

Cherenkov Counter Update

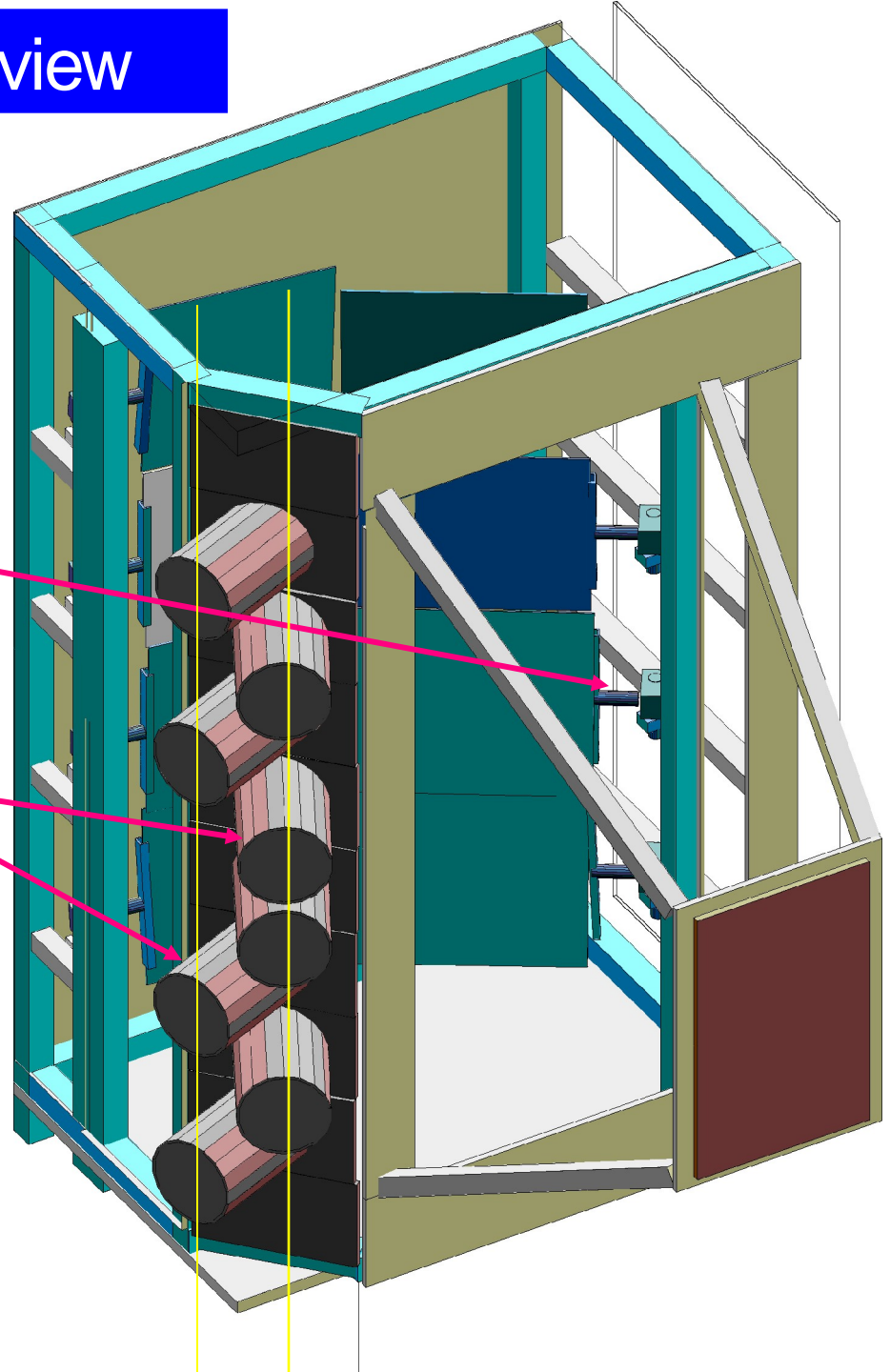
- Mechanical design
 - ✓ Design of the optics finalized
 - ✓ Design of the phototubes holders finalized and parts under fabrication (received)
 - ✓ Design of mirror mounts finalized and parts received
 - ✓ Design of the full tank structure being finalized (under construction)
 - Issues
 - Mirrors manufacturer
 - Glass mountain will not make the toroidal mirrors (Eagle glass will make them)
 - SESO is able to make all shapes
 - Cost of mirror fabrication (we have budgeted \$ 22,000)
 - 11,000 dollars for 4 spherical mirrors from Glass Mountain
 - 350,000Euros for 10 mirrors 4 spherical and 4 toroidal + 1 spare of each.
 - **Need to find a better option for mirrors manufacturing !**
- Contacted CERN people (they will do the Al coating)

