

GLAST Large Area Telescope Instrument Science Operations Center

Monthly Status Review 12 July 2007

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ISOC Manager



ISOC Highlights

□ Recent Events

- ETE1b on July 6
- ETE2 on July 7, and ETE2 repeat of LAT physics run on July 10
- Mission Planning Exercise 2 is continuing

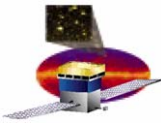
□ Upcoming Events

- LAT Collaboration Meeting: SLAC, 31 July – 3 August
- Instrument Commissioning Simulation #2: 15-16 August



Narrative Procedure Development

- ❑ **Total of 105 NPs identified**
 - **90 written (86%)**
 - **76 reviewed at level 3 or higher (72%)**
 - **35 have PROCs completed and tested in an ETE (33%)**
- ❑ **Updated NPs to include references to the PROCs**
- ❑ **In the process of updating NPs to include B1-0-0 changes**
- ❑ **ETE3 status**
 - **28 of the 29 NPs are ready for PROC development (level 3)**
 - **Remaining NP is expected to be at level 3 by end of July**



Narrative Procedure Status

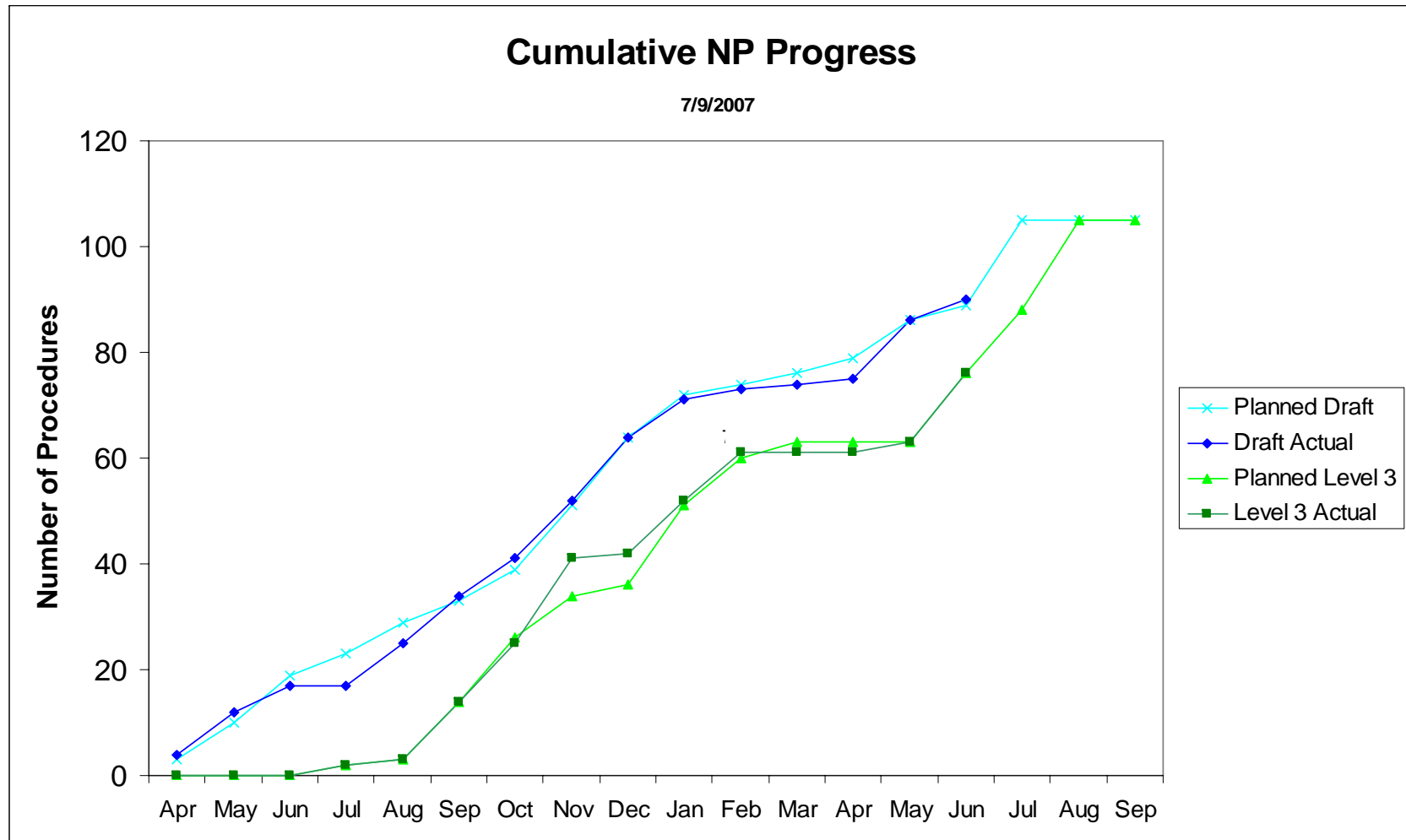
Status by ETE								
ETE	Date	# of Procedures	Level					
			1	2	3	4	5	6
ETE 1a	Apr-07	2	0	0	0	0	2	0
ETE 1b	Jul-07	8	0	0	0	0	8	0
ETE 2	Jul-07	20	0	0	0	20	0	0
ETE 3	Aug-07	29	1	0	24	4	0	0
ETE 4	Oct-07	46	13	0	17	1	0	0
		105	14	0	41	25	10	0

