Gamma-ray Large Area Space Telescope

GLAST Large Area Telescope:
I & T Input to Monthly Technical/Cost/Schedule Review 01/26/06

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Last Month's Accomplishments (1 of 2)

- **Management**
  - **Supporting Environmental Test Planning**
  - **Maintaining Daily Planning/Hand-off Meetings**

- **IFCT**
  - **Integrated flight SIU's**
  - **Completed Phase 0 LATTE 4 tests**
  - **Completed Power Rack acceptance and integration**
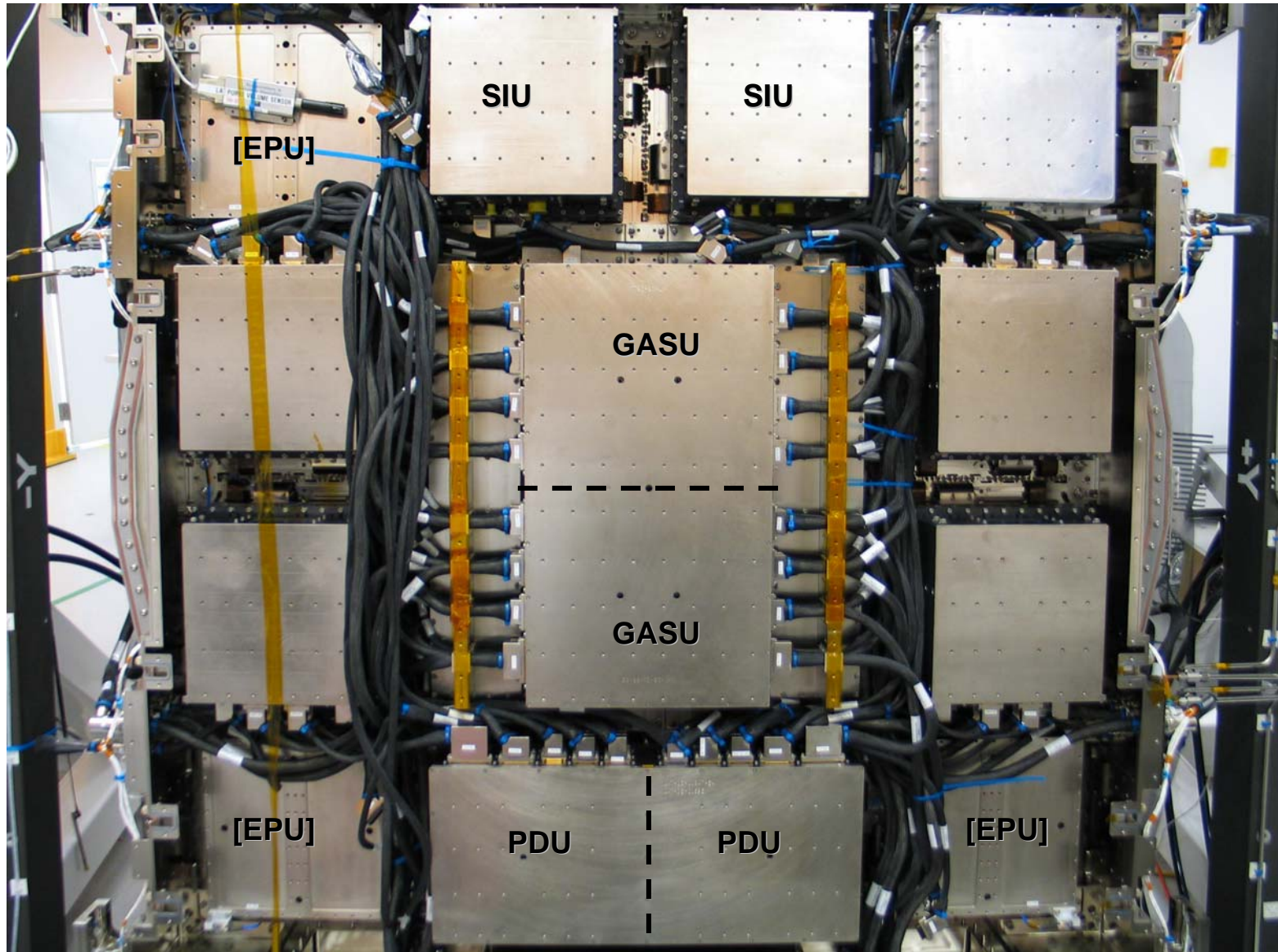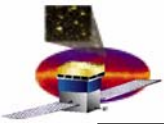 - **Completed Control Rack acceptance and integration**

