

## SATELLITES

# Echo Success Story

## See Front Cover

► THE ECHO SATELLITE launched Aug. 12 (see SNL, 78:114, 1960) has swung around and around the earth, visible as far north as the United States-Canadian border and as far south as the tip of South America.

Looking like a moving star of zero magnitude, the 100-foot-diameter sphere has been easy to see.

Via the new satellite, radio messages have been bounced from coast to coast. Echo has been hailed as a big step forward in communications.

The launching was part of a long-range National Aeronautics and Space Administration program designed to investigate the feasibility of global communications systems using satellites. The moon has been used as a natural communications satellite.

During the last few years, it has been increasingly apparent that communications lines are becoming overcrowded. Telephone and telegraph lines are barely able to keep up with the demand. Future demands on transoceanic telephone cables, which are already carrying a heavy burden, will continue to grow.

## ASTRONAUTICS

# Show Astronaut Shuttle

► A BELL-SHAPED DESIGN for an astronaut shuttle between space stations and the earth was outlined at the annual West Coast meeting of the American Astronautical Society in Seattle, Wash.

E. F. Styer of Boeing Airplane Company's Aero-Space Division said his investigation of possible vehicles for from one to 50 passengers showed the bell shape was structurally simpler and required less weight per crew member than glide vehicles.

Mr. Styer said the bell-shaped vehicle could have small control flaps and would use small rockets for establishing desired re-entry conditions. Parachutes and inflatable impact bags would be used for landing.

His studies were made of vehicles re-entering the atmosphere at more than six miles a second—about the speed of vehicles returning from the moon, other planets or distant earth satellites.

A "sausage skin" area for repairing ailing spacecrafts was also proposed at the meeting. E. J. Merrick, project engineer in General Electric Company's Missile and Space Vehicle Department at Philadelphia, suggested in a report that repair drydocks in space "could be as simple as a plastic 'sausage skin' drawn over and around the craft and then inflated, or they could be as complex as a geodesic sphere."

The drydocks would be inflated with gases fed from a mother ship or other sources. Inside, comfortably-suited men could work in a life-sustaining atmosphere.

And a Princeton, N. J., engineer told

In spite of Echo's success, scientists are not predicting the end of telephone and TV transmission as it is known today. They do, however, think that earth satellites will someday provide a much greater capability for global communications. Experimentation in this direction will one day lead to worldwide TV, for instance. In the years to come, communications satellites might also serve as relay stations for messages to and from space vehicles.

The inflatable sphere, shown on the cover of this week's SCIENCE NEWS LETTER, was fabricated of Du Pont Mylar polyester film, about half the thickness of the cellophane on a cigarette package, covered with vapor-deposited aluminum to provide radio wave reflectivity of 98%, up to frequencies of 20,000 megacycles.

Before launching, about 30 pounds of sublimating powders were inserted in the sphere. It was then folded accordian-fashion and placed inside a 26½-inch-diameter magnesium container which carried it into orbit.

About two minutes after the payload was injected into orbit, the magnesium container was split open by an explosive charge placed around its middle. The in-

flatable sphere was released from its container and gradually began to inflate with the expansion of the small amount of residual air left inside. Thirty pounds of sublimating powders caused additional inflation: 10 pounds of benzoic acid provided the initial expansion and 20 pounds of anthraquinone provided for sustained inflation.

The two primary stations taking part in the Project Echo communications experiment have been Bell Telephone Laboratories' facility at Holmdel, N. J., and the NASA-Jet Propulsion Laboratory's Goldstone station in California. Radio signals were bounced between the east and west coasts of the U. S. via the orbiting satellite.

During the experiments, BTL transmitted on a frequency of 960 mc/s for reception at Goldstone. JPL transmitted at 2390 mc/s to BTL on the east coast.

• Science News Letter, 78:130 August 27, 1960

## ROCKETS AND MISSILES

## Discoverer Well Enough Insulated for Animal

► THE INTERIOR of the 30-by-27-inch Discoverer XIII capsule is sufficiently insulated to protect a small animal riding in it from the terrific heat to which the exterior is exposed on its return to earth, Lt. Gen. Bernard Schriever, Commander of the Air Research and Development Command, has reported.

When the scorched lid of the gold-plated aluminum space traveler was removed, its instruments were found to be unmarred.

Gen. Schriever said that although all the temperature data had not yet been fully processed and evaluated, all indications were that interior heat would not be a matter of concern when an animal is sent aloft.

The 12,000-mile ride to earth was fully telemetered; but instruments inside the capsule recorded data on tape to permit a full and complete reconstruction of the entire performance of the Air Force space probe pride.

The Discoverer XIII capsule, the first man-made object to be recovered from orbital flight in outer space, made its debut at the White House before President Eisenhower and a host of dignitaries from Government, the Air Force and industry.

The golden space explorer, looking like an instrumented kettle drum, contained a special 50-star American flag which was presented to the President by Gen. Thomas D. White, Air Force Chief of Staff, who noted that the capsule began its return to space over Alaska, the 49th state, and was fittingly recovered in the waters near Hawaii, the 50th state. The President, on behalf of all Americans, expressed pride in "this remarkable achievement" and his personal appreciation for whoever thought of "the thoughtful gesture of this flag." Col. Roy Allison is the Air Force officer who included the flag in the Discoverer capsule.

The top of the instruments, packaged by Lockheed Aircraft Corporation, had a small white seal inscribed, "O. K. to install cover. This one's coming back home."

• Science News Letter, 78:130 August 27, 1960

the meeting tomorrow's space stations and some satellites could be built with balloon-like tubes that inflate in space with a plastic foam that would become hardened in the sun's heat.

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## PHYSICS

## Highest Magnetic Fields Produced at Los Alamos

► THE HIGHEST MAGNETIC fields known have been produced at Los Alamos Scientific Laboratory, using the technique of implosion, the inward direction of explosive forces, which is also one method for detonating atomic bombs.

A thin copper tube was imploded by high explosives and a large volume of initially weak magnetic field was compressed up to a strength of 14 million gauss in a volume of about one cubic inch by Drs. C. M. Fowler, W. B. Garn and R. S. Caird. The achievement of such a strong magnetic field, which lasted for two-millionths of a second, is reported in Science, 132:187, 1960, by Dr. Harold P. Furth of the University of California's Lawrence Radiation Laboratory.

The gauss is a unit measuring magnetic strength. The earth's magnetic field averages less than one gauss. One application of very high magnetic fields is in the confinement of a hot plasma in a "magnetic bottle," the major problem in the control of fusion power for peaceful purposes.

• Science News Letter, 78:130 August 27, 1960