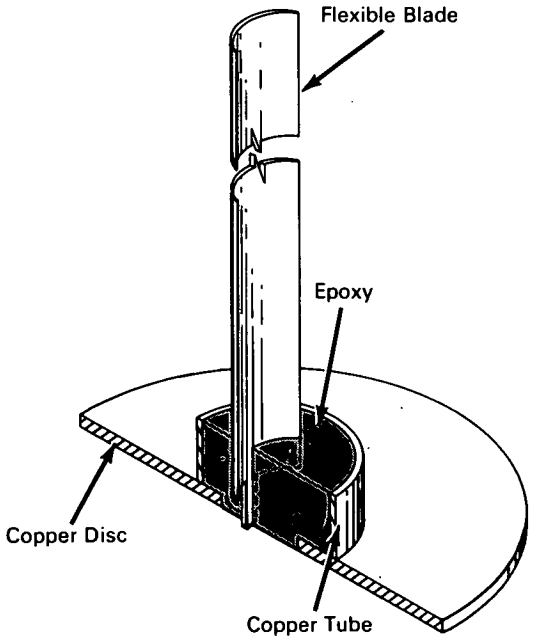
July 1968

Brief 68-10238

NASA TECH BRIEF

Astronaut Space Suit Communication Antenna



In carrying out his investigations on the moon surface, the astronaut must maintain communication with the Lunar Excursion Module (LEM) as he moves about. He must also have unencumbered use of his hands. For these reasons, an investigation has been made of communication antenna design for mounting on the astronaut's backpack.

One design consists of a dual frequency transmission line mounted in a foam filled fiberglass cavity. Tests of this antenna resulted in worst case null depths from −19 to −30 db for normal backpack heights, thus reducing the maximum useful range for astronaut-to-LEM to less than 400 yards.

A second design, consisting of a spring steel monopole in a blade-type configuration, has shown superior performance characteristics. This antenna is mounted in a copper cup filled with a potting compound that is recessed in the center to facilitate bending the blade flat for stowing when not in use. Tests of this antenna resulted in worst case null depths from −5 to −11 db, amounting to an appreciable gain in maximum useful range of astronaut-to-LEM. This antenna exhibits an unusually broad bandwidth characteristic over the LEM operating frequency range of 259.7 MHz to 296.8 MHz with a voltage standing wave ratio of 1.6:1 or less.

(continued overleaf)

Notes:

1. The wide bandwidth, not normally associated with monopole antennas, is mainly due to the relatively large mounting cup diameter of 1-1/8 inches and the favorable impedance characteristic, achieved by using the backpack hard cover and the thermal garment for a ground plane. The monopole antenna operates as an asymmetric dipole because of the irregular ground plane with a characteristic impedance between the 36-ohm monopole and the 72-ohm dipole, represented by the coax lead.
2. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   Manned Spacecraft Center
   Houston, Texas 77058
   Reference: B68-10238

Patent status:

No patent action is contemplated by NASA.

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