Last Month's Accomplishments (2 of 2)

- **SVAC**
  - **Preparing for full LAT tests (Phase 1 and 2)**

- **Online**
  - **Troubleshooting full LAT NCR's**
  - **Developing LICOS scripts for system level test (Phase 1 and 2).**
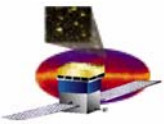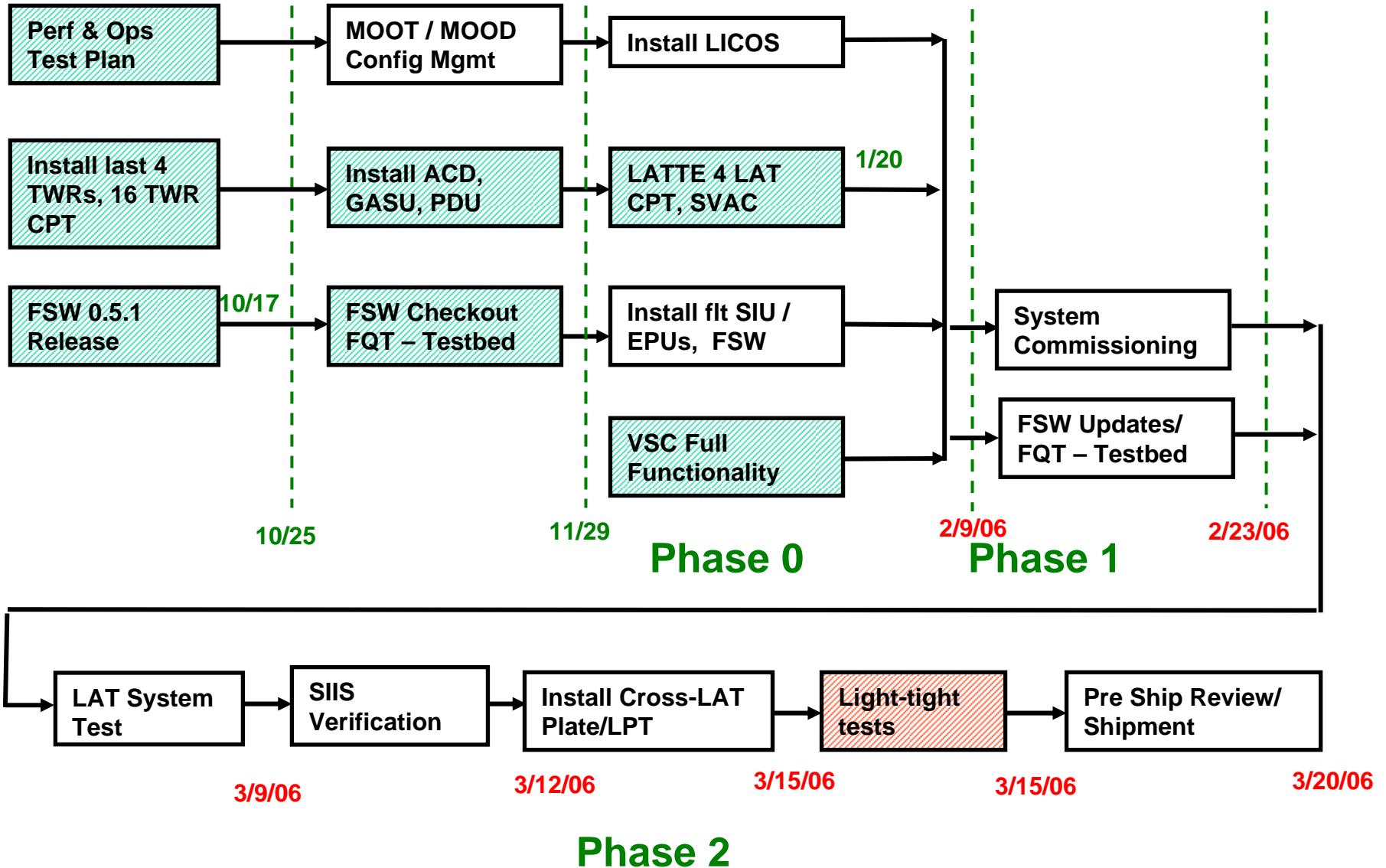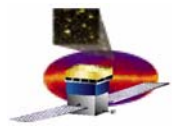
I&T Activities

