GLAST Large Area Telescope:

LAT Status and Observatory Integration

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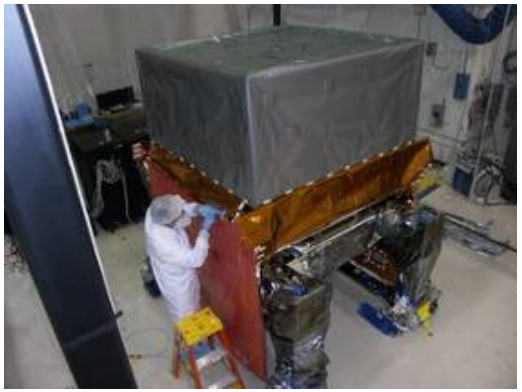
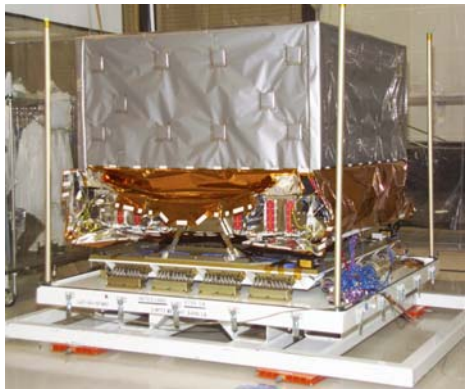
LAT Status



