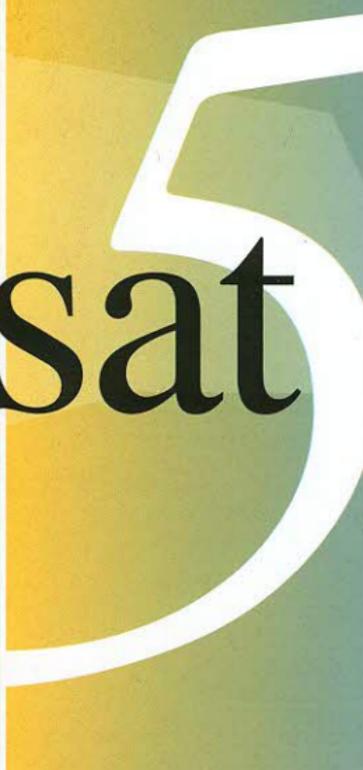




A Remarkable Satellite
A Unique Legacy



Landsat
Celebrating 25
Years

On March 1, 1984, Landsat 5 headed into space with an expected life span of three years. No one could have foreseen that this fifth satellite in the Earth-observing Landsat program would far exceed that expectation. In 2009, the still-operational Landsat 5 celebrates its 25th anniversary in orbit. For a quarter of a century, it has steadfastly captured images of Earth's changing surface. It has amassed a legacy of Earth observation unmatched by any other satellite of its kind.



March 1, 1984
Launch
1984



Las Vegas
Urban growth
1984



The Landsat Program

The Landsat program is a series of satellite missions jointly managed by the U.S. Geological Survey (USGS) and the National Aeronautics and Space Administration (NASA). The goal of these missions is to repeatedly acquire digital images of Earth's landmasses and coastal boundaries to document the changing face of the planet over time. In fact, collecting information about Earth from space—a process known as remote sensing—has matured largely in conjunction with the Landsat program.

NASA shouldered the responsibility for developing and launching the Landsat satellites. The space agency launched the first satellite in 1972, and the most recent one, Landsat 7, in 1999. In addition to flying the satellites, the USGS handles the operations, maintenance, and management of all Landsat data reception, the processing and archiving of Landsat images, and their distribution to users worldwide. Landsat



Monitoring
Aral Sea
1989



Yellowstone National
Park Fire Scars
1993

satellites 1 through 4 are no longer operational (Landsat 6 never achieved orbit). But Landsat 5 continues to function along with its much younger counterpart. Together, Landsat 5 and Landsat 7 take hundreds of digital pictures of Earth every day.

Landsat 5's TM Sensor

Landsat 5's original payload included two sensors, the Multispectral Scanner (MSS) and the Thematic Mapper (TM). But images captured by the TM sensor stole the show. Each TM image is derived from a 185-km-wide and 170-km-long sensor swath of Earth's surface. Image resolution is about 30 meters.

Thirty-meter resolution is what scientists call "moderate" spatial resolution in a satellite image. In short, the TM sensor was designed to see things like a forest, but not every tree in that forest. In Landsat 5's TM images, therefore, it isn't possible to pick out fine details such as individual buildings. But larger features such as housing developments,



Bolivia
Clear cutting
2000



Greenland
Glacier
2006



Flooding in U.S.
Midwest/Landsat 5
begins 25th year
2008

One Tough “Bird”

It's not surprising that a satellite that has survived many times longer than its design life has a history of miraculous recoveries. Since 1984, Landsat 5 has experienced at least 22 different problems (engineers call them anomalies), all of which have been overcome by redundant systems or pure ingenuity on the part of Landsat flight operations teams.

interstate highways, and farmers' fields are easy to distinguish. Furthermore, the images cover a large enough area to allow for frequent global coverage (every 16 days). This continuous, repetitive coverage—coupled with sufficient detail to reveal environmental changes and human-related impacts ranging from desertification to urban sprawl, agricultural irrigation, and reforestation—is what has enabled Landsat 5 TM images to fill the critically important scientific niche they have for the past 25 years.

The Landsat 5 Legacy

To date, Landsat 5 has taken more than 600,000 images of Earth's continents and coastal regions. The USGS Earth Resources Observation and Science (EROS) Center houses these images, along with those captured by all the other Landsat satellites.

Landsat imagery represents the world's longest continuously acquired civilian collection of space-based land remote sensing data. These unique pictures of the planet form a global visual archive, an irreplaceable reference for monitoring Earth's well-being.

During its 25 years in orbit, Landsat 5 has "seen" a lot. It has recorded the effects of the 1986 Chernobyl nuclear power plant explosion, the fires that scorched Yellowstone National Park in 1988, Greenland's changing glaciers, and much more. When satellite images are used to understand and mitigate disasters today, the "before" images are almost always Landsat scenes. Most are very likely from Landsat 5.

Landsat 5 has recorded countless other natural and human-induced changes to the global land surface. The collection of imagery from this remarkable satellite is becoming increasingly more precious and significant as it is combined with and compared to data gathered by more recent satellites. In fact, it's been said that Landsat 5's quarter century of TM imagery may be the nation's single most important asset in land remote sensing.

<http://landsat.usgs.gov>

<http://landsat.gsfc.nasa.gov>