

# Landsat Update

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*Note: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.*

## Landsat Mission News

### Recent Landsat 7 Data Acquisition Suspensions

In September, two events caused the Landsat 7 satellite to suspend data acquisitions. On September 9, 2014, the satellite performed a delta-inclination (delta-i) maneuver to maintain the satellite's mean local crossing time. This maneuver required a suspension of acquisitions from 9:30 CT (14:30 UTC) to 9:00 CT (14:00 UTC) September 10, 2014 .

On Saturday, September 27, 2014, the satellite stopped acquiring data due to an onboard telemetry unit issue. Investigations into the issue determined that the primary remote telemetry command unit encountered an error, and switched to the secondary. There were no issues detected to the functionality of the satellite. Imaging was suspended from 15:20 CT (20:20 UTC) on September 27 until 16:23 CT (21:23 UTC) on September 29, 2014 when nominal acquisitions resumed.

### Landsat 8 Images the Moon

Once each month, the Landsat 8 satellite rotates away from scanning the Earth, to image the moon for Lunar Calibration scans. The moon's fairly uniform bright reflectance, practically nonexistent atmosphere, and undeviating surface patterns make it the perfect target source for calibration to ensure quality and consistency for Landsat 8's Operational Land Imager (OLI). Lunar Calibration scans take place over two night-time orbits, to allow optimal day imaging to continue.

Data from the moon are used to calibrate the on-board detector arrays with a series of scans. This allows all detectors to image the moon in two sequences for complete calibration of all detectors. The first scan uses half of the detectors, after which the satellite swings back to image the Earth. Once earth imaging is complete, the satellite is maneuvered into position to complete lunar imaging of the remaining detectors. One detector is imaged twice to account for any differences between orbits.

The lunar scans are typically done just after the full moon. At that time, the lunar phase is near 8 degrees, which is sufficient to consider the moon full, but not so bright that it introduces saturation errors to the calibration calculations.

In July 2014, the first of three “supermoon” lunar scans were done. When the moon is at perigee (closest to the earth), it can appear ~15 percent larger than when it is at its furthest point (apogee). The images below show the lunar images acquired at apogee in December 2013, and at perigee in July 2014.



December 17, 2013: Lunar image at apogee.



July 12, 2014: Lunar image at perigee.

## Landsat Product News

### LPGS Updates and Release Notes

Recent updates to the Landsat Level 1 Product Generation System (LPGS) include metadata (MTL) updates for removal of padding as well as the addition of Ground Control Point (GCP) versioning. This LPGS release also includes the addition of newly updated Phase 1 GCPs, where there was poor registration, or inaccurate GCPs, and improvements to land masks for cloud cover enhancements. Details about these updates can be found in the July 9, 2014 and July 23, 2014 news on [http://landsat.usgs.gov/Landsat\\_Metadata\\_Changes.php](http://landsat.usgs.gov/Landsat_Metadata_Changes.php).

### Cloud Cover Assessment Changes Coming to Landsat Metadata

In early 2015, a CFMask cloud cover algorithm will be replacing the currently-used algorithms for Landsat 4-5 TM, Landsat 7 ETM+, and Landsat 8 OLI/TIRS data. The MSS algorithm will remain unchanged.

In addition to the implementation of the CFMask algorithm, a Land Cloud Cover score will be added to the metadata (MTL) files for all Landsat data, including Landsat 1-5 MSS. This score provides an estimate of the percent cloud cover over the land within an image. The new MTL parameter will be:

**CLOUD\_COVER\_LAND**

These changes will be implemented in Level 1 Product Generation (LPGS) release 12.6 for Landsat 1-5 and 7 data, and release 2.5 for Landsat 8 data.

In the Landsat 1-5 MSS metadata files, the currently named **CLOUD\_COVER\_AUTOMATED\_L1** will be removed, and the **CLOUD\_COVER** parameter will be retained.

## Upcoming Landsat 8 Surface Reflectance Data Products

In the upcoming months, Landsat 8 product options will be available to all users via the Earth Resources Observation and Science (EROS) Center Science Processing Architecture (ESPA) On Demand Interface (<http://espa.cr.usgs.gov/>). These include top-of-atmosphere (TOA) reflectance, surface reflectance (SR), and spectral indices. Landsat 8 surface reflectance data will also be available from EarthExplorer (<http://earthexplorer.usgs.gov>).

Landsat 8 will not be processed with the Landsat Ecosystem Disturbance Adaptive Processing System (LEDAPS) that is used for Landsat 4, 5 and 7 SR data. A new algorithm has been developed to take advantage of Landsat 8's unique characteristics.

The original L8 SR code was written in FORTRAN and output only SR. The USGS EROS translation to a C version adds options for TOA reflectance and SR-based spectral indices.

All Landsat 8 scenes can be processed to SR products, including pre-WRS2; however, scenes with a solar zenith angle greater than 76 degrees can be corrected only to TOA reflectance.

More details about the upcoming L8 SR data, as well as a better known timeframe of availability will be provided in a future Landsat Update issue. Relevant webpages and documentation will also be made available before public release.

## Landsat 8 Online Cache Cleanup

Since launch, over 300,000 Landsat 8 Level 1 (L1) data products have been added to the online cache and made available for immediate download. During the first week of September 2014, the online cache filled to capacity, requiring a cleanup to allow newly acquired data to be added. Clean ups will continue occasionally to maintain the online cache space.

The most current and frequently downloaded scenes remain available on the cache, but users will need to request Level 1 processing in [EarthExplorer](#), [GloVis](#), or the [LandsatLook Viewer](#) to receive L1 products for those removed from the online cache.

