Landsat 3 shares multiple launch

The third in the Landsat series of earth-resources satellites was successfully launched into orbit on March 5, to serve applications ranging from crop monitoring to dam inspection to mineral prospecting. The same rocket also orbited OSCAR 8 — a relay satellite for amateur radio operators — and a NASA experiment to study the effects of charged-particle plasmas in space on high-voltage spacecraft systems.

Like its predecessors, launched in 1972 and 1975, Landsat 3 carries as its main instrument a "multispectral scanner" that monitors the earth at different wavelengths that can then be variously combined to reveal, for example, the extent of healthy, diseased and dead trees in a forest, or the patterns of silt or pollution in a river. The latest Landsat's scanner, however, carries a sensor for a fifth spectral band (the others had four), sensitive to thermal infrared emissions that can provide better data on crop vigor, urban "heat islands," power-plant effluents and other thermal sources. As with the other Landsats, the newest probe has as one of its principal advantages its lofty, orbital viewpoint (more than 900 kilometers above the earth), from which Landsat 3 can cover the entire earth every 18 days. This enables large-scale surveys and repetitive observations to be made in a fraction of the time and at far less cost than studies from the ground or even from aircraft. Besides the scanner, the satellite carries a pair of vidicon cameras capable of photographing the ground with 40-meter resolution, twice as sharp as those of its predecessors.

Hundreds of diverse organizations have been making use of Landsat data since the program began, a growing number of them in foreign countries. The scale of their projects has ranged from land-use studies for individual cities to the ongoing endeavor known as LACIE, the Large Area Crop Inventory Experiment, whose goal is to be able to forecast global production of wheat (and, potentially, other crops) with 90 percent accuracy per country for nine years out of every 10.

A still more sophisticated Landsat 4 is planned for launch late in 1981. Landsat 1 was shut off on January 16, after nearly five and one-half years of operation; Landsat 2 is still in operation.

The OSCAR 8 radio satellite, launched with Landsat 3, is part of an educational program to enable satellite communications to be utilized in U.S. and Canadian classrooms. It is also intended as an aid to "ham" radio emergency communications and several experimental projects. The other part of the multi-payload launching was PIX, a Plasma Interaction Experiment from the NASA Lewis Research Center in Cleveland. The PIX researchers want to know the extent to which charged particles in space affect high-voltage components, such as by causing arcing, since future projects such as ion-drive spacecraft or solar-power satellites are likely to need high voltages for their high power requirements in order to keep the required currents correspondingly low. □

Viking orbiter 2 leaky but alive

A leak aboard the Viking 2 orbiter, which has been circling the planet Mars for the last 19 months, has cost the spacecraft nearly one-fourth of its remaining supply of attitude-control gas with which it maintains its orientation in space. This would cause the craft to run out of gas as early as mid-December, rather than surviving until its planned March 1, 1979, shutoff date, so Viking officials have cut back its permitted daily gas consumption by about 40 to 60 percent. If there are no other fuel-wasting problems, says project manager G. Calvin Broome of Jet Propulsion Laboratory in Pasadena, the orbiter's scientific experiments will probably not have to suffer.

The cause of the leak is not certain, but it began on February 7, just a day after the spacecraft entered a period in which it was spending about four hours a day in the shadow of Mars. (Previous occultations, says Broome, had lasted about an hour a day or less.) Blocked from the sun's warmth for so long, a plastic material in the gas-valve seats may have cooled by more than 100°C, possibly hardening to the point at which tiny dirt particles in the gas would have held the valve open rather than being pressed into the plastic by the closing valve. The leak stopped on February 24 — the day after the long occultations ended. (This circumstantial explanation is uncertain because there have been past leaks during periods of no occultations. It was such leaks, in fact, that prompted officials in January to shut off one of each orbiter's two gas systems, cutting gas usage about 40 percent.)

Meanwhile, on March 3, flight controllers successfully got orbiter 2 to jettison its "bioshield," the top of the container which had enclosed the Viking 2 landing craft during the flight from earth. The bioshield had been left attached because of uncertainties about a gyro-system problem that had developed just as the lander was separated from the orbiter on Sept. 3, 1976. The risk of jettisoning the device last week was unanimously approved by the Viking scientists, says Broome, both because of the large amount of science that has since been accomplished and because removing the bioshield would nearly triple the field of view of the "scan platform" that carries the orbiter's cameras and other instruments. □

Cosmonauts set record

On March 4, aboard the Soviet Salyut 6 space station, Soyuz 26 cosmonauts Yuri Romanenko and Georgi Grechko set a new record for continuous human residence in space, eclipsing the 84-day mark set four years ago by U.S. Skylab astronauts Gerald Carr, William Pogue and Edward Gibson. The Salyut 6 mission has also produced a number of other space "firsts," in the course of working toward a Soviet goal of larger stations and extended activity in orbit. In January, Vladimir Dzhanibekov and Oleg Makarov linked their Soyuz 27 craft with the station (the first double docking), spent five days aboard the Salyut with their colleagues (the first double-crew occupancy), and returned to earth in Soyuz 26. On Jan. 22, the unmanned Progress I vehicle (a Soyuz with enlarged storage capacity) coupled with the station for 15 days on a resupply visit that included the first in-space refueling operation. Then on March 4, Romanenko and Grechko were joined by the crew of Soyuz 28, which included space veteran Alexei Gubarev and Czechoslovakian "cosmonaut-researcher" Vladimir Remek, the first non-Russian cosmonaut.

Romanenko and Grechko were scheduled to stay in space about two more weeks, according to Soviet officials early this week. An East German and a Pole are to visit the station before the end of the year, and cosmonauts from Bulgaria, Hungary, Romania, Mongolia and Cuba are expected to have been in orbit by 1983. □

Waking up Skylab

Skylab lives! Or at least it's twitching. The U.S. space workshop had been virtually dead in space except for one receiver since Feb. 9, 1974. Worried that it may reenter the atmosphere before space shuttle astronauts can raise its orbit with a remote-control booster in October of 1979, NASA engineers this week sent commands to the receiver from a Bermuda tracking station, in hopes of activating telemetry signals that would reveal the workshop's condition. About two minutes of data and brief periods of the unmodulated carrier wave resulted from the first two attempts, suggesting a possibly faulty component (there are alternates) but giving grounds for hope that Skylab can be brought to life. The intermittent carrier wave indicated that the workshop was probably turning on its long axis at about 10 revolutions per hour, bringing its solar panels in and out of sunlight.

The second day of attempted communications produced more unmodulated signal, and Skylab was commanded to begin gradually charging its batteries. Officials hoped, if that worked, to be able to reorient the workshop next month to a position with less atmospheric drag. □