



# NATIONAL RADIO ASTRONOMY OBSERVATORY

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August 30, 1983

**VLB ARRAY MEMO No. 261**

Dr. Ernest R. Seaquist  
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Dear Ernie:

Thanks very much for your letter of July 28 with the news about the CLBA. I am sorry to be so long in replying, but I have just returned from an extended trip.

I think your letter outlines the attractions of coordinating our activities and at the same time describes the problems and concerns on both sides. But it is good to see, at last, that Canadian astronomers no longer feel that cooperation with us will cause you "to be buried", or that you will lose your "support" from the Federal and Provincial governments, from Canadian industry, and from the scientific community.

Alan Bridle and Tom Legg have begun to discuss possible configurations using 9 Canadian and 10 U.S. antennas, and I hope that a mutually satisfactory solution can be found.

In the meantime, I think it is important that we ensure that the two arrays will be technically compatible, as well as have complementary configurations. For this reason we have asked Canadian scientists to participate in the work of our design groups, to keep you informed of our plans, to learn what you are doing, to profit from each other's experience, and, where appropriate, to modify the design to ensure compatibility.

During the next few months we will be making some firm decisions about the details of the VLBA record system, the correlator, the bandwidth and number of independent frequency channels, the control and monitor system, etc. - all of which greatly impact the feasibility of jointly using the VLBA and CLBA. In particular, the Bridle/Walker VLA-VLBA-CLBA concept implies the use of at least 4 VLA antennas (which may or may not be available) or a total of 23 playback stations at the processor (plus at least one or two for Europe, one for Arecibo, etc.). Who is going to build such a large processor and provide the necessary computer power to handle the data? On a more mundane level, mutual agreement now to the detailed questions of tape format, tape speed, type of recorder (e.g. 2 or 4 heads) will save a lot of later grief. There are many, many other examples of choices which would be somewhat arbitrary if we did not need to consider the need for compatibility.

I suggest that the best mechanism for working out these problems is through the already established VLBA Working Groups in which there is already Canadian representation. Probably other Canadian scientists may wish to participate, and this would be very appropriate. However, they should first contact the appropriate committee chairman, and I suggest that the costs of the additional telephone calls be born by the CLBA rather than NRAO.

As you know, we have an extensive memo series which describes all of the work which has been done in connection with the VLBA. Please feel free to reproduce any of this material to distribute to Canadian scientists as you feel appropriate. In this way they will be able to remain familiar with our detailed plans as they develop. I recognize that Canadian planning is less advanced than our own, but we of course remain interested in learning more about the CLBA plans.

You have the VLBA meeting schedule, and it would expedite things if you contacted the appropriate Canadian scientists. By copy of this letter I am informing the U.S. Group. We have much lost time to make up. The time for issuing "resolutions" and organizing "collaborative studies" is past.

Let's get on with the work of ensuring that the VLBA and the CLBA will be able to talk to each other.

Sincerely,

K. I. Kellermann

KIK/bbs

xc: M. Roberts  
H. Hvatum  
C. Walker  
R. Burns  
M. Balister  
G. Peery  
A. Rogers  
M. Ewing  
W. Horne  
C. Bignell  
P. Napier  
A. Readhead  
M. Cohen  
T. Legg  
A. Bridle

1983 July 28

Dr. Ken Kellermann  
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Dear Ken:

As you know, the Canadian Long Baseline Array has recently been approved by the National Research Council of Canada. Although the project is far from being funded as yet, this approval is an important step toward that goal. As a result, the CLBA Planning Committee is seeking funding support for further design studies. Since there could be two arrays in North America this decade, it is clearly very important that we develop a strategy for the use of these instruments together in the most effective way.

The meeting in Charlottesville on 1983 April 21, appears to have led to the conclusion that it is not feasible to cooperate by building a single North American array jointly operated by both countries. Under the present circumstances, a diversion of effort toward this goal is seen by scientists on both sides of the border to be potentially harmful to the present courses of action. The efforts so far have been rather successful. On the other hand, if both instruments are funded, we would not be making the best use of public funds if the instruments could not be combined part of the time. Furthermore, such an oversight would not produce the best science, and this would be glaringly apparent to the international scientific community. I feel confident that astronomers in both countries would agree on this point. Perhaps we should look into the means for scientific cooperation now and proceed by assuming that there could be up to nineteen new antennas in North America very soon. To this end, the CLBA Planning Committee adopted at its June 30 meeting, the following resolution:

"The CLBA Planning Committee of the Canadian Astronomical Society notes that the parallel development of separate very long baseline arrays in Canada and the U.S. may lead to the construction of as many as nineteen new high frequency antennas in North America in the 1980's. It recognizes the scientific benefits to be obtained by coordinating some aspects of the outfitting and placement of these new antennas so that they might be used together at times for joint experiments. It affirms its willingness to discuss with its U.S. counterpart adjustments of design to both arrays, subject to their stand-alone viability, so that the capability of the combined array would be enhanced."

Clearly the first significant step in this direction is VLBA memo #237 by Alan Bridle and Craig Walker. This memo has generated a great deal of discussion here in Canada, and it was the subject of an extensive discussion at our June 30 meeting. Its importance is that it utilizes in an effective way complementary aspects of the configurations proposed, and permits an interface with the VLA. Equally important, it provides a significant measure of relaxation in the timing of a decision to adjust the configuration by utilizing many stations in the existing proposed configurations. The chief difficulties with this scheme, as seen here, are its political saleability and the use of only six Canadian antennas. The former difficulty arises because it would seem peculiar that the one or two Canadian antennas in U.S. territory are not owned and operated by the U.S. The second difficulty arises because an array of six antennas is not considered a viable stand-alone facility. Of course, the N.R.C. decision to recommend funding for a nine element array was not known when the memo was written.

The Canadian configuration working group has been asked by the Planning Committee to continue the effort begun by Alan and Craig by investigating alternatives to this scheme, while keeping some of its outstanding merits. I hope that this will lead to a collaborative study, and that the outcome will be to find a mutually agreeable configuration.

Yours sincerely,

E.R. Seaquist  
CLBA Planning Committee