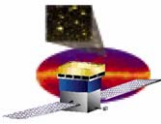
Schedule				
	Planned Draft	Draft Actual	Planned Level 3	Level 3 Actual
Apr	3	4	0	0
May	7	8	0	0
Jun	9	5	0	0
Jul	4	0	2	2
Aug	6	8	1	1
Sep	4	9	11	11
Oct	6	7	12	11
Nov	12	11	8	16
Dec	13	12	2	1
Jan	8	7	15	10
Feb	2	2	9	9
Mar	2	1	3	0
Apr	3	1	0	0
May	7	11	0	2
Jun	3	4	13	13
Jul	16	0	12	0
Aug	0	0	17	0
	105	90	105	76

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	105		88	
Aug	105		105	



Narrative Procedure Development Progress

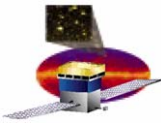




PROC Development

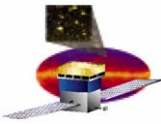
- ❑ From Elizabeth Ferrara, 11 July
- ❑ 12 ETE1a/b PROCs have been validated
 - Couple of sections of NOOP PROC need to be updated
- ❑ 22 PROCs successfully validated in ETE2
 - 13 more to be revised following ETE2

PROC	Not Started	Draft	Not complete	Coded	Ready for test	Tested	Validated	Total
ETE1	0	0	1	0	0	0	12	13
ETE2	0	0	14	0	2	2	22	40
ETE3	16	4	2	2	2	0	0	26
ETE4	42	0	6	0	0	0	0	48
Total	58	4	23	2	4	2	34	127



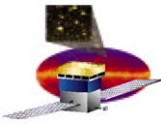
Mission Planning Exercises

- ❑ **MPEx2 (June 25 - July 13, 2007)**
 - **Nominal weekly ATS timelines built and sent to GSSC per schedule**
 - **LEO#2 (June 26-28) impacted MPEx by causing delays and errors in Integrated Observatory Timeline (IOTL) sent by MOC**
 - **CHS software checked IOTL against LAT timeline and reported discrepancies**
 - **Missing physics runs from IOTL caused by changes to orbit predicts**
 - **LAT physics runs are based on SAA events and the time of the SAA can change with a new orbit product predict (available after LAT timeline submitted)**
 - **Looking at solutions to reduce the occurrence of these errors or identify them earlier so a new timeline can be submitted to MOC**
 - **Plan to discuss strategies with MOC at next GIMGOM**
 - **Minor usability issues identified with ISOC Mission Planning Tool (MPT) and addressed through JIRAs**
 - **PROC requests sent to MOC and GSSC**
 - **ISOC successfully created and sent two PROC requests with parameter files**
 - **Both PROC requests entered into MPEx timeline by the FOT**
 - **Parameter files were successfully used in the ETE2**
 - **ISOC successfully sent a PROC request with an associated upload file**



