VLBA TEST MEMO NO.

National Radio Astronomy Observatory

MEMORANDUM

To:	VLBA Project	Date:	February	22,	1988
From:	Craig Walker				
Subject:	Test Coordination Meeting, Feb. 16 1988				

Those present: Napier, Clark, Lilie, Bagri, Walker, Hunt, Crane, Stetten, Campbell, Wade, Thompson, Romney.

I described the pointing observations that have been done so far. Two pointing runs at 610 MHz have been done. The data path has been opened and solutions obtained. Bob Duquet has provided a program to fit for pointing offsets using monitor data (BBC total power). The PEEK program normally used on the VLA has been made to work for the VLBA data on both the VAX and the DEC10. The solutions for the pointing parameters were good to roughly a minute of arc. At that level, only the azimuth encoder offset is significant and Clark will update the number in the control system. The pointing should now be good enough to get started easily at 5 GHz.

There was a discussion of how to decide when to attempt to run Pie Town remotely and unattended. It has already been run remotely but, because some hardware is not yet ready, it is not yet safe to run unattended. It was concluded that, before attempting an unattended observation, approval should be obtained from Rhodes, Clark, and Napier. We will probably use attempts at unattended observations to gather more pointing data. For such observations, if the computer died and the antenna stowed, nothing important would be lost. Clark does not feel that we are ready for unattended, critical observations such as a NUG run because it is too easy for the computer to die.

Wade described the tests that are being done on the stability of the foundation at Pie Town. Targets were placed on the foundation, track, and wheels and a benchmark was placed near the fence. Observations showed no deflections of the foundation or track above the noise of 1 - 2 mil as the antenna was moved over the points being measured. There were no indications that the wheels were out of round or not centered properly. Measurements of the wheels at many azimuths confirmed the 11" tilt found with the tilt meters. The high scatter about the best fit tilt found with the tilt meters was also seen. Wade is now convinced that the scatter is real and is due to the track. This aspect of the antenna performance has not yet been accepted so we can require the manufacturer to fix the problem. The fluctuations may be repeatable and so, in principle, the pointing system could compensate for them. Clark expressed concern that this would be difficult. He would much rather see the problem fixed.

I noted that I am now receiving NUG proposals to determine technical feasibility at Pie Town. Despite NUG requests for Mark III mode A, we will let the geodesy requirements drive the number of baseband converters that we will provide. Also, it was noted that the operating funds will not allow NUG operations at Kitt Peak and Los Alamos this year.

Bagri has been analysing the delay stability of the system. This was triggered by his measurements that showed that the relative stability of the cables down the antenna was not good enough for the desired system stability of a few picoseconds. His analysis shows that there are several parts of the system that would need to be improved by large amounts to meet the desired stability. Improving all of them is likely to be difficult. Because of this, he has suggested that we should look hard at phase cal systems again. He feels that D'Addario's analysis of this in 1985 was both overly optimistic on the performance of the VLBA system and overly pessimistic on the likely stability of a well designed calibration system. There was a general agreement that it is likely to be easier to obtain the desired performance from a phase cal system than from trying to stabilize all of the devices that Bagri identified. Thompson described a possible scheme partly. The scheme is based on the existing 500 MHz round trip path monitor system. The discussion had to be cut off because of another meeting so it will be continued next time.