

## SOVIET SATELLITE

### A study of the ionosphere

Geophysicists from Bulgaria, Hungary, East Germany, Poland, Romania and Czechoslovakia are participating with the Soviet Union in a study of the upper layers of the earth's atmosphere via Cosmos-348, a satellite launched June 13.

Experiments aboard the spacecraft will give scientists a look at the polar lights, magnetic storms and temperature and ion concentration measurements.

Temperature changes in the ions will supply data relating to heating of the upper atmosphere in the areas near the poles during magnetic storms. The movement of electrons and ions from one hemisphere to the other along magnetic lines will be traced. Comparisons of data from this satellite with those from one launched in the winter of 1968 will give the scientists an idea of seasonal changes in the ionosphere, says Dr. Yuri Galperin of the U.S.S.R. Academy of Sciences.

## SATELLITE SENSOR

### Carbon monoxide study

Scientists estimate that about 200 million tons of carbon monoxide are released into earth's atmosphere every year from automotive and industrial exhausts. In spite of this amount, however, the total concentration remains about the same—500 million tons. It is believed, therefore, that some natural mechanism may be responsible for removing the gas as it is generated.

In order to map the high and low concentration of carbon monoxide in the atmosphere and perhaps identify the removal sinks in which the gas is changed into another compound, the General Electric Company's Space Division in Pennsylvania, has submitted plans for a carbon monoxide satellite sensor to the space agency.

## BEYOND APOLLO

### Lunar base study

Lunar exploration of the future—beyond the present constraints on surface-stay time of the Apollo series—will most likely involve the multiple use of a semipermanent lunar base.

The lunar base concept, now under study, could be a combination mobile shelter unit and laboratory capable of supporting two men on the surface for two weeks. From such shelter the men could travel over miles of the moon's surface with the use of either a hovercraft or a surface roving vehicle.

The base study is examining a variety of design concepts: one that would be derived from a space station module; one that would function only on the lunar surface; and one that could operate with or without a lunar orbiting space station.

## SOLAR CELL ARRAY

### Power for Skylab

The largest solar cell array system for electrical power ever devised for a spacecraft is now being completed at the Marshall Space Flight Center, Huntsville, Ala. The

solar array will be used for the workshop and telescope components of the Skylab cluster to be launched as a space station forerunner in 1972.

The array is composed of four wings, each with four and one-half panels; each panel contains 20 modules of solar cells. The total, 164,160 individual solar cells, can generate as much as 10,500 watts peak.

The wings, each weighing 1,000 pounds, will be folded against the sides of the Apollo telescope mount during launch and will then be deployed by a scissors mechanism to form a cross. The array is so wired that if a meteoroid should strike a panel, or some other failure should occur, only one of the 18 separate power sources would be affected.

## LIFE-SUPPORT SYSTEM

### Regenerative process

Unlike the consumable life-support systems now used in Apollo flights, the life support systems for the planned Space Station/Base will be regenerative—capable of recovering drinkable water and contaminant-free oxygen from crew waste. A 90-day test of such a system is now being conducted by the McDonnell Douglas Astronautics Co., under a \$1 million contract from the space agency.

Four graduate students entered the spacecraft simulator in June for the uninterrupted test.

The nuclear-fueled system is on loan to the National Aeronautics and Space Administration from the Atomic Energy Commission. According to AEC, this is the first time that radioisotopes have been used as a heat source in a manned chamber experiment. The low temperature distillation and vapor filtering system can produce about one pound of bacteria-free drinking water per hour from perspiration, respiration and urine. Developed by the Air Force, the system has turned out potable water which tested more bacteria-free than ordinary tap water, with no taste problems or chemicals added.

## VIKING 1975

### Soft landing experiment

The Viking flight to Mars in 1975 will make a soft landing on that planet in 1976. The Office of Advanced Research and Technology of the National Aeronautics and Space Administration has been exploring a variety of means to make such a landing.

One method could be the use of a parasol-type instrument, made of deployable fabric and a metal aeroshell that would open like an umbrella. The aeroshell would be aimed along the flight path to serve as a decelerator or aerodynamic brake for landing from orbit.

An experimental model of such an instrument, the Supersonic Planetary Entry Decelerator, will be tested at Wallops Island, Va., Aug. 12. Launched from a single-stage Castor rocket with two smaller Recruit rockets to an altitude of 45 miles, it will coast to 57 miles before starting descent. At 44 miles altitude, the conical aeroshell will be popped open by ground command to simulate passage of the Mars entry spacecraft through the thin Martian atmosphere.

At 27 miles altitude, while traveling at Mach 2.7, a 55-foot-diameter disk-gap-band parachute will be deployed.