



Landsat Update

AGU Edition December 2018

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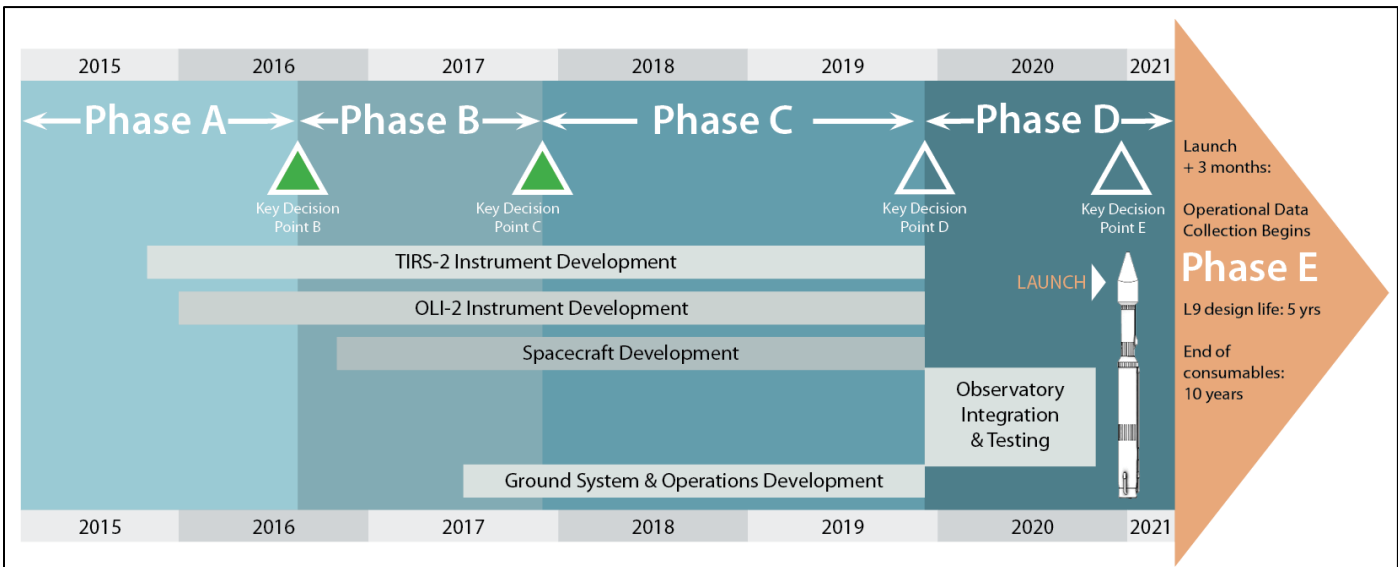


Landsat 9 Development Status

Landsat 9 is currently in Phase C (final design and fabrication) of the mission development and life cycle (see timeline below).

All aspects of the ground, launch and space segments are on track for a scheduled launch readiness date of December 2020.

Visit the Landsat 9 Mission webpage for more details: <https://landsat.usgs.gov/landsat-9-mission>.



A timeline of Landsat 9 mission development and lifecycle.

New Landsat Science Products Availability

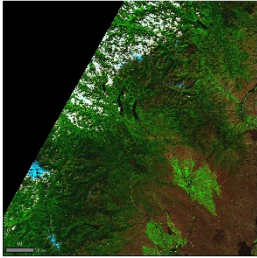
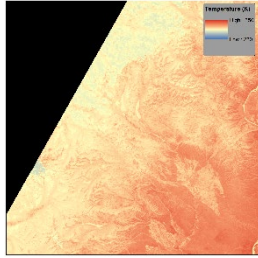
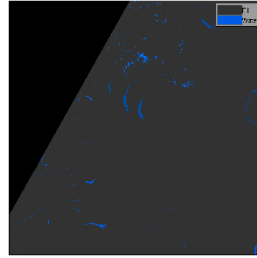
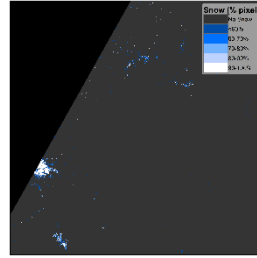
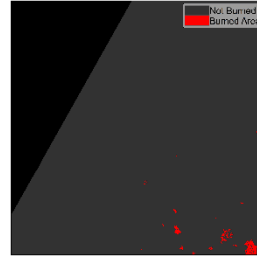
The USGS is developing research-quality, applications-ready, Level-2 and Level-3 science products derived from Landsat Level-1 data. These science products can be used to monitor and assess how changes in land use, land cover, and land condition affect people and nature.