Steps to Ship to NRL

- Phase 0 – Hardware check out
  - Hardware
    - ACD
    - Flt PDU, Flt GASU (EM GASU), Flt Cables, EMI Skirt, no SIU/EPU
  - Software
    - LATTE 4
  - Exit
    - Successful LATTE 4 CPT
- Phase 1 – Software check out
  - Hardware
    - Flt PDU, Flt GASU, 2 Flt SIU, 3 Flt EPU, VSC, Control/Pwr Racks
  - Software
    - FSW, VSC, LICOS, Configuration Database
  - Exit
    - Successful LICOS CPT
- Phase 2 – Run for the record
  - Hardware
    - Full complement of flight hardware (See Above)
  - Software
    - Flight release of FSW, VSC, LICOS, Configuration Database
  - Exit
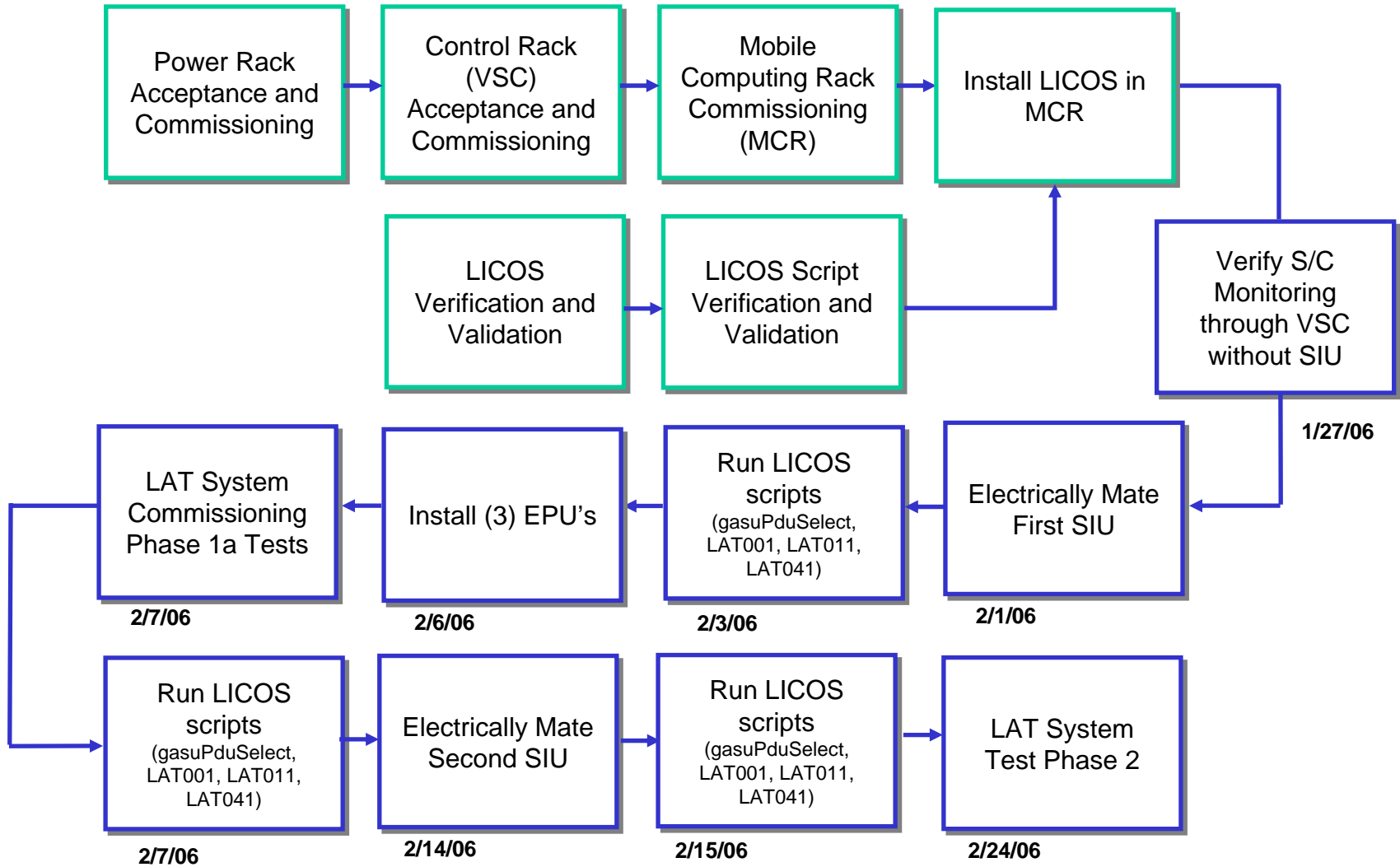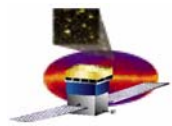   - Successful LICOS CPT, SVAC, E2E, Verification w/SIIS