## Changes Coming to the LandsatLook Viewer

The LandsatLook Viewer (<http://landsatlook.usgs.gov>) is a prototype tool that was developed to allow rapid online viewing and access to the USGS Landsat image archives. This viewer enables interactive exploration of the Landsat image archive, at up to full resolution directly from a web browser.

The [LandsatLook images](#), designed for visualization analysis, are displayed in the Viewer. This type of image is of value to anyone who wants to quickly see the major features in a Landsat image, or compare obvious changes to Earth's surface through time. Along with on-screen viewing and image export functions, the LandsatLook Viewer provides access to the Landsat Level 1 standard product and metadata.

In the near future, users may begin to notice changes to the LandsatLook Viewer. These changes are being implemented to improve the usability and functionality of the tool.

We welcome [suggestions and feedback](#) from the Landsat user community as we begin to implement these changes.

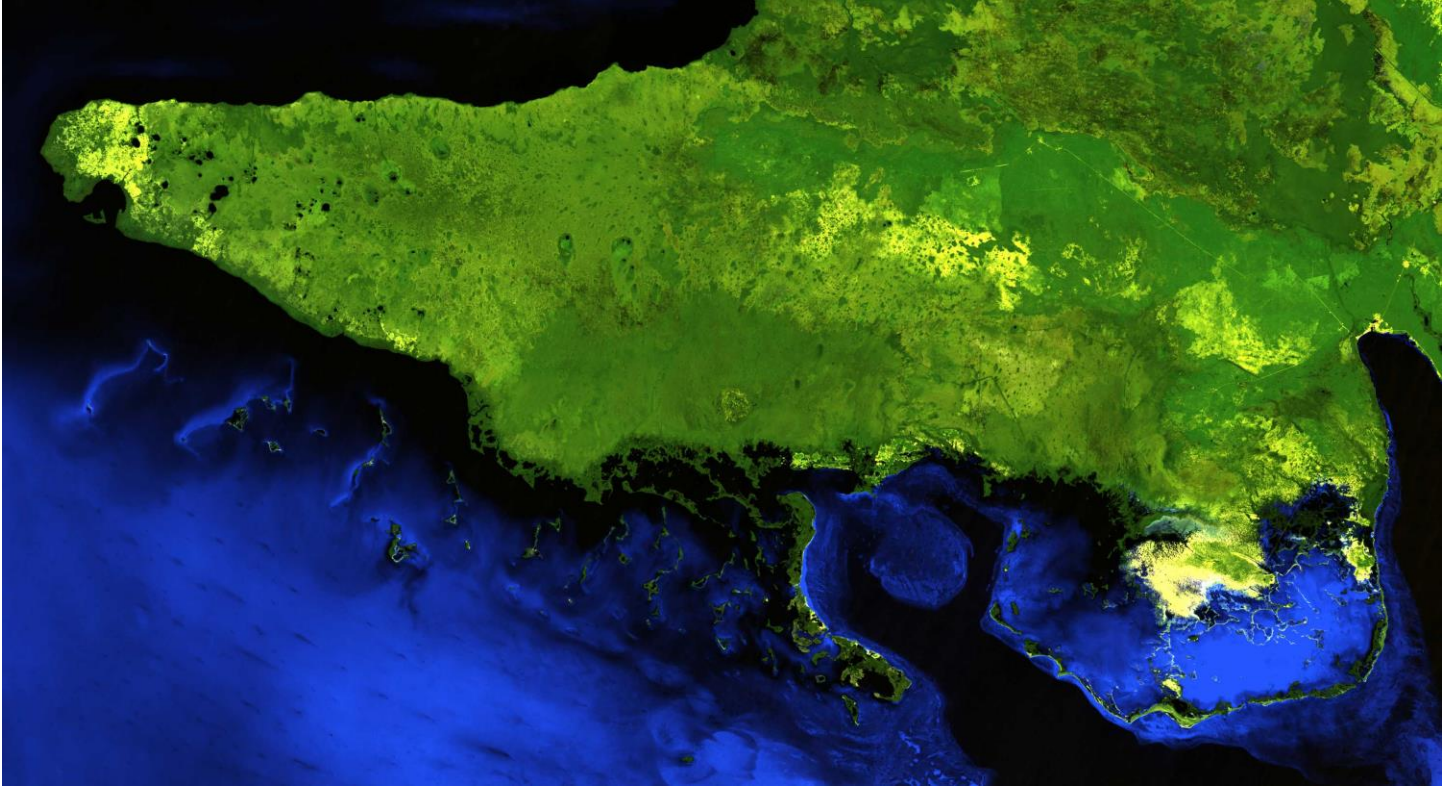
# Landsat Image of Interest

## Zapata Peninsula

Sensors: Landsat 8

Acquisition Dates: January 18, 2014

Path/Row: 15/45



The Zapata Peninsula is located in western Cuba. Most of this sparsely populated area lies within the Ciénaga de Zapata National Park and the UNESCO-designated Biosphere Reserve.

The region is covered by large areas of open swamp and marshes intermixed with dense woodlands. It is also home to one of the largest coastal wetlands in the Caribbean region. The extensive and fragile ecosystem is protected for its biodiversity and high concentration of migratory birds, mangrove forests, seagrass beds, and coral reefs.

This Landsat 8 image shows the peninsula and neighboring region. The dense forests are dark green, while the open swamps and marshlands are shown in brighter green and yellow tones. This image also shows the surrounding deep ocean water and channels (dark blue and black), along with shallow water and coral reefs (bright blue).

Landsat images provide a valuable record of the earth's surface and are useful for space-based mapping and classifications of vegetation, ecosystems, and coastal habitats.

This and other interesting images can be found on <http://landsat.usgs.gov/gallery.php>.