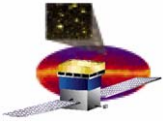
MPEX (continued)

- ❑ **MPEX2, continued**
 - **GSSC issued a test ToO request on July 10**
 - **ToO “acknowledge” message was received at ISOC and logged**
 - **Upon receipt of the ToO message, ISOC paging system was used to send emails to selected people**
- ❑ **MPEX3 (Fall 2007)**
 - **Goals:**
 - **GSSC issue ToO PROC request (more complete than MPEX 2 test)**
 - **GSSC issue ToO cancel**
 - **ISOC send RPS file inputs to GSSC to request special LAT pointing and to identify periods where LAT will not be taking data**
 - **Mid-week timeline replan**



Flight Operations Software Progress

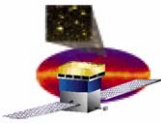
- ❑ MPEX-2 support
- ❑ ETE-1b, 2 support
- ❑ FOS release 3.0 in support of ISOC Release 3.0
 - V&V completed in time for GRT-7
 - 18 out of 28 FOS Level 3 requirements completed
- ❑ FOS release 3.1
 - V&V completed in time for ETE-2
 - 24 out of 28 FOS Level 3 requirements completed
- ❑ Redactor performance was an issue for GSSC
 - Optimized the code for a factor of 20 speed improvement
- ❑ Set up Pipeline II processing of non-event science data
- ❑ Computing platform infrastructure maintenance
- ❑ Ops Facility infrastructure work
- ❑ In progress:
 - Calibration trending tool
 - Web based Mission Plan Viewer
 - Web based Telemetry Table GUI
 - Mission Planning Tool updates
 - Mnemonic viewer



CHS Testing

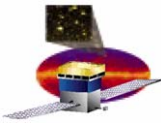
□ Acceptance Testing

- separated 3.0 ISOC release into three releases - 3.0, 3.1, 3.2
 - allowed release/use of work as it was completed
 - 3.0 used for GRT 7
 - 3.1 used for ETE 1b & ETE 2
 - 3.2 planned for early August (use for ETE 3)
- good progress on testing
 - 17 reqts (3.0) + 35 reqts (3.1) verified in last month
 - cumulative: 205 of 276 (~75%) L3 reqts verified



FOS JIRA issues (as of 7/10)

Package	Issues opened since 6/4	Issues closed since 6/4	Total # of issues currently open
Core	76	63	63
Monitor: FASTcopy	2	0	6
Monitor: Logging	0	0	5
Ops Facility	8	11	1
Packages & Installers	6	6	5
Trending: Calibration	2	2	4
Trending: Telemetry	6	9	3
LAT T&C	1	0	3
Totals	101	91	90



Requirements Tracking

Requirement Category	Release Status & Plan (as of 07/11/07)											total
	1 6/05	1.2 11/05	1.3 2/06	1.4 5/06	2 7/06	2.1 10/06	2.2 2/06	3 6/07	3.1 7/07	3.2 8/07	4 9/07	
	GRT2	GRT3			GRT5	GRT6	ETE1 MPEX1	GRT7 MPEX2	ETE1b/2	ETE3	ETE4-6	
Misc (Facility, Redundancy, Sec., Doc, etc.)	3	1		2	7	4	4		17	2	22	62
Mission Planning	2	2					30	9	2	2	5	52
Telemetry Processing	2	3	1	7	4	14	2	2	4	3	3	45
Science Data Processing		1		1	2	3			6		22	35
Telemetry Monitoring		1	1	2	1	15	1	5		2	5	33
Logging			3			4		1			2	10
Trending			12		6	3			1			22
Anomaly Tracking & Notification						6	3		5	1	2	17
# new reqts verified	7	8	17	12	20	49	40	17	35	10	61	276
cumulative total	7	15	32	44	64	113	153	170	205	215	276	

