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Brief 71-10220

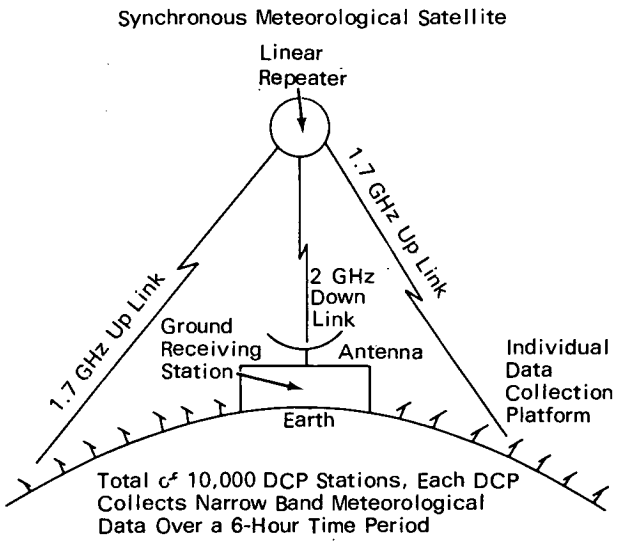
NASA TECH BRIEF

Goddard Space Flight Center

A Pseudo Random-Access Synchronous Meteorological Satellite System

The problem:

To devise a system for extracting meteorological data from an active Earth station via a satellite communications system. The most common procedure for obtaining definitive meteorological data uses existing terrestrial communications links where the data is, in many cases, collected and reported manually. However, a system of this nature is slow and inefficient, and many locations are completely inaccessible to the installation of such terrestrial links.



The solution:

A communications satellite system (see fig.) which uses a pseudo-random time frequency multiplexing technique for extracting real-time meteorological data from a great number of isolated weather stations (data collection platforms, DCP) situated at random throughout the world.

How it's done:

The multiple access system uses a single communications satellite repeater, located at a synchronous altitude (41,255 km, or 22,300 n. miles), as the relay point for retransmitting all data to a common central processing station. The system can, for instance, extract data from 10,000 independent DCP stations during any 6-hour time period.

Each DCP would transmit with an output power of 10 watts, using an omni-directional antenna. The up and down links are in the L-band, approximately 2 GHz, with a 10 MHz bandwidth for 10,000 DCP stations. The data rate would be less than 1 kHz per station. All DCP's report for at least 10 seconds once every 6 hours. The DCP's are frequency multiplexed into 8 groups of 1250 each; and the groups, in turn, are time multiplexed so that no more than 38 bandwidths will time-overlap in the 6 hour time frame. The only interference to the DCP channel is due to thermal noise and the uncorrelated noise from the other 38 in-band channels. With these specifications, the selected DCP frequency stability need not be better than 1 part in 10^5 to minimize intrachannel interference. The DCP station need not have a receive capability, and the timer stability of the transmitter is only ± 316 seconds for 1 year. The result is a simple, low-cost DCP station.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
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Reference: B71-10220

(continued overleaf)

Patent status:

No patent action is contemplated by NASA.

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