

## SPACE

# Satellite for Radio Hams

➤ A NEWBORN satellite, Oscar, carried out of this world piggyback by its big brother, Discoverer XXXVI, is now spinning across the skies saying "hi" to radio hams all over the world.

With the successful launching of OSCAR (Orbital Satellite Carrying Amateur Radio), a new kind of cooperation between the U.S. Government and amateur radio operators was born. Oscar, developed by a group of California hams, was allowed to ride the Discoverer for the purpose of obtaining information from outer space and to introduce to amateur operators throughout the world new methods of radio communication.

The ten-pound Oscar is a miniature shortwave radio transmitter beaming the letters HI in Morse code (four dots followed by two dots) back to earth. The frequency of this friendly message is 145.0 megacycles (millions of cycles a second).

This is the international frequency assigned to amateur operators, who can pick up Oscar's greeting with simple receiving equipment. Radio hams and others interested are expected to track Oscar on his travels around the earth. Oscar operates on one-tenth of a watt.

The Discoverer satellite has its own job to do after delivering Oscar to the skies. It is part of the large overall U.S. Air Force project on space recovery. Oscar meanwhile will be an aid to ham operators training themselves in the field of electronics and trying to expand their range of communi-

cation. The Oscar satellite is the latest in a long series of experiments undertaken by the hams since the advent of radio. During the 1930's, radio hams experimented with ultra-short waves, now known as very high frequencies, especially the waves near those used for the lower TV channels.

At first both scientific theory and amateur practice indicated that the very high frequencies were only useful for very short distances, but the amateurs proved that long distances could be covered.

Layers of air of varying temperature and humidity could form a kind of tunnel through which the waves could travel. Ham operators sent messages 100 miles during the 1930's. In 1957 amateurs sent messages this way from California to Hawaii, a distance of 2,500 miles.

Amateur radio operators cooperated with scientists during the International Geophysical Year from 1957 to 1958. The hams gathered information on how radio waves travel through the ionosphere, according to the American Radio Relay League.

The radio hams bounced radio messages off the Echo satellite for long-distance communication and are planning expanded efforts for the upcoming Echo II passive communications satellite.

Amateurs have also bounced radio signals off the moon for coast to coast communication, using only one-fiftieth the power used by military stations.

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## SPACE

# Capsule Needs Name

➤ THE UNITED STATES space agency is looking for a name for its latest brain child, a two-man space capsule that will meet another spacecraft circling around the earth.

The capsule could be given such a name as Vulcan, for the Roman god of fire and metal working, because the ultimate goal of this rendezvous in space is to join various stages of a space vehicle capable of traveling to the moon and planets.

Most rockets and spacecraft of the National Aeronautics and Space Administration are named for Roman gods. The Mercury capsule, carrying two astronauts on suborbital flights, was named for the messenger of the gods. The Saturn rocket, having a thrust of 1,300,000 pounds in its first trial model, was named for the father of the gods. Jupiter, giving his name to another rocket, was one of Saturn's children. The Atlas rocket is the namesake of the titan condemned to uphold the heavens on his shoulders for fighting against Jupiter.

The new capsule program will be an extension of the Mercury effort. The new craft, still in the planning stage, will have

the same shape as the Mercury capsule but it will weigh two to three times as much as the one-ton Mercury.

The base of the two-man craft will be larger than the Mercury capsule, providing 50% more cabin space. The new capsule will be able to take week-long trips around the earth, enabling astronauts to train for longer flights. Two-man flights could begin in 1963-64. The new craft will be boosted into space by a Titan (a primeval deity) II and will rendezvous in space with an Agena rocket stage launched by an Atlas booster. When both vehicles are in orbit, propulsion in both the capsule and the Agena can be used to perform rendezvous and docking maneuvers.

The rendezvous technique could be used to assemble the three-stage Apollo (the god of youth, poetry and music, and later the sun god) capsule scheduled to land men on the moon in 1970.

The names committee of NASA decides on an appropriate name for each project with the approval of James E. Webb, NASA's Administrator.

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## TECHNOLOGY

# Electronic "Brain" Turns Symbols Into Talk

➤ A METHOD by which a large electronic "brain" can talk to anyone was reported to the Eastern Joint Computer Conference in Washington, D. C.

The system, called a digital to voice converter, combines photographically stored information and voice recordings. It is still in the development stage, Evan L. Ragland of Motorola, Inc., Chicago, told the Conference.

Vocal information from a computer would be particularly useful in air traffic control for producing flight plans, giving pilots clearance and presenting weather information. Other prospective uses include in banks, for automatic inventory control, and for dialed weather information.

The techniques tested for the digital to voice converter promise to result in compact and inexpensive equipment, Mr. Ragland reported. The converter would translate the binary code used by the computer into voice in the following manner:

A vocabulary of several thousand words is stored photographically in the memory. The photographic word is projected onto an electrically charged, photosensitive plate if it is the one needed according to the binary code being translated. The entire vocabulary is optically scanned at a rate sufficiently high to provide the needed word in a time imperceptible to the listener. That word is then played by the recorder.

Mr. Ragland pointed out that although the English language has 600,000 words, the average vocabulary is only 15,000 words. Of these, 1,000 words account for 80% of all usage and only 50 words account for 50% of all usage. Since a 1,000-word vocabulary allows expression of most ideas, he believes a vocabulary of several thousand words could provide computers with a conversational capability.

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## GEOPHYSICS

# Earth Has Dust as Well as Gas Tail

➤ THE EARTH has a tail of dust as well as of gas, two U.S. astronomers suggest.

Drs. John C. Brandt and Paul W. Hodge of the University of California, Berkeley, said the dust tail is probably acted on by pressure of the sun's radiation in much the same way as comet tails are. Their suggestion of a dust tail for earth follows the discovery from satellite measurements of a concentrated dust layer surrounding the earth.

The earth's dust tail is formed from smaller particles blown out of this dust ring by radiation pressure, the astronomers report in *Nature* 192:957, 1961. They made their suggestion as an explanation for the gegenschein, a soft luminous glow seen in the sky opposite the sun, which is also called the counter-glow.

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