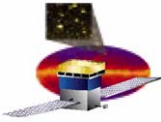
Key:	
	Incremental release (only new requirements tested)
	Major release (all requirements satisfied to date tested)



ETE1b/ETE2 Support

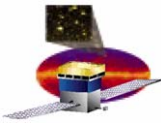
□ ETE 1b Support:

- **LAT personnel supported the test from the MOC, LISOC, and GD**
 - **Three LISOC personnel present at the MOC (Bator, Hakimi, Hascall)**
- **LAT was powered up and configured for Science Observations by I&T, followed by transfer of command authority to the MOC**
 - **One long (~12-hour) continuous Physics Run performed**
 - **10 Narrative Procedures and 12 STOL PROCs exercised**
 - **Two errors observed in the LATNOOP PROC to be resolved (LTC NOOP and LSWNOOP)**
 - **Real Time data and L0 files received by LISOC via RedacRT and FASTCopy, respectively**
 - **All objectives of the test were met**



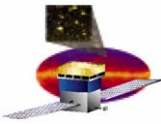
ETE2 Support

- ❑ **LAT personnel supported the test from the MOC, LISOC, and GD**
 - Four LAT/LISOC personnel present at the MOC (Bator, Grove, Hakimi, Hascall)
- ❑ **LAT was successfully powered up via PROCs for the first time**
 - Exercised VCHP Heaters
 - Powered Up LAT
 - Turned on Main Feed & Initialize LTC
 - Activated All towers
 - Powered on All 12 ACD Boards
 - Set LAT Cal High Voltages
 - Set LAT Tracker high voltages
 - Set Lat ACD Voltages
 - Executed LAT Physics Observation
 - Exercised File Upload and Processor Dump Activities
 - Real Time data and L0 files received by LISOC via RedacRT and FASTCopy, respectively



ETE2 Support (Cont'd)

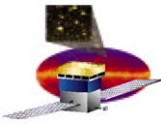
- 12 Narrative Procedures and 35 STOL PROCs were exercised
 - Eight minor PROC issues (No impact on functionality of the PROCs)
 - More significant issues in eight other PROCs (total for ETE1b/ETE2)
 - Telemetry check in LATNOOP PROC
 - Limits need to be revisited/updated in POWERTEM, POWERTKR, POWERCAL, and POWERFREEBD PROCs and NPs
 - Telemetry check error in BEGINPHYSOB PROC
 - PROC typo errors in ACDBIASCFG
 - LATP Packet averaging in BEGINPHYSOB and ENDPHYSOB may need to be revisited and possibly updated
- Several JIRAs written during the test to improve LICOS displays, the Ops-Log, etc (JIRAs ELG-9, ELG-10, ICS-306, ICS-307, ICS-308, ICS-309, and ICS 313)
 - Mnemonic displays need to be updated
 - Real-time file and memory dump tools need to be added
 - Real time data handling chain is not robust against malformed data
 - Can cause crashes, hangs or other bad behaviour
 - Requires restart of chain components
 - Investigating possible fixes
 - Real time data handling chain is not robust against duplicate data streams
 - A fix is planned



ETE2 Support (Cont'd)

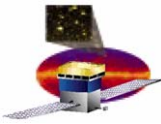
- Repeated the LAT Physics run of the ETE2 by PROC on July 10
 - Wrong argument was used in the LATSETEVENTOUT PROC on July 7
 - A 90+ minutes Physics run (at ~ 500 Hz) performed
 - SSR dump was done by I&T due to no scheduled TDRS
 - Level-0 data (Science, HK, and Diag.) received and is being processed

As a whole, ETE1b/ETE2 was a Big Success



Current Developments in Science Ops

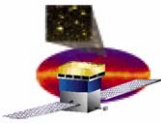
- ❑ **Launch & Early Orbit studies have been organized to define procedures, analyses, and detailed timelines (E. Grove/NRL)**
 - **Functional areas: SAA boundary, Detector Timing-in, Background Observation, Pointed Observation, Sky Survey, Filter Performance, Detector, GRB Handling, and Calibration (by subsystem)**
 - **Status reports for each area are to be presented at the Collaboration meeting at the end of July**
- ❑ **For the study of the SAA boundary the background model has been extended to cover the interior of the SAA (M. Ackermann/SLAC)**
 - **The study, still in progress, is using Gleam to evaluate what Low-Rate Science counters (TKR/ACD) can be used in flight to monitor the perimeter**



