Status Report on Time Calibration and Angle reconstruction

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April 9 2007

ANITA Monday Phone Call

Impulse Timing Determination

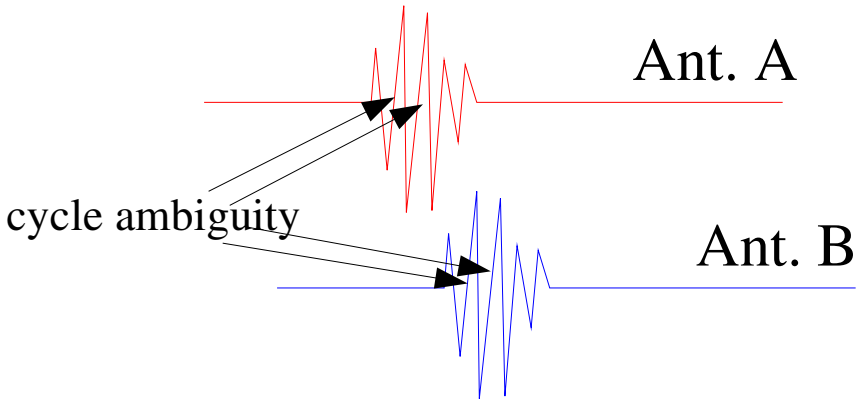
Threshold Crossing Time in Power envelope (SLAC Analysis):

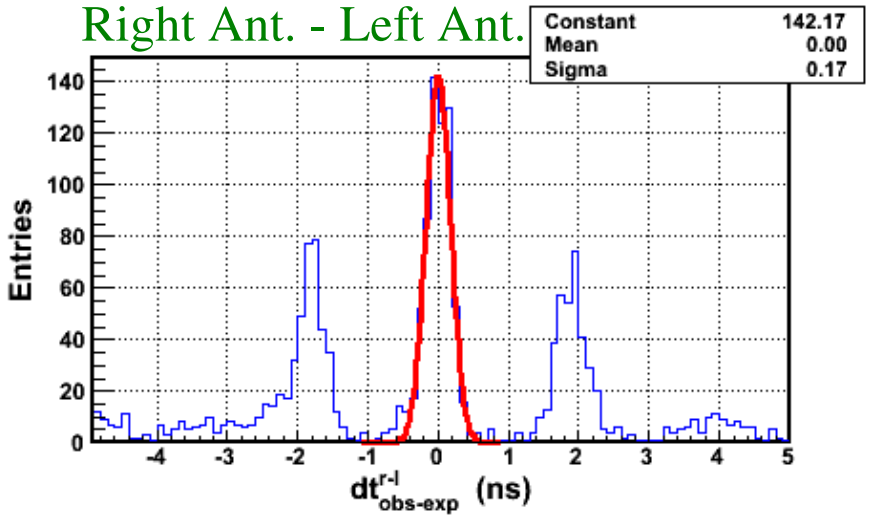
-> Poor time resolution for Willy Field Ground Pulse Data (300-500 ps)

Zero Crossing Time in Time Domain Waveform.

-> not used for SLAC analysis because of multiple peaks caused by cycle ambiguity.

-> But each peaks have narrow widths.