System Test Flow

Perf & Ops Test Plan	→	MOOT / MOOD Config Mgmt	→	Install LICOS

Install last 4 TWRs, 16 TWR CPT	→	Install ACD, GASU, PDU	→	LATTE 4 LAT CPT, SVAC

1/20

10/17 FSW 0.5.1 Release → FSW Checkout FQT – Testbed → Install flt SIU / EPUs, FSW

VSC Full Functionality

System Commissioning

FSW Updates/ FQT – Testbed

10/25　　　　　**11/29**　　　　　**2/9/06**　　　　　**2/23/06**

Phase 0　　　　**Phase 1**

LAT System Test	→	SIIS Verification	→	Install Cross-LAT Plate/LPT	→	Light-tight tests	→	Pre Ship Review/ Shipment

3/9/06　　　**3/12/06**　　　**3/15/06**　　　**3/15/06**　　　**3/20/06**

Phase 2

Roadmap to LAT Phase 1 Test

```
┌─────────────────┐   ┌─────────────────┐   ┌─────────────────┐   ┌─────────────────┐
│ Power Rack      │   │ Control Rack    │   │ Mobile          │   │                 │
│ Acceptance and  │──▶│ (VSC)           │──▶│ Computing Rack  │──▶│ Install LICOS in│
│ Commissioning   │   │ Acceptance and  │   │ Commissioning   │   │ MCR             │
│                 │   │ Commissioning   │   │ (MCR)           │   │                 │
└─────────────────┘   └─────────────────┘   └─────────────────┘   └─────────────────┘
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- Power Rack Acceptance and Commissioning
- Control Rack (VSC) Acceptance and Commissioning
- Mobile Computing Rack Commissioning (MCR)
- Install LICOS in MCR

- LICOS Verification and Validation
- LICOS Script Verification and Validation

- Verify S/C Monitoring through VSC without SIU — **1/27/06**

- LAT System Commissioning Phase 1a Tests — **2/7/06**
- Install (3) EPU's — **2/6/06**
- Run LICOS scripts (gasuPduSelect, LAT001, LAT011, LAT041) — **2/3/06**
- Electrically Mate First SIU — **2/1/06**

- Run LICOS scripts (gasuPduSelect, LAT001, LAT011, LAT041) — **2/7/06**
- Electrically Mate Second SIU — **2/14/06**
- Run LICOS scripts (gasuPduSelect, LAT001, LAT011, LAT041) — **2/15/06**
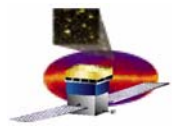- LAT System Test Phase 2 — **2/24/06**

Critical steps have been identified and are in the current I&T plan

I&T Summary Plan

ID	Task Name	Start	% Complete	Finish	Baseline Start	Baseline Finish
1	**50-50 schedule**	**10/31/05**	**53%**	**3/20/06**	**10/31/05**	**3/7/06**
