

## Impacts of Landsat 8 Technical Advancements

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### ABSTRACT:

The design of the Landsat 8 observatory incorporates several evolutionary technical advancements intended to enhance the value of Landsat 8 data for science and applications. The two sensors aboard Landsat 8, the Operational Land Imager (OLI) and Thermal Infrared Sensor (TIRS) are both pushbroom radiometers affording better radiometric sensitivity relative to the whiskbroom sensors flown on earlier Landsat satellites. This technical approach improves signal-to-noise ratios (SNR's) almost an order of magnitude relative to the performance of the Landsat 7 ETM+. The greater SNR's allow 12-bit data digitization over expanded dynamic ranges in comparison to the 8-bit ETM+ data. The OLI also collects data for two new spectral bands, a shorter wavelength blue band for coastal water observations and a short-wave infrared band for cirrus cloud detection. Finally, the on-board data recorder, data transmission system, and ground system are all designed to increase the number of images that can be captured and processed by the data archive system at the USGS EROS Center. The data collection rate is currently approaching 650 scenes per day.

All of these enhancements are having an impact. The new short-wave infrared band is revealing the presence of previously undetected cirrus clouds thereby facilitating the selection of images and pixels for analyses. The new blue band and the improved radiometric sensitivity are leading to the more accurate retrieval of water-borne constituent (e.g., sediment, dissolved organic matter) concentrations in coastal and lake waters. The improved radiometry is also helping with the more accurate detection and characterization of land cover change such as forest disturbance. The increase rate of image collection is producing more frequent cloud-free observations for time series analyses. These impacts will be discussed in greater detail during the presentation.

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