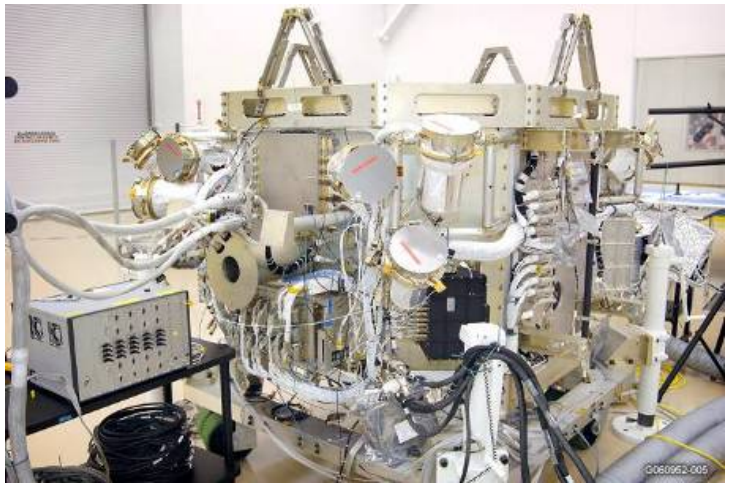
LAT w/ Radiators (pink) on test stand



LAT ready to ship

LAT in transport container

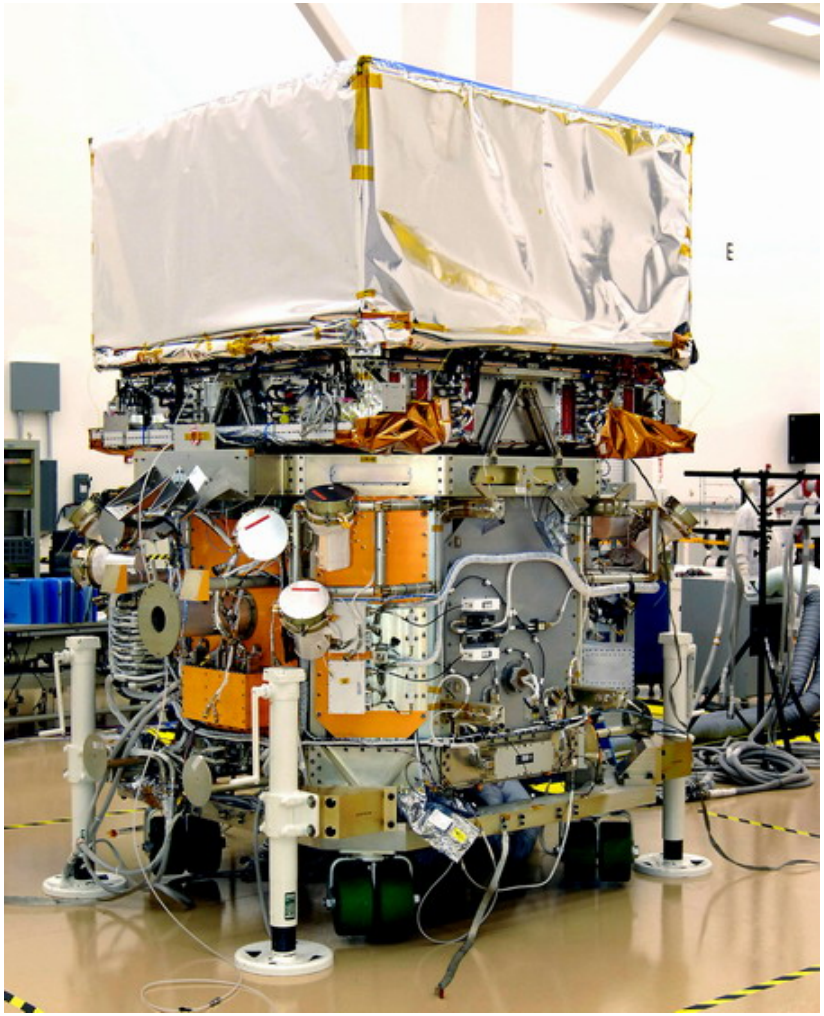
- LAT successfully completed environmental testing at NRL on Sept 14th, 2006
  - PreShip Review with NASA, Sept 15th
- Left NRL on Sept 16th, 2006 for General Dynamics in Phoenix, AZ by dedicated truck
  - Arrived Sept 18th
  - Post ship CPT completed, Sept 22nd
  - New Flight Software Load, Sept 28th
- Official delivery of LAT to NASA – Oct 6th



GLAST S/C bus waiting for LAT installation at General Dynamics. GBM installation in progress.

LAT Status (2)

- Mechanical Integration on the observatory completed Dec 8th
- Electrical integration and safe to mate completed Dec 18th
- Functional testing of LAT via the Observatory command and telemetry systems completed Jan 13th, 2007.
  - Performance of LAT installed on the observatory is essentially the same as delivery.
  - Test time for LAT on the bus is limited by other activities. A complete characterization of LAT has not been possible yet.



LAT Requirements Verification

- LAT has 459 requirements to verify
  - detector performance, system performance, interface characteristics, environmental operability, etc
  - 340 requirements have been verified and reports submitted to NASA (317 have been approved)
  - 51 additional requirements satisfied with release of TVAC test report (expect compliance)
  - 56 requirements are deferred until load of final LAT flight software
  - 2 requirement issues are being worked.
- LAT meets or exceeds all of its requirements related to instrument performance and science objectives