New Strategy

-> Take Zero Crossing Method

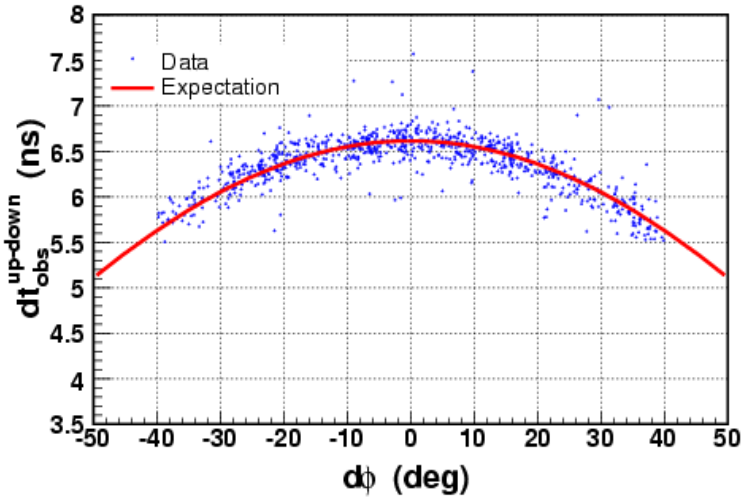
-> Calibration using the main peak

-> Keep all zero crossings near the maximum peak

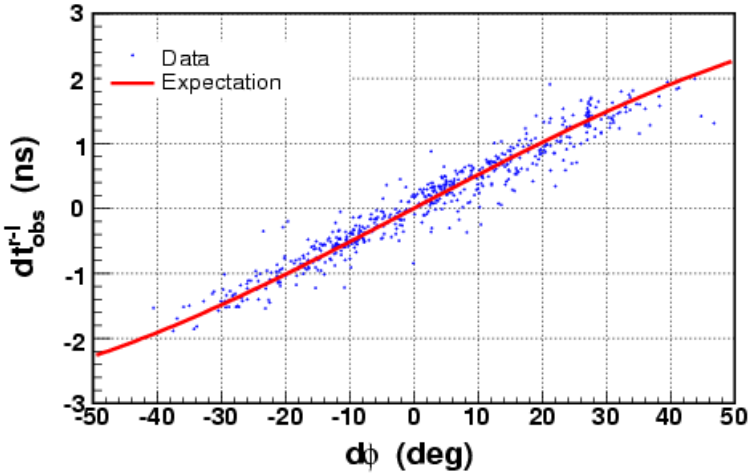
-> Then select the best time with the best fit result.

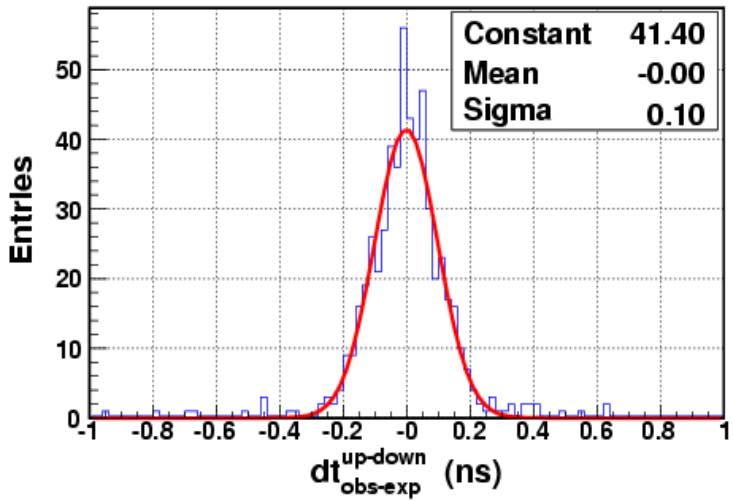
Time Offset Calibration (V. Pol Only)

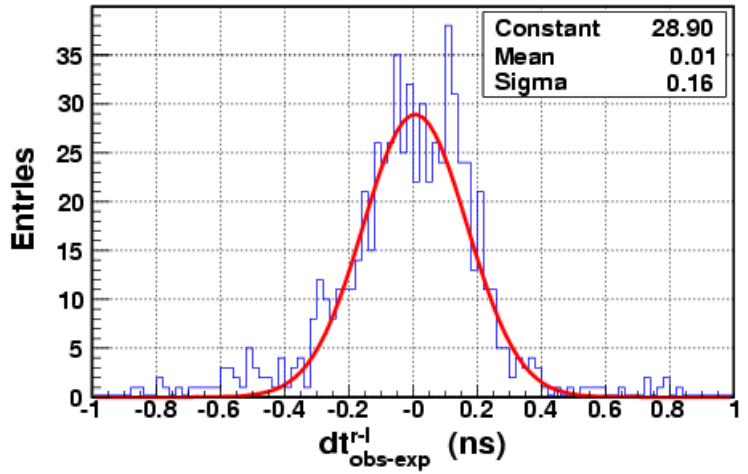
dt (Up-Down)



dt (Right-Left)







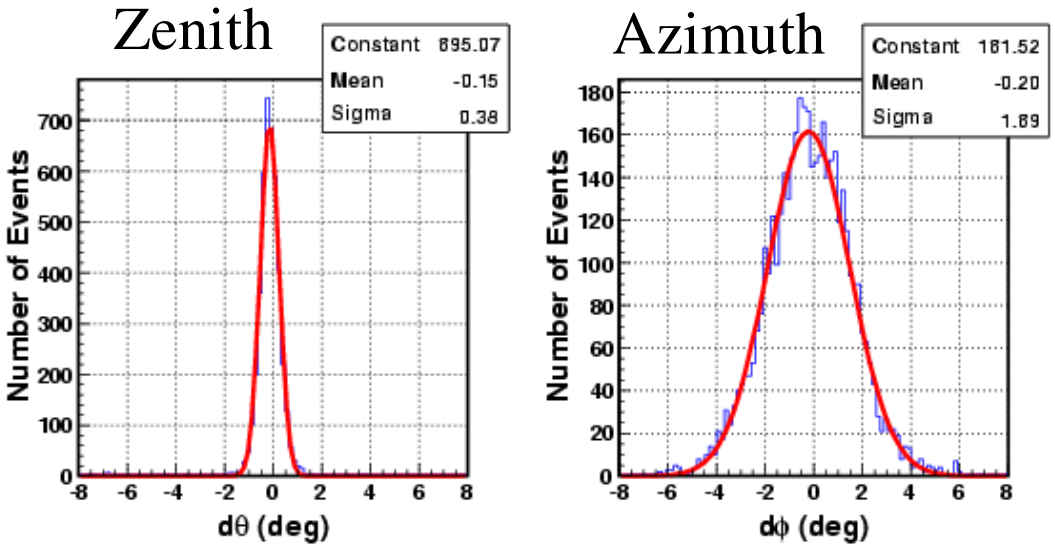
Angle Reconstruction

First Trial of Fit.

