

## METEOROLOGY

# Weather Research Urged

A FAST-MOVING program for weather research was advocated by Sen. Lyndon B. Johnson (D.-Tex.). The Senate Majority leader, who is chairman of the Aeronautical and Space Sciences Committee, recommended weather control as an international goal to be promoted by the United States.

Water, or rather the periodic lack of it, in Texas has prompted the Senator's intense interest and concern for scientific progress in weather control.

He told SCIENCE SERVICE that "anyone who has gone through drought and through flood realizes that water is a basic question of life and death itself." He said that the mastery of weather could assure for all drought stricken areas of the world controlled water supplies to be used as needed.

The weather satellite Tiros, developed by the Air Force and successfully launched under the National Aeronautics and Space Administration's program, as well as other more sophisticated satellites, have placed us "on the threshold of an age-old dream," he said.

He underscored the important meteorological revelations on cloud patterns revealed by Tiros which, with other develop-

ments in weather studies, indicate that "some measure of weather control seems ultimately possible."

Sen. Johnson stressed the need for such control to be developed under international auspices. "Any nation that learned to control the weather would have at its disposal an instrument that could be more potent in controlling the earth than even the hydrogen bomb." He proposed, therefore, that outer space explorations in meteorology be a joint prospect for the United Nations.

The recent establishment of a National Center of Atmospheric Research by the National Science Foundation was commended by Sen. Johnson as filling an important gap in the field of weather modification.

The Soviet Union has concentrated a great deal of effort in this direction and has had for many years two such centers.

The new Center working with the Weather Bureau and the National Aeronautics and Space Administration "in this exciting endeavor" soon may make the dream of weather control a reality, Sen. Johnson predicted.

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## ROCKETS AND MISSILES

# "Middle-Road" Satellite

THE DEFENSE DEPARTMENT will soon launch a "middle-of-the-road" communications relay satellite. It will be tougher and more complex than balloon satellites being prepared for bouncing radio beams from one spot to another.

But the satellite will not be as difficult to put into its proper orbit as the proposed 24-hour communications satellites, three or four of which would remain stationary over points of the earth and relay messages to and from the ground and each other.

Officials in Washington, D. C., indicate the new satellite may be launched soon, probably within the next few weeks. They say two of the major techniques required for the satellite are well tested.

The "middle-of-the-road" concept places a satellite in a circular orbit at a relatively low altitude—650 miles minimum. Ground stations transmit information to the satellite, where the information is stored on magnetic tape.

When the satellite comes near the ground station to which the message is addressed, it broadcasts the message.

Instructions to the satellite would be in code. A relayed message might also be. Thus the satellite might develop as a nearly invulnerable method of communication.

This system is based on two proved techniques.

The first communications experiment was Project Score. This experiment—in which the President's voice was broadcast from space—demonstrated that voice, teletypewriter and even multiple teletypewriter

signals could be received, stored and then retransmitted by a satellite.

Second, long-lived Tiros, the weather satellite, has proved the reliability of delayed broadcast. From two stations, the satellite can be instructed to photograph any part of the world over which it passes.

After making the photographs, the satellite holds the information and later broadcasts it to the two ground stations.

Score and Tiros have thus advanced the communications art.

Many military leaders are eager to get a communications system into orbit. Army Signal Corps officials say the military has serious problems with global communications through cable and radio facilities.

The facilities are crowded. Cables can be cut. Shortwave radio can be upset by atmospheric conditions.

Thus the Defense Department has set out to put up a communications satellite, with payload developed by the Signal Corps. The satellite is part of Task COURIER, first phase of Project NOTUS.

The Air Force will place the satellite into orbit with a two-stage rocket. Army-built stations in various parts of the world will relay messages through it.

The satellite must transmit and receive information very rapidly as it passes the stations. It will have a message capacity equivalent to 20 teletypewriter channels, each operating continuously at a rate of 100 words per minute.

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## TECHNOLOGY

# One-Eyed Robot Hunts Objects Lost in the Sea

A ONE-EYED, SWIMMING ROBOT with powerful claw-like pincers is being developed for hunting and retrieving objects lost in the ocean at depths up to 2,000 feet.

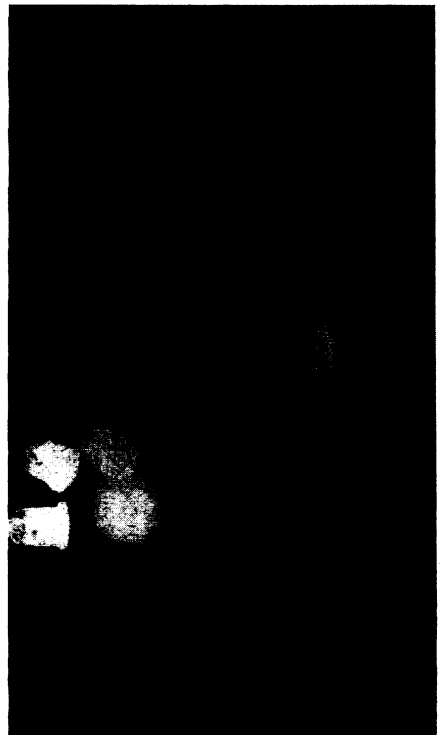
Solaris, as the robot is called, has propellers for motion. When its TV eye spots some object on the ocean floor, an image of the object is flashed to a monitoring screen aboard a surface ship, from which operators, by remote control, guide the 500-pound robot to its prey and make it clamp the find in its claw.

At a depth of 1,600 feet, Solaris can patrol an area equal to 270 football fields at one anchoring of the surface ship. Normally the TV camera can see 15 to 25 feet. Under ideal conditions it can spot a one-inch-diameter cable at 50 feet. Any object weighing 7,500 pounds or less in water can be hauled up to the surface.

In turbid waters, a sonar system helps the TV eye—enabling operations to continue in spite of bad underwater "weather."

Designed by Vitro Laboratories in suburban Silver Spring, Md., a Solaris is now being built for recovering torpedoes from the test range operated by the U. S. Naval Torpedo Station at Keyport, Wash. It is believed the robot could also be used to recover spent solid-fuel rocket boosters.

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**UNDERWATER ROBOT**—Vitro Laboratories' Solaris retriever is ready to recover a torpedo. Solaris can "nail" itself to unwieldy objects, pull up scrap iron with electromagnets, plant explosives, tend nets or scoop up cable or pipe for inspection.