

Interoffice

National Radio Astronomy Observatory
Charlottesville, Virginia

October 4, 1983

To: VLBA Members

VLB ARRAY MEMO No. 273

From: Arthur Shalloway

Subject: Minutes of VLBA Data Communications Teleconference - 9/26/83

Attendees: B. Peery, K. Kellermann, B. Burns, G. Runion, L. D'Addario,
S. Weinreb, M. Balister, H. Hvatum, A. Shalloway, D. Weber,
K. Sowinski, C. Broadwell, G. Hunt

Shalloway requested the latest requirements of a VLBA data network.

Kellermann stated there should be one set of test fringes made once per ten hours and that VLBA Memo No. 159 was still the latest on the subject. He also stated that the subject would be reviewed at the Scientific meeting on October 7.

In D'Addario's opinion, there should be constant monitor information sent from each antenna site to the control site. This transmission requires a data rate of 500 baud and for safety we should set the specification at 1000 baud.

The two above quotes can be considered specifications; however, they are actually opinions and the following quotes are the opinions of others.

Weber stated that one could live without constant (on-line) monitor information, but there were times on the VLA when monitor data was desired continuously from certain components for as much as several days or a week.

Weinreb thought we must have continuous monitor data at the central site.

D'Addario questioned the requirement for fringe testing.

Discussions were then carried on about a satellite system.

Shalloway: Our own satellite system would be the most reliable, and in the long run, the cheapest way to go. Some rough prices are:

Xmit & rec. antenna & electronics	= \$95k x 11 sites	= \$1045k
Spares	\$20k x 11	= 220k
		<u>\$1265k</u>
Transponder rent (2 ea., 58k baud channel)	\$2k/mo x 12 x 10 yr.	= 240k
		<u>\$1505k</u>

or \$150.5k per year for 10 years as compared to \$190k to \$220k per year for dedicated telephone lines.

Telephone line data communications - especially in outlying locations - is not always dependable. Especially, if the system goes out at night, quite often one must wait until the next morning when the telephone employees come to work. From what I have been able to learn, satellite communication is very reliable.

D'Addario questioned my statement that telephone lines are a problem.

Peery then related his knowledge from investigating the VLBA sites. His discussion is contained in his attached memo.

At this point, Weinreb said, because of the initial outlay required, we should only investigate the dedicated telephone line network.

Hvatum said we should investigate the best system with backup capabilities, but within the present budget.

***** End of Meeting *****

Since the meeting, I have received some more accurate prices on satellite systems. They are based on \$75,000 per station, although the quoting company said \$60k to \$75k.

Xmit & rec. antenna & electronics - \$75k x 11 =	\$ 825k
Spares	= <u>50k</u>
	\$ 875k
Transponder rental	\$2k x 12 x 10 = <u>240k</u>
(2 ea., 56k baud channel)	\$1115k

or \$199k/yr. on a 5-year basis

and \$111.5k/yr. on a 10-year basis

as compared (for a dedicated telephone line) to:

\$210k to \$240k/yr. on a 5-year basis

or \$190k to \$220k/yr. on a 10-year basis.

In my opinion, this should be seriously considered. We could consider buying the antennas and building the electronics ourselves.

NATIONAL RADIO ASTRONOMY OBSERVATORY
Green Bank, West Virginia

September 29, 1983

TO: A. Shalloway
FROM: B. Peery
SUBJECT: Telephone System at Prospective VLBA Sites

In our visit to prospective VLBA telescope sites, we inquire about telephone service. In all cases where there are existing facilities, we get an answer that is not a very enthusiastic endorsement of the local system. At some of the existing installations there are alternate systems or alternate systems being considered. The main use has been for voice communication. They have not attempted to transmit data to any extent, it appears - definitely not high speed digital data.

The following is a brief review of our interpretation of what the situation is at those sites visited:

- Harvard Observatory - Fort Davis, Texas
Served by Southwest Bell out of Fort Davis.
Have asked for upgrade of system for 2400 baud.
This is being worked on. Moving slow.

- McDonald Observatory - Fort Davis, Texas
Served by Southwest Bell out of Fort Davis.
Are considering private satellite system to the
University of Texas in Austin.

- Kitt Peak - Arizona - Served by Mountain Bell out of Tucson.
Our impression is that our experience there has
been similar to that described by other sites.

- Owens Valley Observatory - Big Pine, California
Served by small telephone company out of Bishop.
They have dedicated line back to Caltech in
Pasadena by-passing local system.

- Haystack Observatory - Westford, Mass.
Served by New England Telephone (part of Bell
System).
Have private microwave link back to MIT - Boston.

Five College Observatory - Quabbin Reservoir near Pelham and Cooleyville,
Mass.

Served by New England Telephone (part of Bell
System).

Have private microwave link back to University of
Mass. in Amherst.

North Liberty Radio Observatory - North Liberty, Iowa

Served by small local telephone company.

Have private microwave link back to University of
Iowa in Iowa City.

In all cases, the people we talked with thought that we could probably get better service by by-passing the local organization, but this would take time and would probably increase the cost of the service. We did not pursue the issue beyond this, as we were making our first visit and the sites are considered prospective sites at this time.