Currently, **Level-2 Surface Reflectance** and **Level-2 Provisional Surface Temperature** Science Products for Landsat scenes acquired from August 1982 to present are available to download from the U.S. Landsat ARD dataset on EarthExplorer (<https://earthexplorer.usgs.gov>) (see next article in this issue).

The following tile-based **Level-3** Landsat Science Products will be available soon, and will be downloadable as new datasets on EarthExplorer (<https://earthexplorer.usgs.gov>):

- **Dynamic Surface Water Extent** (Landsat 4 TM – Landsat 8, 1982-present)
- **Fractional Snow Covered Area** (Landsat 5 TM – Landsat 8, 1984-2017)
- **Burned Area** (Landsat 5 TM – Landsat 8, 1984-2017)

The figure below displays sample images of each Landsat Science Product contained in ARD Tile h004v002, which covers central Washington State.

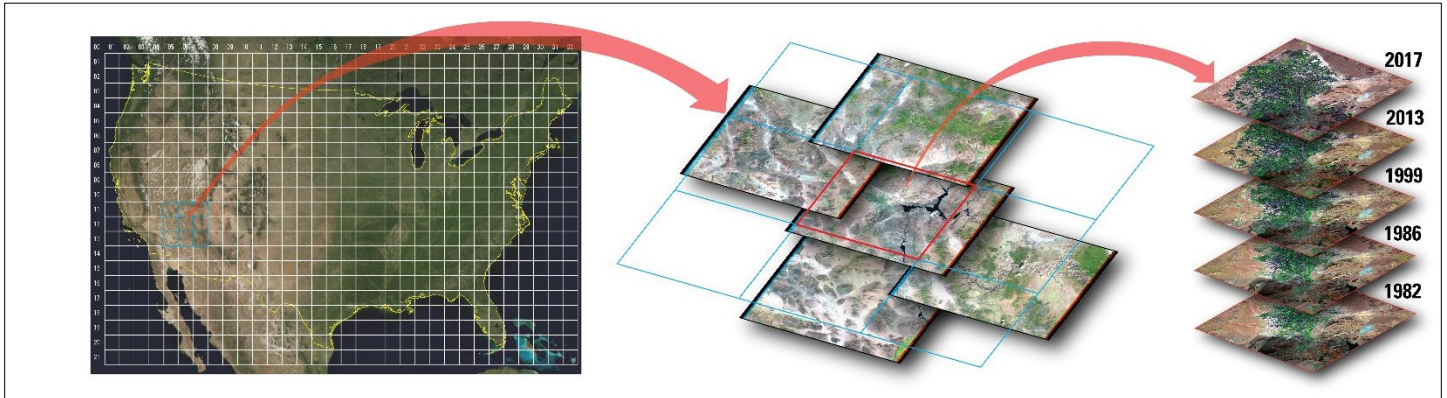
Surface Reflectance	Provisional Surface Temperature	Dynamic Surface Water Extent	Fractional Snow Covered Area	Burned Area
<i>The fraction of incoming solar radiation that is reflected from Earth's surface to the Landsat sensor</i>	<i>Represents the temperature of the Earth's surface in Kelvin (K)</i>	<i>Describes the existence and condition of surface water</i>	<i>Indicates the percentage of a pixel covered by snow</i>	<i>Represents per pixel burn classification and burn probability</i>
				

Visit <https://landsat.usgs.gov/landsat-science-data-products> for details and documentation about Landsat Science Products. This page will also contain links to sample data for the Level-3 products soon.

