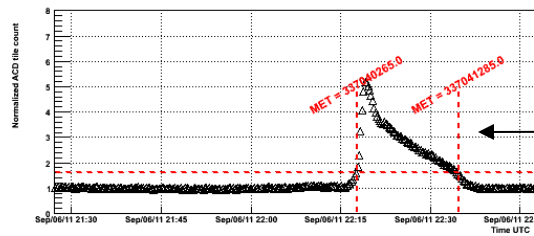
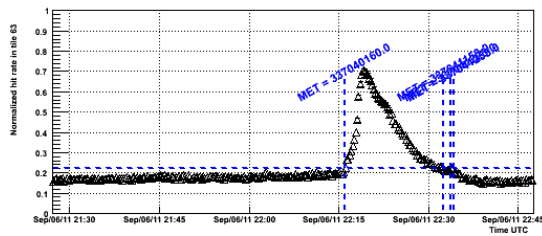


Monitoring and trending of photon rates in Pass 6 and Pass 7

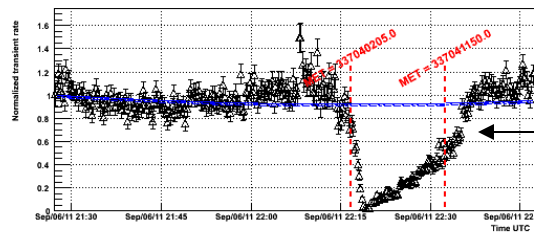
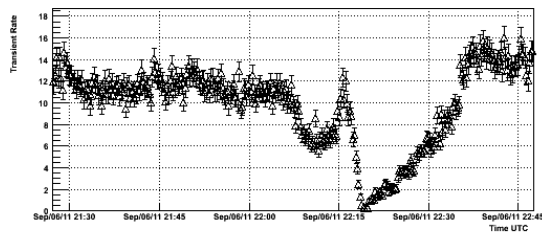


Science Operations: Solar Flares

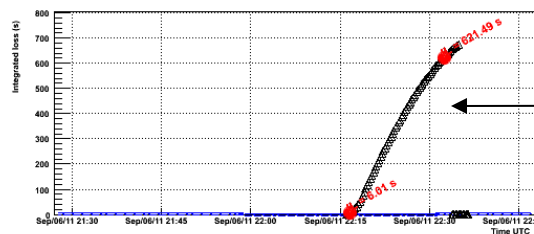
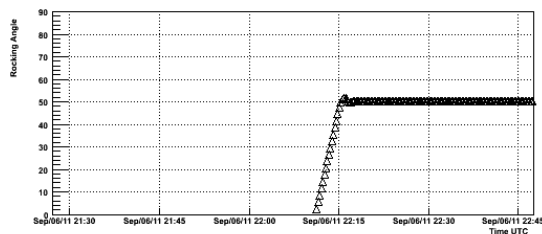
- Solar flare monitoring in place
 - Improved Data Quality Monitoring with solar flare quantities
 - Monitor effect of flares on reconstructed photon rates