Only using 6 antennas' vertical channels (up 3, and down 3 near maximum ch)

chi2 fit, put 160 ps error for all antennas.

Results



(run 1027,
about 150km from Willy)

0.4 deg of Zenith Angle Resolution:

-> Good Time Resolution in Up/Down (same board), long baseline

1.7 deg of Azimuth Angle Resolution

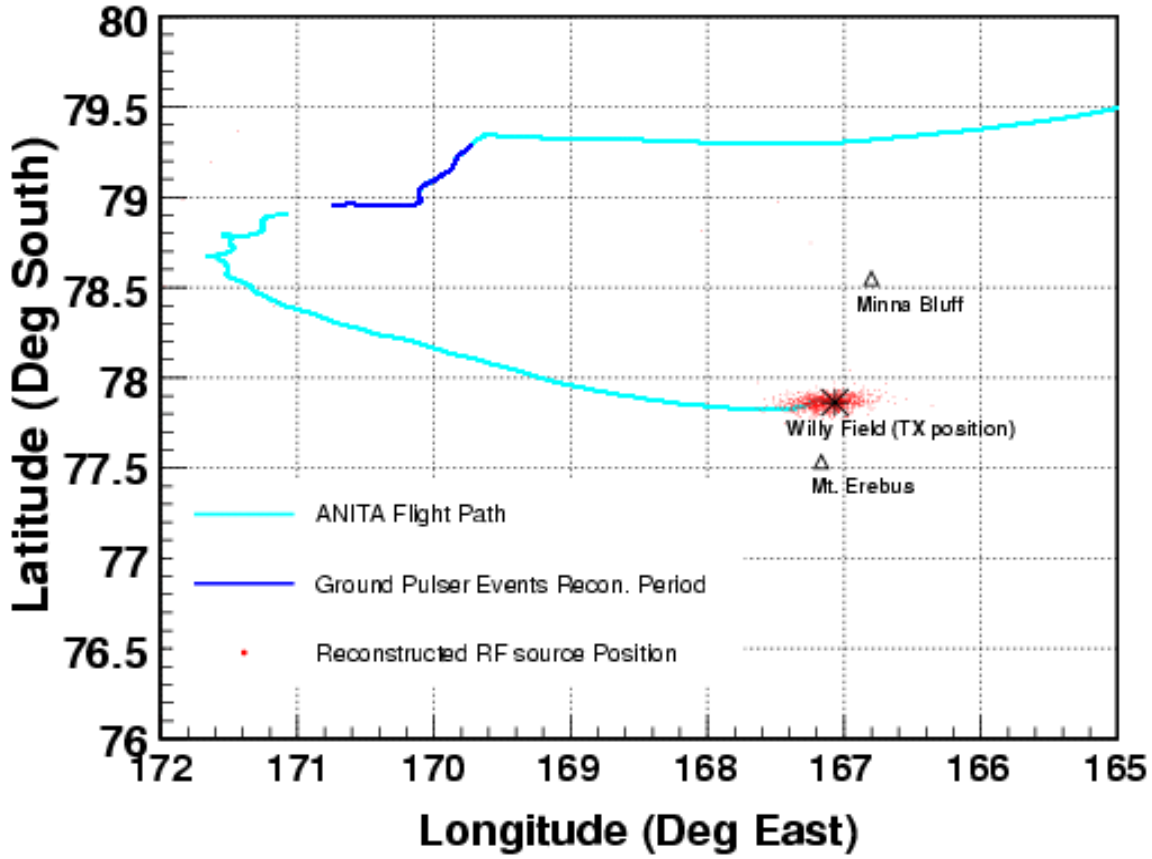
-> Worse Time Resolution in Left/Right than Up/Down (different board), shorter baseline.

Currently, efficiency is about 50-60%, and mis-reconstruction rate is about 5%,

-> but a lot of room to improve.

RF Source Map for Calibration Pulser Events

RF source points can be obtained by projecting reconstructed angle to the surface.
We use BEDMAP information for surface elevation.



Initial 10% Data Analysis (Search Big Point Source)

Very Nave Selection Criteria

- V/Vrms (Maximum Channel) > 3.5
- V(Maximum Channel) > 60mV
- It reduces data size to 2% level.

Fit Quality

- Reconstructed RF distance < 700km
- Angle difference; | phi_maximum – phi_recon | < 22.5 deg
- chi2 < 4

162 Events Passing !!

RF Source Map for the initial 10% Data