2	**LICOS/FSW Installation & Test**	**10/31/05**	**76%**	**2/8/06**	**10/31/05**	**1/20/06**
3	Mobile rack assembly & test	10/31/05	100%	1/25/06	10/31/05	11/11/05
4	LICOS Installation	1/25/06	20%	2/7/06	1/16/06	1/19/06
5	Flight SIU installation	1/16/06	35%	2/1/06	1/16/06	1/19/06
6	FSW Installation	2/8/06	0%	2/8/06	1/20/06	1/20/06
7	**System Test**	**2/9/06**	**0%**	**3/14/06**	**1/21/06**	**3/1/06**
8	Phase 1 - System Commisioning	2/9/06	0%	2/23/06	1/21/06	2/7/06
9	Phase 2 - System Test	2/24/06	0%	3/9/06	2/8/06	2/20/06
10	SIIS Interface verificatoin	3/10/06	0%	3/11/06	2/21/06	2/22/06
11	Cross-LAT plate installation	3/12/06	0%	3/14/06	2/23/06	2/25/06
12	Preship Review	3/15/06	0%	3/15/06	3/2/06	3/2/06
13	Ship to NRL	3/16/06	0%	3/20/06	3/3/06	3/7/06

I&T Detail Schedule (1 of 2)

ID	Task Name	Start	% Complete	Finish
336	**Phase 1 Hardware installation**	**1/16/06**	**34%**	**2/10/06**
337	Mechanically Install SIU	1/16/06	100%	1/16/06
338	SIU/EPU Flight Cable routing	1/23/06	80%	2/1/06
339	SIU/EPU Safe to Mate tests	1/23/06	70%	2/1/06
340	Collect & Document current power rack settings w/Agilent power supply/PDU and current	1/17/06	100%	1/17/06
341	Install, S2M, and commission new power rack	1/17/06	100%	1/17/06
342	Baseline measurement of all current & voltages	1/17/06	100%	1/18/06
343	**NCR 783 BOB test per MRB disposition**	**1/19/06**	**100%**	**1/20/06**
352	Verify external crate in control rack prior to SIU install with LATTE4	1/20/06	100%	1/23/06
353	Finish initial release of the alarm handler	1/24/06	100%	1/24/06
354	V&V LICOS	1/25/06	0%	1/27/06
355	**Verify Control Rack external crate operation with ODS/Windows**	**1/24/06**	**52%**	**1/27/06**
361	V&V MCR	1/27/06	0%	1/27/06
362	**V&V scripts**	**1/27/06**	**0%**	**2/10/06**
368	Verify S/C monitoring w/o SIU thru VSC	1/31/06	0%	1/31/06
369	Remove SIU dongle	2/1/06	0%	2/1/06
370	Electrically Mate SIU	2/1/06	0%	2/1/06
371	Power Rack check voltages & current after SIU mate	2/1/06	0%	2/1/06
372	Run LICOS scripts (gasuPduSelect, LAT001, LAT011, LAT041)	2/2/06	0%	2/7/06
373	Run LICOS muons	2/8/06	0%	2/8/06
374	Install final HIB (spare)	2/2/06	0%	2/2/06
375	NCR 811 LAT-DS-2094 R&R (1553 cables)	2/8/06	0%	2/8/06
376	LAT Optical Survey	2/2/06	0%	2/3/06
