

## LANDSAT Update - Volume 3, Issue 1, 2009

---

### Opening the Landsat Archive

Electronic access to the entire USGS Landsat 7 archive, enabling users to download standard-format scenes at no charge, has been an amazing success, with over 225,000 scenes downloaded since October 1, 2008. Previously acquired imagery from Landsat 1 through Landsat 5, is also now available for download at no charge using the same standard processing format. Processing parameters and other details about the products can be found at [http://landsat.usgs.gov/products\\_data\\_at\\_no\\_charge.php](http://landsat.usgs.gov/products_data_at_no_charge.php). Previously offered USGS Landsat products with customer-defined options, including media, are no longer available.

Newly acquired Landsat 7 ETM+ SLC-off and Landsat 5 TM images with less than 40 percent cloud cover are automatically processed and made available for immediate download. Imagery with greater than 40 percent cloud cover can be processed upon request. Once the requested scenes are processed, an email notification is sent to the customer with instructions for downloading. These scenes will then become accessible to all users. Landsat data can be searched, downloaded, or requested from GloVis or EarthExplorer. High demand for this data may result in slow search performance and processing times, which typically range from 1-3 days for Landsat 7 ETM+ and some Landsat 5 TM data and 3-4 weeks for Landsat 1-5 MSS, Landsat 4 TM and some Landsat 5 TM data. Please contact Customer Service at [custserv@usgs.gov](mailto:custserv@usgs.gov) with any comments or questions.

## Landsat Science Team Spotlight



**Figure 1. Dr. Eileen Helmer**

Dr. Eileen Helmer has been a scientist with the International Institute of Tropical Forestry (IITF) since 1999. The Institute (a research laboratory within the USDA Forest Service) is located in Río Piedras, Puerto Rico.

Helmer and collaborators develop methods for using a series of Landsat image mosaics to monitor forest ecosystems and land-cover change in persistently cloudy tropical landscapes, integrating socioeconomic and biophysical data to reveal what factors drive forest recovery and forest clearing for urbanization. They also study how landscape structure influences species diversity and structure of recovering forests.

### *Selected Publications of Helmer or Collaborators*

Helmer, E. H.; Brandeis, T. J.; Lugo, A. E.; Kennaway, T.. 2008. Factors influencing spatial pattern in tropical forest clearance and stand age: Implications for carbon storage and species diversity. *Journal of Geophysical Research* 113:G02S04. <http://www.treearch.fs.fed.us/pubs/29987>

Helmer, E.H., Kennaway, T.A., Pedreros, D.H., Clark, M.L., Tieszen, L.L., Ruzycki, T.S., Marcano, H., Schill, S.R., Carrington, C.M.S. 2008. Distributions of land cover and forest formations for St. Kitts, Nevis, St. Eustatius, Grenada and Barbados from satellite imagery. *Caribbean Journal of Science* 44(2):175-198. <http://www.caribjsci.org/>

Helmer, E. H., M. A. Lefsky, and D. A. Roberts. Biomass accumulation rates in secondary forests of lowland Amazonia from space borne lidar and time series of satellite imagery. (Manuscript submitted in May 2008).

Ruefenacht, B., M.V. Finco, M.D. Nelson, R. Czaplewski, E.H. Helmer, J.A. Blackard, G.R. Holden, A.J. Lister, D. Salajanu, D. Weyermann, K. Winterberger. 2008 or 2009. *Conterminous US and Alaska forest type mapping using forest inventory and analysis data*. *Photogrammetric Engineering and Remote Sensing*: In Press.

Helmer, E. H. and B. Ruefenacht. 2007. A comparison of radiometric normalization methods when filling cloud gaps in Landsat imagery. *Canadian Journal of Remote Sensing* 42(3):325-340.

<http://www.treesearch.fs.fed.us/pubs/30282>

Kennaway, T. and Helmer, E. H. 2007. The Forest Types and Ages Cleared for Land Development in Puerto Rico. *GIScience & Remote Sensing* 44(4):356–382. <http://www.treesearch.fs.fed.us/pubs/30000>

Brandeis, T. J., Helmer, Eileen H.; Oswald, Sonja N. 2007. The status of Puerto Rico's forests, 2003 Resour. Bull. SRS-119. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 72 p. <http://www.treesearch.fs.fed.us/pubs/28823>

## **The 17th William T. Pecora Memorial Remote Sensing Symposium**

**The Future of Land Imaging - Going Operational  
November 16-20, 2008  
Denver, Colorado**

The Pecora Conference series was established by the USGS and NASA in the 1970s as a means of sharing ideas and experiences resulting from the use of remotely sensed data. The objectives of the Pecora Conferences are:

- 1) To foster the exchange of scientific information and results derived from the application of remotely sensed data; and
- 2) To provide a forum for discussing ideas, policies, and strategies on land remote sensing.

