GLAST Large Area Telescope:
Integration and Test
One and Two Tower
Integration Readiness Review
EGSE/Online

Elliott Bloom
I&T Manager
EGSE Process; Design to Use

Integration and Test (I&T) Subsystem
Electrical Ground Support Equipment (EGSE) Plan
LAT-MD-01533
Just released for review.
Online Roadmap

• LAT-TD-03075 Document written and agreed to February 2004
• Describes work to be done to prepare for flight part arrival

• All this work is essentially done, including V&V. This will be described latter in the talk.
6.9 – Building 33 EGSE room 102 set-up
**Flight Software Test Bed**

**Used in V&V Procedures for EGSE/Online**

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- **Global-Trigger/ACD-EM/Signal-Distribution Unit***
  - **Spacecraft Interface Unit**
    - Spacecraft Interface Board (SIB): Spacecraft interface, control & data
    - LAT control CPU
    - LAT Communication Board (LCB): LAT command and data interface
  - **3 Event-Processor Units (2+1 spare)**
    - Event processing CPU
    - LAT Communication Board
  - **Power-Distribution Unit (PDU)**
    - Spacecraft interface, power
    - LAT power distribution
    - LAT health monitoring

- **12 ACD Electronics Cards**

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**LAT EGSE**

I&T Two Tower IRR 5
LATTE for 1&2 Tower I&T Almost Complete

- Outstanding items:
  - Hardware monitoring (includes trending)
  - Power-up sequence
    - Depends of FSW deliverables (ECD 11/19)
    - In progress (ECD 12/3)
  - Simple event filtering
    - In progress (ECD 11/18)
  -Subsystem scripts
    - Awaiting deliveries
      - A month is no longer needed given all scripts are expected to be delivered in LATTE 4.x form.
      - Couple of days is sufficient for check-out and I&T Configuration Control.
    - Working with development versions
  - System scripts (SVAC & PT/E2E)
    - In progress (ECD 12/15)
  - Security completion
  - Pipeline
  - Training
    - In progress with development test scripts
    - Final scripts available soon after final subsystem deliveries of scripts
  - V&V (following pages)
    - Matrix of verification criteria

- Online has been and shall continue practicing I&T testing from end to end with SVAC and IFCT involvement to ensure there is no missing critical functionality
Online logbook Status

• The Shift Log, Mate/Demate and Component Installation Record are already installed in the clean room for practice.
• the Material Mix Record and EGSE Log will be installed in the clean room by 1/3/05.
• The material mix record will be finished in the next two weeks,
• the EGSE log will be designed and implemented right afterwards.
• The Configuration Log and Software Installation Log should follow on in that order.
## Component Installation Log Specification

### Component Installation Log

<table>
<thead>
<tr>
<th>Unit Description</th>
<th>&lt;text&gt;</th>
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</thead>
<tbody>
<tr>
<td>Component R/D</td>
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<table>
<thead>
<tr>
<th>Operator ID/Password</th>
<th>Operator Date Time</th>
<th>QA ID/Password</th>
<th>QA Date Time</th>
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<td>Date Time: (MM/DD/YY HH:MM:SS)</td>
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<td>Serial Number</td>
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<table>
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### Torque

<table>
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<tr>
<td>Apply Torque:</td>
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<tr>
<td>Torque Stripe MMR# (autogenerated from Material Mix Record):</td>
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<tr>
<td>Witness Stripe</td>
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### Grounding

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<tr>
<td>Measured Resistance:</td>
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<tr>
<td>Label Tape Witness:</td>
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<tr>
<td>Label Tape Expiration:</td>
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</table>

Complete Online logbook Specification
LAT-MD-LAT-MD-04601
In Signoff.
V&V matrix (1)

- LATTE 4.6.0 baseline ready for use.
  - Baseline acceptance review will be a LAT Engineering meeting.
    - Present completion of V&V testing of feature functionality on all platforms, EM, Test Bed, and finally subsystem Flight Hardware.
- Software versioning verification robustness
  - Done
- Housekeeping / environmental quantity monitoring
  - Done
- Power sequencing
  - ECD 12/4 (Test Bed & EM)
- Schema/Configuration reader - Ancillary data handling (e.g., serial numbers)
  - Done (EM, Test Bed, & Flight Hardware at subsystem level)
- Script and Suite execution engine (Run Control) robustness
  - Test robustness against exceptions in each of the various threads
  - Done (EM, Test Bed, & Flight Hardware at subsystem level)
- Persistent file export/archive system only applicable to Bldg 33.
  - Done (EM)
- Raw science data file conversion to FITS
  - Done (EM)
- Online Pipeline processing
  - Done (EM)
- Trending
  - Online data base – MySQL – Done (EM)
  - DB synchronization offline (ISOC & SVAC use) – ORACLE – ECD 12/23
V&V matrix (2)

• Commanding
  – Test every command
    • Done (EM, Test Bed, & Flight Hardware at subsystem level)
  – Performance
    • Done (EM & Test Bed)
• Event stream
  – Science data format (LDF)
    • Done (EM, Test Bed, & Flight Hardware at subsystem level)
  – ACD software counters
    • Done (EM, Test Bed, & Flight Hardware at subsystem level)
  – Prescaling and filtering
    • Done (EM, Test Bed, & Flight Hardware at subsystem level)
  – Performance
    • Done (EM, Test Bed, & Flight Hardware at subsystem level)
  – Playback ability
    • Done (EM, Test Bed, & Flight Hardware at subsystem level)
• Triggering
  – Functionality
    • Done (EM, Test Bed, & Flight Hardware at subsystem level)
V&V matrix (3)

- HippoDraw visualization tool
  - Practically Done (EM, Test Bed, & Flight Hardware at subsystem level)
  - New releases sometimes show new bugs.
- Run and Test Report generators
  - Done (EM, Test Bed, & Flight Hardware at subsystem level)
- Test script completion status setting
  - In progress (ECD 12/1)
- Run comments handling
  - In progress (ECD 12/1)
- E-logbook
  - Online DB synchronization to mirror MySQL data base (ECD after integration starts)
  - Online Standalone GUI
    - In Progress (ECD 1/15/05)
  - SVAC Web GUI
    - Done (EM)
- Subsystem scripts (ELX, CAL, TKR, ACD, E2E, SVAC, system) – Not delivered yet. ECD - CAL Scripts 12/10; ECD-TKR 1/5/05; ECD-ELX ?; ECD-E2E, SVAC, System 12/23
  - Algorithm
  - Robustness
  - Performance
  - Output products
Summary

- EGSE hardware/Online has been extensively used and is currently being used in Flight hardware build for all subsystem.
  - Acceptance testing by electronics on I&T test stands yet to be done.
  - LATTE 4.6.0 is baseline
  - Online logs on schedule for Flight Integration
- Online software V&V is essentially complete and release under configuration control is in place.
- CCB is operational for Online software

[http://jira.slac.stanford.edu]