Cherenkov Counter Overview

- 4 - spherical mirrors
- 4 - elliptical mirrors
- 8 - 3" quartz photonic phototubes

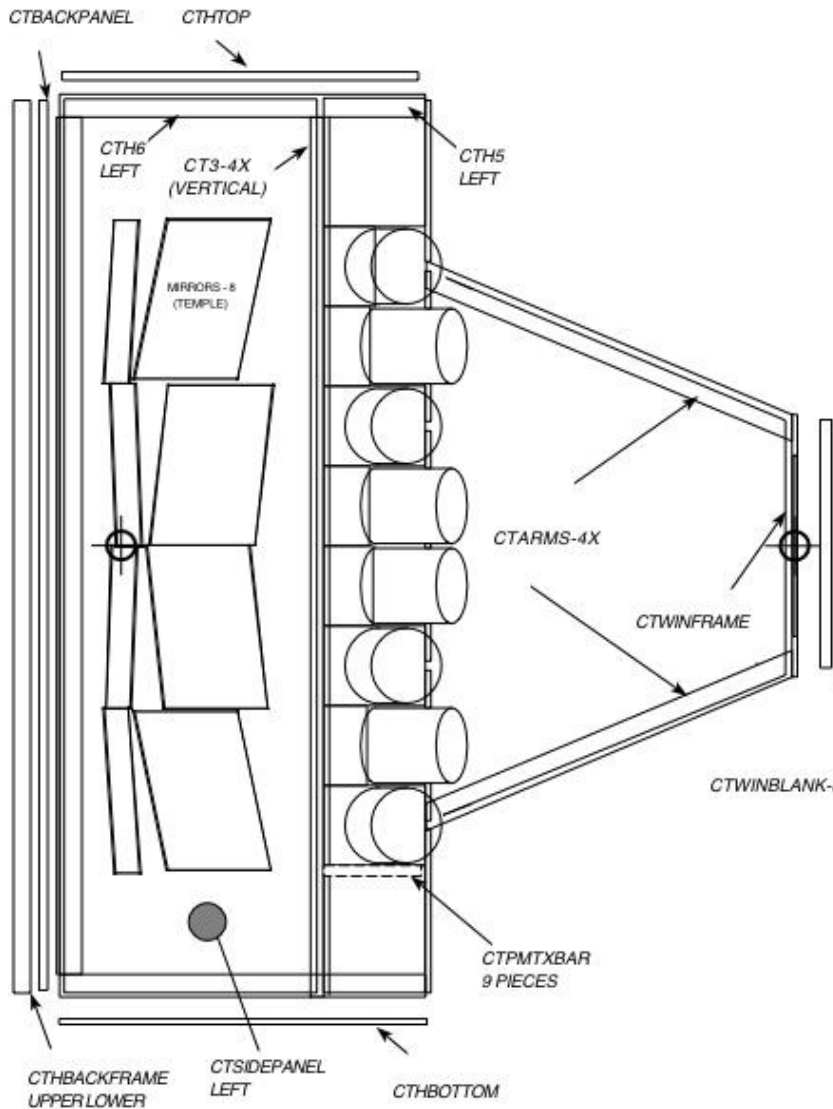
Mirrors held on one side and can rotate in the horizontal and vertical planes

Two orientations of tubes pointing to
Near mirror (spherical)
Far mirror (elliptical)

