GEOPHYSICS

Test "Solar Rocket" Soon

A rocket that uses the chemical energy of the ionosphere for power could provide scientists with a low altitude satellite for making atmospheric observations.

➤ A "SOLAR ROCKET," powered by the chemical energy of matter in the atmosphere from 60 to 70 miles high, may be tested within five years, Dr. Peter H. Wyckoff of the Air Force Cambridge Research Center, Cambridge, Mass., has predicted.

The air level at 60 to 70 miles, a part of the ionosphere, is a hugh storage battery. Scientists are currently puzzling out methods for tapping its energy.

If the test vehicle is successful, it could lead to a low altitude satellite from which world-wide observations would be made. The earth satellites scheduled for launching during the International Geophysical Year will vary from 200 to 1,500 miles above the earth's surface at speeds of about 18,000 miles an hour.

Source of the power to drive the "solar rocket" would come from heat released by the recombination of atomic oxygen, which is broken down from its usual double form, O_2, into two parts by the sun's energy. A catalyst, or third party, is needed to make the recombination work.

As foreseen by Dr. Wyckoff, the first test vehicle would not stay in orbit even once around the world. It would be sent up collapsed within an Aerobee-Hi rocket, then expanded after its booster reached the 65-mile height and dropped off.

Although the solar rocket is not part of the IGY program, information on conditions in the upper atmosphere gained during IGY will be essential to its development, Dr. Wyckoff said.

The test solar rocket, which would be mostly hollow, could scoop in all the very thin air it hits at the 65-mile altitude. Atomic oxygen in the air would hit baffles coated with a catalyst, releasing heat that would be converted to power by a heat exchanger. The air would then be expelled from the solar rocket's rear. This system might give velocities as high as 18,000 miles an hour.

Although some promising solid catalysts are being studied, Dr. Wyckoff said he could not reveal their names.

Experiments in March, 1956, provided the "breakthrough" showing the solar rocket was possible. A burst of light equal to one million candle power shone in the sky when a rocket dumped 18 pounds of nitric oxide into the high atmosphere. This was the first time man succeeded in unlocking the energy in the atomic oxygen stored in the atmosphere.

The idea of a rocket powered by the atmosphere's chemical energy was first suggested by Dr. Joseph Kaplan, University of California physicist who heads the United States' IGY program.

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GEOPHYSICS

Satellite Only Part of IGY

➤ THE SIX EARTH satellites scientists expect to launch sometime during the 18-month International Geophysical Year (IGY) are only a small part of this intensive program for taking a world-wide look at the earth's land, sea and air.

The first man-made moonlet will not start circling the world before early 1958, perhaps not until next spring.

Because of "international relations," the date and time for lifting the tiny sphere 300 miles above the earth's surface will be made public in advance, Richard W. Porter has said. Mr. Porter heads the technical panel for the earth satellite program for the U. S. National Committee for IGY.

The satellite launchings are some months away, whereas the IGY, from which "remarkable results" can be expected, started on July 1.

How outbursts of all kinds of radiation from the sun affect the high atmosphere was outlined at a special meeting of the U. S. IGY committee held at the National Academy of Sciences, Washington, D. C., by Dr. N. C. Gerson of the Air Force Cambridge Research Center, Cambridge, Mass.

Humans are most concerned with the lowest part of the atmosphere, since there seems to be little direct contact between the upper atmosphere and man's daily pursuits. However, high-altitude regions are "rapidly approaching the traveled medium of commerce and transportation."

Unmanned vehicles will be followed by manned supersonic rockets, outmoding present long-distance transportation, Dr. Gerson predicted. Before this happens, upper atmospheric conditions must be known more exactly than they are now. The IGY program is expected to shed much new light on the properties of the earth's high atmosphere.

Conditions there also affect long-distance communications, and thus the flow of information upon which all kinds of daily decisions are made.

A big sunspot, in late June, shot out flames for hundreds of thouands of miles, ushering in IGY with a bang. It showered the earth's atmosphere with extra large amounts of particles and radiation, causing a black-out of shortwave radio signals.

The atmospheric chaos resulting from the spot tested the special communications set-up by which the IGY warning agency at Fort Belvoir, Va., alerts scientists around the world when stormy conditions are expected. The agency, run by the National Bureau of Standards, reported that, radio-wise, the disturbance was the most severe in several years.

The particles and radiation change the radio-reflecting properties of the ionosphere so that radio waves that would normally bounce back to earth from the ionosphere simply keep right on going into space. The particles and radiation also affect the earth's magnetic field.

Unusual activity was also noted in cosmic rays and auroras, or northern lights.

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