

## SPACE

# Echo I Is Space Hero

► THE ECHO I communications satellite is now one year old and a space hero—it has even had a stamp issued in its honor.

The 100-foot aluminum sphere, now battered by the space "bullets" called micrometeorites, has chalked up many accomplishments during its amazingly long lifetime. Among the most important transmissions of its 150 experiments were:

Telephone conversations between the east and west coasts of the United States.

Facsimile photographs and a letter sent by the U. S. Post Office Department.

Voice and music between the U. S. and England.

A voice message by President Eisenhower during its first orbit around the earth.

Radio frequency energy between the U. S. and France.

The Echo I has traveled 4,480 times around the earth for more than 138,000,000 miles. It was launched from Cape Canaveral, Fla., Aug. 12, 1960, and has been seen by millions of people since then.

Echo I has enabled scientists to confirm orbital behavior theory. Because of its larger size and small mass it is extremely sensitive to solar radiation pressures and air drag. This causes the orbit to shift from a circular to an elliptical path.

When launched a year ago, Echo I's orbit was 1,049 miles when farthest away from earth and 945 miles when closest. During the months until December, 1960, the satellite was forced by solar pressures into an orbit of 1,350 and 580 miles when farthest and closest. By mid-June this year the orbit was a circle 960 miles above the earth. Now Echo I is again moving in an ellipse between 1,093 and 827 miles up.

The National Aeronautics and Space Administration reported that Echo II is planned as an even bigger sphere (135 feet) rigidized with a frame of laminated aluminum and plastic. The outside "skin" will also be stronger than that of Echo I, which can still be observed from earth.

• Science News Letter, 80:135 August 26, 1961

considered a hazard for space travelers. The satellite travels through these belts twice in each 31-hour orbit. The doughnut-shaped Van Allen belts surround the earth at latitudes of less than 70 degrees between 600 and 30,000 miles up.

The four satellites are planned to observe the solar wind, interplanetary magnetic fields and the distant regions of the earth's magnetic field, the National Aeronautics and Space Administration reported.

The 83-pound octagon-shaped satellite was launched by a three-stage Delta rocket from Cape Canaveral, Fla. The NASA Goddard Space Flight Center, Greenbelt, Md., had the major responsibility for the satellite. The Ames Research Center of NASA, the University of New Hampshire and the State University of Iowa have contributed some of the experiments.

The entire particle spectra from energies of a few electron volts to 10 billion electron volts will be measured. A magnetometer on a boom, some 32 inches from the satellite body, determines particle interaction with magnetic fields.

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# New Type Satellite

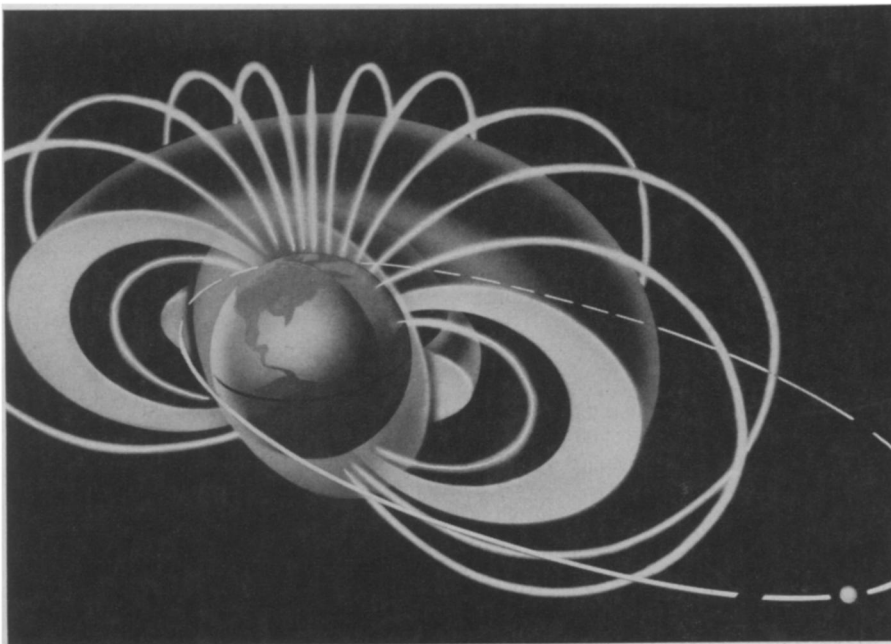
► THE FIRST in a new series of satellites was launched Aug. 15 to travel an unusual path around the earth.

The probe, Explorer XII, is reaching 50,000 miles into space when farthest away from earth (apogee). At its closest point (perigee) it streaks across the sky 170 miles up.

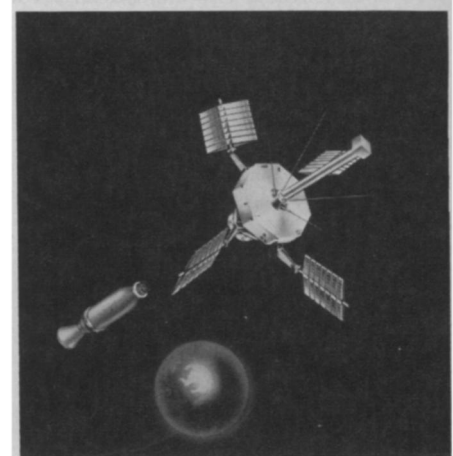
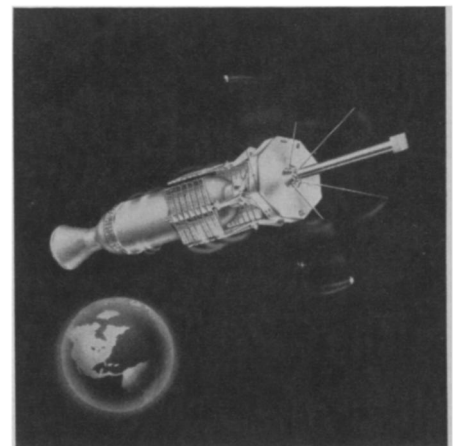
The satellite is being used to study the behavior of energetic particles, electrons and

protons, the minute building blocks of matter present in space. These particles sift down into the earth's atmosphere and cause radio disturbances, communications blackouts, magnetic storms, Northern and Southern Lights.

The new satellite, the first of four, is testing the particle population of space and also of the trapped radiation regions (the Van Allen belts) surrounding the earth and



**PARTICLE SLEUTH**—The Explorer XII is reaching far into space to study bits of matter in the trapped radiation regions of the Van Allen belts surrounding the earth as a huge doughnut.



**SATELLITE UNWINDS**—Yo-yo weights despin the third stage of the Delta rocket and Explorer XII traveling at more than 24,000 miles an hour (represented at top). Four solar paddles are released when an explosive-actuated cutter severs a nylon rope after the third stage is separated by explosive bolts and a spring mechanism (bottom).