Current Developments in Science Ops (2)

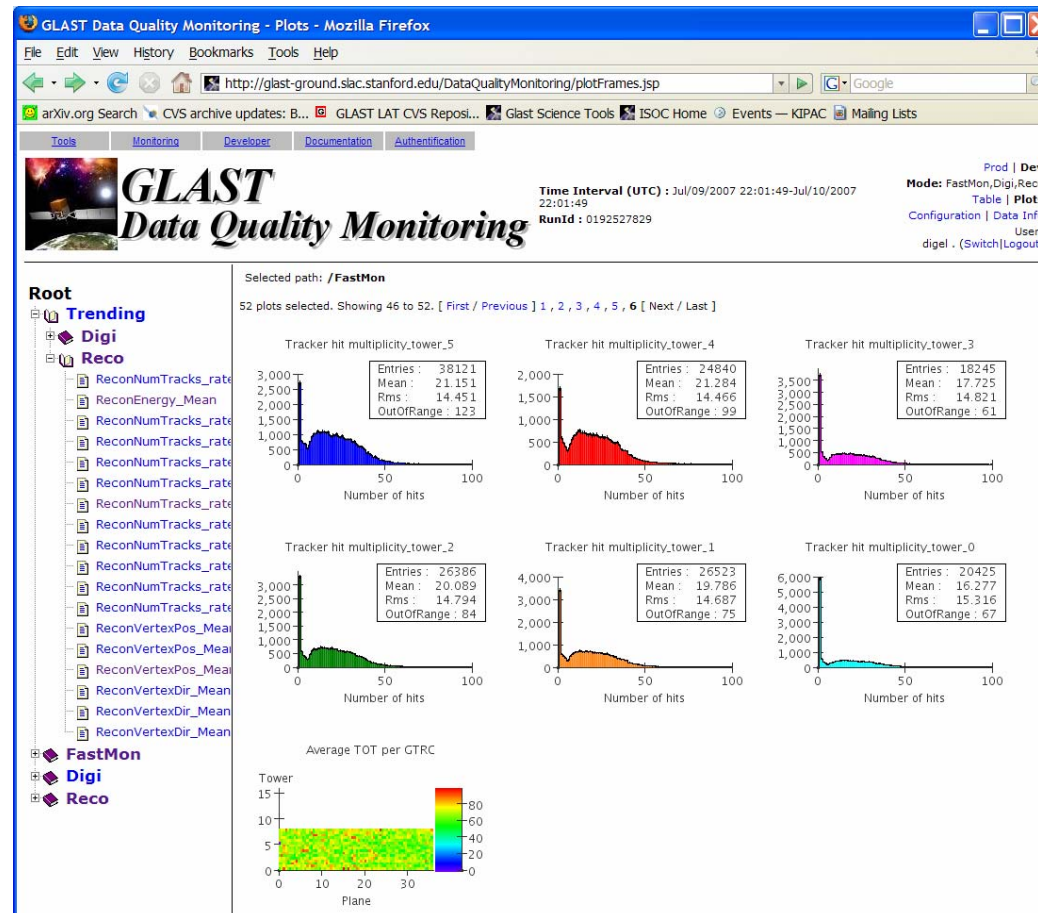
- **Noise flares in the TKR ground data have been studied using the Buffer Saturation Fraction (H. Tajima/SLAC)**
 - **The temperature dependence is strong and the rate of flares should be very small under flight conditions**
 - **BSF monitoring is included in the TKR monitoring scripts, along with strip and layer occupancy**