U.S. Landsat Analysis Ready Data (ARD)

In 2017, U.S. Landsat Analysis Ready Data (ARD) became available to make the Landsat archive more accessible, easier to analyze, and reduce the amount of time users spend on data processing for time series analysis.

U.S. Landsat ARD are derived from Landsat Collection 1 Level-1 precision and terrain-corrected scenes that are processed and arranged in geospatially-calibrated tiles as dense temporal stacks available for immediate use for monitoring and assessing landscape change.



Example visualization of the U.S. Landsat Analysis Ready Data tile-based structure for time-series stacking.

U.S. Landsat ARD are the first USGS data to be placed into the ARD tile grid-based structure. The figure above displays the ARD tile grid structure, how the selected tiles (blue squares) align over Landsat scenes (red square), and how time-series data stacks can be created.

U.S. Landsat ARD are available from 1982 – present for the conterminous United States, Alaska, and Hawaii. Landsat 8 Tier 1 and Tier 2 Level-1 data, and Landsat 7 and Landsat 4-5 Tier 1 Level-1 data are used as input.

U.S. Landsat ARD are processed to a common tiling scheme, with each tile containing 5,000 x 5,000 30-meter pixels and includes all the pixels acquired in a given day within its extents.

Each ARD Tile includes the following data products:

- Top of atmosphere reflectance
- Top of atmosphere brightness temperature
- Surface Reflectance
- Provisional Surface Temperature
- Pixel Quality Assessment band

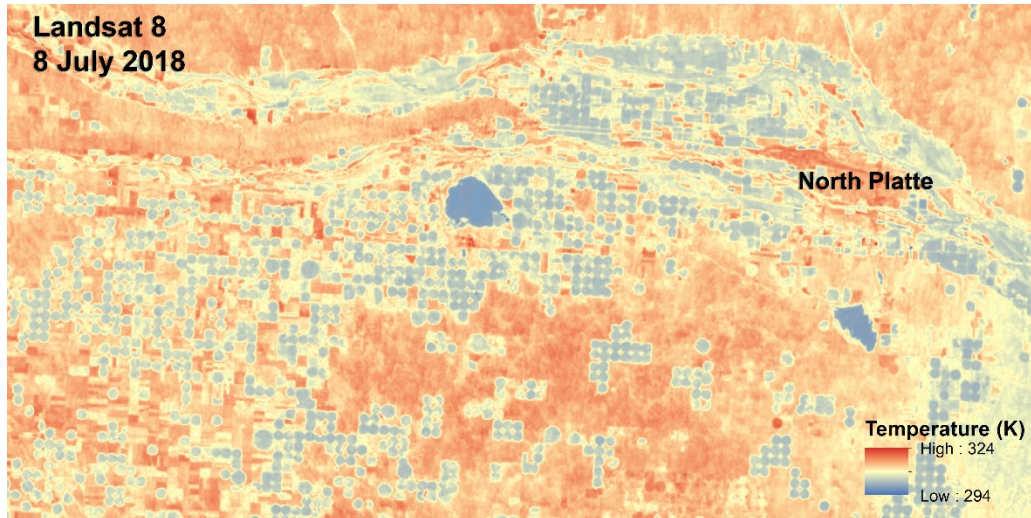
Additional information and documentation about U.S. Landsat ARD and the data products contained within each tile can be found at <https://landsat.usgs.gov/ard>.

Landsat 1-5 Multispectral Sensor (MSS) data will be considered for addition into the ARD product suite in the future, and global Landsat ARD specifications are being developed and will be announced when finalized.

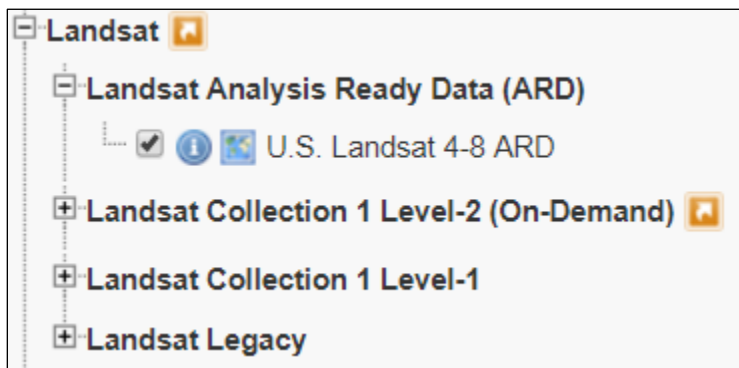
Provisional Landsat Surface Temperature Data Available

The Landsat Level-2 Provisional Surface Temperature Science Product is now available for download as part of the U.S Landsat Analysis Ready Data tile package.

