The Files - New Commercial Equipment File 27 April 1959

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Conference Report - Harris Transducer Corporation

1. On 8 April 1959 a conference was held at Headquarters with Mr. Edwin Sutter, Washington Representative of the Harris Transducer Corporation, Woodbury, Connecticut, to discuss a secure means of communications. Mr. Sutter presented a short brief written by Dr. Harris on the possibilities of using electromechanical ceramic devices for transmitting intelligence by mechanical motion through wire.

2. The technique of mechanically transmitting intelligence through wire is similar to the vibrating action that takes place in ultrasonic welding, i.e., the ultrasonic resonator actually transmits motion through one of the two materials which are to be welded together. The principle of the communications system is similar to the ultrasonic device, only no welding is to take place. A piezoelectric rod (transducer) is inserted at one end of a specially constructed cable and by longitudinal vibration of the transducer created through electromechanical modulation, mechanical motion is transmitted down the length of this cable and detected by a second transducer and its associated receiver.

3. Limitations - The limitations of such a device are two-fold:

a. The sound velocity through water or metal is extremely slow. (See page 1 of the attachment). The example cited is for a communicating link, over wire, between New York City and Paris. Over this distance, a period of 15 minutes would be required to transmit one bit of information and receive this information at the other end of the link. It is evident that a large amount of information would be stored within the wire cable during a given period of time.

b. Because of a mechanical motion being transmitted over the length of the wire a specially constructed cable is required to reduce as much as possible any friction. This cable is visualized as a coaxial cable with special wire supports to allow longitudinal motion to be freely effected.

5. Mr. Sutter was not sufficiently familiar with this system to answer such questions as (1) what power would be required to communicate over a given distance, (2) would repeater stations be necessary along the length of the wire to enable long distance communications and (3) what might the bandpass of the transducer and the wire be since this brief stated a possible "Q" of 10,000 for mechanical resonators. Mr. Sutter stated that he would obtain this information and any other information available that might aid in our evaluating such a system for possible use by this Agency.

6. Comment - One possible application of this type of communications system is for a secure telephone to be used between two closely spaced buildings at an overseas station, i.e., for telephone conversations between [redacted] 25X1C4a This would eliminate quite a bit of running back and forth between the two offices. However, some means would be required to determine if the telephone cable had been broken into since it seems that this is the only means of taping this method of communications. This could possibly be accomplished by pressurizing the cable or completely evacuating the air from the cable. Evacuation of the air will also aid in reducing mechanical friction within the cable.

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