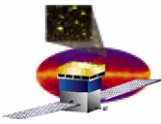
ACD tile 63
(sun-facing)
rate increase



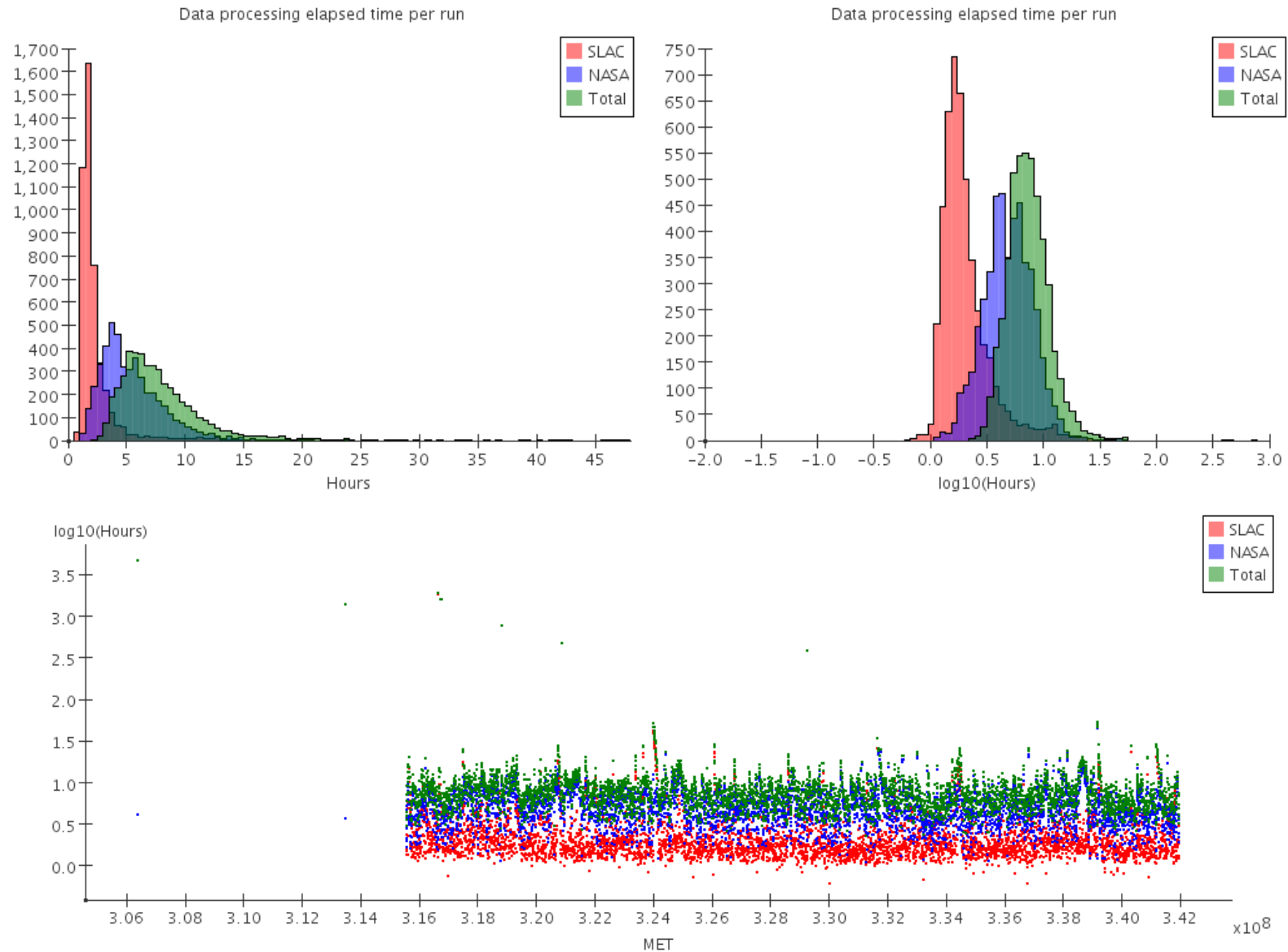
Transient-class
photon rate dip

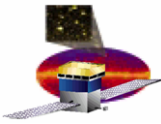


Integrated
exposure loss
in seconds



Data Processing Elapsed Time Per Run





Science Ops: Data Quality Monitoring

- ❑ DQM tutorial given before Collaboration Meeting in August
- ❑ DQM shift support has improved from direct email campaign
 - Individual emails sent out to 74 newer student and postdoc members of the LAT collaboration, asking them to sign up for DQM shifts
 - Only four non-covered shifts until 2012 April 16
 - Will follow-up with non-respondents
 - Plan to repeat email solicitation each year



Tutorials Agenda

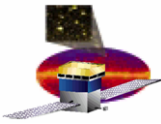
10 Added by Tosti Gino, last edited by Nicola Omodei on Aug 26, 2011 (view change)

[Back to the Tutorial Sign-up Page](#)

Thursday: August 25

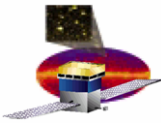
Time	Kavli Aud.	Topics	Tutors
8:30-10:30	Session 1	Data Monitoring: Introduction (pdf) (ppt)	Anders
Coffee Break	10:30 - 11:00		
11:00-12:30	Session 2	Data Monitoring: hands-on (Sign up)	Anders





