

VLB ARRAY MEMO No. 389

National Radio Astronomy Observatory
Tucson, Arizona

September 14, 1984

MEMORANDUM

TO: Buck Peery, K. Kellermann

FROM: R. L. Brown

SUBJECT: The Location of the Tucson VLBA Antenna

Permit me to comment briefly on your concern about excessive wind on Kitt Peak and its apparent ramification, viz. a search for a valley site for the Tucson-area VLBA antenna.

There's no disputing the fact that the wind blows sufficiently hard on Kitt Peak that the 12-meter, occasionally, has to cease observing. No doubt the VLBA antenna, if situated near the 12-meter, would also periodically be forced to stow by the wind.¹ However, I would hope that it is also beyond dispute that Kitt Peak is an excellent observing site. For most of the year the sky is exceptionally transparent even at 22-45 GHz. If we now consider moving the telescope down off the mountain to the Sonoran desert floor we can reasonably expect that the effect of the wind will be lessened (but surely not eliminated). At the same time we deliberately compromise the atmospheric transparency over the telescope (although, again, there will still be many excellent days). All things being the same, the decision hinges on the incremental gain (fewer wind-stow days) versus the incremental loss (increased atmospheric opacity). The VLBA science advisory group, for instance, could review this tradeoff and reach a decision.²

But here I would like to argue that all things aren't the same: location of the VLBA antenna adjacent to the 12-meter potentially benefits both telescopes. First, the VLBA antenna

¹ I exclude from this argument the obvious point that all elements of the VLBA, most particularly the high altitude antennas including the VLA itself, will similarly be stowed occasionally owing to high winds.

² Remember that we are trading fewer days in which the antenna is forced to stow against higher atmospheric opacity every day of the year.

can expect more rapid service when needed, particularly with regard to diagnostic help, if it were near the 12-meter than otherwise. The 12-meter is, of course, manned 24-hours a day with very capable technical help resident during normal working hours. Simple repairs, routine service, or even a phone call back to VLBA operations saying "the power is out" may significantly speed the antenna back into operation. Emergency service, of any description, would be facilitated on Kitt Peak. Second, the VLBA effort can benefit from shared facilities: lab space, equipment and lodging are all available on Kitt Peak. Finally, not to be overlooked (certainly not by me), the VLBA can catalyze improvements to the 12-meter operation that will be mutually beneficial, i.e., effect a cost-saving to both operations. Here I have in mind, for instance, expanded lab facilities and the availability of data-quality telecommunications on the mountain.

The wind is surely an important consideration to the VLBA in Arizona (and elsewhere for that matter). I would be pleased to look after assembling and condensing the available wind statistics on Kitt Peak and in the neighboring Sonoran desert if you'd like. This is the easy part, these are the tangibles. However, the decision as to where to locate the VLBA antenna shouldn't simply come down to an evaluation as to whether it is more windy on a mountain top or in the valley. More is involved.