ASTRONAUTICS

What Astronaut Feels

As SCIENCE NEWS LETTER *goes to press the astronaut is being readied for the first U. S. manned space shot. If successful, the following story tells what he will experience.*

At the time of blast-off the astronaut is lying down inside the Mercury capsule on top of a Redstone missile, strapped into the astronaut's couch constructed of crushable honeycomb material to fit his body exactly.

As the Redstone lifts off the launching pad at the zero hour, he checks the flight timer on the instrument panel to see if it has begun to operate. If it has not, he must actuate the clock start button and announce "clock operating."

Then as the rocket shoots into flight a tremendous pressure begins to push him into his couch giving the feeling of weighing between 1,500 and 2,000 pounds. It feels as if he were being smashed, and he has trouble seeing anything.

Thirty seconds after "lift-off" and every 30 seconds after that until free fall (when weightlessness sets in), he reports on his control-system fuel supply, the amount of the earth's gravitation experienced, the angle of the rocket in flight, the cabin pressure and the oxygen supply.

The first U. S. astronaut is not just a spectator watching the view as was the first Russian cosmonaut. He has been trained to work.

In two minutes and 15 seconds, the Redstone engines cut off and the escape tower is cast off. The astronaut then fires a cluster of three small rockets and the space capsule is pushed away.

If the space capsule, which looks like an oversized child's top, begins to oscillate as it is released from the Redstone, an automatic pilot steadies it. The capsule's pilot periscope, which shows the earth's curvature at the highest altitude, now is extended into space.

The Mercury astronaut reports all factors to a control center on earth.

Weightlessness sets in when the rockets cut off. Instead of feeling pinned down in the couch, the astronaut now feels light as air. He is strapped down for safety reasons. Fifteen seconds after engine cut-off, turn-around starts.

Now, instead of facing forward, the automatic pilot causes the craft to make a half-circle turn so the flat end of the "top" faces forward and the astronaut rides backwards for the rest of the scheduled 290-mile trip.

The astronaut handles the control stick to find out just how well he can do the job while weightless. Every motion he makes will be sent back to earth by telemetry. He actually takes control of the capsule and tries to manipulate it under weightless conditions, where everything not strapped down floats.

After four minutes of flight, the astronaut begins to use the earth periscope and report what he sees and what checkpoints are visible from more than 100 miles above the earth.

The entire flight lasts about 15 minutes. The astronaut "sees" the earth three ways: through a porthole, by periscope and by instruments. After about seven minutes of flight the capsule begins reentry flight with the blunt end down so the astronaut lands on his back, considered the safest landing position.

The telescope is retracted. He operates some of the 127 switches, dials, buttons and fuses to find out if he can do it as well as he did on becoming weightless.

Shortly afterwards, he hits the fringe of the earth's atmosphere and reports how much the gravitation from the earth increases.

Soon the 63-foot red and white parachute opens at the narrow end of the "space top" and before long the capsule is spotted by waiting ships and aircraft.

After landing in the ocean, the astronaut has the choice of staying inside the capsule until he is on board ship or he can open the capsule hatch, inflate a raft and be picked up by helicopter. In either case, he is the most celebrated man ever to return to the U. S.

• Science News Letter, 79:290 May 13, 1961

AERONAUTICS

Planes With Vertical Lift Will Be Future Air Buses

➤ PLANES with a vertical lift will be flying buses, carrying air-traveling commuters from city to regional airports, by the late 1960's, Peter G. Kappus, General Electric designer, predicted.

The aircraft having the vertical take-off and landing (VTOL) propulsion systems now under development will alter the size, shape and use of airports in the near future. The VTOL is the answer to problems such as air and ground congestion and disturbing noise levels.

Use of VTOL will make it possible for jet airports to be placed 50 to 100 miles from a city. A short-range VTOL could cover such a distance in 15 to 20 minutes carrying 80 to 100 passengers.

V-ports located at business and population centers would handle helicopters and VTOL airbus traffic. Future city planning should give consideration to "this great new breakthrough in aviation," Mr. Kappus told the Tinker Society of Professional Engineers and Scientists in Oklahoma City.

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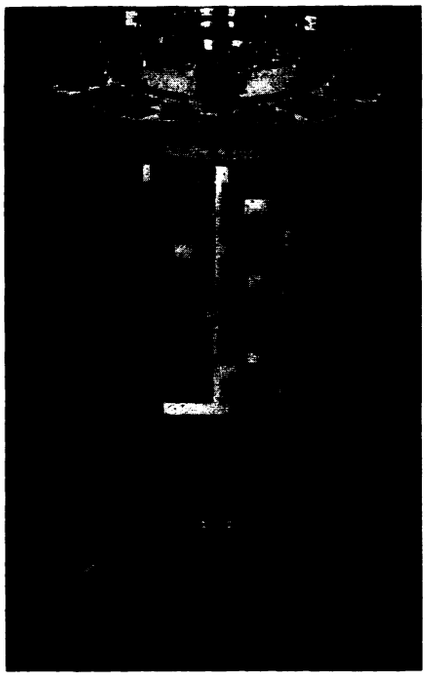

Explorer XI—Studies gamma rays

ROCKETS AND MISSILES

Launch Space Observatory

➤ THE FIRST astronomical observatory ever launched into space—a United States achievement—is contained in the Explorer XI satellite now circling the earth. The gamma-ray telescope of Explorer XI is designed to detect and measure cosmic gamma radiation in space. Gamma rays are believed to hold the secrets about the elements making up the universe, including the earth.

The observatory-satellite will be able to "map" distribution of gamma rays both in the Milky Way galaxy of the sun and its planets and in neighboring systems, such as the Magellanic Clouds. Scientists have difficulties studying these space gamma rays from earth because of radiation in the earth's atmosphere.

Very fast and very small nuclear particles, protons, bombard the earth's atmosphere from space. The earth's magnetic field turns aside the protons, which scatter and interact with particles of the atmosphere, resulting in the production of gamma rays.

Scientists believe the same process takes place in space. Balloon flights have shown that interference from earth's radiation is so strong the only way to find out is to study the reactions from above the earth's main atmosphere, as Explorer XI is now doing.

The 82-pound satellite resembles an old-fashioned street light. It consists of a 12-inch diameter octagonal aluminum box 23½ inches long mounted on a six-inch-diameter aluminum instrument column 20½ inches long. Once in space the satellite's instruments are powered by solar cells. In its orbit, the satellite tumbles end over end ten times every minute. This enables the telescope to scan part of the surrounding space every six seconds.

Explorer XI was launched from Cape Canaveral April 27, at 9:16 a.m. EST. The satellite went into orbit and sent signals back to earth by telemetry as planned.

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