

General News

Communications Devices, Theory Rate High at Show

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SAN FRANCISCO. — Numerous exhibits of the latest in communications equipment attracted noticeable attention from the large crowd and several technical papers were read outlining fresh and interesting ideas in communications technique.

Some of those described as the most fascinating dealt with meteor-burst transmission methods, with speakers declaring that tests support the belief that this type of propagation will reliably meet certain medium-range air-ground needs for data transmission, as well as for other forms of communications.

Bruce M. Sifford, Stanford Research Institute, Menlo Park, Cal., in a paper describing the optimum transmission rate for low-power meteor-burst communications systems, stated a reliable low-power VHF system has been developed which will operate up to 1,300 miles.

Meteor-burst systems transmit intermittently by reflecting signals from ionized trails left by disintegrating meteors. They are considered particularly useful for mobile operations.

Synchronous Detection.

Mr. Sifford said tests indicate that the amplitude and phase of received signals can be relatively

stable during a burst so that synchronous detection can be used.

For a low-power transmitter, he said, an optimum bandwidth could be around 500 cps.

He presented considerable data gathered on a Bozeman (Mont.)-Palo Alto (Cal.) link.

Mr. Sifford pointed out that higher frequency systems do not have as much capacity as lower frequency systems, but they are less susceptible to severe ionospheric disturbances which plague the lower frequencies.

As an example of capacity, he said that with a bandwidth of 2.3 kc (representing a "bit" transmission rate of 1,150 bits per second), an average information rate of nine bits per second is possible. This means a 25 word message, at six letters per word and five bits per letter, would take some 1½ minutes to transmit. (The optimum duty cycle of such a system at this frequency would be only about 1.3 per cent).

He emphasized that these results were based on a limited amount of data taken on a particular path during early morning hours of operation. A system designed for other times and paths, he noted, would require additional propagation measurements. Wide variations from this average can also be expected for short operating times, he stated.

Bandwidth Dependence.

Mr. Sifford concluded that the best bandwidth is dependent upon other system parameters, such as transmitter power, antenna gain and threshold level.

Since most useful meteor trails are apt to be off the direct path between transmitter and receiver, he pointed out, it is not likely that narrow-beam antennas would significantly increase the capacity of such a system.

On Tuesday, Donald R. Church, Acoustica Associates, Inc., Mineola, N. Y., described a new type underwater, low-frequency sound source analogous to highly directional end-fire antenna arrays.

The sound source is a long, thin rod which radiates sound energy into water. A 10 kc per second model, 13-foot long, showed a directivity index of over 20 db, he stated, with an efficiency of over 60 per cent and a power handling capacity of over 2 kw.

In a paper written on electromagnetic effects associated with hypersonic reentry vehicles, R. F. Whitmer, Microwave Physics Laboratory, Sylvania Electric Products, Inc., Mountain View, Cal., put a lot of emphasis on the effect of the ionized shock layer around the vehicle on propagation characteristics.

He summarized factors affecting electromagnetic wave transmission and reception in connection with remote controlled guidance, telemetry, voice communications and radar tracking of a reentry vehicle.

G. Swarup and K. S. Yang, of Stanford University Radio Propagation Laboratory, Stanford, Cal., discussed some of the interferometer phasing problems encountered at microwave frequencies.

K. E. Perry, Massachusetts Institute of Technology (Lincoln Laboratory), Lexington, Mass., said a device is being designed to encode a digital message into a redundant form for transmission over a phone line or similar channel.

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