377	Machine Thermal Shunts	2/3/06	0%	2/3/06
378	LAT power Impedance check	2/3/06	0%	2/6/06
379	Power Rack Cable routing & Safe to mate	1/23/06	80%	2/1/06
380	Control Rack Cable Routing	1/23/06	80%	2/1/06
381	Heater Control Box (HCB) Integrations	2/2/06	0%	2/2/06
382	Install Temp Sensor Brackets	1/23/06	100%	1/23/06
383	Install ACD cable J26 and safe-2-mate	2/3/06	0%	2/3/06
384	Replace Cable DS2110 (ACD J25)	2/3/06	0%	2/3/06
385	NCR 808 - Backshell torque (12? Cables)	1/25/06	80%	2/3/06
386	Check Grid heaters, thermal sensors	2/3/06	0%	2/6/06
387	Install EPU's	2/6/06	0%	2/7/06

4.1.9 - Integration and Test

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I&T Detail Schedule (2 of 2)

ID	Task Name	Start	% Complete	Finish
388	**FSW/LICOS Installation**	**12/14/05**	**3%**	**2/23/06**
389	**Phase 1 - Software Checkout**	**12/14/05**	**33%**	**2/2/06**
396	FSW Install and Checkout	2/1/06	0%	2/1/06
397	LICOS Installation	2/1/06	0%	2/6/06
398	**Phase 1a System Test Plan (LAT w/SIUs)**	**2/7/06**	**0%**	**2/23/06**
399	**Sub-Series SIU-P Integration**	**2/7/06**	**0%**	**2/14/06**
400	PduGasuSelect - Primary Power-On	2/7/06	0%	2/8/06
401	15 minute data collection (e2e B-2)	2/8/06	0%	2/8/06
402	PduGasuSelect - Primary Power-Off	2/8/06	0%	2/8/06
403	PduGasuSelect - Redundant Power-On	2/9/06	0%	2/9/06
404	15 minute data collection (e2e B-2)	2/9/06	0%	2/9/06
405	PduGasuSelect - Redundant Power-Off	2/9/06	0%	2/9/06
406	LAT001 - Primary Power-On (LICOS)	2/9/06	0%	2/10/06
407	LAT041 - Baseline Configuration (LICOS)	2/10/06	0%	2/13/06
408	LAT011 - Primary Power-Off (LICOS)	2/13/06	0%	2/14/06
409	**Sub Series SIU-R Integration**	**2/14/06**	**0%**	**2/17/06**
410	SIU-R safe-to-mate, mate to EGSE	2/14/06	0%	2/15/06
411	NCR783 Work	2/15/06	0%	2/15/06
412	PduGasuSelect - Primary Power-On	2/16/06	0%	2/16/06
413	15 minute data collection (e2e B-2)	2/16/06	0%	2/16/06
414	PduGasuSelect - Primary Power-Off	2/16/06	0%	2/16/06
415	LAT004 - Primary Power-On (LICOS)	2/16/06	0%	2/16/06
416	LAT044 - Baseline Configuration (LICOS)	2/16/06	0%	2/17/06
417	LAT014 - Primary Power-Off (LICOS)	2/17/06	0%	2/17/06
418	**Sub Series LAT CPT Scripts**	**2/17/06**	**0%**	**2/23/06**
419	PduGasuSelect - Primary Power-On	2/17/06	0%	2/17/06
