

NATIONAL RADIO ASTRONOMY OBSERVATORY
Green Bank, West Virginia

Minutes of Science Working Group Meeting, September 9, 1983

K. Kellermann

Attendance: Backer, Thompson, Fomalont, Hjellming, Napier, Crane, Owen, Rots, Bignell, Ekers, Thompson, Burke, Reid, Moran, Shapiro, Broderick, Johnston, Shaffer, Clark, Kundu, Linfield, Seaquist, Balister, Roberts, Burns, Stinebring, Hvatum, Moffet, Readhead, Cohen, Kellermann (Chm.), others.

- 1) Antenna elevation limit: Shapiro has urged that the antennas be capable of reaching an elevation limit of zero degrees to aid in the calibration of astrometric and geodetic data. Previous experiments, reported Shapiro, show smaller residuals in the baseline determination when measurements are made at elevations lower than 5 degrees. Kellermann commented on the increased (u,v) coverage possible as well, but Cohen did not feel this would be useful. Negative impacts of keeping a low elevation capability, include increased susceptibility to interference and additional constraints on site selection.

A consensus emerged that if there is not a great impact on the antenna cost, that the antennas be able to reach the horizon. However, this requirement should not influence the choice of site or compromise the interference protection provided by a horizon of at least 3 degrees in most directions.

- 2) The need for rapid antenna slewing rates to minimize time between sources, especially when trying to track fringe phases, was discussed. Drive rates of 90 deg./min. in azimuth and 30 deg./min. in elevation were considered a good cost-performance compromise, although Shapiro felt that 40 deg./min. elevation drive rate would be better.
- 3) We need to decide the order that we want to build the antennas. Primarily this will depend on logistical considerations (availability of land, completion of EIS's, movement of antenna erection crew, etc.). To the extent that there is some flexibility in the schedule, the group discussed scientific priorities, particularly in light of the small (hopefully negligible) possibility that the project might be terminated before all 10 antennas are completed. No obvious consensus emerged. In order to keep open the options for cooperating with Canada, the Hawaii and Puerto Rico, as well as Haystack and Washington, should be delayed as long as possible. But Hawaii and Puerto Rico, along with Iowa, were generally felt to have the greatest scientific interest. Owen pointed out the great value of the nearest antenna to the VLA, as this will

increase the resolution of the VLA, and even without the VLBA project would be of high priority due to the great scientific return. Probably, the New Mexico site near the VLA should be developed first, in order to make use of the extensive mechanical and electrical support facilities available at the VLA. If this site cannot be obtained in time, then the Tucson site would be a second choice. The group felt that Iowa should be included as soon as feasible, and that the Haystack and OVRO sites should be in the last group.

- 4) The relative merits of the Haystack and FCRAO sites were discussed. Rogers and Burke did not feel that the Haystack site had a less favorable interference environment or meteorological conditions. Some concern was raised about the access to FCRAO and the uncertain future of that observatory. No one appeared to show interest in the opportunity to use the FCRAO mm facility together with other mm telescopes to extend the performance of the VLBA.
- 5) Balister summarized the cost savings and convenience of using 20 kHz rather than 10 kHz as the minimum frequency step. No strong objections were voiced.
- 6) M. Kundu summarized the opportunities for solar observing with the VLBA and agreed to keep himself informed as the VLBA design and development progresses to ensure that solar observing is not compromised.
- 7) Kellermann pointed out the possible need for up to 23 playback stations at the Processor to exploit the potential opportunities implied by the Bridle/Walker VLBA/CLBA plan (VLBA Memo 237). Several people felt that it would not be necessary to observe over such a wide range of spacings, and that a 19 station correlator would suffice. Even with 19 stations, however, the spectroscopic capability is minimal.
- 8) Kellermann reminded the group that precision operating conditions for the antennas would be limited to wind velocities under 15 mph or perhaps slightly higher, and that wind velocities frequently exceed this value at a number of our sights. No great concern was expressed that this would significantly limit the shortwave performance of the instrument.