NASA News

National Aeronautics and
Space Administration

Washington D C 20546
AC 202 755 8370

For Release

Richard McCormack
Headquarters, Washington, D.C.
(Phone: 202/755-8487)

IMMEDIATE

RELEASE NO: 77-150

LANDSAT SATELLITE OBSERVES FIFTH BIRTHDAY

Landsat 1, the first satellite ever launched to focus specifically on the Earth and its natural resources, completed its fifth year in orbit last week.

Launched July 23, 1972 -- with a life expectancy of only one year -- Landsat 1 carries devices which record and transmit to Earth the unique signatures radiated by land, water, minerals, vegetation and man made structures.

Landsat 1 was joined by a second such satellite, Landsat 2, Jan. 22, 1975. Weighing some 816 kilograms (1,800 pounds) and circling 925 kilometers (575 miles) above the Earth in polar orbit, each satellite photographs three strips 185 km (115 mi.) wide of North America and 11 similar strips covering the rest of the world.

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July 21, 1977

Strips photgraphed the following day are contiguous to those of the first day, with a 14 per cent overlap of coverage at the equator and a greater overlap near the poles.

With each satellite 180 degrees apart, coverage of a given spot on the Earth is repeated every nine days. It is this repetitive coverage that provides Landsat with the ability for monitoring time-dependent changes in surface features. In early 1978, the system will be joined by a third satellite, Landsat 3. Landsats are built by the Space Division of General Electric Co., Valley Forge, Pa.

No satellite has stirred more excitement than Landsat. The late space pioneer, Dr. Wernher von Braun, predicted that through this one program alone, the nation could realize "a return exceeding its total space program investment."

Using the signatures and other data collected by the satellite,scientists have achieved some dramatic applications. Landsat imagery has provided the raw data to identify the polluters of air and water. It has led geologists on oil and mineral hunts in Alaska, Oklahoma, the Rocky Mountains and the jungles of Brazil. Biologists have been able to detect potential fishing grounds. Changes in ecology brought on by forest fires, earthquakes and strip mining have been plotted.

Urban development is guided by determining in advance how projected growth patterns will affect transportation needs, public service facilities and the environment.

Landsat's potential for agriculture is staggering. Farmland of an entire region can be sorted crop by crop in a matter of hours in combination with high speed computers. The end result is a computer-printed terrain map showing precise location and area of each crop with an accuracy of more than 90 per cent. Investigators using Landsat images of California's Imperial Valley, for instance, inventoried in 40 man hours more than 25 separate crops in 8,865 fields. The total area covered was 185,150 hectares (458,000 acres). Among the crops readily identified were corn, popcorn, soybeans, sorghum, oats, grasses (rye, Bermuda, Alicia and Sudan), lettuce, mustard, tomatoes, carrots, onions and alfalfa. The scientists distinguished between wet-planted fields, plowed lands, harvested fields and bare soil in areas as small as 4.5 hectares (10 acres). (The remote sensing devices on a Landsat scheduled for launch in the early 1980s will locate and identify these characteristics on a one-acre plot!)

This experiment demonstrated the potential of a satellite system to conduct extensive and repeated crop surveys which could increase accuracy and timeliness of forecasting harvest volume and contribute to decisions on new plantings to meet demands.

One such system using Landsat satellites is the Large Area Crop Inventory Experiment (LACIE), a three-year project involving NASA, the U.S. Department of Agriculture and the National Oceanic and Atmospheric Administration (NOAA).

Designed to improve the accuracy of global crop forecasts, LACIE, in its initial states, is aimed at forecasting wheat crops. It can, however, be expanded at a later date to include other major grains such as rice and corn. The first full crop year of LACIE has been completed as planned, and with the final successful completion of this major experiment, the United States will have demonstrated the technology required for an operational global crop forecasting system of paramount international political and economic significance.

To date the oil and mining industries are the largest purchasers of Landsat data, which are made available through the U.S. Department of the Interior's EROS Data Center at Sioux Falls, S. D. Although the Landsat data use techniques are still experimental, there have been some notable successes locating new mineral deposits with the help of these images and tapes.

Landsat images completely free of clouds are now available for every part of the United States. A large scale mosaic covering several western states has revealed some previously unrecognized details of an east-west fault associated with the Colorado mineral belt. Known mineral locations corresponding with those deduced from Landsat data have thus indicated the possibility of new and untapped lineaments revealing similar areas to be explored.

Accurate predictions of snowmelt are important in planning the best use of water for power generation, irrigation, flood control planning and estimating future water supplies for major cities. Up to now, such predictions -- useful in deciding whether to hold or release water in reservoirs -- have been based on less accurate observations made by foot or land vehicle penetration of remote wilderness areas or by aircraft (see NASA photos on pages 7 and 8). NASA is working with other federal agencies and several states in analyzing the data gathered by Landsat and weather satellites for predicting the amount of water to be expected from melting snow in mountain areas.