With an eye toward the future, the theme of Pecora 17 is "Future of Land Imaging...going operational." The conference offered a program on applications of satellite and other remotely sensed data to study, monitor, and manage the Earth's land surface, as well as technologies to improve satellite data analyses, quality, access and preservation. Given the recent release of an Office of Science and Technology Policy report recommending the United States maintain a core operational capability for land imagery through the creation of a U.S. National Land Imaging Program, a special focus of Pecora 17 was on the challenges of migrating satellite programs from research missions to operational capabilities.

<http://www.asprs.org/pecora17/>

## **Landsat Ground Station Operators Working Group (LGSOWG) Meeting**

The Landsat Ground Station Operators Working Group (LGSOWG-37) meeting was organized by the U.S. Geological Survey (USGS) and hosted by the Center for Earth Observation and Digital Earth (CEODE), Chinese Academy of Sciences in Shanghai, China, September 15 – 19, 2008.

Participants from 11 countries, including representatives of 17 international ground stations, members of the USGS Landsat and Landsat Data Continuity Mission (LDCM) Projects, and NASA staff, discussed details regarding Landsats 5 and 7 mission status, no-cost Landsat product distribution, the Landsat Global Archive Consolidation initiative, programmatic issues and future plans.

LDCM sensor and spacecraft development was the primary topic of discussion, supported by presentations on project and ground system status; downlink agreement concepts; ground system and downlink overview; data archive, production and distribution; and Landsat Science Team activities.

International Cooperators reported on the status of their systems, and provided information regarding the business model and organizational structure of their stations. They also addressed future satellite mission and ground system plans of their agencies:

Japan: Presented data distribution status for the Advanced Land Observation Satellite (ALOS), as well as a report from JAXA, the Japanese Space Agency, on current and future earth observation missions.

Germany: Detailed several recent and future programs, including TerraSAR-X (launched June 2007), TanDEM-X (to be launched end of 2009), EnMap (to be launched in 2011), and RapidEye (launched August 29, 2008).

Brazil: Presented the status of the China-Brazil Earth Resources Satellite (CBERS) 2B, launched September 19, 2007.

Argentina: Reported the status of the Satélite de Aplicaciones Científicas-D (SAC-D) spacecraft, scheduled for launch in May 2010.

Europe: The European Space Agency (ESA) briefed the group on the many ESA programs in progress, including the Global Monitoring for Environment and Security (GMES) programs.

Given the Global Earth Observation (GEO) activities in which most countries participate, sharing information about ongoing and future earth imaging programs is of increasing importance.



**LGSOWG-37 participants in Shanghai. Photo credit: CEODE**

## 50,000 Orbits and Counting

The Landsat 7 satellite established a milestone by making its 50,000 orbits around the Earth on Monday, September 8, 2008. That's more than 1.2 billion miles traveled. Launched on April 15, 1999, Landsat 7 was designed for a 5 year mission-life, but exceeded expectations.

The image below was acquired by Landsat 7 and shows a portion of the Yalu River, which separates the cities of Dandong, China, (top, center portion of the image) to the left, and Sinuiju, North Korea, to the right.

The river is 790 km (491 mi.) in length and forms the northern boundary between North Korea and the Jilin and Liaoning Provinces in north China. Dandong (located on the left bank of the Yalu, top center) has a population of 2.4 million and is the largest border city in China. With a much smaller population of 200,000 (1981 est.), Sinuiju grew because of the lumber industry, which uses the river to transport logs from inland forests.



**Figure 2. Landsat 7 image of the Yalu River and the Korea Bay.**

## **New NASA Grant to Facilitate Landsat Usability**

*Story courtesy of NASA ([http://landsat.gsfc.nasa.gov/news/news-archive/news\\_0158.html](http://landsat.gsfc.nasa.gov/news/news-archive/news_0158.html))*

Dr. David Roy of South Dakota State University, Geographic Information Science Center of Excellence (GIScCE), is the recipient of a \$3.29M, 5-year grant funded by NASA's Making Earth System Data Records for Use in Research Environments (MEaSUREs) program.