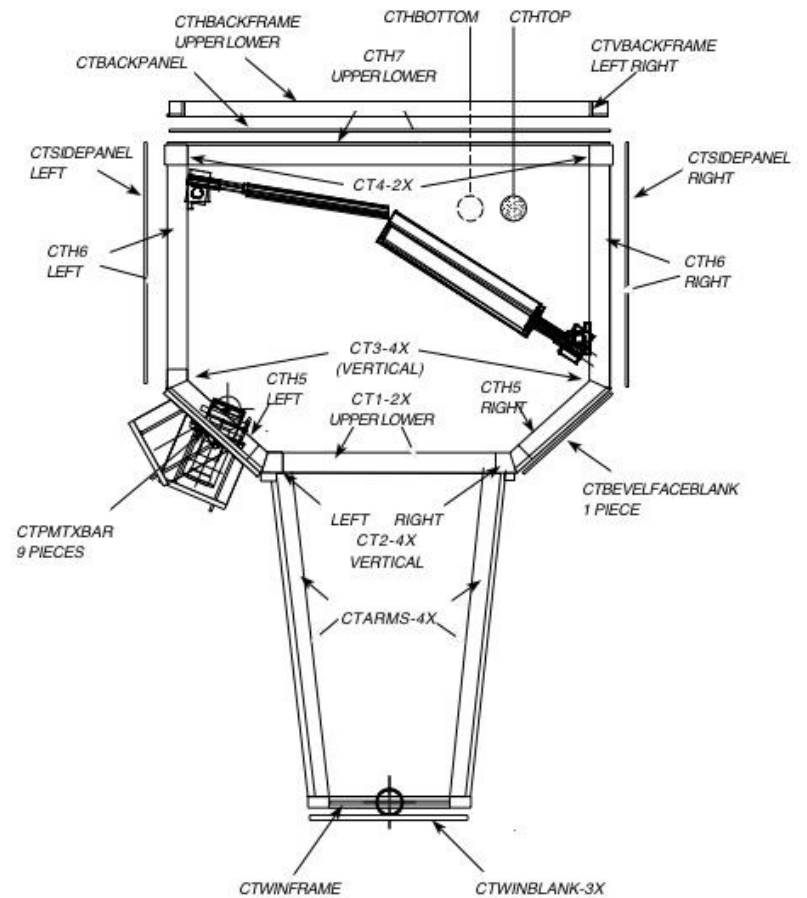


Under fabrication at Alpha Tool Inc, NJ

LEFT SIDE VIEW



TOP VIEW



Phototube holders



Phototube mount

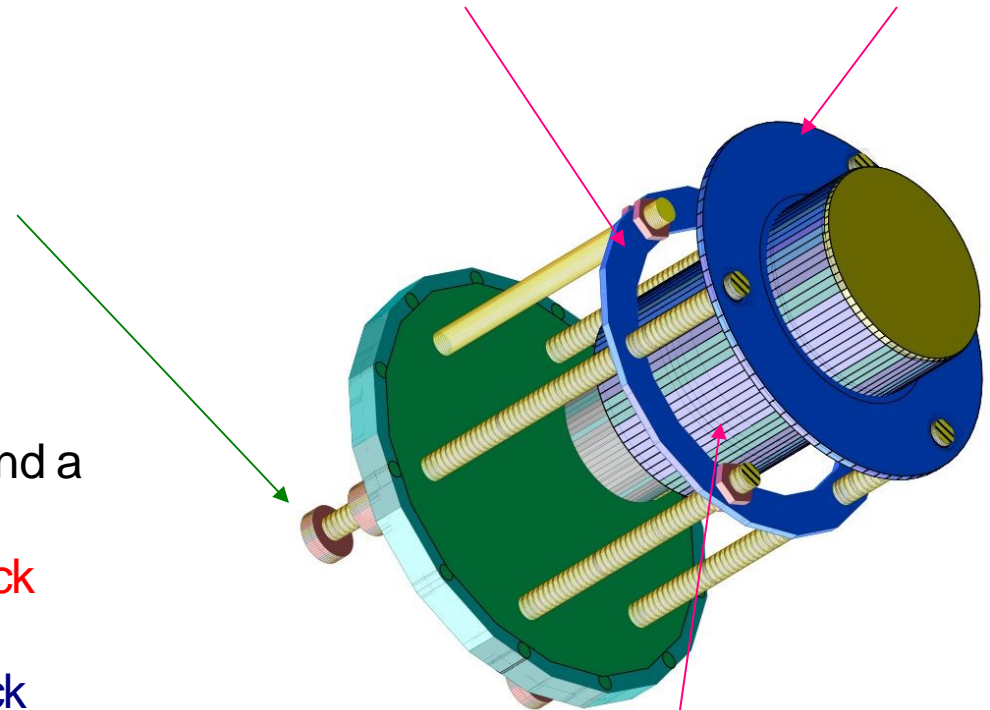
- The pointing of the face of the tube can be adjusted from outside

