

4 Dec. 1986

To: Coordination Committee (Project Book Authors)
From: Craig Walker
Subject: Questions about the Project Book.

The following is a list of questions and problems found during a recent read through the Project Book (I was preparing a colloquium on the VLBA) and not resolved in a discussion with Jon Romney.

1. (p. iii and antenna chapter) At one time we had an operating condition in which the antenna could be pointed but no specific performance was guaranteed. This would allow low frequency observations in moderately strong winds. This was for winds up to 55 mph. This condition does not appear here or in the antenna chapter. Does it still exist?

2. (Chp. 1) Jon pointed out that Cam and I use different abbreviations for the stations. We should probably standardize.

Yes
3. (p. 2-3) The humidity spec in the site control building is shown as +/- 10. This is twice the range that we are specifying for the data playback system area in the AOC (CRAI). Is the spec correct and is it good enough? I know that we backed down on the specs for cost reasons but was this too far?

4. (p. 2-4) The elevation limit is 0 deg, not 5 deg.

5. (Antennas) What happens at -30 deg C. Do we have to stow? If so, how much time will be lost, especially in Iowa and Washington? If it is significant, what can be done?

6. (p. 4-4) Flagging is only listed for antenna off source and l.o. system problems. What about other problems (eg. module dead, receiver warm, etc.)? Some might only affect a subset of the data so the antenna might still be recording.

7. (p.6-2) The column heading "antenna temps" is confusing to astronomers who would expect it to be the power due to a source. Also, the numbers are not consistent with the table on p. 5-7.

8. (p. 6-5) The first l.o. is at $n*500 \pm 100$ MHz where n is 4 or higher. This would not allow the bottom end of L band to be observed! Even if n could be 3, the ± 100 , rather than the original spec of $\pm 100,200$, precludes simultaneous observations in one IF of frequencies over all of L band (I suppose 2 IF's could be used).

9. (p. 6-6) Can the 610 MHz filter be switched out? I thought we had agreement that it could but that is not mentioned. In the absence of interference, we may want to observe in a wide band.

10. (Electronics) How is the 327 MHz signal mixed into the IF band? There is no mention of the 327 MHz l.o.
11. (Digital Processing) How are the clipper levels set and how are the levels maintained? In the absence of phase switching, this is important.
12. (p. 10-2) Is the restriction to 2x interleaving necessary? Interleaving up to the oversampling rate would not increase the rate at which calculations are made compared to the normal wide band case.
13. (p. 10-2) I suggest a rewording of the section on interpolation - I did not understand it at first even though I have done the derivation of the need for it.
14. (Correlator) It is intended that taper functions can be applied to the input data prior to the FFT but this is not mentioned.
15. (p. 10-5) The text leaves the impression that the pulsar gate is applied before the FFT rather than after as is the current plan. This should be fixed.
16. (p. 10-6) The scheme of always making 2048 point spectra and then averaging adjacent channels when less resolution is desired produces an output spectral channel response function that is rather different from what we are normally accustomed to ($\sin x / x$). Whether this is good, bad, or indifferent is not clear yet but this consequence of the transform scheme probably should be mentioned.
17. (correlator) No mention is made of how Doppler tracking is to be done. The station based fringe rotators remove the effect of the Earth's rotation but the effect of the Earth's motion in its orbit is still there if the reference point is the Earth's center as I expect is will be. The easiest solution is probably to Doppler track the reference frequency so that a station with a constant l.o. sum will appear to have a slowly changing l.o. offset. In fact, the ease of doing the Doppler tracking is one of the advantages of the FX approach.
18. (p. 11-4) Much of the discussion of the processing that occurs in the correlator is based on the XF approach. While the same functions occur in the FX correlator, they happen in rather different ways.
19. (p. 12-2) The impression is given that the cost of digital communication is rather uncertain. However, as far as I remember, it has been studied (by Art Shalloway) at least as well as any of the other factors - perhaps Carl is not aware of Memos 265, 273, and 299.
20. (p. 12-9) The table of jobs to be done at the antennas shows 16 hours per week of module replacement. I hope this is way off or we have failed miserably to provide a reliable system! Note that this is the most time consuming job in the list.

21. (p. 13-5) The Phase I numbers (especially office) are far out-of-date. Of course, I don't believe that we have a formal list of more up-to-date numbers. Examples are that more space is required for Scientific Offices. Also, Business and Fiscal are not even going to be in the building in Phase I by current plans.

I suggest that changes to the project book be made where appropriate and would appreciate answers to the questions raised. VAX MAIL can be sent to me at CVAX::CWALKER through Dec 12 and to CWALKER (eg on VAX1) later. I would have sent this as VAX mail except for the missing VAX's at the moment.

* #1 10-DEC-1986 15:10:45

NEWMAI

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From: CVAX::BPEERY
To: CWALKER, BPEERY
Subj: MEMO CC 57

RE: ITEM 3 --- WE ARE WORKING TO GET + OR - 5%. WILL KNOW BETTER WHEN WE
GET PIE TOWN WORKING.

SIGNED BUCK

MAIL)