Landsat data will be fused with MODIS land products to systematically generate "seamless" consistent mosaicked Landsat ETM+ data sets with per-pixel quality assessment information and derived land cover characterization at monthly and longer time periods. The mosaic products will be generated for the conterminous USA and Alaska for a 7 year period, and made freely available to the user community in near-real time.

The project is a collaboration with the U.S. Geological Survey's Center (USGS) for Earth Resources Observations and Science (EROS). The USGS Center is the repository for satellite images taken from the Landsat series of satellites which since 1972 has been providing the longest dedicated land remote sensing data record of the Earth. Dr. Tom Loveland, who is the USGS Landsat Science Team Leader, said, "This project will provide the USGS with a state-of-the-art strategy for creating the land monitoring data sets needed by the nation's resource managers and an exciting opportunity for evaluating the next generation of Landsat processing and delivery systems. The project is timely because as of this year, Landsat images became available free of charge."

The grant supports Roy's innovative approach for filling the information gaps that commonly exist in Landsat data. These "gaps" result from both cloud-cover—which on global average obscures 35% of Landsat data—and the triangular data voids created by the May 2003 failure of the Landsat-7's Scan Line Corrector. Roy's approach uses 500-meter data from the MODIS sensor (specifically, the 16-day MODIS BRDF/Albedo product) and existing gap-free Landsat data to predict Landsat reflectance for a given date. This method works, on a per-pixel basis, by modulating the Landsat reflectance of the known date data by a value that represents the relationship between MODIS reflectance on the prediction and known dates—while taking into consideration the Landsat sensor-sun view angle geometry.

Scientists will spend the first half of the five-year period developing a prototype at South Dakota State University. Then they'll move the system to the USGS and put it into operation.

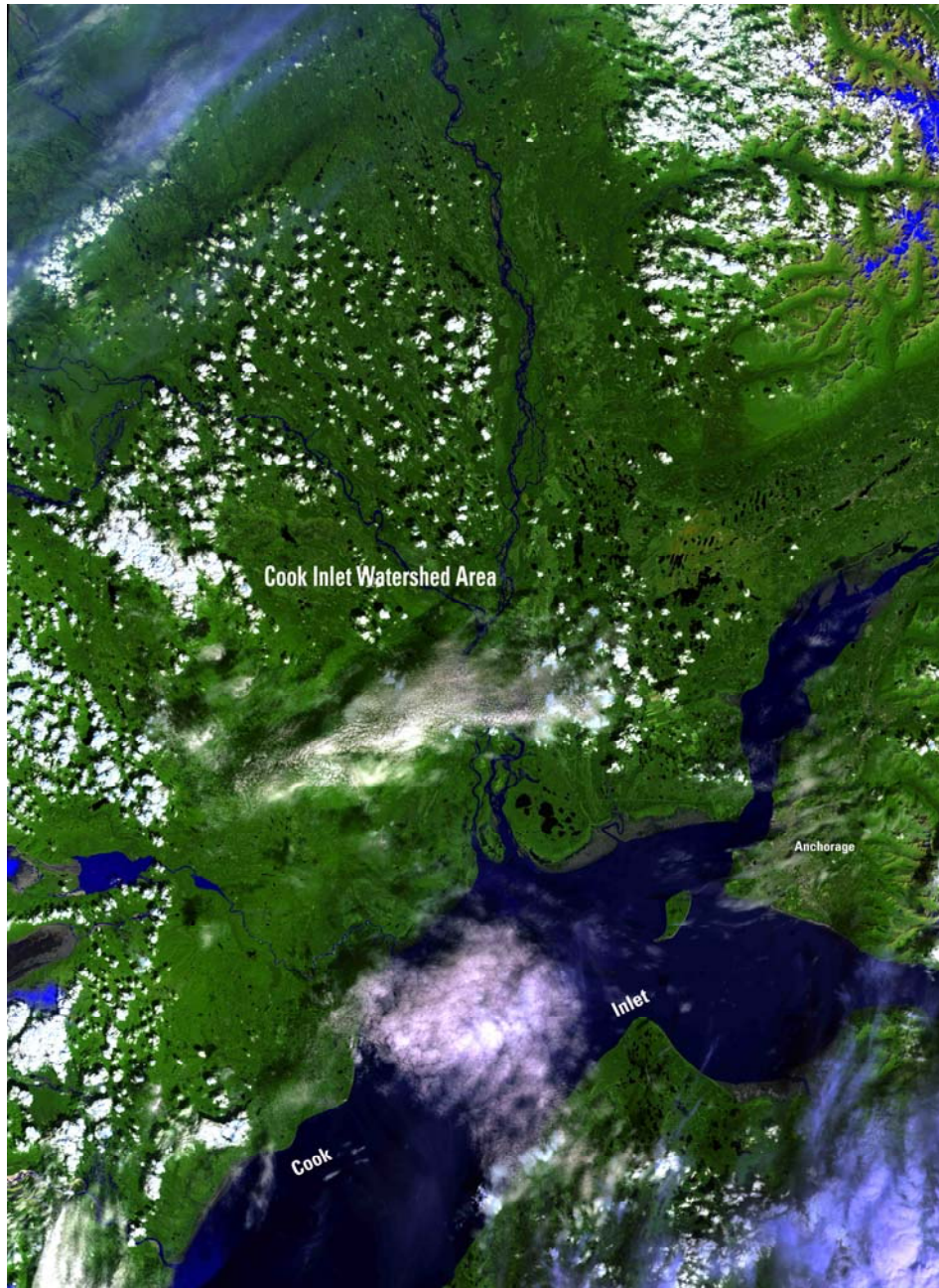
Dr. Tom Loveland and Dr. Matthew Hansen are co-investigators on the project. Dr. Hansen said, "This project has the potential to fundamentally change the way satellite data are accessed and used. Our experience in processing and characterizing Landsat imagery will enhance the data's utility for a whole range of users. This is a very exciting project."