420	LAT301 (LICOS compat. ACD CPT - primary)	2/20/06	0%	2/20/06
421	LAT511 (LICOS compat. TKR LPT - primary)	2/21/06	0%	2/21/06
422	LAT071 (LICOS compat. calibration scans)	2/22/06	0%	2/22/06
423	PduGasuSelect - Primary Power-Off	2/23/06	0%	2/23/06
424	**Phase 2 - LAT Level System Test (Run for the Record)**	**2/24/06**	**0%**	**3/14/06**
425	**Flight Release**	**2/24/06**	**0%**	**2/24/06**
430	LAT System Test (LICOS LAT CPT, SVAC, E2E Verification with SIIS)	2/24/06	0%	3/14/06
431	**X-LAT Plate installation**	**3/14/06**	**0%**	**3/15/06**
434	Pack & Ship to NRL	3/15/06	0%	3/20/06

LICOS Status

| Function	Status
TeleCommanding	☑
Telemetry handling	☑
Science Data handling	**Progressing: Needs FSW B0-6-2**
Monitoring	☑
Trending	☑
Archiving	☑
Script running	☑
Configuration tracking (MOOT/FMX)	**Awaiting FMX V2 from FSW**
Activity tracking (e-logbook)	☑
V&V	**Started 1/26**

Design overview
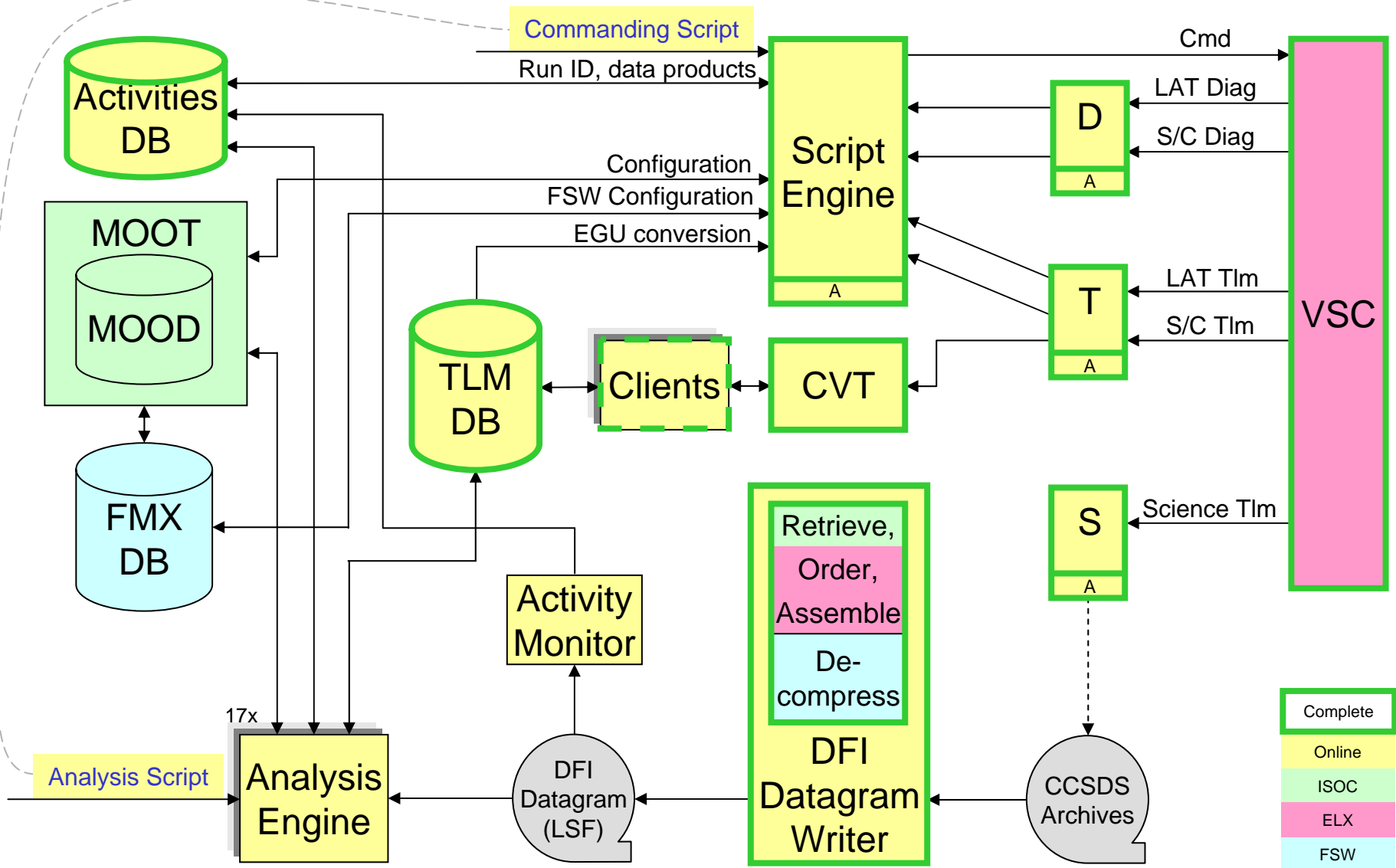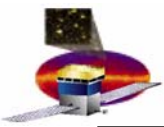
Progress since December 14

- **Script development**
  - **pduGasuSelect (front/back door switch) – Ready for V&V 1/30**
  - **Power On (LAT00x) – V&Ved: some rework necessary; reV&V 1/30**
  - **Power Off (LAT01x) – V&Ved; ready for Bldg 33**
  - **Reinitialization (LAT02x) – In development**
  - **Safe mode (LAT08x) – Ready for V&V 1/31**
  - **Baseline Science Ops (LAT06x) – Portions used in SIU/EPU burn; V&V 1/31**
  - **LPA script – In development**
  - **LCI scripts – In development with collaboration from FSW**
- **Activities DB work**
  - **E-Logbook GUI update to accommodate new features in progress**
- **Mobile Computing Rack (MCR)**
  - **CM procedures**
  - **V&V today – Ready for use 1/30**
  - **Modules security certification at NRL complete. Modules returned.**
- **Telemetry table GUI with limit violation information**
- **Alarm handler**
- **UTC clock**
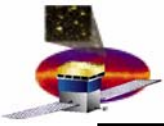
Critical Development Areas

- **LAT Science Data handling, especially LCI data**
- **Configuration handling in lieu of MOOT**
- **Script development**
- **V&Vs:**
  - **LICOS**
  - **LICOS scripts**
 - **LICOS configurations**
  - **Mobile rack**

LICOS Test Scripts

- **Based on LAT Perf. & Ops Test Plan (LAT-MD-02730)**

Script	Status
