VLBA ACQUISITION MEMO #365

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To: VLBA Data Acquisition Group

From: Alan E.E. Rogers

Subject: Preliminary tests of modified "triple cap" contour

The suggestion that head flying could be reduced by using a "triple cap" contour was made in VLBA Acquisition Memos 305 and 356. In Memo 356 a special shape was suggested in which the negative pressure of the trailing edge of the outrigger caps might be used to pull down the tape and prevent a gap from opening at the leading edge of the central cap which contains the gap. This "modified triple cap" contour (see figure of Memo 356) has now been tested using outrigger caps made of epoxy and appears to show the vacuum pull-down effect at high tape speeds.

The test contour was made by taking a damaged and almost worn out headstack from the junk pile and forming outrigger caps by filling the approaches to the headstep with epoxy. This was accomplished by using plastic shim stock as a form against which to pour the epoxy. Since epoxy doesn't adhere to the plastic it could be easily removed after the epoxy had cured. After the epoxy has completely cured the outriggers were worn down to conform with the tape profile by using an abrasive tape. While the resulting triple cap contour was similar to the figure of Memo 356 it was rather imperfect especially on one side where it lacked a sharp edge.

Following repeated tests to make sure a stable contour had been established, tests of the loss were made by playing back a recording with an 0.9 micron wavelength. Playback signal strength was measured at speeds from 40 to 320 IPS and for vacuums from 4 to 15 inches which correspond to tape tensions from 0.9 to 3.3 N. The results are compared with a standard "single cap" headstack which had been contoured for 7.5" vacuum. The performance of the modified triple cap looks very encouraging. Good head to tape contact can even be maintained at 4" with speeds to 320 IPS. In fact, the contact improves a little in going from 160 to 320 IPS which perhaps indicates the presence of a "vacuum pull-down" on the trailing edge of the outrigger. (Performance in reverse is not as good and the asymmetry, which is also seen on some standard heads, is still being investigated.)

The next step might be to apply a more durable triple cap contour to a new headstack (this has to be done during manufacture).

Perhaps equally important, although much more difficult, is to develop a good computer model for the triple cap to allow us to explore various parameters like the apex angle, the length and separation of the outriggers, etc. Hans has suggested that several wedge-shaped grooves running along the headstack making a "multi-cap" might be even better. Also, any design has to be tested under operational conditions where, for example, dirt might get lodged between the caps. There may be other unforseen problems so that much more work is needed. The potential payoff of a new low pressure contour is lower wear rates and better high-speed performance which will be essential for any new thin film head arrays.

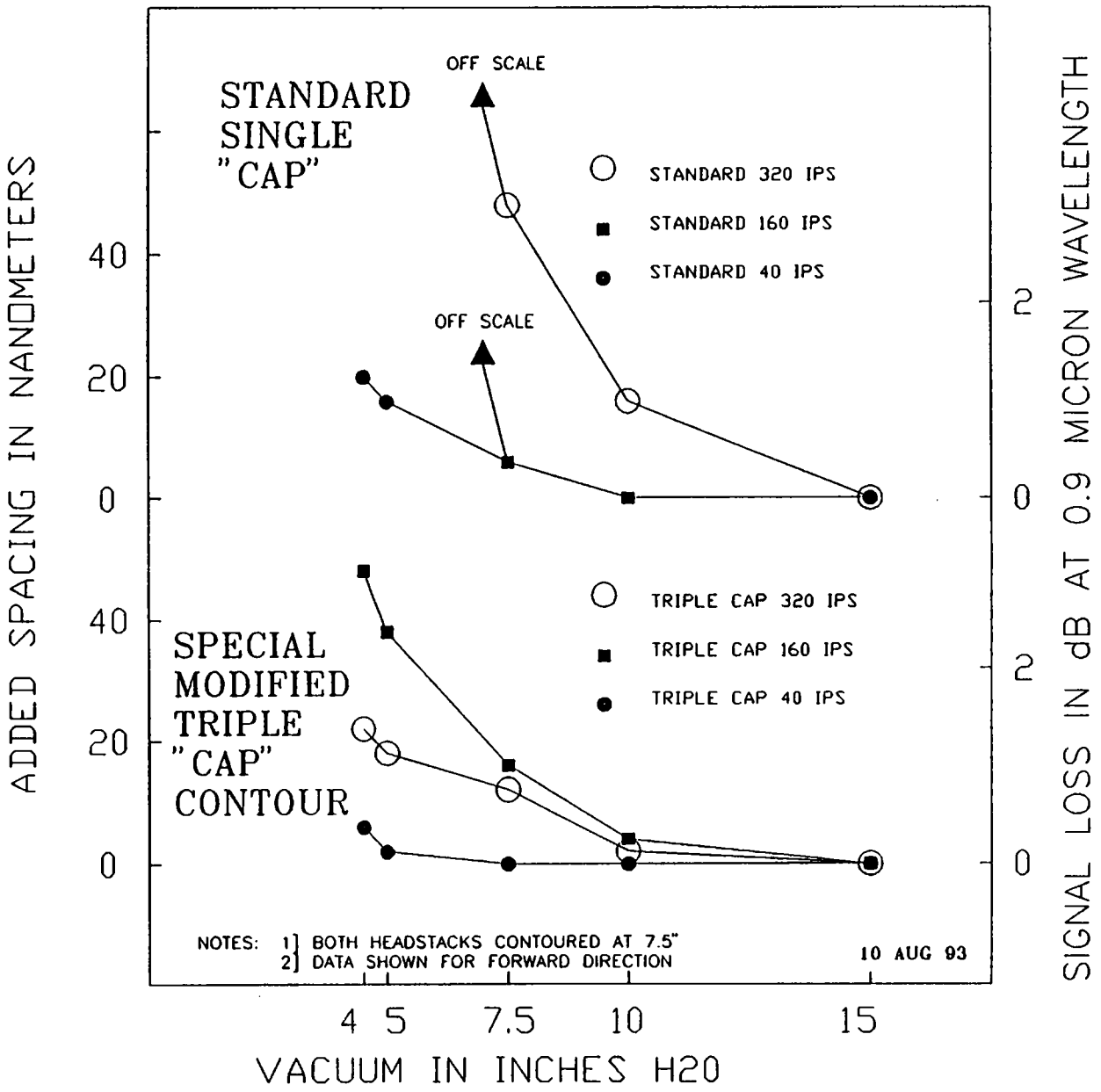

FIG. FIRST TESTS OF MODIFIED TRIPLE CAP CONTOUR