SPACE TECHNOLOGY LABORATORIES, INC.
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5730 ARBOR VITAE STREET, LOS ANGELES 45, CALIFORNIA

FOR IMMEDIATE RELEASE

EXPLORER VI EXPERIMENTS

Two classes of experiments, environmental and propagation, are being conducted by Explorer VI, newest satellite in America's continuing investigation of space.

These are: (1) environmental experiments in which data of the space environment encountered by the satellite will be gathered and telemetered to ground stations; and (2) propagation experiments in which two of the payload transmitters will be used to transmit signals to Hawaii and possibly Boulder, Colorado, and a VLF receiver will measure a signal received from the radio station NSS at Annapolis. Payload transmitter operation is controlled and payload functions selected by use of the Doppler and Command System.

Descriptions of the experiments are as follows:

Space Environment Experiments

Experiments to measure and telemeter the space environment encountered by the payload will consist of the following:

a. Micrometeorite Flux* and Momentum**

An apparatus developed by Air Force Cambridge Research Center will be utilized to count impacts of micrometeorites above a certain level of energy. Overall weight of the equipment is 0.7 pound. The average power requirements is 70 mw.

* Flux - number passing through given area in given time
** Momentum - mass x velocity

b. Magnetometer (search-coil)

A search-coil magnetometer developed by STL will be used in conjunction with a flux-gate magnetometer (paragraph c) to enable mapping of the vector magnetic field. Continuous measurements will be made of the magnetic field and its direction. The weight of this equipment is 1.0 pound; power consumption is 22 mw.

c. Magnetometer (flux-gate)

This equipment developed by STL will be used in conjunction with a search-coil magnetometer to measure the spin axis component of the magnetic field. Its weight is 2.2 pounds; its power consumption is 160 mw.

d. Vehicle Position Determination

An STL-developed facsimile system, somewhat like a TV camera, will be contained in the payload to determine the position of the vehicle relative to the earth. It will consist of both optical and electronic equipment. Transmitted pictures of the earth will have a resolution of approximately 5 miles and will provide meteorological information (such as cloud cover). Equipment weight is 2.5 pounds; power consumption is 231 mw.

e. Ion Chamber and Geiger Tube

An ionization chamber developed by the University of Minnesota will be carried to measure the total radiation flux. In conjunction with this chamber, the University of Minnesota is also supplying a Geiger-Muller tube for count rate. The combination of these two instruments will furnish mean specific ionization per particle. Weight of this equipment is 2.0 pounds; pwr 120 mw.

f. Scintillation Counter

An STL scintillation counter will be used to determine the total radiation flux encountered. Shielding used on this experiment will be of a different material than that used on the University of Minnesota experiment. Equipment weight is 3.0 pounds; power required is 150 mw.

g. Cosmic Ray

A triple coincidence proportional counter telescope, designed by the University of Chicago, will be used to obtain a total count of charged particles above two energy thresholds. The seven counters are arranged concentrically to provide single incidence and triple coincidence measurements. Weight is 4.0 pounds and the power requirement is 200 mw.

h. Aspect Indicator

This STL-developed equipment is a phase comparator which measures the phase relationship between the output of a photoelectric diode "sun scanner" and the search-coil magnetometer; this will provide the "H" direction of the magnetic field encountered. Weight of the equipment is 0.7 pound; power required is 24 mw.

i. Very Low Frequency Propagation

A very low frequency receiver furnished by Stanford University will be utilized to monitor the propagation of 15.5 kc signals from NSS, Annapolis. This will enable the dispersive properties of the atmosphere at very low frequencies to be studied. Equipment weight is 0.5 pound and power estimate is 86 mw.

j. Other Measurements

Temperature readings of the payload compartment and of the paddles which contain the solar cells will be telemetered from the satellite. Current and voltage measurements will determine the storage battery and solar cell condition.

Propagation Experiments

The propagation experiments will utilize one-way transmission from the Explorer VI payload transmitters to ground receiving stations. Three types of propagation measurements will be made as follows:

a. Electron Density

Two coherent transmitters, developed by STL, will be used for electron density measurement. To obtain electron density at the satellite, the doppler frequency shift of the transmitters will be compared at the Hawaii station. As the payload passes through space where there are no electrons, the doppler shift is exactly proportional to frequency. The presence of electrons, however, forms a "dielectric" medium. This "dielectric" will have a larger effect at low frequencies than it will at higher frequencies. Careful comparison of the doppler effect at two widely separated frequencies will thereby provide a measure of electron density.

b. Faraday Rotation

The faraday rotation caused by a change in the total ions along the propagation path from payload to ground is to be measured in Hawaii. This measurement involves observation of the rotation of the plane of polarization of the arriving VHF signal. This rotation will be relatively slow and will be recorded automatically.

c. Amplitude and Phase Fluctuation

A third propagation experiment which may be made will use signals from the VHF transmitter. Two receivers spaced on a 475-meter base line will be used to measure amplitude and phase fluctuations induced by the ionosphere. Ground equipment which would be used for this experiment is already in existence at the National Bureau of Standards Laboratory in Boulder, Colorado.

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