Landsat data are also being used in a cooperative effort to assess the marine environment in a 3.87 billion square meter (4.63 billion square yard) area of the Gulf of Mexico.

In combination with ground information gathered by a commercial fishing fleet of some 70 vessels, three oceanographic research ships, a low-flying "spotter" group of nearly 40 airplanes, four marine oil drilling rigs and a weather satellite, Landsat images have been used successfully to locate and harvest living marine resources in the Gulf. But even with all these applications it is obvious that the potential of Landsat has just barely begun to be tapped.

Photographs to illustrate this news release will be distributed without charge only to media representatives in the United States. They may be obtained by writing or phoning:

The Public Affairs Audio-Visual Office
Code FV/NASA Headquarters
Washington, D.C. 20546

Telephone: 202/755-8366 Photo Nos: 77-H-226
77-H-225

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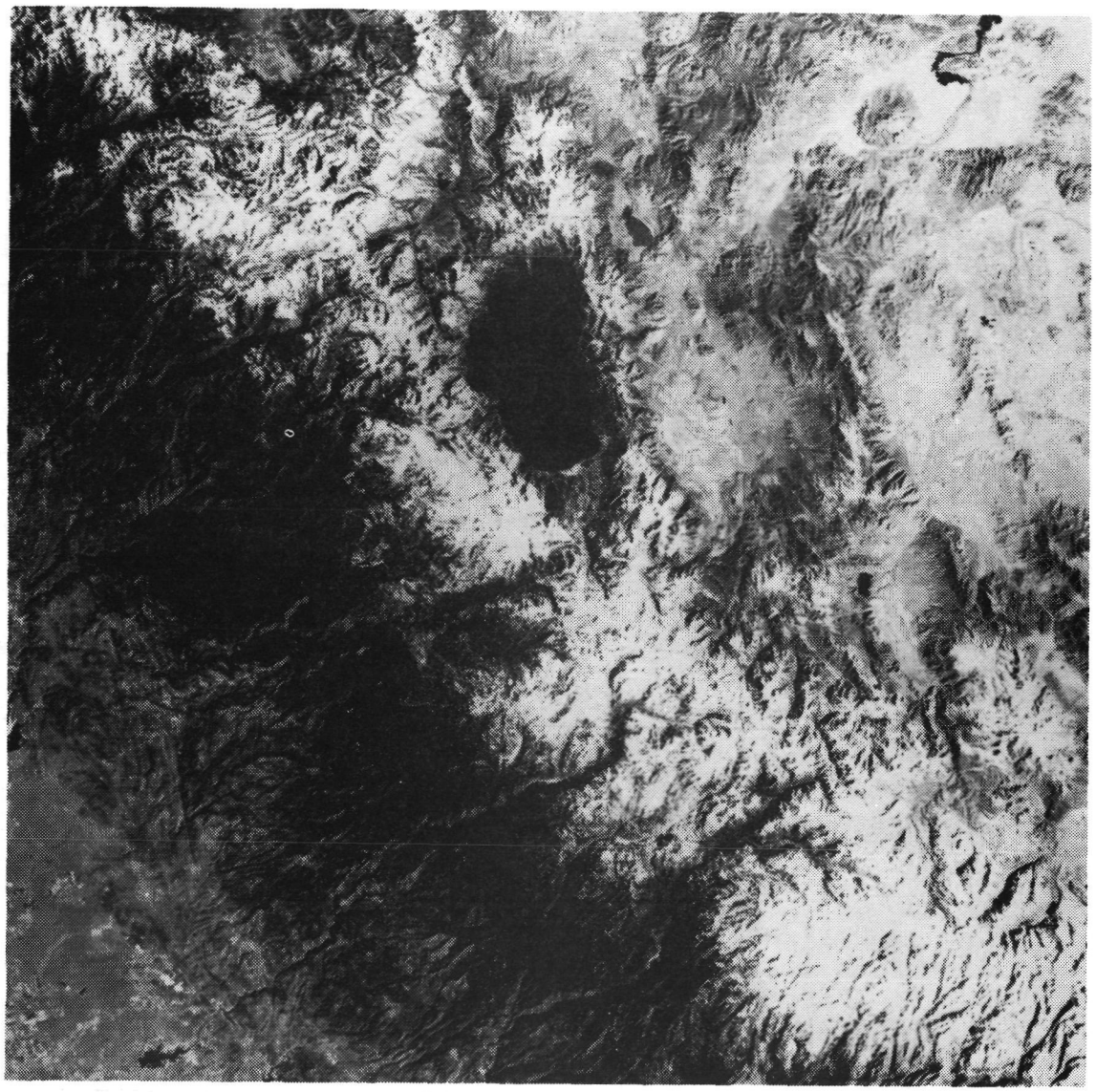

SNOW BARED SIERRA NEVADA IMAGED BY SATELLITE -- Clear evidence of the West's continuing drought is shown in this satellite scene of the snow bare Sierra Nevada mountains. Covering 13,225 square miles, the image was recorded by the Landsat satellite Feb. 14, 1977, and radioed to NASA's Goddard Space Flight Center, Greenbelt, Md. Measurements made from this image reveal that the snowline is 2,000 feet higher in 1977 than in a comparable 1975 image, a near normal snowfall year. Information from snow survey teams and in-place ground sensors confirms that the available snow in the Sierras not only covers less area but is thinner. Lake Tahoe can be seen in the photograph center.

