

National Radio Astronomy Observatory

Green Bank, West Virginia

To: File

February 14, 1980

From: R. K. Moore

ADDITIONAL BASELINE TO INTERFEROMETER

MEMO No. 115

Subject: Additional Baseline to Interferometer

A meeting of the committee was held at 1:00 pm on 14 February. The following were present: Jim Coe, Buck Peery, Len Howell, Sidney Smith, Ron Weimer, Don Hovatter, Fred Crews, Bob Moore, Green Bank, Hein Hvatum and Bill Meredith, CV, teleconference system.

The following major topics were discussed:

1. Site. Progress to date concerning location and acquisition of property for principle site link reflector locations were reviewed. A memo has been written on the principle site (Memo #110). A meeting is scheduled with Mower Lumber Company to discuss Hosterman Ridge location for passive reflector site. A desired location has been established on Asbury Knob for an additional reflector site. Mr. Grimes, owner of the property, has been contacted and he is considering the matter. We will continue to negotiate with him.
2. Telescope. The study group discussed the information which B. Peery had received concerning the moving of the 85-3 and/or the purchase of a new 40-45 ft. telescope. Preliminary cost figures are attached. The study group leaned toward the purchase of a new telescope rather than moving the 85-3. It was decided that we should try to obtain more definitive cost figures on a new telescope. Accordingly, it was agreed that we would request the National Science Foundation's approval to go out with solicitations to prospective vendors. B. Peery will prepare the specifications. R. K. Moore will write a memo to J. Marymor requesting that he obtain NSF approval for solicitations. Dr. Hvatum made the point that we should try to support any recommendations for a new telescope in terms of dollars.
3. Microwave Link. Dr. Hvatum indicated that he would like to see the time element shortened concerning the microwave link. Jim Coe said that it would be late 81 or early 82 before this could be done. With more manpower it could be shortened to possibly late 81. Dr. Hvatum stated that he would like to see a little more time given to this and further discussion at the next meeting.
4. Computer. It was generally concluded that the NRAO's position should be the retention of one DDP 116 system and to acquire the necessary manpower to support it. The matter of who would program the data analysis, etc. will be discussed further 21 February. Ron Weimer submitted a report on the computer area which is enclosed.

5. Time and Charges for Study. Don Hovatter requested that all concerned keep a record of time spend on this program. It was reaffirmed that 20k had been earmarked for our study effort. It was finally asked that each division involved in this project keep total manhours and to submit estimates of manhours on the task list to the following persons who will act as coordinators: Site, B. Peery; Link, Jim Coe; Computer, B. Meredith; and Telescope, B. Peery.

It was indicated by Fred Crews that a meeting would be held with Navy representatives on 21 February in the teleconference room. Those persons from NRAO required for the meeting will be notified by Fred. A final comment was made that our proposal to the Navy should include cost of operating the new extension to the baseline.

RKM/baw

Attachments

# REPORT OF R. W. MEYER RE. COMPUTER.

## 8 & 9 Computer, Computer Peripherals and Computer Interface

New computer: If a new computer were to be provided, we would recommend a Modcomp II series compatible with what we have now. Estimates are as follows:

New computer	25 K
Tape System	8 K
Disk System	7 K
Printer Log System	10 K
CRT's	7 K
Card Reader	3 K
Misc. Extra Controllers	8 K
	<hr/>
	68 K
Estimate Extra Components	20 K
	<hr/>
	88 K
Estimated time	30 man months
	Eng./Construct/Test
	24 man months
	Software

Might be able to do analysis on new computer if integrated into original plans.

Old Computer: We would leave the DDP116 in, with the addition of two new hardware ports. One would dump data currently going to disk into the new data analysis computer. Even if the data analysis computer is not part of original plan, we would add link at this time. The second link would be a two way data/command link to the remote site. Data would be supplied to microwave link as a serial data stream for modulation at each end. We would get back a serial data stream from the microwave receiver at each end. Cost would be minimal since most of the equipment would be constructed locally.

