Integration & Calibration Subcommittee Meeting

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For this meeting, let's NOT discuss…

- Beam tests for the LAT Flight Unit
- Polarization
- Special calibration for GRB and AGN localization and timing
- Calibration files and instrument response functions

What's the spirit of the Beam tests ?

- Prove to the project that we meet the science requirements (stick to the minimum)
- Check that the hardware is working (DAQ included) for different triggering modes
- Validate MC - Prove to ourselves that we meet the science requirements (should not overtest)

In orbit we want to measure flux

$$\# \gamma = Aeff \times Flux$$

we must know very well Quality cuts and Background rejection cuts

Beam Test we must know very well the flux and the number of photns

$$\# \gamma = Aeff \times Flux$$

Multiple photons
Beam dispersion
Energy resolution

we must evaluate Quality cuts and Background rejection cuts

How well do we need to know ?

Parameter	Knowledge	Comments
Effective Area (>100 MeV)	? %	
Effective Area (<100 MeV)	? %	Changes rapidly
Photon Energy (>100 MeV)	10 %	
Photon Energy (< 100 MeV)	5 %	Need good tagger
PSF 68%	10 %	
PSF 95%	20 %	Need high stats
Angle of incidence	? %	
Beam Flux	? %	
Deadtime	? %	Need good duty cycle

BEAM TYPE (photons)	PRO	CON
Backscattered laser (EGRET)	•E dispersion = 20% at 20 MeV, 10% up to 3 GeV	•Low intensity •Intensity fluctuations (used a NaI to monitor) •Multiple photons •No tagger
"usual" GLAST with radiators of different thickness (incoherent brehmstrahlung)	•Simple to implement	• Need to believe correction method for multiple photons • Need fine tuning to get 20 MeV • Need tagger
Coherent brehmsstralung	•Monochromatic •Less run time needed	• May need tagger • Some multiple photons from Low energy • Maybe available only in 2003 •Can we get 20 MeV ?

Beam Tests Location

- If outside SLAC, need to evaluate costs and risks
- Even at SLAC we need controlled environmental conditions for test beam
- Need to define protocols for transfer of equipement

Energy vs Angle (photons)

A = effective area
PA = peak effective area
PSF = point spread function
E = energy resolution
FOV = Field of View

Do we need a 5th angle for FOV ?

Can we get a 5% tagged beam ?

	0 deg	30 deg	55 deg	80 Deg
20 MeV	A,PSF,E		PSF	
100 MeV	A,PSF,E		PSF	
1 GeV	PA,PSF,E, FOV	FOV	FOV,PSF	FOV
10 GeV	PA,PSF,E		PSF	
300 GeV	A,PSF,E		PSF	

Energy vs Angle EGRET (photons)

Energy	Θ (inclination)	Φ (azimuth)
15 MeV	0 deg	0
20 MeV	10 deg	22.5 deg
35 MeV	20 deg	45 deg
60 MeV	30 deg	
100 MeV	40 deg	
200 MeV		
500 MeV		
1 GeV		
3 GeV		
10 GeV		

- 30 to 200 K triggered photons/bin
- 2 months of Beam Test
- < 150 runs

Timing

- Test triggering modes as function of Energy
- How much time we dedicate to self triggering mode ?
- Shall we only verify that the GPS works or shall we interface with spacecraft to learn more about GPS calibration ?

Engineering Model

- EM – 3 Si trays, full CAL, 1 (?) ACD tile
- August 2002 because of CDR (M.N), May 2002 (T.K.)
- Can we learn something about the beam or about our requirements ?
- Shall we only plan cosmic rays ?

2 towers (Qual), May 2003 (M.N.)
4 towers, August 2003,
pushing for the CAL

Which configuration for the Calibration Unit ?

Tower alignment is now determined by mounting tolerances which are the order of 100 μm