NASA Photo: 77-H-226

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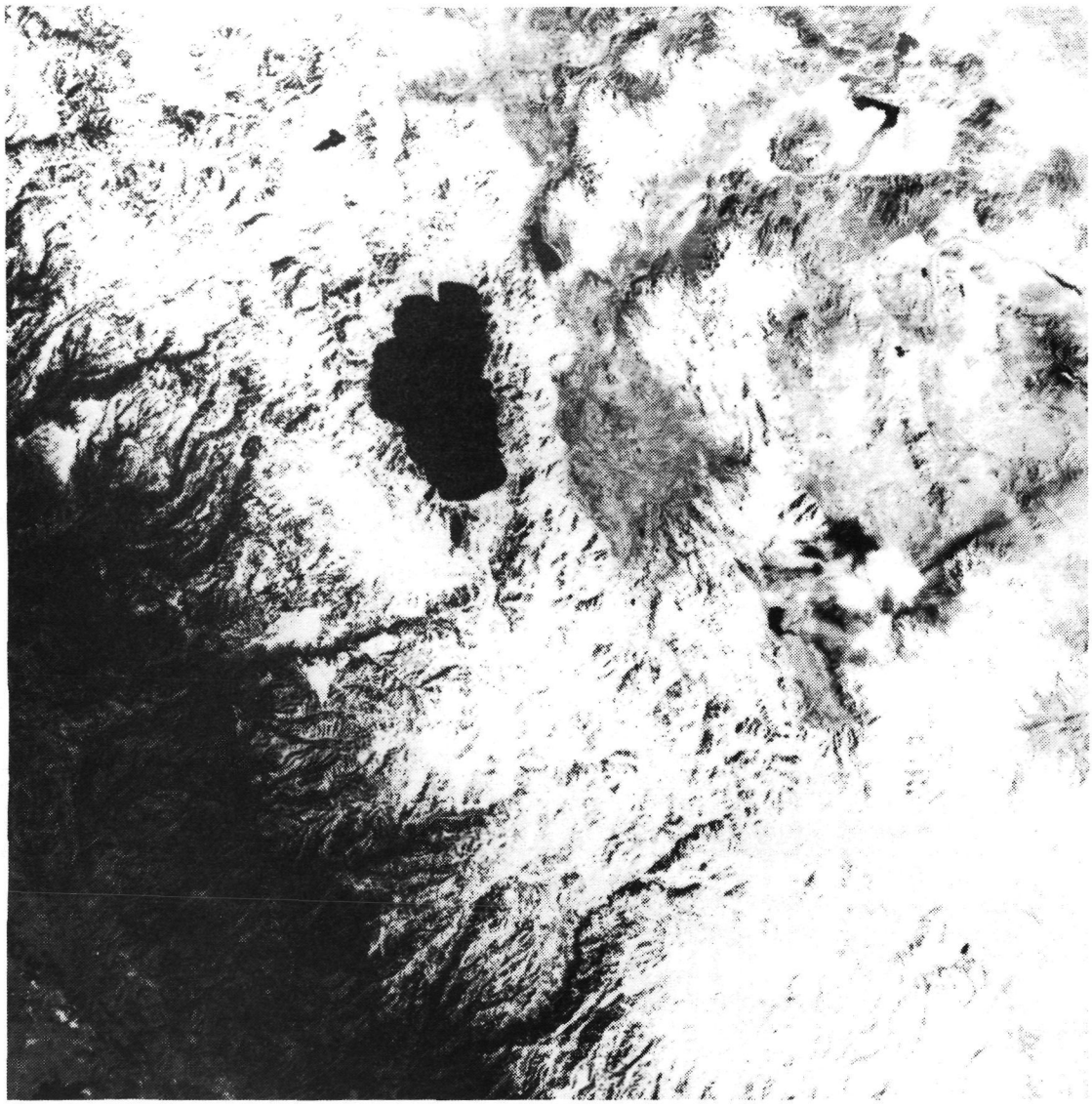

SNOW LADEN SIERRA NEVADA IMAGED BY SATELLITE -- This satellite photograph of the Sierra Nevada mountains, covering a 13,225 square mile area, depicts a near normal snowpack Feb. 23, 1975. It was recorded by the Landsat satellite and radioed to NASA's Goddard Space Flight Center, Greenbelt, Md. Measurements made from this image reveal that the snowline is 2,000 feet lower than the snowline in a comparable 1977 Landsat image. Lake Tahoe can be seen in the photograph center.

NASA Photo: 77-H-225

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