

THE VLBA DATA ACQUISITION SYSTEM REPORT
AND ITS IMPACT ON THE AT

R.P.Norris

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Abstract

The VLBA have produced the Final Report for Phase I (Design) of the Data Acquisition System (VLBA Acquisition Memo #42). Here I assess the impact on the AT of developments described within that report. The main effect is in cost, since the new VLBA report gives cost estimates which are significantly higher than those given previously. The overall capital cost (in FY85 US\$) is \$636k for the complete AT LBA system described in AT/17.3.1/003 (i.e. Culgoora - Siding Spring - Parkes - Tidbinbilla - Hobart), which represents an increase of 28% over the previous estimate.

1 INTRODUCTION

The final report (hereinafter referred to as the VLBA report) for the design phase of the VLBA Data Acquisition System has recently been released. Although it does not contain any major technical changes from previous reports, it is much more specific in some areas (especially the data playback electronics). The cost estimates are also revised, and in some cases it seems that costs have increased by a factor approaching two. The main causes of these increases are:

1. A 60% increase in the price of the Honeywell recorders
2. Greater sophistication of formatting
3. An underestimate of the quantity of electronics needed for the data playback system.

These increases have serious implications for the AT, since all the costs for the use of VLBA tape recorders for the AT LBA, as proposed in AT/17.3.1/003 (hereinafter referred to as the AT report), were based on the VLBA estimates. Here I assess how the content of the AT report is affected by the VLBA report.

2 TECHNICAL CHANGES

2.1 Data Acquisition Terminal

There are no significant changes, except:

1. The baseband converter gain has been changed from 46dB to 64dB - presumably a typographical error.
2. The output format has now been defined more explicitly, and the precise data format (including error correction codes) is changeable by software.
3. The formatter and decoder were previously separate units, but now the decoder appears as one module within the formatter.

2.2 Data Playback Terminal

This has changed significantly, in that only a preliminary outline of the proposed design was available before, but now the design appears to be almost complete. The major change is an apparent growth in the quantity of electronics. Unfortunately, no detailed description of the system is currently available to us. I have therefore taken

the cautious, although perhaps pessimistic, approach of assuming that we will use all their electronics in our data playback terminals, except where the number of modules can obviously be scaled by the number of channels.

One cause of the growth in the size of the deskew electronics seems to be that the system is now more flexible in the use of tape format, which can be changed by software control. It is possible that we could reduce the cost if we decided to forego some of this flexibility. Additional causes probably include a greater sophistication found to be necessary once the detailed design was developed.

It should also be noted that some items, such as the micro for tape transport control, are now explicitly included whereas before it was not clear whether they were included or not.

3 COST CHANGES

3.1 Data Acquisition Terminal

A comparison of the old and new prices is given in Table 1. The overall increase of 14% is entirely accounted for by the increase in the cost of the recorders.

3.2 Data Playback Terminal

It is not clear how much of the VLBA equipment might be duplicated by our existing correlator electronics, and so I have taken the perhaps pessimistic approach of assuming that we will use all their electronics (scaled as necessary) in our data playback terminals. Their playback electronics (lumped together in the VLBA report as 'deskew electronics') are costed at \$30k (compared to \$16k in their previous report) for 32 channels. Furthermore, the more detailed design in the VLBA report shows that the simple scaling that I used for this unit in the AT report is inappropriate, and this has increased the price of the AT design even further. Hence the revised cost for the AT 'deskew electronics' comes out at \$13.75k.

4 CONCLUSION

The cost of the AT LBA tape recorder design has increased by 28% from US\$494k to US\$636k. Devaluation of the A\$ has made the situation even worse. Against this serious increase in cost may be weighed the reassurance that at least the VLBA design is now firmer, and so hopefully there will be no more large increases.

TABLE 1: COSTS FOR DATA ACQUISITION TERMINAL

The prices shown are for one AT Data Acquisition Terminal (DAT). Old prices are taken from AT/17.3.1/003 and new prices are based on VLBA Data Acquisition memo #42, using the same assumptions as in AT/17.3.1/003. All prices are in FY85 US\$.

Item	Qty	Old price	New price
IF distributors	2	2000	1500
Baseband converters	4	10000	10000
Formatter/Decoder	1	8000	7000
Rack & Power Supplies	1	5000	5000
Model 96 transport	1	15000	24000
Recorder electronics	1	6000	8000
Headblock	1	4000	8000
Labour (electronics)	1	10000	6000
Labour (recorder)	1	6000	6000

TOTAL		66000	75500

Note: The cost of the formatter/decoder is slightly uncertain since we need only one quarter of the VLBA formatter requirement, but need an entire decoder/buffer/quality analyser. The above figure is the best estimate I could make given the available data, but is uncertain to about \$1000.

TABLE 2: COSTS FOR DATA PLAYBACK TERMINAL

The prices shown are for one AT Data Playback Terminal (DPT). Old prices are taken from AT/17.3.1/003 and new prices are based on VLBA Data Acquisition memo #42, using the same assumptions as in AT/17.3.1/003. All prices are in FY85 US\$.

Item	Qty	Old price	New price
Decoder electronics	1	4000	13750
Rack & Power Supplies	0.2	1000	1000
Model 96 transport	1	15000	24000
Recorder electronics	1	6000	8000
Headblock	1	4000	8000
Labour (electronics)	1	2000	2000
Labour (recorder)	1	6000	6000

TOTAL		38000	62750

Note: The VLBA report does not seem to include the cost of rack and power supplies, and so I have added these as before. The VLBA report also seems to lump together all the labour as a total of \$6000, which seems inconsistent with their estimates for the DAT's, for which they include a labour cost of \$6000 for the recorder alone. I have therefore added an additional labour cost for the DPT electronics.