VLB ARRAY MEMO No. 157

Dec. 6,1982

To: VLBA Configuration and Sites Groups

From: R. C. Walker

Subject: Possible VLBA Sites

Below is a list of potential sites for VLBA telescopes. The sites listed are ones that appear in many of the best arrays that we have studied and are good candidates for inclusion in the final array. The latitude and longitude used in the array studies are given in parenthesis for each station. This list is meant as a guide to the site committee. The sites listed should be investigated for suitability and availability. Many of the sites are easy in the sense that they are existing observatories that presumably would be willing to provide local support. I have noted those cases where there are significant uncertainties about a site. Those sites should receive the most attention. The size of the region within which a site can be located without affecting the configuration varies depending on the length of the shortest baselines to that station. For those stations which are not located at an observatory, I have attempted to indicate the constraints.

The tightest constraints are for the stations near the VLA because of the short baselines connecting to the VLA. These are also stations for which there is still considerable doubt as to the best locations. It would be good to have a selection of good sites near the VLA, distributed more or less like those listed, from which a final choice could be made. Some input from the VLA scientific staff on the most useful sites in terms of interaction with the VLA would be valuable. Fortunately, the political need to find final sites for the antennas near the VLA is probably not nearly as great as for the rest of the array because all of the options are in the same state and all will presumably be supported from the VLA.

This list should not be considered complete. It is the result of my work only. Other workers may have some other favorite sites. It is also possible that other regions may be found to be desirable as the configuration studies continue.

Hawaii (19.8, 155.5). Anywhere in the state would be ok for the uv coverage. The site should be at a high altitude at avoid water vapor, although it is not necessary to go as high as the top of Mauna Kea. Somewhere near the mid level support station for the Mauna Kea telescopes might be good. All arrays have this site.

Puerto Rico (18.34, 66.75). Anywhere in Puerto Rico would be ok for the configuration. The best sites for atmosphere are probably Ramy or in the southwest part of the island. We still don't know if Puerto Rico can be used. The water vapor is bad but, if it is stable, we may be able to live with it. The Arecibo Observatory may be much worse than other sites on the island. Puerto Rico is in most arrays.

Haystack, MA (42.43, 71.49) Use observatory site. In most arrays.

Owens Valley, CA (37.05, 118.28) Use observatory site (telescope?). In most arrays.

Alaska. If Puerto Rico cannot be used, we will want an Alaskan site. Anchorage has relatively mild weather but Fairbanks would be drier. The exact location is not important.

Laredo, TX (27.5, 99.5) All arrays have a station in southern Texas or at Fort Davis. Laredo has been used as a compromise between the desires to stay as far south and as dry as possible. At present, we know little about the suitability of any South Texas sites.

Fort Davis, TX (30.47, 103.95) Use Harvard Radio Astronomy Station or the McDonald Observatory.

North Liberty Radio Observatory, Iowa (41.58, 91.57) Use observatory site. A site in the midwest is needed. There is considerable freedom to choose the exact location. NLRO and VRO are two observatories that could be used.

Vermillion River Observatory, IL (40.06, 87.56) Use observatory site. The site is not currently in use but support can probably be obtained from the University of Illinois.

Wenatche, WA. (47.4, 120.3) A site in the Northwest is needed. There are dry regions in central Washington and western Montana. There is considerable freedom in choosing a specific site. Penticton would be good if Canada gets included.

Missoula, MO. (46.8, 114.0) An alternative for the Northwest station. There is a university in the area.

Fargo, ND. (46.8, 96.7) Arrays involving Alaska often use a station near the Canadian border in the vicinity of North Dakota. North Dakota State University in Fargo has expressed interest and has land in several places in the state.

All arrays have a station a few hundred kilometers from the VLA. The next six stations are possibilities. If specific sites are found more than about 50 km from the specified location, the configuration should be checked.

Kitt Peak, AZ (31.96, 111.6) The observatory site or something closer to Tucson would be ok, although that may depend on the specific configuration.

Green River, UT (39.0, 110.2) Is this site too isolated?

Boulder, CO (40.00, 105.26) There are some radio facilities near

Boulder. Are they useful? What about interference?

Pueblo, CO (38.3, 104.5)

Blythe, CA (33.6, 114.6) Is this site too isolated?

Amarillo, TX (34.6, 101.8)

The rest of the stations are between about 50 and about 200 km from the VLA. Two stations in this area will be needed, generally one about 60 km and one about 150 km from the VLA. If operationally convenient sites in this area are found that are not in this list, they should be suggested to the configuration group.

Socorro (34.1, 106.9) May be too close to VLA. Are there any good alternatives 10 to 20 km to the east?

Scholle (34.4, 106.5) Northeast of Socorro.

Quemado (34.35, 108.49) West of VLA on Rt 60.

Horse Springs (33.93, 108.25) Southwest of the VLA.

RT107 (33.66, 107.13) Near intersection of New Mexico 107 and Interstate25

Elephant Butte Res. (33.3, 107.25) Along Interstate 25 well south of Socorro.

Lamy (35.5, 105.85) Near Santa Fe.

Los Alamos (35.9, 106.4) Is there a good site at the labs?

Gallup (35.5, 108.7)

Las Cruces (32.3, 106.75)

San Ysidro (35.5, 106.8) Southwest of Los Alamos.