

Leveling the 6m antennas

Dick Plambeck, revision A, 6 Feb 2006

Tiltmeters

A Schaevitz model LSOC-1° inclinometer is installed on the azimuth platform of each 6m antenna usually near the stowpin. Usually the inclinometer is covered with a sheet metal box.



The Bendix connector on the inclinometer is wired to the tilt1 input of the a/d mux board in the cabin, as given in the table below. Raising the right side of the tiltmeter increases the a/d reading. The tilt is given in arcminutes on the BIMA drives rtd screen.

<i>Bendix</i>	<i>D9</i>	<i>signal</i>
A	1	+15 V pwr
B	6, 3	Pwr, signal gnd
C	2	-15 V pwr
D	7	Tilt out, $\pm 5V = \pm 1$ degree

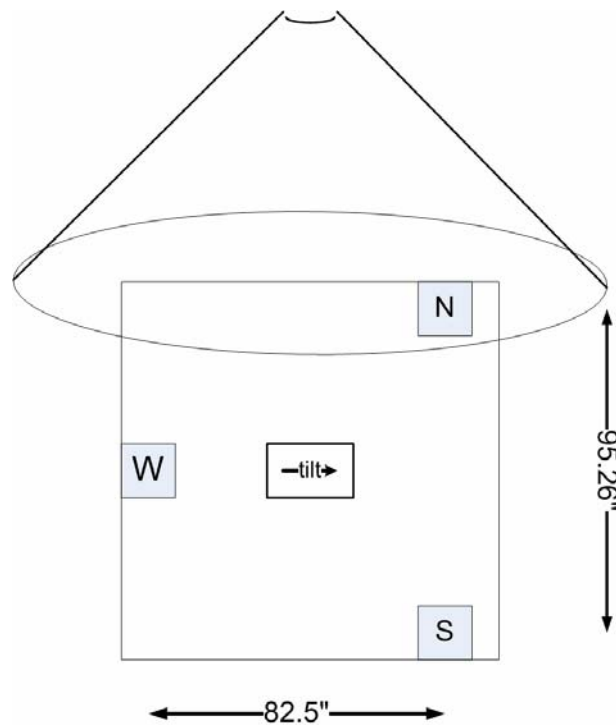
Converting tilts to leg errors

The height of the west leg is fixed. Designate the height of the north and south legs as $N = W + \Delta N$, $S = W + \Delta S$. If we express the tilt as a function of azimuth as:

$$t(\varphi) = A \cos(\varphi) + B \sin(\varphi) + C$$

Where

$$A = (\Delta N + \Delta S) / 2d_1 ,$$
$$B = (\Delta S - \Delta N) / d_2$$



and C is a constant offset term. One can derive A and B from a least squares fit to the tilt vs. azimuth, or more crudely, from the tilts at azimuths of 0, 90, 180, and 270 degrees:

$$A = 0.5 (t(0) - t(180))$$

$$B = 0.5 (t(90) - t(270)).$$

Thus, if the tilt is more positive at $\phi=90$ than at $\phi=270$, the south leg is higher than the north leg. Solving for ΔN and ΔS in inches, one finds:

$$\Delta N (\text{inches}) = 0.024 A (\text{arcmin}) - 0.014 B (\text{arcmin})$$

$$\Delta S (\text{inches}) = 0.024 A (\text{arcmin}) + 0.014 B (\text{arcmin})$$

One must *remove* these errors in order to level the antenna; that is, if $\Delta N = 0.1$ inch, one must *shorten* the N leg by 0.1 inch. The adjustment screws have 4 threads per inch, so one full turn changes the height by 0.25 inch.

Adjusting the feet

1. Loosen tiedown nuts at the 4 corners of the base.
2. Jack up the N or S corner of the base to take the weight off the foot. Be sure to insert the jack under the reinforcing plate – see diagram below.
3. Use special wrench to turn adjustment ring on the foot. Turning the ring CW unscrews the support screw from the base, thus raises the base.
4. Lower the jack; adjust other leg; remeasure tilt.
5. When finished, tighten the tiedowns at the 4 corners of the base.

