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# **Engineering Model I&T**

**Eduardo do Couto e Silva**

*(for E. Bloom on behalf of the I&T group)*

**Engineering meeting – October 15, 2002**



# EM Deliverables to I&T

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- **ACD** – none
- **TKR** - one full size mechanical module and a four-tray module fully instrumented (1 with W, 2 No-W and 1 bottom tray) with cables and electronic readout (mini-tower), TKR lift fixture, preliminary functional test scripts
- **CAL** – fully instrumented module, preliminary functional test scripts
- **ELX/I&T** - EGSE – EM1 version
- **ME/I&T** - 1 x 4 support grid
- **SAS/I&T** - GLEAM Monte Carlo, calibration algorithms



# EM Risk Mitigation

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**The EM is the only hardware I&T will have prior to the Calibration Unit (Apr 2004)**

1. First time we verify an integrated system whose design is closer to the final one.
2. Test MGSE alignment/handling/assembly tools and procedures of integrated LAT system
3. Test EGSE hardware/procedures/scripts for functional tests of integrated LAT system. Verify events are synchronized.
4. Validation of van der Graaf test hardware to use and establish the LAT low energy (17.6 MeV) photon performance
5. Prototype energy reconstruction algorithm for validation of LAT science requirement for low energy (17.6 MeV) photons
6. Prototype calibration infrastructure of integrated LAT system
7. If the airplane test is approved we want to investigate the feasibility of doing an EM “on” vibration test to see if there are any microphonics



## EM Delivery Schedule from Subsystems to I&T

<b>Subsystem/Hardware</b>	<b>Delivery to I&amp;T (baseline dates)</b>	<b>Delivery back to subsystem</b>
ME – EM/CU Grid	December 2, 2002	Not required
TKR – EM Mechanical Model	December 9, 2002	Not required
TKR – EM live mini-tower	February , 2003 (not in baseline)	Not required
ELX – EGSE Hardware	February 2003	Not required
CAL – EM Calorimeter	April 25, 2003	June 6, 2003

**I-CDR is a week after final hardware delivery !**

**I&T would like to keep EM as long as possible**



# EM Planned Tests

Test	Purpose	Dates	Observers/Users
CAL alignment	Test MGSE Prototype	October 2002	I&T CAL
TKR alignment	Test MGSE Prototype	December 2002	I&T TKR
TKR Readout	Test TKR-TEM integration EGSE Test Code Validation	February 2003	I&T TKR
CAL Integration	Test CAL-TEM integration EGSE Test Code Validation	March 2003	I&T CAL
EGSE Integration	Test Integrated System	March 2003	I&T ELX
TKR-CAL Integration	Test system integration EGSE Test Code Validation	March 2003	I&T System Engineering
Calibration and Data Analysis	Muon Calibration/Survey van der Graaf calibration test	April 2003	I&T SAS



# EM GSE Schedule

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<b>GSE Item</b>	<b>Purpose</b>	<b>Date Available</b>
Cal alignment tool	Cal alignment test	October 2002
Cal external features model	Cal alignment test	October 2002
Grid Bay model	Cal alignment test	October 2002
Cal Lift/Alignment Sling	Cal alignment test	October 2002
EM Grid Rotation Stand	EM Assembly Support Fixture	December 2002
Tracker Lift Fixture (fromTKR)	Tracker alignment test	December 2002 (TBR)
EM1 Electronics (from ELX)	Readout of EM data	February 2003 (TBR)
van der Graaf	Produce low energy photons	January 2003
scintillators	Veto charged particles	January 2003
Cal Lift Sling	Lift Cal out of shipping container	March 2003
Cal Rotator	Rotate Cal upside-down	March 2003



# EM Software Schedule

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<b>Software Item</b>	<b>Purpose</b>	<b>Date Needed (final version)</b>
EGSE scripts	Acceptance/functional tests	February 2003
GLEAM Monte Carlo	Study low energy photons	January 2003
Calibration algorithms	Calibration of TKR and CAL	February 2003
Database	Store calibration information	February 2003
Data taking software	Run control and monitoring	March 2003



# Summary

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- I&T will have a better I-CDR with a successful EM system integration. The EM is the only integrated system available to I&T prior to the Calibration Unit delivery (Apr 04).
- The EM schedule is driven by the TKR+CAL hardware delivery to I&T
- The current schedule is very aggressive since I&T EM activities and I-CDR preparation will occur in parallel.