My Tasks

- Take measurements of the positions of detectors in the Neutron Arm.
- Create a table of the positions of the centroids of the detector bars for use as a Database.
- Create documentation for all Neutron Arm Databases.
- Detail methods and measurement techniques for the Neutron Arm geometry measurements.
- Renew work on Neutron Arm timing calibrations.
- Gain familiarization with the Scintillator classes to ease the change of Database formats later.

Measurements of NA

- Measurements
 - I measured the vertical positions.
 - Albert has measurements of the horizontal positions.
 - Tim Ngo made measurements of depth.
- Neutron Arm is currently taken apart, base and cage are in different locations (in sandlot).
- Measurements were done from top of cassette to bottom edges of the detector bars.
- Detector stand to detector floor was measured.
- Detector floor to survey marks was measured.
- Measured the distance from the Central Bob to the inside of the cage (Basis of depth measurements).

Measurement Technique



Table of Positions

- Measured vertical positions resulted in error as high as 3.18 cm.
- After numerous options considered, averaged size of bar was used.
 - Takes into account gap between top of detector and top of cassette.
- Vertical and horizontal positions are measured in relation to steel squares.
- Depth positions are measured with respect to the central bob position.
- Working table can be found at /home/mjona/NA Geometry.sxc.
- Centroid positions are currently an xml format.

Neutron Arm Documentation

- Documentation for old database.
 - Complete.
 - May be found on GEN Wiki page. hallaweb.jlab.org/experiment/E02-013/wiki/tikiindex.php?page=GEn
- New Database will be in MySQL.
- Geometry information currently in xml format.
 - Names are (N)eutron (A)rm (G)eometry underscore plane name (N1 or V1R for example) dot xml.
 - Fields are (detector), elements in fields are detector (number), (X) position, (Y) position, and (Z) position.
 - X and Y are relative to Lower Beamside Front Square, Z to Central Bob.

Neutron Arm Timing

- Progress hasn't been made since early May.
- Algorithm
 - Interative. Relates all detectors to a reference detector N1-10.
 - Side independent. All right sides are related; all left sides are related. Right and left are related at N1-10.
 - Vertical iterations are done on neutron plane 1, then horizontal iterations are done to arrive at final detector.
 - Veto calibration was done similarly, iterating between V1 and V2, with right and left related at the reference detector (V2-14).

Neutron Arm Timing 2

- Later planes have increasing unalignment.
 - This appears to be a limitation of the algorithm.
- Timewalk effects haven't been included.
- Corrections on distance haven't been included.
- Implementation for Glascow detectors clumsy and incomplete.
 - This is caused by the poor quality of the Glascow Detectors, and that many of them were changed out over the last part of the experiment.
- Example: (N1-10L N1-9L) + (N1-9L N1-8L) + (N1-8L)
 - -N2-8L) + (N2-8L N3-8L) = N1-10L N3-8L

Status of Neutron Timing



Final Status

- Geometry measurements were taken.
- Geometry datafile was created.
- Some Documentation has been created. Since the form of the Database is changing, complete documentation will have to wait.
- Information on measurement techniques is available.
- Work on Neutron Timing is still pending.
- I feel comfortable with the Scintillator classes.