Magnetic Shielding

- Based on a 3" diameter cylinder and a maximum 300G DC field,
 - Amumetal (80% Nickel) 0.125" thick
 - Amunickel(49% Nickel) 0.062" thick provides 50:1 reduction at least

Tests done at Temple consistent with these predictions

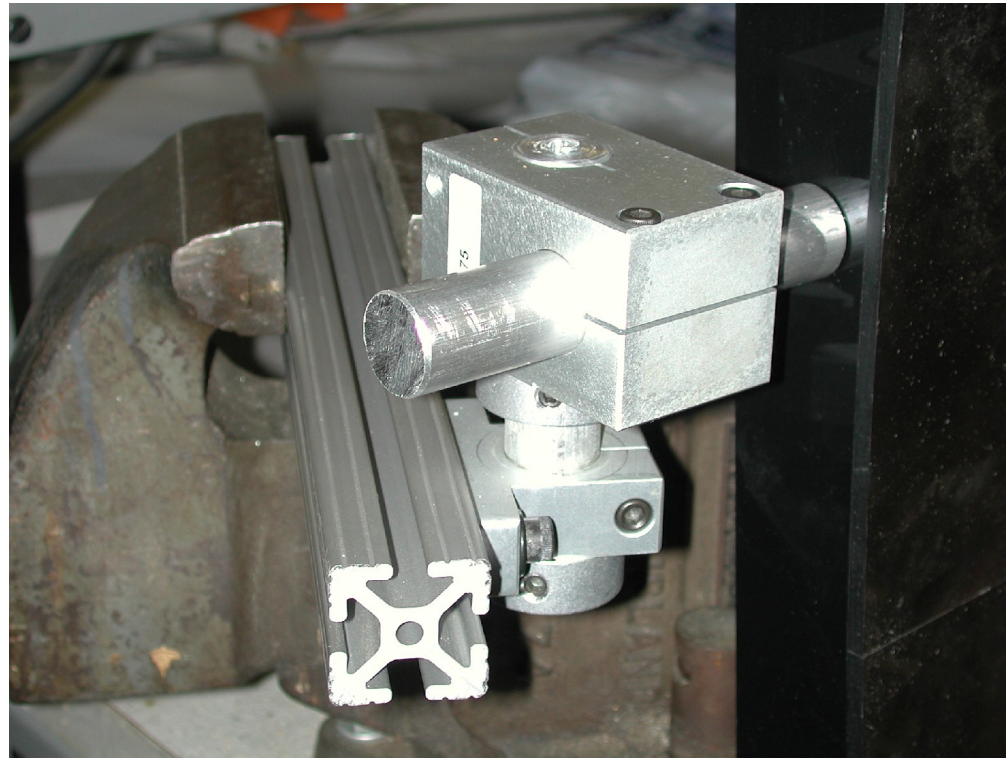
Support ring Pointing ring



Mu- metal shield
Extends from the face of
the tube by 2inches



Mirror mounts



Parts for mounting the eight mirrors are at Temple.

SANE Cherenkov Budget

•Tank

- structure (pyramid+ box)(at the shop) \$25,000
- phototubes support and pointing (received)
- mirrors support and pointing (received)
- tank windows
- gas system (parts received)

•Mirrors (Glass mountain or else for savings) (Eagle glass+CERN)

- 4 spherical mirrors +spare: \$ 11,000
- 4 toroidal mirrors + spare \$ 11,000

•Phototubes

- 8 units of 3” quartz Photonis tubes + spare (8 received) \$ 24,000

•Electronics

- FLASH ADCs (Jlab) ??
- DVCS RSA cards ??

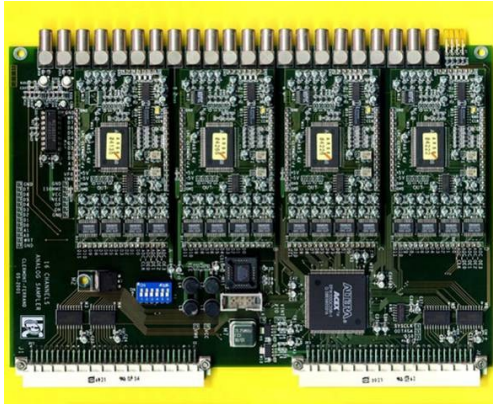
•Temple contribution: \$ 20,000

•DOE request: \$ 55,000

Summary

- Reasonable progress in the construction of the mechanics, expect to have all the hardware by the end of the summer of 2006.
- Phototubes: Have 8 tubes + 8 mumetal shields
- Mirror manufacturer almost determined (Eagle Glass + CERN).
- Electronics still under investigation.