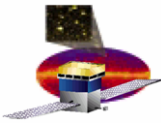
Automated Science Processing: GRBs

- ❑ GRB Blind Search
 - 96 GRB candidates since Aug 2008 (56 since last IFC meeting)
 - 9 confirmed LAT GRBs (GRB080916C, 081024B, 090217, 090510, 090902B, 090926A, 100116A, 100724B, 110731A)
 - 87 accidentals
 - 3 associated with Earth limb emission during the AXP-triggered ARR; 1 associated with Vela entering LAT FoV
 - 9 associated with Cyg-X3 (Mar 2011) and Crab (Apr 2011) pointings
 - 45 associated with Nadir runs and GC pointing. Code was added on 11 Sep 2011 to avoid these triggers.
 - Remainder consistent with expected accidental rate.
- ❑ GRB Detection Refinement
 - Processed >2059 GRB candidate notifications from GCN since Aug 2008
- ❑ Recent ASP Development for GRBs
 - Switched to Pass 7 data on 1 Aug 2011
 - Recalibrated GRB blind search trigger
 - Update event selections and diffuse models in GRB follow-up and flare detection and source monitoring tasks
 - Enabled automated generation of GCN Notices based on GRB follow-up ASP analysis, on 12 Aug 2011



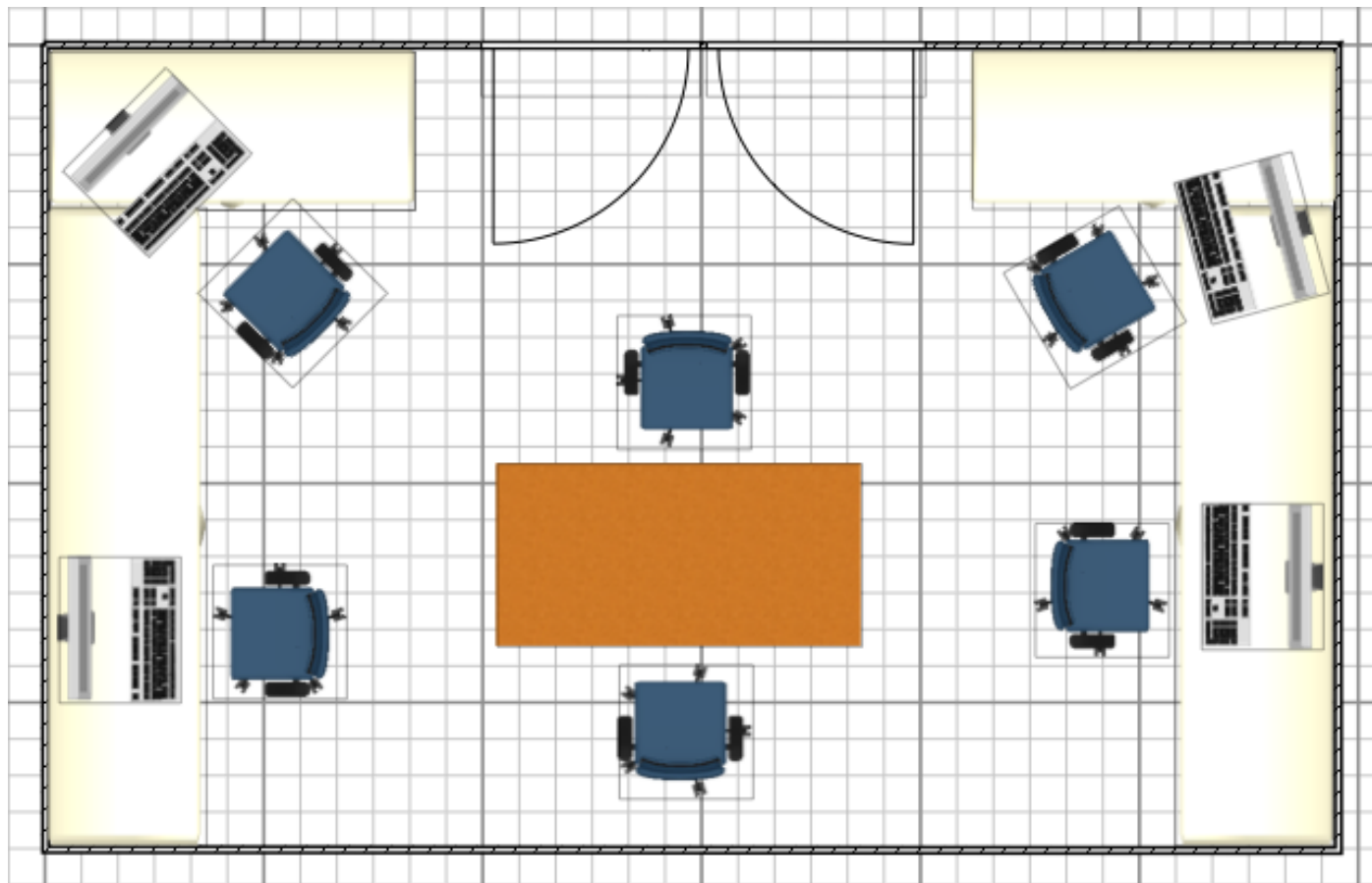
Automated Science Processing: Sources

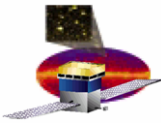
- ❑ Flaring source detection and flux monitoring tasks
 - Used by Galactic and Extragalactic Flare Advocates
 - 165 Astronomer Telegrams have been issued for flaring sources as a result of ASP processing
 - 26 ATEs since the previous IFC meeting
 - Daily and weekly fluxes for the monitored source list continue to be sent to the FSSC every day
 - 65 sources have been added to the original 23 in the monitored source list
 - 7 added since previous IFC meeting
- ❑ Future ASP Development for source monitoring
 - Flare detection task for TeV sources using Bayesian Blocks. This will serve as possible trigger for ground-based IACT follow-up.



ISOC Facilities: Mission Support Room

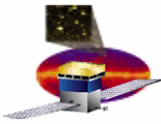
