aerospace

RADIO PROPAGATION

Satellite study planned

A satellite to investigate the effects of the ionosphere on extremely low and very low-frequency (ELF/VLF) propagation is being studied for the U.S. Navy.

The possible design of such a satellite is the goal of a project being done by the Astro-Electronics Division of RCA in Princeton, N.J., for the Naval Air Systems Command.

Most of the data on ELF/VLF propagation in the ionosphere are theoretical; the proposed satellite would provide the first actual experimental transmission data. The major unknown is the behavior of different types of antennas, although the RCA study will include power requirements, stabilization and other factors.

The Navy will concede only that the classified study will "pave the way for new operational systems," but ELF/VLF transmissions are known to pass much more efficiently through seawater than do higher frequencies, and they can be ducted through the ionosphere for great distances around the globe. These characteristics suggest that some application related to long-distance submarine communications may be involved.

SATELLITE REENTRY

Pegasus 3 descends at last

One of the largest U.S. space satellites ever put into orbit has met a fiery end over the Indian Ocean.

In 1965, within the space of five months, three satellites comprising the Pegasus series were launched from Cape Kennedy. They carried expandable wing-like structures, each 14 feet wide and 48 feet long, to detect impacts of micrometeoroids.

Pegasus 1 and 2 were placed in elliptical orbits ranging from about 310 to about 460 miles above the earth. Pegasus 3, however, went into an almost circular orbit that carried it no higher than 336 miles. As a result, the accumulated drag of the atmosphere finally slowed the satellite; it dropped so low that it burned up in the atmosphere on Aug. 4, over the Indian Ocean.

Numbers 1 and 2 are likely to remain aloft another five years, estimates the Smithsonian Astrophysical Observatory. All three satellites, however, were turned off to free their radio frequencies, after more than twice their planned lifetime. Together they revealed a generally lower micrometeoroid level than expected, saving an estimated 1,000 pounds in shielding on the Apollo spacecraft design.

MANNED LIFTING BODIES

HL-10 goes highest, fastest

The HL-10 manned lifting body, the leading candidate to become the much-talked-about space shuttle plane of the middle or late 1970's, has reached its greatest height and speed while investigating the stability of its controls in the thin upper atmosphere.

On Aug. 6, the wingless craft, which resembles a stepped-on ice cream cone with fins at the large end, reached an altitude of 77,000 feet and a speed of 1,003 miles per hour, 1.52 times the speed of sound. Its best previous marks were 68,000 feet and Mach 1.35..

There have been 23 flights with the HL-10, though only 10, including the latest, have used the power of the craft's rocket engines. The previous flights were glide tests.

The idea of the lifting body is that its wingless shape makes it suitable to be launched into earth orbit, carrying replacement crews or supplies; then when it descends, its rounded underside and flat top provide enough lift and control to let the pilot guide the descent as though the vehicle were an aircraft.

INTERPLANETARY STUDIES

Jupiter magnetometer in the works

With the Mariner double flyby of Mars only days in the past, a team of researchers is already designing an instrument package to visit the vicinity of Jupiter, next planet beyond it, more than four years from now.

The device is to be first used aboard the Pioneer F deep space probe, scheduled for launch in February or March of 1972, to fly within 120,000 miles of the giant planet between November 1973 and June 1974. Pioneer F will be the first U.S. space vehicle to go beyond the orbit of Mars, after which it will pass through the asteroid belt on its way to Jupiter.

Heart of the five-pound package is a wide-range magnetometer, designed to measure the strong magnetic field of Jupiter as well as the weak ones in space along the way. The instrument must be rugged enough not to be destroyed by the strong field, yet sensitive enough for its deep space measurements.

The magnetic field at earth's surface is about 0.5 gauss. Estimates of Jupiter's field range from 10 to 1,000 gauss. The magnetometer team, managed by the National Aeronautics and Space Administration's Ames Research Center in California, hopes to locate the position and direction of the center of Jupiter's field.

A year after Pioneer F leaves to fly by Jupiter's equatorial region, the almost identical Pioneer G will be sent past one of the planet's polar regions.

METEOROLOGY

Cloud-height finder set for Vietnam

Combat weathermen checking flying conditions in Southeast Asia may be benefiting next year from a light, portable cloud-height measuring device that packs into a suitcase.

Called a ceilometer, the 55-pound instrument uses a beam of light, aimed skyward and reflected by the clouds into a photosensitive detector, to determine cloud heights ranging from 50 to 3,000 feet. The 3,000-foot ceiling, while low for meteorological research, is sufficient for planning flight sorties. Two men can quickly set up and operate the system, using the return signal strength in earphones or on a meter, plus some simple geometry, to calculate heights.

Conceived by the Air Force Cambridge Research Laboratories, the ceilometer is being produced by General Time Corp., Wheeling, Ill. Delivery of the first 25 units to Asia is scheduled for early 1970. The compact size and ruggedness of the units could allow them to be dropped into advance or combat areas to support emergency or covert flights.