



Gamma-ray Large Area Space Telescope



# GLAST Large Area Telescope: I&T Integration Readiness Review

Online Peer Review July 21, 2004

# Roadmap

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#### Roadmap

- LAT-TD-03075 Document written and agreed to February 2004
- Describes work to be done to prepare for flight part arrival in July 2004
- Status of required elements follows
- § 7 Bonus items are not addressed
- § 8 Subsystem support is never ending





- ✓ 6.1.1 Trigger API
- ✓ 6.1.2 ACD script migration
- ✓ 6.1.3 EBF (now called LDF) package update
- New request
  - ✓ ACD software counters



6.2 – Hardware monitoring system

- Development started by ELX for Test-bed needs
- FSW is developing a housekeeping telemetry server
- HskSvr usage will fit seamlessly into ELX monitor
- Online is adding

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- Alarming
- Alerting
- Archiving
- Trending

# Expected April, 2004

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#### 6.3 – Power-up sequence

- Initial development by ELX for Test-bed needs
  - Manipulates PDU registers directly via LATTE script
- FSW method being developed

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- Part of LAT "plumbing"
  - Provide desired schema
  - Issue "Go" command
  - Handle completion status

# > Expected April, 2004



#### **6.4 – Event prescaling in VxWorks**

- Needed to manage nominal or higher trigger rate testing
- ✓ Completed

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However, new request:

- Simple event data filtering
  - Requires FSW support
  - > Delivery 15 August, 2004



#### 6.5 – Subsystem scripts

- Official deliveries needed prior to V&V phase
- None yet received
- Development snapshots stored in CVS
- Online gaining experience with these snapshots
- E2E scripts in progress (Lester, trigger group)

### Expected May, 2004



- 6.6 Security against unauthorized software changes
- In the I&T testing phase (not commissioning phase), protection is needed against on-the-fly editing of code and configurations as the changes can't reliably be tracked
  - ✓ Run reports indicate mismatches with released files
  - ✓ Kiosk mode

✓ Read-only source files



6.7 – Security against operator complacency

- ✓ Permission scheme set up
  - ✓ Operator authentication
  - Certain features are enabled or disabled according to operator permission level
  - Normally disabled for backward compatibility (e.g. during commissioning)
  - $\checkmark$  Core system modified to use it
  - Test scripts must use it for it to be effective
- Operators must sign off on input parameters

- Test scripts must use it for it to be effective



#### 6.8 – Operator training

Requires completed system

- Then train Brian Horwitz and John Canfield from IFCT
- They, in turn, train test conductors



#### 6.9 – Building 33 EGSE room 102 set-up (1)

Taken over by IFCT

- $\checkmark\,$  Two PCs set up with four screens
- Online needs to practice *in situ*

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# 6.9 – Building 33 EGSE room 102 set-up (2)





- ✓ Plan completed
  - Transfer scripts via CVS tag
- **New request:** ۲
  - Transfer scripts by DVD



- ✓ Web based version completed (Oracle)
- ✓ Stand-alone version completed (MySQL)
- DB synchronization program still needed
- New requests
  - ✓ Mate/Demate GUI changes
  - Component installation log



#### 6.12 – OPUS and the paper trail

OPUS has been replaced with new pipeline software called GINO (for GINO Is Not OPUS)

- GINO is hot off the keyboard ( alpha test )
- SAS has demonstrated it to Online and SVAC
- Online will implement its side after the peer review
- Expected April, 2004
- ✓ Fallback solution has been implemented



#### 6.13 – Validation & verification (1)

- Subsystem test-stands
  - Many instances (~40)
  - Many hours of operation
  - Many people involved, each with a different approach
- EM-1 and EM-2 tests with mini-tower
  - More complete with hand-off of persistent data to SVAC
  - But, less seat time and consequently less practiced
- Full tower testing (no detectors)
- Test-bed testing
  - Just getting started
  - Hardware not yet fully functional
- Standalone mode testing
  - Useful for developing code not requiring hardware interaction

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# **Flight Software Test Bed**



**R. Claus** 

6.13 – Validation & verification (2)

- Limited unit testing of core functions
- Will exercise system in not often explored corners of phase space
  - Bad data

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- High data rate
- Large data sizes
- Will induce errors in major blocks to verify graceful behaviour
  - Induced exceptions
- Will generate a matrix of features with checked-off test criteria

# Confidence will improve with more testing

> However, we need to define an end point



6.14 – Documentation

- ✓ Doxygen API documentation generated with each release
- User's and Developer's Guides in progress (S. Becker)



#### Almost there...

• Outstanding items:

- Hardware monitoring (includes trending)
- Power-up sequence
- Simple event filtering
- Subsystem and system scripts
- Security completion
- Pipeline
- Training
- V&V
- Online plans to practice I&T testing from end to end with SVAC and IFCT involvement to ensure there is no missing critical functionality