Electronics



1 GHz Analog Ring Sampler (ARS)

x 128 samples x 289 detector channels

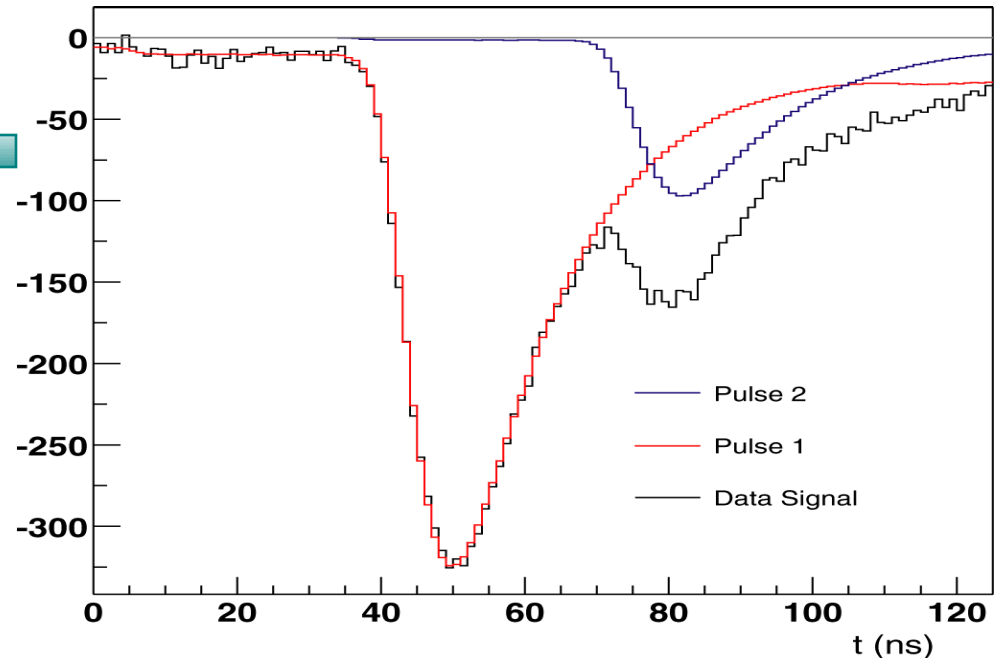


Sample **each** PMT signal in **128 values** (1 value/ns)

Extract signal properties
(charge, time) with a wave
form Analysis.



**Allows to deal with
pile- up events.**



Need a trigger for a start

Commissioning Plan

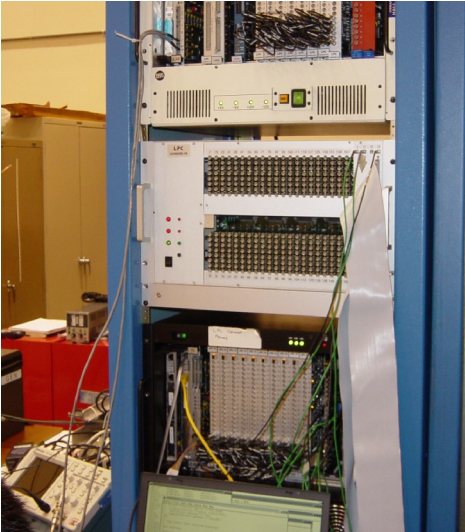
- Setup in parallel with GEP III
 - Tank with partial instrumentation
 - Full tank structure
 - Two mirrors (Near side and far side mirrors)
 - 2 phototubes
- Issues
 - Need to coordinate installation with GEP III
 - Platform to install the Cherenkov is needed
 - Trigger for testing the Cherenkov counter is also needed?
 - Flash ADCs (RSA cards) need to be ready by the that time

We need also to explore the possibility of an independent test before the proposal goes into Jeopardy (June 2006).

Waiting for the proposal review by DOE....

Electronics

Not all the calorimeter channels are read for each event



Calorimeter trigger



Following HRS trigger, stop ARS.

30MHz trigger FADC digitizes all calorimeter signals in 85ns window.



- Compute all sums of 4 adjacent blocks.
- Look for at least 1 sum over threshold
- Validate or reject HRS trigger within 340 ns

