SPACE

Sun-Scanning Satellite

A new orbiting solar observatory that scans the sun as directed from the ground is expected to help scientists predict solar storms that spray space with radiation—By Ann Ewing

➤ AN UNMANNED sun-scanning satellite, scheduled for launch April 21, will have nearly as much "tender, loving care" as has previously been given only to manned spacecraft.

Except for the man-in-space program, no United States scientific satellite has had so many sophisticated controls as the OSO-B, for orbiting solar observatory.

Scientists hope that information on the sun's activity gathered by the sensitive instruments on this OSO will help them find a way to predict the solar storms that sometimes spray space around earth and the other planets with deadly radiation.

One of the key instruments for the new "eye in the sky" was prepared at Harvard College Observatory under the direction of Dr. Leo Goldberg, with Dr. W. Liller serving as assistant director of the project.

Normally the satellite will point the scanning spectrometer on the orbiting orbservatory at or close to the sun's center. However, a command system will allow an operator on the earth to stop the scan at any desired wavelength in the ultraviolet and the instrument will then, on another command, make a picture of the solar surface at that wavelength.

Thus a ground-based scientist can, in effect, tell the scanner to stop and take a longer, deeper look at an area of particular interest, such as a sunspot or flare.

The spectrometer is about the size and shape of a window box. It will send back to earth about a dozen pictures of the sun every hour.

During a solar flare, clouds of ionized hydrogen gas—protons and electrons—shoot out from the sun, spewing the earth and other planets with radiation somewhat like a gigantic rotating sprinkler. This radiation produces the northern lights, causes fading or blackouts of shortwave radio transmissions and may make space travel deadly.

When it is launched, OSO-B will be the second such platform in space. S-16, launched in March, 1962, was the first of a series of similar observatories that the National Aeronautics and Space Administration plans to orbit during the current solar activity cycle of 11 years, now nearing a low point.

The Harvard spectrometer can look at the sun in two ways:

1. Rather than recording ultraviolet light from the whole solar disk, it can concentrate on a small spot in the center, about one percent of the entire solar disk. Then the spectrometer will record, in about 27 minutes, the intensity of radiation over the whole ultraviolet spectrum, from 500 to 1,500 angstroms. (Visible light reaches from about 4,000 to 8,000 angstroms in wavelength.)

2. The spectrometer will scan the whole disk of the sun, back and forth, bottom to top, recording at just one wavelength. Each complete scan will take about four and one-half minutes and will provide a crude ultraviolet picture of the whole sun.

Although the scanning spectrometer is the largest instrument for OSO-B, the satellite will also carry seven other experiments. Included among these are two experiments designed by scientists at the Naval Research Laboratory, Washington, D. C.

One of these will look for X-rays given off by the sun. The other will keep track of the white light of the sun's corona.

Also included will be experimental equipment to detect the zodiacal light and strong sources of ultraviolet light in the heavens.

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SPACE

Russia's Goal in Space Is Manned Orbiting Station

➤ THE SOVIETS' LAUNCHING of the Zond I automatic space station indicates that their most pressing goal in space is not the moon, but a manned station orbiting the earth.

Such a station could give the Russians a significant military edge. The United States is not expected to try sending up a manned station before 1968.

If it is true that the Russians use the same booster for space programs that they use to lift intercontinental ballistic missiles, they could relatively cheaply turn out the 25 to 50 boosters required each year to build and supply a manned space station.

The Russians have twice sent up two manned satellites at once, exhibiting their potential for linking craft in space. The actual hook-up of cosmonauts on the dual Vostok flights failed, they contend, only because not enough fuel was aboard.

Last Nov. 1, the Russians launched Polyot I, a satellite that could be maneuvered sideways and change its orbits as directed. Such mobility would be required for building space platforms.

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CHEMISTRY

Oil Added to Concrete To Prevent Pitting

➤ LINSEED OIL and an emulsifying agent added to fresh concrete will help prevent the pitting and scaling caused by freeze-thaw action. These linseed oil compositions formulated by the U. S. Department of Agriculture's Agricultural Research Service are non-flammable and could be prepared right where they are used.

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SPACE

Spacemen to Bail Out In a Ballute

➤ A UNIQUE balloon-parachute, called a Ballute, will provide an emergency escape if necessary for astronauts on their way to the moon.

At altitudes less than 70,000 feet, the drag balloon inflates gently, stabilizing the jumper in a vertical position in thin air. Jumpers reported that at all altitudes there was very gentle inflation with a smooth, stable ride, as compared with the severe jolt of parachute jumps.

The drag balloons are then jettisoned and regular parachutes opened in this system developed by Goodyear Aerospace Corporation, El Centro, Calif.

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Goodyear

BALLUTE TESTED — During the first live jump testing of the Ballute drag balloon, an Air Force parachute jumper is photographed from both back and front. Jumps from as high as 40,000 feet were made at the Department of Defense Joint Parachute Test Facility, El Centro, Calif.

SPACE

'Hot Electrons' Propel Spacecraft at High Speed

➤ A NEW ELECTRICAL propulsion technique ejects "hot electrons" and ions to propel spacecraft to far planets at speeds more than 100,000 miles per hour.

In the new technique, developed by the Radio Corporation of America's David Sarnoff Research Center at Princeton, N. J., the electrons in a plasma are trapped by crossed electrical and magnetic fields. The first causes them to absorb energy, and the second causes them to spiral around the lines of force. Eventually the electrons escape through the exhaust nozzle, pulling ions with them.

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