Landsat 8 Celebrates Five Years in Orbit

The Landsat 8 Earth-observing satellite has marked being five years in orbit. In that time, it has racked up 26,500 orbits around the planet, 1.1 million "scene" captures, and an abundance of images that represents 16% of all the continuous observations in the 45 year Landsat archive.

Landsat 8, which makes global measurements of Earth's land surface, strengthened the program's role as a cornerstone among the growing number of government and commercial programs that capture imagery of Earth from space. The global coverage and faster data acquisition rates are enabling significant research and opening up new ways in which scientists, businesses, and resource managers can use the data.

"I am thrilled by the performance of Landsat 8, and even more so by the adoption of the data by so many people for important, consequential research and applications." said Jim Irons, NASA Landsat 8 Project Scientist.

For scientists that want to compare new imagery or data to previous decades, the unbroken 45 year Landsat record offers the one, consistent reference point. This role is furthered by USGS, who manages the expanding data archive, and NASA's commitment to keeping the entire Landsat data archive free and accessible to scientists and the public. Landsat 9 is targeting a launch in 2020 and will continue that role.

Landsat 8 benefits from evolutionary technological advances over its predecessors. The Operational Land Imager (OLI) collects data in two spectral bands: a deep blue (coastal/aerosol) band and a cirrus cloud detection band. Both science instruments, OLI and the Thermal Infrared Sensor, can outperform their predecessors' measurement sensitivity due to improved signal-to-noise ratio.

These improvements have been integral to the work of water quality managers who can now use Landsat 8 to map water quality indicators in coastal and inland waters. "We can now pull out detailed maps of water constituents, including chlorophyll, dissolved organic matter, and suspended sediment," said Jeff Masek, the Landsat 9 Project Scientist.

Landsat 8 has also made mapping the movement of glaciers, ice sheets, and sea ice easier. This in turn has led to the near-real-time global monitoring of glaciers, detailed Antarctic ice sheet velocity maps, and new Antarctic rock outcrop maps, all of which combine to give a better understanding of cryospheric processes.

Landsat 8 also detects more subtle changes in vegetation health and can help make meaningful measurements of biophysical variables that land managers track, like leaf-area index. And with the launch of the European Space Agency's Sentinel-2 satellites, scientists are now "harmonising" imagery from multiple missions to observe changes to vegetation on seasonal timescales.

Landsat 8 was built with a five year design life. Most missions that survive their first few months in orbit tend to last much longer than their stated design life. Given that Landsat 8 instruments have few moving parts and the OLI instrument in particular has significant redundancy, scientists and engineers think Landsat 8 will continue operating for years to come.

This article is a modified version of the original source article which can be found at: www.nasa.gov/feature/goddard/2018/landsat-8-marks-five-years-in-orbit