- ❑ Completed size reduction of ISOC Mission Support Room
- ❑ 3 Ops workstations with triple displays + 1 ISOC s/w build system
- ❑ Plus 1 Windows PC and 1 Linux PC using shared display





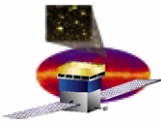
Near-term Future Objectives

- ❑ Migrate all ISOC linux servers and software off RHEL4 to RHEL5 (Q2 FY2012)
- ❑ Update the LAT flight software to B3-0-0 (Q2 FY2012)
- ❑ Perform full Pass 7 event reprocessing if needed by LAT Collaboration (Q3 FY2012)
- ❑ Implement selectable priority processing scheme in Level 1 processing (Q4 FY2012)
- ❑ Implement offsite archive of ISOC software (Q4 FY2012)
- ❑ Transition LAT Level1 event reconstruction software from Pass 7 to Pass 8 (Q2 FY2013)
- ❑ Transition LAT Level1 event processing from Pass 7 to Pass 8 (Q3 FY2013)



IFC Budget for ISOC Operations

- ❑ LAT is performing very well overall, and ISOC flight operations and s/w development needs are decreasing
- ❑ IFC budget supports 2 FTEs for ISOC operations
 - Until now:
 - 1 FTE of Flight Operations support
 - 1 FTE of Flight Operations software support
 - Starting in CY2012
 - 1 FTE of Flight Operations support
 - Mission planning; monitoring; s/w development and maintenance; non-routine operations support
 - 1 FTE of ISOC Level 1 Processing support
- ❑ Level 1 Data Processing is a core/essential ISOC task
- ❑ New FTE mix aligns better with expected future support needs



Summary

- ❑ LAT is still performing very well overall
- ❑ Improved Flight Operations tools to support file management for coming FSW updates
- ❑ Level 1 Processing accomplished smooth transition from Pass 6 to Pass 7 processing
 - Level 1 DQM can now handle Solar activity
 - Improvements in enlisting DQM shift scientists
- ❑ Stability of LAT operations results in recommended change to ISOC operations mix in IFC budget
 - Change 1 FTE to Level 1 processing support