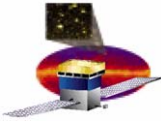
- **Pipeline task for source monitoring has been tested with DC2 data (S. Ciprini & G. Tosti/INFN Perugia, J. Chiang/UMBC/SLAC)**
 - **Exposed a weakness (since fixed) in the Pipeline system's management of tasks**
 - **The user interface for the resulting light curves in the trending database is now being revisited**



Current Developments in Science Ops (3)

- Event-level monitoring tasks were implemented for ETE2
 - Fast Monitoring, Time Dependent Monitoring, End of Run Digi Monitoring and Recon Monitoring (Pisa/SLAC)





SAS Status: Service Challenge

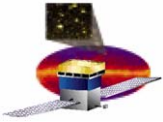
- Service Challenge Work
 - 1-year gtobssim run out the door for Collab Mtg
 - 55 day run generation complete
 - Descoped ARR from this simulation
 - Technical problems with bkg interleave scheme
 - To be fixed for next runs
 - 2 days on SLAC batch farm
 - Doing post processing now for distribution
 - PASS5 backgrounds analysis complete - “final” pre-launch
 - Will reprocess 55 day run for analysis
 - 1-day sampled run of backgrounds with alternate hadron shower model - to see if backgrounds analysis notices any difference
 - Nothing significant seen
 - 3 hr run, full simulation, pointed at vela
 - Ditto, but with interleave to see how interleave and pointing behave
 - Demonstrated flaw in interleave for pointing :-)
 - TODO next:
 - 3 orbit-hr full simulation (again, but with more features)
 - GRB; point at vela; L0 files for L1 practice; Heavy ions



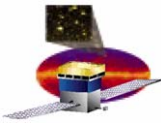


SAS: Sundry Items

- ❑ **50 TB disk & 240 compute cores**
 - installed in **SCCS water cooled racks**
 - Doing cabling, OS install etc now. Ready in ~2 weeks
 - Represents full CPU allotment for launch (data + MC)
 - Plan to add 150 TB before launch
 - Current 50 TB is to tide us over
- ❑ **Data access tools being configured**
 - Data Catalogue, LAT Data & Astro Servers
 - New versions released this week
- ❑ **Xrootd**
 - Used recent sims to test it. Now have a production mode set up and are working through error handling issues.
- ❑ **Pipeline2 @ Lyon**
 - Thought to be ready to go
 - It is July in France...
- ❑ **Pipeline @ Bologna**
 - Bologna not looking likely; investigating Padova



Backup Slides



LAT ISOC Operations Simulations

- **What are they ?**
 - **two (maybe three) rehearsals @ SLAC prior to launch**
 - relies on participation of the LAT Collaboration
 - internal requirements imposed on us by us

- **Goals**
 - **To rehearse ISOC launch and early orbit activities**
 - **To rehearse command and control of LAT in flight-like manner**
 - **To practice roles and responsibilities of SO, FO, and the LAT CCB and SOOG during operations, including decisions involving operations**
 - e.g. mission planning, contingency actions, changes in configurations and calibrations, etc.
 - **To demonstrate readiness of the infrastructure used for transferring, processing, accessing, and monitoring data and data processing**
 - **To generate plots, tables and reports necessary for L&EO**
 - **To address data analysis needed for L&EO**
 - present results and corresponding analysis methods
 - » in coordination with the Science Groups, in particular C&A.



ISOC Operations Simulation 1

□ Date and Location

- 1 week (Oct 8 to 12, 2007) @ SLAC ROB room (C&D) and ISOC ops room
 - We will have a brief introductory session to explain how the rehearsal will work (day 1)
 - Rehearsal means only a few ppt presentations! (days 2-4)
 - » shifts needed depending on attendance and scope of the rehearsal
 - Debriefing session and presentations of L&EO analysis (day 5)

□ Topics

- Operations
 - Procedures/Processes
 - On console activities
 - Contingency activities
 - » data analysis to resolve issues (timescale hours to a day)
- Infrastructure
 - Data Transfer
 - Data Processing
 - Data and Data Processing Monitoring
- Data Analysis as planned for L&EO
 - short term (timescale a few days)
 - long term (timescale weeks or more)