Focus vs. Elevation on the VLBA Antennas

VLBA TEST MEMO NO. 28

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The tests of FRM position reported in VLBA Test Memo 26 revealed that there is a significant change of optimum focus with elevation. On Dec. 13, 1991, observations were made on most VLBA antennas to measure this effect at 1.3 cm. The results are given here. Plots of the measured points along with a curve of the form f = c + d*cos(ZA) (f=focus, ZA=zenith angle, c and d are constants) that was fitted to the points are shown below. The fitted values for c and d are (in cm):

Station	c	d
PT	8.73	0.78
LA	8.38	0.67
FD	8.73	0.66
NL	9.60	0.69
BR	7.02	0.62

KP and OV were not tested.

These results show that the focus varies by about 2/3 cm over the full elevation range. Since the FWHM of the focus peak at 1.3 cm wavelength is about 2 cm, this is significant even at this band. At 7 mm, it is critical to correct for this effect and this is being done by entering focus values in the schedules.

I suggest that the on-line system correct the focus using an equation of the form shown above. The coefficients could be handled in the same way as pointing equation coefficients.