Estimated cost of material	5 K
Estimated Elect. time	6 man months
Software	3 man months (Ref. #109)

I would much prefer the "old computer" approach.

11. Delay: The present delay system is being studied to reduce the interference to the 300-foot. Depending upon the outcome of this study, we may need to build it into an RFI tight rack. The change-over period would be a good time to do this if it becomes necessary.

Estimated time	1 man month
Material	\$2 K

We need to investigate the maximum delay necessary for the new system to assure ourselves that the present system is adequate. If it is inadequate, some time would be required to implement a fix. For a small margin we might juggle the delay clock slightly to increase delay. This would have a slight software implication.

Estimated time	.5 man month
Cost	\$.5 K

Lobe Rotator: The maximum offset rate needs to be determined to assure ourselves that the present system is adequate. Again if the increase is small, we might implement it with a slight clock change in lobe rotator.

Estimated time for fix	.5 man month
Cost	\$.5 K

#### 14. Data Communication and Monitoring

The first approach here would be to provide a duplicate of the 45-foot link boxes. This is already included in the time and material estimates in paragraph 8 & 9.

Since we are proposing to have a telephone link to the new site, I think an additional data link would be appropriate. If power is down at the remote site, it would provide a basic set of measurements under battery backup. These might include, wind speed, temperature and other items that telescope operations consider important. If power is up but there is some question about link data, we could steal a few frames of link data and send them back over the telephone line. It is not clear whether the telephone connection should be able to command the telescope but this should be considered. If this type approach looks feasible, I would also propose to do something like it at the current 45-foot site only using 43 MHz radio instead of telephone lines.

Addition estimate	3 man months
Material	\$2 K

#### 13. Telescope Control

I would propose that we not provide the HP calculator control at the new telescope. A duplicate of the digital portion of the control loop at the 45-foot would be supplied.

Estimated time	2 man months
Cost	\$2 K

#### 17. Telescope Encoders and Electronics

The Inductosyns now being planned for installation on the 85-foot telescopes would be used on the new telescope. A duplicate of the electronics at the 45-foot would be provided.

Estimated time	2 man months
Cost	\$2 K

PRELIMINARY COST FIGURES FOR TELESCOPE

Major Tasks	Move 85'3			Buy 45' (ESCO)			Buy 40' (Harris)			Buy 45' (RSI)		
	Dollars	Quantity	Time	Dollars	Quantity	Time	Dollars	Quantity	Time	Dollars	Quantity	Time
Basic Structure	-	300 ton	-	700,000	40 ton	18 mo	750,000	42 ton	12 mo	500,000	25 ton	6 mo
Modifications	125,000	2 new drives + Bolts, etc.	-	-	-	-	150,000	Prime focus extra 2 ft.	-	-	-	-
Servo	-	-	-	-	-	-	-	-	-	-	-	-
Foundations	9,000	80 yd <sup>3</sup>	3 mo	3,000	28 yd <sup>3</sup>	3 mo	7,000	60 yd <sup>3</sup>	3 mo	7,000	60 yd <sup>3</sup>	3 mo
Excavation	2,000	300 yd <sup>3</sup>		1,000	120 yd <sup>3</sup>		300	30 yd <sup>3</sup>		300	30 yd <sup>3</sup>	
Dismantle	128,000			-	-	-	-	-	-	-	-	-
Shipping	94,000		6 mo	75,000		1 mo	18,000	6 trucks	1 mo	Inc.		
Erection	265,000			100,000		1 mo	25,000		2 wks	Inc.		
Painting	50,000		1 mo	-	-	-	-	-	-	Inc.	-	-
Cabling												
Power Reg.		50 kw			20 kw			15 kw			20 kw	
Trailer Control												
Sterling Mount				40,000		6 mo	40,000		6 mo	40,000		6 mo
Total Dollars	675K			919K			990.3K			547.3K		

Avg. 750-800K on foundations.