

RADIO ASTRONOMY

Moon's Distance Increased

Radar echoes reflected to earth by the moon's surface indicate that the planet may be farther from the earth than earlier measurements show.

► THE MOON is now suspected of being several miles farther from the earth than was previously thought.

Preliminary studies of radar echoes reflected back to earth by the lunar surface indicate the moon's observed distance is somewhat larger than the calculated distance, Dr. Benjamin S. Yaplee of the U. S. Naval Research Laboratory, Washington, D. C., reported.

He told a joint meeting of the International Scientific Radio Union (URSI) and the Institute of Radio Engineers that radar echoes from Venus would be necessary to confirm the longer distance.

Dr. Yaplee said the high-power radars and large antennas now available, used with the still experimental masers and paramagnetic amplifiers, will allow scientists to catch radar echoes from Venus and Mars, and also the sun.

The relative distances to Venus, Mars and

other planets are known quite accurately, but the actual distance to any of them is not known very accurately. The earth's mean distance from the sun, known as the astronomical unit, is taken as the yardstick for setting the scale of distances to the planets and stars.

If Dr. Yaplee's radar observations of a slightly farther distance to the moon are confirmed, the present value of the astronomical unit, 92,900,000 miles, will be changed. More importantly, however, the distances to all planets will be known much more accurately, a requirement for interplanetary space travel.

Dr. Yaplee also reported radar observations of the sun's extremely tenuous outer atmosphere, the corona that is visible to the naked eye only during solar eclipses, should yield information about the ionized gases of which the corona is composed.

By using various radar frequencies, he

said, the reflection spectrum of the moon and planets can be obtained. In the case of the sun, the ionization gradient can be studied.

The average distance of the moon from the center of the earth has been given as approximately 238,900 miles.

Artificial Lightning

► ARTIFICIAL lightning bolts of 1,000,000 volts have been generated between a ship and a helicopter, Dr. M. M. Newman of the Lightning & Transients Research Institute, Minneapolis, Minn., reported to the joint meeting.

The man-made jolts of electricity traveled 3,000 feet along a suspended wire. Wire lengths of nearly two miles could be supported by the helicopter, Dr. Newman said.

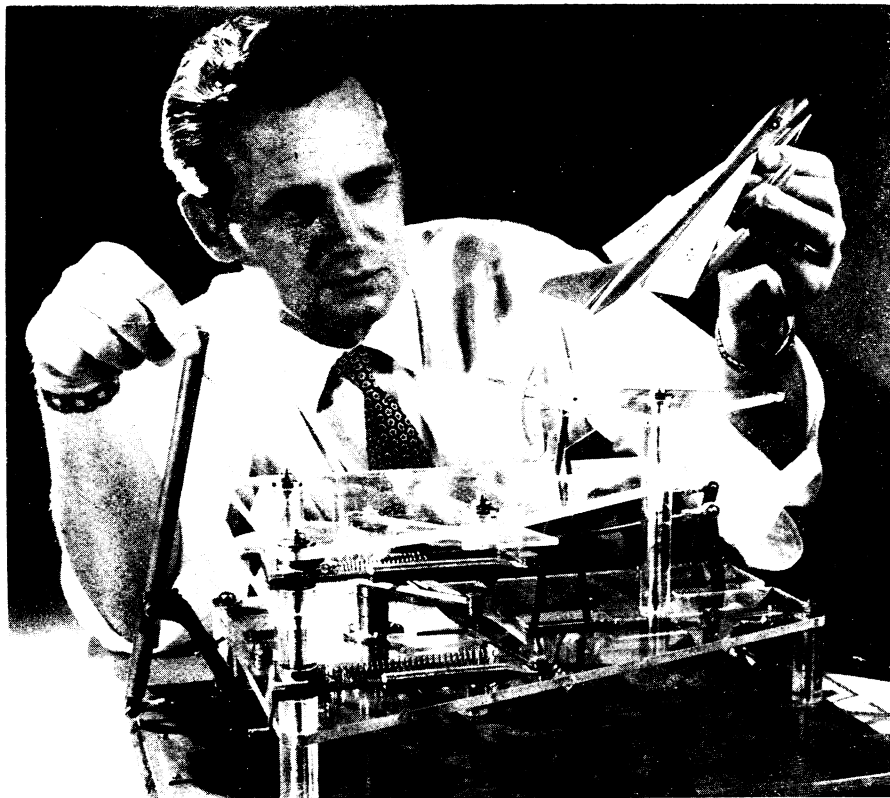
Reason for generating the artificial lightning, he explained, is to find some way of cutting down on the interference with radio communications caused by natural lightning.

The 1,000,000 volt pulses were fired into the helicopter-supported wire from a sea-going schooner laboratory. The plane and its passengers were protected by 200 feet of nylon rope between the helicopter and wire.

Some typical lightning atmosphere were reproduced with the schooner generator. Since the source pulse is accurately known, Dr. Newman explained, this high power, mobile lightning generator provides a "decided advantage in continuing atmospheric propagation investigations."

"Possible psychological pilot aversion to being at the receiving end of an artificial lightning discharge" was avoided by having a scientist aboard during the test flights. A condenser was also installed across the gas tank gage to prevent possible explosion of the fuel tanks. The high voltage safety precautions proved adequate.

Science News Letter, May 3, 1958



SUPERSONIC FLIGHT CONTROL—Using models, a Bendix Aviation Corporation engineer shows how identical motions of the pilot's control stick (left) for the B-58 Hustler pass through a linkage system that moves the actual control surfaces only as much as varying flight conditions permit. Called "ratio changing," the variable motion is computed electronically in the Hustler over the plane's whole range of speed and altitude. The Hustler can thus be described as an automatic airplane.

PHYSICS

"Electric Eye" Used In Radiation Detector

See Front Cover

► UNDER THE impact of 2,000,000-volt electrons from a high voltage Van de Graaff accelerator, a 50-pound block of ice gives off a visible glow known as Cerenkov radiation.

This demonstrates the scientific principle underlying a new detector for high-intensity atomic radiation.

The detector, developed by Westinghouse Electric Corporation scientists, uses an "electric eye" to detect the same glow in ordinary water. From this the intensity of the atomic radiation causing the glow can be measured.

For protection, the photograph that appears on the cover of this week's SCIENCE NEWS LETTER was taken through a circular three-foot-thick window containing a transparent solution of zinc bromide. The window is imbedded in the equally thick concrete walls surrounding the Van de Graaff machine.

Science News Letter, May 3, 1958