Provisional Surface Temperature represents the temperature of the Earth's surface in Kelvin (K) and can be an important geophysical parameter for understanding Earth surface energy and water balances, and for monitoring and assessing effects of landscape change (see example below).



Landsat Surface Temperature data are being processed from newest to oldest acquisitions and is available from EarthExplorer under the Landsat category, Landsat Analysis Ready Data (ARD) subcategory, and is listed as U.S. Landsat 4-8 ARD (see image below).



For additional information please visit the Landsat Surface Temperature and U.S. Landsat ARD web pages: <https://landsat.usgs.gov/landsat-surface-temperature> and <https://landsat.usgs.gov/ard>. Questions about Provisional Landsat Surface Temperature data can be directed to custserv@usgs.gov.

Landsat Collection 2 Planning

The USGS is planning for the release of Landsat Collection 2 in mid/late 2019. Landsat Collection 2 will contain **Level-1** and **Level-2** products generated from Landsat 1-8 data, with Landsat 9 Operational Land Imager 2 (OLI-2)/Thermal Infrared Sensor 2 (TIRS-2) data to be added after nominal data is received, expected in early 2021.

In Collection 2, Landsat processing systems will continue to generate **scene-based output** and deliver the data in **UTM projection**. The Quality Assessment (QA) band specifications for both Level-1 and Level-2 products to harmonize the data will be updated and provided – this includes adding per-band Level-1 saturation flags, and removing duplicates currently provided in the Level-2 QA band.

Each Collection 2 Level-2 product package will contain both Surface Reflectance and Surface Temperature bands, which will be created when all auxiliary data becomes available.

As the definition of Collection 2 becomes more finalized, details about data products and documentation will be made available on the Landsat Missions Website (<https://landsat.usgs.gov>).

Changes Coming to Landsat Missions Website

Before January 14, 2019, the current Landsat Missions Website (<https://landsat.usgs.gov>) will be transitioned to a more unified USGS website structure resulting in a new URL for the site: www.usgs.gov/landsat.

The new USGS-based site has a similar menu structure to the existing Landsat Missions website and contains all the same content. Work continues to move web content to the new USGS site, so users may notice incomplete pages until the effort is completed in early 2019.

Users are reminded to contact Customer Services (custserv@usgs.gov) with any questions or to receive assistance locating new pages.

Pecora 21/ ISRSE-38 Joint Meeting To be Held in 2019

A joint meeting of the 21st William T. Pecora Memorial Remote Sensing Symposium (Pecora 21) and the 38th International Symposium on Remote Sensing of Environment (ISRSE-38) will convene in Baltimore, Maryland, USA from October 6 – 11, 2019. The combined conference will be hosted by NASA, NOAA and the USGS, with an overarching theme of "*Earth Observation – Continuous Monitoring of Our Changing Planet: From Sensors to Decisions.*"

The call for abstracts will be announced soon. Visit <http://pecora.asprs.org/> for more information about the conference.

Connect/Interact/Contact

Landsat Missions Website: <https://landsat.usgs.gov> *soon to be www.usgs.gov/landsat

Landsat Headlines: <https://landsat.usgs.gov/2018>

Landsat Updates: <https://landsat.usgs.gov/landsat-updates>

Landsat Media Library: <https://landsat.usgs.gov/media-library>



USGS Landsat: @USGSLandsat

NASA Landsat: @NASA_Landsat



USGS: <https://www.facebook.com/USGeologicalSurvey>

NASA Landsat: <https://www.facebook.com/NASA.Landsat>



USGS: <https://www.instagram.com/usgs/>

NASA: <https://www.instagram.com/nasa/>

Contact us:

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