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To: VLBA Data Acquisition Group
From: Alan E.E. Rogers
Subject: Recording Characterization Test Plan

A) Tape Related

- 1) Investigate prepass relaxation time.
- 2) Can prepass be replaced with pass through tape cleaner?
- 3) Tracking offset vs tape temperature.
- 4) Tracking signature with tape turned over, direction of tape motion, and speed change.
- 5) Tracking offset vs packing tension.
- 6) Tracking offset vs accommodation from previous high and low humidity. High/low temperature.
- 7) Repeat for various tape types.

B) Machine Related

- 1) Tracking offset vs vacuum level.
- 2) Tracking signature vs vacuum signature.
- 3) Tracking offset vs deck plate temperature.
- 4) Tracking offset vs position of tape in vacuum columns.
- 5) Tracking offset vs capstan axis alignment (vertical and horizontal).
- 6) Tracking offset vs capstan taper angle.
- 7) Tracking offset vs head position.
- 8) Tracking offset vs tape footage.
- 9) Tracking offset vs axial location of tape reels.
- 10) Tracking offset vs tape speed.
- 11) Tracking offset/signature vs reel servo gain (vacuum-column sensor output).
- 12) Tracking offset vs other transport parameters.
- 13) Tracking offsets due to irregularity of bearing surfaces (due to wear or dirt buildup).

C) Electronics Related

- 1) LVDT offset and linearity vs temperature and voltage.
- 2) LVDT offset repeat at reduced oscillator levels.

General Philosophy

The purpose of these tests is to find out what factors have the greatest influence on the tracking performance of the tape recorder/playback system and then determine what steps are needed to control variations in the critical factors. We should only have to introduce machine and tape dependent parameters as a last resort. For example we could characterize the tracking of each recorder for each tape as a function of footage. I don't think, at this stage, that this should be done. We may be able to align the transports to greatly reduce tracking offsets and their dependence on tape and environmental factors.

Tracking Offset

By tracking offset, I mean both the D.C. and slowly varying A.C. components. The full description being the tracking "signature". In all tests it would also be useful to examine the forward/reverse offset.

Division of Labor

We have at our disposal the following systems:

<u>Recorder</u>	<u>Software</u>	<u>Location</u>	<u>Personnel</u>	<u>Availability</u>
VLBA REC #1	VLBA	Pie Town	George Peck	Now
VLBA REC #2	VLBA	Socorro	George Peck	Jan '89
VLBA REC #3	VLBA	Haystack	Alan Rogers/ Roger Cappallo	Jan '89
MKIIIA	Field System	Haystack	Hans Hinteregger Dan Smythe	Jan '89

I suggest item A2 be studied by NRAO. Items like B4 and B5 which require adjustments to the transport can be done at Haystack. Other items could be done at both places. Once we determine the major causes for the tracking offsets further tests will be needed and the whole investigation will probably evolve as we (hopefully) unveil the cloak of "black magic" and gain a better understanding of the system.

Schedule

Some tests can start now while others will have to wait until the MKIIIA test system is ready. I would hope we could start reporting our findings before the end of January and complete all tests by the end of March 1989.