SPACE

Space 'Mirror' Investigated

Three new satellites are designed for making inspections of the ionosphere, the invisible and mysterious mirror in the heavens—By Walter Wingo

See Front Cover

➤ THREE NEW SATELLITES—one shaped like a dumbbell, another like a windmill and the third like a chubby chess pawn—have been given the same general mission in space.

They are designed to make a close-up inspection of the ionosphere, the invisible and mysterious mirror in the heavens, and find out where it is cracked and why sometimes the whole thing shatters, causing great confusion on earth.

The dumbbell-shaped satellite is designated officially as UK-C. Built by the British, it is to be the third international satellite launched by the National Aeronautics and Space Administration.

UK-C's three specific jobs are to pass through the section of the ionosphere between 170 and 930 miles up, measuring galactic radio noise, vertical distribution of the ozone, and micrometeoroid flux.

The ozone layer is that portion of the atmosphere created through a chemical reaction when the sun's ultraviolet radiation reaches the oxygen in the earth's atmosphere.

It is a fortunate reaction, for it saps the power of the ultraviolet rays which otherwise would be lethal to earth inhabitants.

The ozone measurements should add to the knowledge of the processes which form and destroy ozone, of the air motions which distribute it and of the effects of ozone on the heat balance of the upper atmosphere.

The windmill satellite, called the S-66 last summer when it was originally scheduled for launch, now is termed officially the Beacon Explorer.

One model of the Beacon Explorer was destroyed March 19 when it failed to go into orbit and plunged back into the atmosphere over the South Atlantic. It was the first Delta rocket failure in 23 successive launches.

The satellite was to have examined the ionosphere and tested a new space tracking system using intense beams of light called lasers.

The chess pawn satellite is nicknamed Topsi, because it will concentrate its studies on the ionosphere's topside.

Once in space, Topsi will extend six long insect-like feelers to take radio "soundings" at six fixed frequencies. Mounted at the top of the satellite is a ball-shaped ion mass-spectrometer four inches in diameter.

The launching date of Topsi, postponed twice, has not been set definitely because of troubles with the launch rocket.

Topside ionosphere studies were pioneered previously by three other satellites—Explorer VIII, the American-British Ariel I and the Canadian-built Alouette I—and many sounding rockets.

The ionosphere is a blanket of electrified particles beginning about 35 miles up and extending several thousand miles into space. The degree of electrification waxes and wanes as the sun rises and falls daily. It is strongly suspected that there also are holes in the blanket.

At times, when storms are noted on the sun, the ionosphere goes haywire, and radio beams that normally are bounced off the "mirror" pass right through into outer space. Communication blackouts result and radios in ships, planes and homes emit mostly static.

Seen on this week's front cover is the telemetry receiver operated by the National Bureau of Standards' Central Radio Propagation Laboratory, Boulder, Colo., which was built to receive ionosphere data from the Explorer satellite.

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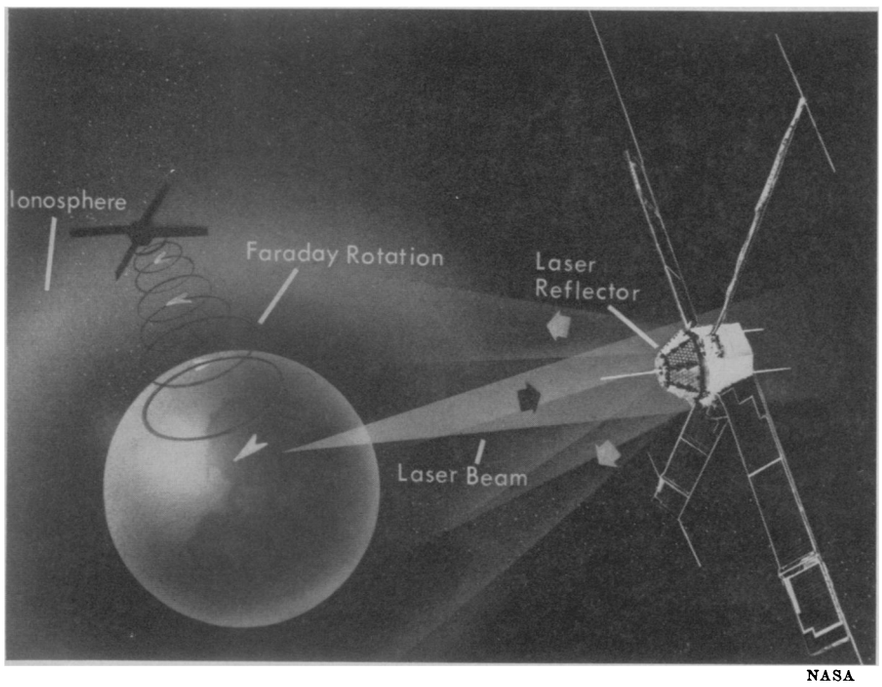

NASA

TRACKING BY LASER—An artist's drawing shows the Beacon Explorer, a solar-powered satellite, being tracked by a laser telescope device located at Wallops Island, Va. The beam of light is directed toward the glass reflectors mounted around the base of the satellite. A laser beam will return after striking a reflector, giving the satellite's position.

PHYSICS

Adjustment in Phase Of Time Signals Made

➤ AN ADJUSTMENT in the transmission of time signals is announced jointly by the U.S. Naval Observatory and the National Bureau of Standards.

The transmitting clocks at the radio stations will be retarded 100 milliseconds April 1, 1964 at zero hours Universal Time (7 p.m., EST, March 31).

The adjustment is necessary because of changes in speed of rotation of the earth, as determined by astronomical observation. Such adjustments are made by international agreement, according to a plan whereby the times of emission of time signals are synchronized to about one millisecond.

The last previous adjustment in phase of time signal pulses was made Nov. 1, 1963.

The countries participating in the coordination of time signal transmissions are Argentina, Australia, Canada, Czechoslovakia, Italy, Japan, South Africa, Switzerland, United Kingdom, and the United Sates.

The U.S. stations include the NBS stations WWV, WWVH and WWVB, and the U.S. Navy stations NBA, NPG, NPM, NPN and NSS.

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SPACE

New Unit Guides Space Reentry Craft

➤ AN ELECTRONIC package half the size of a shoebox will help future astronauts fly their spacecraft like a glider after reentry from earth orbit.

Suspended by cables from a paraglider "wing," the spacecraft is controlled by the electronics unit, developed by Honeywell, Minneapolis. The unit reels the cables in or out.

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