## Did You Know? From the [Landsat Legacy Project](http://library01.gsfc.nasa.gov/landsat/)

- <http://library01.gsfc.nasa.gov/landsat/>

Landsat satellite imagery has been used by Alaska to aid navigation in Cook Inlet



**Figure 3. Cook Inlet, Alaska and the Cook Inlet Watershed area**

Cook Inlet is 192 miles long and is one of the most productive fisheries in Alaska. Along with five species of salmon, several other species of fish make the inlet home. Nearly two thirds of Alaska's population (400,000 people) lives in the watershed area.

The Cook Inlet watershed covers 47,000 square miles of south-central Alaska. Melting snow and ice from mount McKinley, the Chugach Mountains and the Aleutian Range drains into the Susitna, Matanuska and the Kenai rivers, which feed the inlet.

## EROS Authors in Recent Publications

Landsat data in peer-reviewed, published articles.

### *Development of Landsat-5 thematic mapper internal calibrator gain and offset table*

Proceedings of SPIE (Society of Photo-Optical Instrumentation Engineers) Vol. 7081: Bellingham, WA, SPIE, p. Article 708115.

Barsi, J.A., **Chander, G., Micijevic, E.**, Markham, B.L., and **Haque, Md.O.**, 2008, , in Butler, J.J., and Xiong, J., eds., Earth Observing Systems XIII, San Diego, CA, Aug. 11, 2008-Aug. 13, 2008,

<http://spiedigitallibrary.aip.org/getpdf/servlet/GetPDFServlet?filetype=pdf&id=PSISDG007081000001708115000001&idtype=cvips>

### *L5 TM radiometric recalibration procedure using the internal calibration trends from the NLAPS trending database*

Proceedings of SPIE Vol. 7081: Bellingham, WA, SPIE, p. Article 708114.

**Chander, G., Haque, Md.O., Micijevic, E.**, and Barsi, J.A., 2008, , in Butler, J.J., and Xiong, J., eds., Earth Observing Systems XIII, San Diego, CA, Aug. 11, 2008-Aug. 13, 2008,

<http://spiedigitallibrary.aip.org/getpdf/servlet/GetPDFServlet?filetype=pdf&id=PSISDG007081000001708114000001&idtype=cvips>

## Tips and Tricks



### RSS Feeds on the Landsat webpage

Clicking on any of the orange icons on the [Landsat home page](#) will take you to the RSS (Really Simple Syndication) feeds page. After you have subscribed you will be alerted when new content is added the next time you visit the page. It's a great way to stay up-to-date with changes to the site.

Subscribing to a feed is simple – after you subscribe, the [Feed Properties](#) dialog box will appear. You can then select your schedule parameters for when your browser checks the web site for new content.

To view your subscribed RSS feeds, click on the Favorites button in Internet Explorer and click on the RSS icon. If you are using Firefox as your browser click on the Bookmarks option then click on the folder with the RSS icon. The list of subscribed feeds will show up in the drop down menu. To unsubscribe to a feed delete the link in your Favorites or Bookmarks. .

The Landsat website currently has 5 RSS feeds:

- Headlines
- Landsat Image Gallery
- Recent terrain-corrected images
- The latest Landsat 7 scenes
- Landsat Updates