



THE UNIVERSITY OF NEW MEXICO  
ALBUQUERQUE, NEW MEXICO 87131

March 16, 1983

Carl Bignell  
VLA  
P.O. Box 0  
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Dear Carl,

Being a newcomer to the process, I will have to admit that it is not entirely clear to me what our subgroup is supposed to be examining concerning the proposed VLBA. It seems to me that we are examining some of the logistics involved with the establishment of the individual network stations and perhaps the central processing facility also, so let me make some remarks on these two issues.

In the first instance, it is clear that the gross placement of individual elements of the array will be dictated by the desired UV plane coverage. However, as you are no doubt aware, the detailed placement of such stations (with the possible exception of the very shortest baselines) is not severely constrained. That is to say that latitudes of tens and probably even hundreds of miles are possible in the placement of the stations. Although it would probably be desirable to have each station an island unto itself with no necessary local involvement, I suspect that some savings in operational costs might be achieved if we could operate individual elements in cooperation with local institutions. Of course, this would be at some cost in administrative overhead and gastric juices. This issue must be examined closely to ensure that indeed it does make sense. I have little idea of what the maintenance requirements of such stations will be, although I have heard it suggested that two full-time technicians might be required for the job. If indeed it were not necessary to have these individuals full time, this is where the savings might be effected. They could be shared with local institutions, carry out regular maintenance of the stations, be on call at all times, and yet not be charged fully to the project. If experience shows that indeed we need an integral number of bodies on site all of the time, then all of my above arguments turn to dust.

Failing the above argument, it is not clear to me that there is any particular advantage which accrues to a local institution in being associated with the VLBA. If the individual dishes were available for single dish work some fraction of the time, and this time were made available to astronomers at local institutions (or perhaps even on a broader basis), then there might be some interest in this arrangement. However, if the availability were on a

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sporadic or very limited basis (such as was the case for so long with Goldstone) then I think the desirability and the viability of the use of the elements as single dishes would be highly questionable. Even given the above discussion it is clear that the NRAO must be fully in charge of the network stations so that they will be used to their fullest extent to support the activities of the network.

We have to realize that there may not always be institutions in the vicinity of each element that might be interested in access to a single dish for astronomical purposes. However, there are many other things to be learned by working with such a system which might be of interest to electrical engineering departments, vocational-technical schools, etc.

With regard to the central processing station, a rather different set of issues must be considered. There are two models to consider for a central processing station. The first is simply that it would be a place where processing takes place, period. In such a case the only people in residence would be engineering and technical staff and computer support people. Tapes would flow in and fringe visibilities would flow out. The second model is one where the actual processing was only a small portion of the total program at the site. Additionally there would be scientific staff in residence. Fringe visibilities would be turned into models would be turned into maps would be turned into science. I prefer this latter approach (which is indeed the one that has been chosen for the VKA) as I believe it will ultimately ensure that the best quality science will come out of the system.

Assuming the second model, then it is important that the headquarters of the array be in a fairly civilized place in order to be able to attract and retain staff (and that they might attract and retain spouses and families, not to mention their sanity). Preferably it should be located in a town that has a university. It would be desirable if that university already has some ongoing activity in astronomy. It might even be useful to ascertain before the fact that the interest in astronomy would include the types of activities to be carried out by the array. The town should have good transportation facilities, including easy access by road, rail, and air. It would be nice if there were sufficient local electronic and computer industry that support (and perhaps even collaborative development) of receivers and instrumentation for the network could take place. Another, perhaps more esoteric requirement for the location is as follows. We expect at the outset to see the data transferred between stations by the physical transport of tapes. Ultimately, however, we might see this carried out by some telecommunications method. Therefore I think it would be wise to ensure at the outset that the precise location of the central processing headquarters be coordinated as an earth station in the satellite communications/satellite service. In fact I believe that the site should be so coordinated and this coordination registered to ensure access to the spectrum and use as an earth station in the event that we eventually go that route.

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It would be very nice if, following some of my comments above, the headquarters could actually be located on the campus of a university. There are both advantages and disadvantages to this. The primary advantage would be the collaboration and cooperation with on-campus departments of physics, astronomy, and engineering. There is the additional benefit that some universities might even provide some financial assistance in the form of space, free real estate, university services at cost, etc. There are several obvious drawbacks. First, it is imperative that the operation of the VLBA be kept entirely separate from any of the whims of the university administration. Universities, for better or for worse, are one of the least "managed" of any large institutions in the country. We do not want the good management of NRAO to be offset by poor management or capriciousness from a university administration. Finally, there is the problem of parking. Parking is almost always a major problem at any university. Therefore, it is imperative that adequate space and arrangement of parking be negotiated in the event that the headquarters were to be located on a college campus.

If the headquarters/processing center is to have a scientific staff and provide a location for scientists to carry out data reduction, etc., then it will be necessary to have office space for visiting scientists, access to adequate computing power, and a visiting scientist quarters located within the area. Although it would certainly be nice, I think that perhaps we can forego the luxury of a library at this new facility. The need for library materials could be met by the co-location of the facility with a university. The additional cost of a library - space, subscriptions, and personnel would impose a large additional burden on the budget of the VLBA.

Another issue which might arise is the question of whether or not the VLBA should include development laboratories for VLB equipment and techniques. This is a difficult issue. In principal, I feel it is important that development work be carried on and that it be closely coordinated with the current operations of the VLBA. However, historically such development has taken place in the universities and I believe rightfully so. Thus I would not want to see a large development effort at the VLBA that would be to the detriment of university-based programs. Perhaps the way to approach this is to have the VLBA subcontract such development work to some of the existing groups working on development.

I hope these comments are of use to you. I will look forward to working with the group.

Sincerely yours,

R. Marcus Price  
Chairman

RMP:sw





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March 17, 1983

Carl Bignell  
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Dear Carl:

Just a few comments prompted by some of the VLB Array memos. I note in memo 191 on the control building configuration that the tape storage area is estimated at only 210 square feet. It has been the experience of anyone who ever touched a tape that they always needed about three times as much storage space as they anticipated. It certainly doesn't hurt to start with more as the additional space can always be turned into an office or coffee room. Going the other direction often turns out not to be possible.

Also on the plan I note that it addresses only the main building. Is it intended to have any visiting scientist quarters attached? Even if this were not a field site, it can be useful to provide visiting scientist quarters as they often provide a much cheaper alternative to local housing in hotels, etc.

Sincerely yours,

R. Marcus Price  
Chairman

RMP: sw

