Report from the GTOCC TeleCon on Thursday, September 7.

Good turnout at SLAC due to SW workshop: Arache Djannati-Atai, Toby Burnett, Eduardo do Couto e Silva, Seth Digel, Richard Dubois, Jose Hernando, Neil Johnson, Robert Johnson, Tune Kamae, Steve Ritz, Hartmut Sadrozinski
By phone: Ronaldo Bellazzini, Dave Thompson
Kibitz: Elliott Bloom

1) Discussion of layout choices (H. Sadrozinski)- Note distributed previously and on the web("Tracker_Optimization_9-7").

Effective area vs mass: The AO layout has about 1.5RL, and an effective area of about 12,000cm^2, the alternative EL layout has 1.1RL and an effective area of about 10,000cm^2 This is due to the attenuation of the beam. In the AO layout about 50% is in the back, while in EL, the front is slightly increased (3.5% vs 2.5% converters), while the back part is heavily cut. Note that in the SRD we claim a goal of 10,000 cm^2. Note: this is a simple spread sheet calculation normalized to the GLASTsim simulations done for the AO. As such, they "include" reconstruction efficiencies etc.

2) Calorimeter response (Neil Johnson)- Note distributed previously and on the web ("Neil_Johnson_Transparencies_9_07_00")

The effect of correcting the visible (CAL) energy by the TKR information, i.e. the conversion point and the number of hits, works well The results are that both at 50MeV and 100MeV, the corrections improve the TKR to respectable values, with EL better than the AO at normal incidence. Looking at conversions in the last one or two layers improves the energy resolution quite a bit. The quoted effective area numbers are overestimates because no TKR cuts are applied. At larger angles of incidence, the energy resolution both for the total ensemble of gamma's and those converting in the last layers deteriorates quickly, for both AO and EL. I believe this is due to the fact that the angular dependence of the corrections is yet not optimized. It was pointed out that the resolution changes somewhat when the zero suppression (value of low level discrimination threshold = LLD) and electronic noise are added. This is described in a note found in http://burst.nrl.navy.mil/~acrider/studies/Si. A worry was expressed that we should be careful what we promise in the SRD before we have all the parameters of the instrument defined.

3) Calorimeter response (Arache Djannati-Atai)- Note on the web ("Arrache_9_20")

The simulations were done with LLD = 2MeV and 0.4MeV noise. An iterative method was described to correct from the visible CAL energy to the true incident energy. The main point is that the energy corrections appear to be relatively independent of the incident energy, at least at normal incidence. The energy resolution below 100MeV is about constant. Conclusions by Arache:

Full simulations of the AO instrument have been made with an updated model of the CALORIMETER, including noise, active diodes and zero suppression effects. The application of the energy correction method to simulated data

Shows basically that the energy resolution is not an issue for the AO configuration : resolution varies from ~15% to ~30% depending on energy and zenith angle, from 30 MeV to 100 MeV, from 60 to 0 zenith angle. The Front+Back sections of the TKR together with the first layers of the CAL constitute a non homogeneous sampling calorimeter with a resolution of order 25% around few tens of MeV.

4) Tracker response (Hartmut Sadrozinski, for Jose Hernando)- Note distributed previously and on the web (see above)

AO and EL were compared at normal incidence as a function of energy. The effective area of both was corrected with the required factor 0.89. As expected, the EL layout gives about 10,000 cm^2, compared with about 12,000 cm^2 for the AO layout. The difference is mainly in the back. The 68% containment angles PSF68 for the front is a bit worse in EL (3.5deg vs 3.1 at 100MeV), while it is better for the back. Because the AO results were analysed plane by plane, a somewhat better result for EL will emerge in time. The total PSF68 (adding the two PSF68 in quadrature, weighted by the effective area's) is better for EL. The figure of merit FOM for background limited sources appear to be the same for both layouts.

A request was made to evaluate the field of view FoV, before the EL layout could be declared a viable alternative to the AO layout.

An issue for deciding what thickness of front converter to use is modeling a realistic mass distribution in the trays.

A request was made to derive a parametrization of the PSF and the reconstruction efficiency as a function of energy, angle and conversion point. This would help with an analytical figure of merit.

5) Discussion of request to reduce the maximum converter thickness:

T. Kamae brought up the advantages of reducing the converter thickness in the TKR back section: it would allow engineering of the trays to go forward, potentially leading to the same tray structure (except face sheets and core material) for both front and back trays.

R. Johnson said that the design is aimed at making the trays as similar as possible. He liked a mass savings in a reduced converter thickness in the back (0.4 RL is about 50kg), because the present tray design favors tungsten over lead as converter, which introduces a 7% mass penalty. He said that the tight engineering schedule requires us to make a final decision on the converter thickness in December 2000, which is consistent with the original charge to the GTOCC.

R. Bellazzini emphasized that INFN Pisa has taken on the engineering of the heavy trays, with obvious benefits on the budget side. He and his associates are working closely with R. Johnson such that there is no schedule risk in this take-over.

The question, if there is a potential 300kg mass penalty for the GLAST LAT due the re-entry requirements was, I believe, answered with: " No, not at all! (at this time..)".

David Thompson mentioned that he did not see any obvious science drivers for changing the converter thickness, but he did not like the very thick planes in the back section.

In conclusion, it was felt that no science driver or schedule pressure has been sufficiently identified to force us to make a recommendation now for a change in the layout or limit of the converter thickness. A straw poll of the committee showed a preference for changing to thinner layers in the back.

6) Action Items

TKR: evaluate FoV for different layouts/

TKR: evaluate sensitivity of front PSF68 to tray material (realistic face sheets and core)