

Interoffice Memorandum

CALIFORNIA INSTITUTE OF TECHNOLOGY

To: VLBA Memo Series

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Subject: Towards a Correlator Option List

Several correlator performance "dimensions" have been identified, and possible implementation options are indicated. They are listed here to elicit comments from the reader.

In each case, option "0" corresponds to our present notion of the "reference correlator," the one we presently intend to build if there is adequate funding. No costs are indicated; it will be one of our tasks in the coming months to provide incremental costs for these options -- as well as the estimated cost of the reference correlator.

DIMENSIONOPTIONS

A. SAMPLE RATE/ IF CHANNELS	+1	32 CH. X 16 MSAMP/S	(1024 MB/S)
	+1/2	24 CH.	(768 MB/S)
	0	16 CH.	(512 MB/S)
	-1	8 CH.	(256 MB/S)
	-2	16 CH. X 16 MSAMP/S, 2 or 3 LEVELS	

Option -1 satisfies maximum bit rate requirement, but provides fewer than desired channels for bandwidth synthesis. Option -2 indicates the cost savings that might be realized by dropping the 4-level sampling.

B. STATIONS/ BASELINES (FULL CAPA- BILITY)	+2	14 STN, 91 BSL
	+1	12 STN, 66 BSL
	0	10 STN, 45 BSL

Nominally, the correlator is divisible into "half" and "quarter" capability modes (in terms of lags or bandwidth) to handle double or quadruple the number of baselines.

C. DUMP RATE (MIN. INTE- GRATION)	+2	150 HZ
	+1	30 HZ
	0	10 HZ (?)
	-1	4 HZ

Option -1 is the bare minimum, 0 provides some extra field-of-view, +1 covers entire FOV window and perhaps is more useful for pulsar time gating, +2 allows high time resolution time gating and binning and precise fractional bit shift correction, as well as sufficient computing "headroom" for advanced algorithms.

D. FREQUENCY RESOLUTION	+1	1024 CHANNELS/BSL 2 K LAGS(10 STN)
	0	512 1 K
	-1	256 1/2K

The impact is largely on spectroscopy. Option -1 would require more 2-pass processing.

E. CALIBRATION POWER	+1	1/2 VAX-11/780 WITH 5105 AP (MORE MEMORY?)
	0	1/4 VAX-11/780 WITH 5105 AP
	-1	None - leave for post-processing

These options are not well defined at the moment.

F. FRINGE PROCESSOR TECHNIQUE	+1	on-line partial fringe analysis
	0	adaptive windowing in fringe rate, delay
	-1	minimal windowing - leave for post-proc.

These also are not well defined. They are related to the dump rate options above.

- G. MULTIPLE FIELD +1 whole FOV available (dump rate option +1)
- CENTERS 0 two simultaneous field centers analyzed
- 1 one center per pass

These choices are related to dump rate and fringe processor technique.