14 August 1989

VLBA Acquisition Memo # 160

To: VLBA Data Acquisition Group

From: George Peck

Subject: Do We Need A Prepass?

CURRENT PROCEDURE

A prepass has been used, so far, in the MarkIIIA and VLBA tape recorders. The reasons for the prepass are (1) to clean loose debris from the tape and (2) to relax any non uniform tensions built up in the tape pack which could adversely affect tracking ability.

QUESTIONS ABOUT THE PREPASS

1. What conditions necessitate a prepass?
2. Can the prepass be done weeks or months before the tape is used?
3. Is it possible to prepass the tape on another transport than the one which is used to record?
4. If we change to idlers and rollers, in place of fixed posts, will we still need a prepass?

CONDITIONS THAT NECESSITATE A PREPASS

When the tape undergoes a cycle in temperature and/or humidity, the tape pack tension is affected, and some oxide particles come off of the tape. It should be assumed that tapes undergo such a cycle during shipping, although UPS is unable to provide any specific data on temperature or humidity during shipping. I have purposely subjected some tapes to temperature cycles, after doing a prepass and writing a track on the tape. A "prepass effect" was seen, where the tracking varied as a function of footage down the tape. This effect was most pronounced when I played back the tape cold or hot, however, the effect was still present when I let the tape stabilize to room temperature before playing it back. In one case, the "prepass effect" showed a track position variation of 16 microns down the length of the tape. This tape had been allowed to stabilize to room temperature.

PREPASSING THE TAPE AHEAD OF TIME

The prepass can probably be done ahead of time, if the tape is stored in a stable environment. I did an experiment where a track was written on a tape, after a prepass was done. Immediately after the tape was written, I read the tape and recorded the position of the track at various places along the tape. The tape was stored for 23 days, and read again. This time, no prepass was made before reading the tape. No "prepass effect" was noticeable. The tracking down the length of the tape varied only by 5 microns, although the entire track was about 4 microns away from its original position after the 23 days. This should not be a problem, since the track was straight, and we can easily "peak up" on a track even if it is in a slightly different place.

PREPASSING THE TAPE ON A DIFFERENT TAPE RECORDER

I did an experiment where, after having prepassed and written a tape on VLBA recorder #3, I prepassed the tape (at fast speed) on a MarkIIIA transport. Then, I read the tape on recorder #3. There was very little effect on the tracking. I believe that we can prepass tapes on one tape recorder, and then use them on another recorder.

EFFECT OF PROPOSED IDLER AND ROLLERS ON NEED TO PREPASS

More testing needs to be done in this area. I did one test, using an old idler and rollers in place of fixed posts on VLBA recorder #3. After prepassing a tape and writing a track on it, I cooled it to 35 degrees F. The tape was played back cold, without letting it stabilize to room temperature. No "prepass effect" was noticeable at all. If results are regularly this good, we may not need a prepass with the new proposed idler and rollers.

CLEANING THE TAPE

If we do away with the prepass, we may want to find some way to clean the tape. The VLBA recording heads are designed to clean particles off of the tape as it passes over the head. After an environmental cycle or after degaussing, there are likely to be loose oxide particles which should be cleaned off. Presently, the prepass takes care of this, but we may need an alternative if we do not do a prepass.