

THE "UNLIMITED" TAPE CASE

Larry R. D'Addario
16 November 1984

In many design discussions lately, it has been almost universally stated that when less than the specified average recording rate is called for, we can afford to be quite wasteful of tape. Observations are regarded as separable into the tape-limited cases (large bandwidth) and the others, the implication being that in the others we are "unlimited" by considerations of tape use.

It is reasonable to argue that, given good scientific justification and given sufficient budget for tape shipping, a project which needs the full capacity of the recording system should be allowed to use it. But it does not follow that the system may be designed to waste tape (e.g., by recording samples which will never be processed) provided only that we stay below the maximum tape consumption limit. That limit has been set, somewhat arbitrarily, at 50 lbs of tape per day per station. The estimated cost of shipping this much tape is \$140K/year; that's just what goes to UPS, not counting the tape replacement costs and other operational costs that are proportional to tape use; and it's only for the ten VLBA stations, whereas we might have to support tape shipping for other stations which conform to the VLBA design.

It is suggested, for example, that we run the tape drives at the station faster than necessary so as to avoid an excessive speedup factor at playback time if only one playback speed is implemented. Since the resulting high oversampling factor will not be supported by the correlator, we simply skip correlating many of the samples. Other suggestions, such as using oversampling to get a few percent more SNR rather than observing longer, are not operationally cost effective if tape costs are significant (this even ignores the extra capital cost of supporting oversampling). The use of inefficient coding for three-level quantization is yet another example of wasteful design.

The argument is made that these wasteful practices don't matter because in the modes where they are used, we remain below the specified maximum tape consumption rate. I would like to characterize this as "Pentagon mentality." The thinking is similar to that of the procurement officer who has a \$1000 budget for tools, but for whom it turns out that the only tool needed is a hammer. From this he concludes that a reasonable price to pay for a hammer is \$1000. Let's not fall into this trap.

Notice that if the budget for tape shipping could be cut in half, we could afford to hire one or more additional programmers or engineers for the VLBA operating staff. Wouldn't this do more for science than paying it to UPS? Would it be worth some extra capital expenditure or small increase in complexity in order to be less wasteful?