Interoffice

National Radio Astronomy Observatory

Socorro, New Mexico

June 4, 2003

To: Peter Napier

From: Jon Romney

Subject: SECOND REVISED Cost Estimate for VLBA Integration in EVLA Phase 2 Proposal

Again at your request, I have revised my previous cost estimate, dated 2003 March 24, to provide a 2-Gbps recording and playback capability. This represents an intermediate case between the original 4-Gbps concept and the 1-Gbps version considered in the previous revision.

There is ample reason to believe that a 2-Gbps capability will be feasible for Mark-5-like recording systems by 2009-2010, but until and unless the EVLA correlator is able to accommodate this bandwidth, there will be no point in implementing such an upgrade on the VLBA.

I have included in this estimate the cost of *new* 2-Gbps recording systems for the 8 NMA stations, plus *upgrades* to the 1-Gbps recording systems that we anticipate will be in place at the Pie Town and Los Alamos (as moved) VLBA stations; funds from some other source are assumed to be available for the corresponding upgrades to the remaining 8 stations.

For playback systems, I have retained the 2 new playback systems required in both previous estimates. In addition for this version, I have included *upgrades* to all 24 of the 1-Gbps units that we anticipate will have been installed on the VLBA correlator, and which would be transferred to the EVLA correlator.

In both cases, the assumed upgrades differ from the new procurements that were assumed in the original estimate for a 4-Gbps capability.

The revised cost estimated is presented in the attached Table 1. Again, only items [3], [4], and [5] are changed fundamentally, as detailed below. Item [7] is also changed proportionally.

3] & 5] Mark 5 recorders & playbacks. The unit cost for a *new* 2-Gbps system is assumed to be 150% of the current commercial price for a 1-Gbps system; the unit cost for *upgrading* such a system to 2 Gbps is assumed to be 50% of the current commercial price.

4] Mark 5 disk modules. The module cost and capacity are unchanged, but the size (in bytes) of the required media pool is scaled proportionally: half that for the 4-Gbps system, or twice that for the 1-Gbps case.

On the bottom lines of the three estimates I have given you, this latest version is about 57% of the original, 4-Gbps version, and 148% of the second, 1-Gbps version.

Table 1.

EVLA Phase 2

Cost Estimate for VLBA Integration

#	Item	Units	Unit Cost k$	Total Cost k$	Fraction	Comments & explanations
1]	Widar station boards for sub-banding	20	15.0	300	22%	20 = 2 per NMA station to support widely-separated sub-bands
2]	Backplanes & VSI connectors	60	2.0	120	9%	60 = (40 in correlator) + (20 for NMA subbanding)
3]	Mark 5 recorders for NMA stations	8	24.5	196	15%	
		2	8.2	16	1%	
4]	Mark 5 disk modules	203	1.1	219	16%	/ Capacity: 8 X 2TB → 16 TB < Module: Capacity X $0.06/GB + 12.5% → $1,080 \ Pool: 10stn X 30days X 50% @ 2Gbps / Capacity → 203 modules
5]	Mark 5 playbacks for correlator	2	24.5	49	4%	2 = (40-27)*2 - 24
		24	8.2	196	15%	
6]	Optical splitters & switches	276	0.5	138	10%	276 = 3 X [10 X 2 + 18 X (2+2)]
7]	Spares			102	8%	10%, *excluding* disk modules
	Total			1,336	100%	

03/3/23 -- jdr