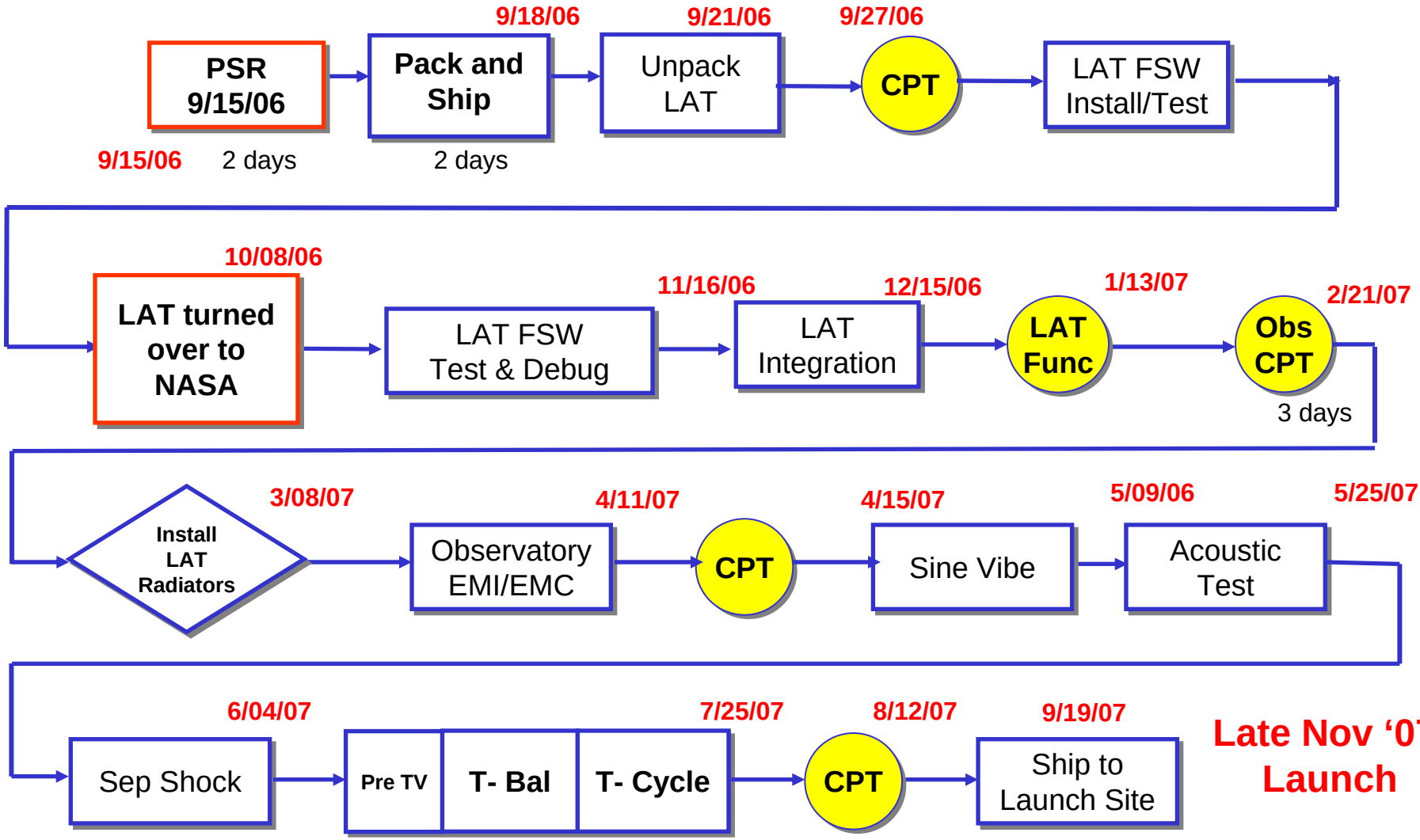
LAT Issues - Reboots

- Unexpected reboots of LAT SIU and EPU computers
  - Have seen >20 reboots of processors over the last 10 months. These are generally watchdog timer or cpu or bus controller exceptions.
  - Investigations in flight software (FSW)
    - Trace context changes to trap software bugs or unanticipated interferences.
    - Address errata relating to RAD750 functionality by modifying FSW.
- Ability to modify, release and load new FSW to LAT has slowed progress.
- Limited test time has been frustrating.

LAT Issues – Completion of Flight Software

- LAT flight software (FSW) was not complete when we turned LAT over to NASA
  - Known bugs that needed fixes
  - Reboot at an average of ~200 hrs of operation
  - Compression of science data not included
  - Gamma Ray Burst detection in LAT event stream not included.
- Priorities were set
  - 1) Reboots; 2) Compression; 3) GRB detection algorithm
  - Many code changes have been made to diagnose reboots but they are just now getting loaded to LAT.
  - Compression is essentially complete but not loaded on LAT.
  - GRB algorithm is in danger of not being available for the last pre-launch FSW load.
    - This is deemed acceptable by the project office and science team.
    - Work arounds:
      - Load full algorithm with limited testing prior to TVAC
      - Load improved FSW with full GRB algorithm after post launch checkout

LAT Future – General Dynamics and beyond



Summary

- The LAT has been completely assembled and thoroughly tested in its environmental extremes.
  - LAT meets its performance goals in all environments
  - No significant anomalies detected to date
  - Trending shows same instrument throughout assembly and test program.
- LAT has been successfully integrated to the GLAST Observatory bus
  - No interface issues detected.
  - LAT performance on the Observatory to date is essentially the same as prior to shipment.
- The LAT Flight Software completion continues to be challenging and a considerable sink for resources.
  - LAT can continue Observatory testing with existing software.

Next Steps

2007 – Support observatory testing at General Dynamics and establish instrument ground systems including the operations center at SLAC. LAUNCH – Nov '07

2008 – Begin science with an all sky survey

2009 – 2017 – Continue discovery-based science