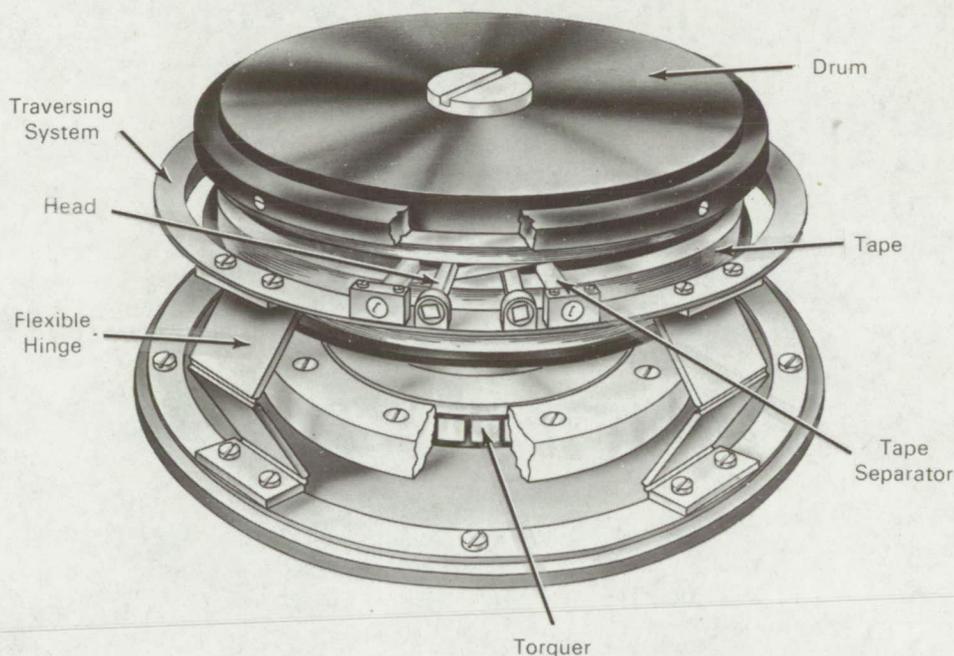


NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U.S. space program, to encourage their commercial application. Copies are available to the public at 15 cents each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Helical Recorder



The problem:

Tape recorders are needed for long-term bulk storage in extreme environments such as in spacecraft in flight. The operation time of present tape recorders is limited by the use of polymer tapes, belts, and many moving parts.

The solution:

A tape recorder has been designed having a minimum of moving parts and no belts, and using metallic tape.

How it's done:

The tape is wound in a helical shape resembling an edge-wound flat spring; its current substrate is beryllium copper. The magnetic coating is of nickel-cobalt plated on the broad surfaces of the tape. Completed tapes now being used are 0.125 in. across the broad surface and less than 0.005 in. thick.

The helically shaped tape is wound on a drum that is directly connected to the armature of a large-diameter torquer motor. Since the drum and torquer are integral, and both ends of the tape are fixed to

(continued overleaf)

the drum, all rotation of the system is at constant angular velocity, with the tape in constant contact with the drum. The direct coupling of the tape to the rotating member of the motor eliminates the need for drive components such as belts or gears.

Recording and reproduction are accomplished by insertion of the heads into a separation of the coil. The heads and tape-separators are mounted on a traversing ring such that, as the tape rotates, the Archimedes-screw effect causes the ring to track up and down, parallel with the drum's axis. Many variations in basic design are possible.

Compared to typical spacecraft recorders, the new design is expected to perform a given mission with 40% less weight and 25% less volume, and to have an operational life of 5 years. The new recorder may interest designers or industrial users of tape recorders.

Note:

Requests for further information may be directed to:
Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland 20771
Reference: TSP69-10340

Patent status:

This invention is owned by NASA, and a patent application has been filed. Royalty-free, nonexclusive licenses for its commercial use will be granted by NASA. Inquiries concerning license rights should be made to NASA, Code GP, Washington, D.C. 20546.

Source: P. T. Cole, P. A. Studer,
and A. L. Tyler
Goddard Space Flight Center
(GSC-10614)