Power On	V&V led to some rework
Power Off	Done
Reinitialization	In progress
EPS Performance	
Baseline Science Ops	Ready for V&V
Register Test	
SIU/EPU Hw Funct	
Energy Measurement Calibration	
Safe Modes	Ready for V&V
Science Modes	
LAT/SC I/F Functional	
Thermal Control	
Survival Heater Test	
Conducted & Radiated Emissions	
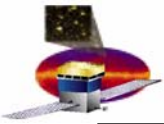
LICOS Test Scripts (2)

Script	Status
Conducted & Radiated Susceptibility	
Science Performance Diagnostics	
Timing Measure & Adjust	
Science Ops Demo	**Derived from LATTE version**
GRB Handling	
ACD CPT	**Derived from LATTE version**
ACD LPT	**Derived from LATTE version**
CAL CPT	**Derived from LATTE version**
CAL LPT	**Derived from LATTE version**
TKR CPT	**Derived from LATTE version**
TKR LPT	**Derived from LATTE version**
Light Tight Test	
T&DF False Triggers	
T&DF Data Transport Errors	
SVAC – E2E Tests	**Derived from LATTE version**
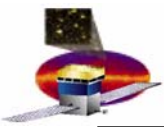
Mobile Computing Rack (MCR)

- **Shifting test operations focus to Mobile Rack usage**

- **Volatile elements (e-log and trending DB) moved from ODS to MCR**

- **V&V in progress**

- **Online to provide procedure and training to run LICOS & LATTE on MCR**

- **Discussions with FSW led to the purchase of additional storage**
  - **2 x 1.2 TBytes (2nd unit is a spare); Should arrive next week**
  - **Units include similar processing power as existing boxes**

- **Spare firewall, switch, bastion host and LICOS server were sent to NRL for evaluation and network test**
  - **Tests highlighted some issues that have been resolved**
  - **Units have been returned**
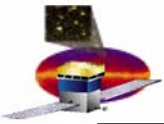
Issues and Concerns

- **Schedule**
  - **Planning extended shifts and 24/7 coverage.**
  - **Rapid turnaround on NCR disposition and resolution. Delivery of new cables**
- **LCI**
  - **Continue to support FSW debugging**
  - **Online script continuing in parallel**
- **Availability of MOOT/MOOD**
- **V&V plan**
  - **Regression testing designed in**
  - **Integrated robust exception handling**
- **Some retesting required to establish calibration baseline and verify online analysis methodology**
  - **Source of initial configuration used with LICOS/FSW running**