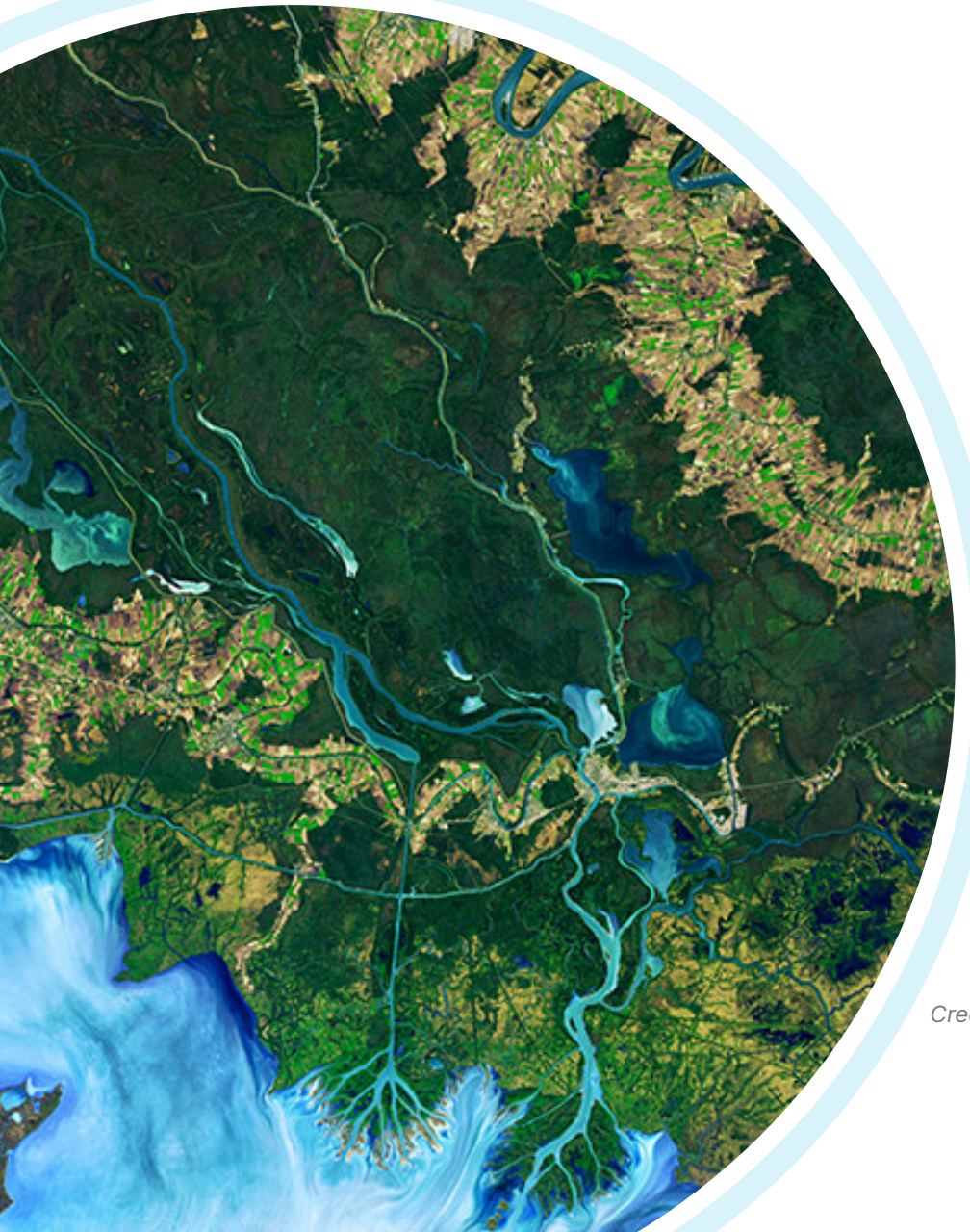
SUSTAINABLE LAND IMAGING

Every day for more than 50 years, Landsat satellites have provided essential measurements to help the nation make informed decisions about natural resource management, including compiling routine drought assessments; developing wildfire prevention strategies; monitoring land surface changes; effectively planning land uses; and understanding the Earth's ecosystem.

Ball Aerospace is partnering with NASA, USGS and the science community to develop and demonstrate a future Landsat architecture that maintains data integrity, while enabling a more flexible and sustainable architecture. Ball Aerospace's Landsat heritage, continued technology development and optimized system designs align well with Landsat Next objectives.

Top: OLI-2
Bottom: SLI-T



Credit: USGS/NASA Landsat

GO BEYOND WITH BALL.®

Sustainable Land Imaging

The instruments on Landsat satellites have evolved significantly over the years, with the Operational Land Imager (OLI) and Thermal Infrared Sensor (TIRS) on Landsat 8 and the Operational Land Imager 2 (OLI-2) and TIRS-2 on Landsat 9 representing the most advanced technology launched to date.

Instrument innovation is continuing under NASA's Sustainable Land Imaging-Technology (SLI-T) program. SLI-T is a partnership with industry to design and demonstrate the Landsat instruments of the future. SLI-T is focused on reducing size and cost, and incorporating emerging technologies for Landsat Next, the initial system in a next-generation Landsat architecture, and Landsat Future programs of record.

Ball Aerospace is at the forefront of miniaturizing remote sensing instruments. We are combining this expertise with our Landsat heritage to develop and demonstrate small instruments that meet SLI-T objectives for Landsat continuity.

Landsat Heritage: OLI

Ball Aerospace designed and built OLI for Landsat 8, which has demonstrated successful performance and exquisite calibration on orbit since its launch in 2013, enabling new coastal and inland water science.

In 2019, we delivered a OLI-2 for Landsat 9 on schedule and under budget, achieving significant cost savings. Landsat 9 launched in September 2021, and OLI-2 has demonstrated equivalent or superior performance to OLI.

Left top down: CHPS instrument, airborne CHPS flight data
Right top down: REMI instrument, airborne REMI flight data

Mission-Level Solutions for Landsat Next & Beyond

As a partner on the SLI-T program, Ball Aerospace has developed and demonstrated innovative instruments that provide for a flexible and sustainable next-generation Landsat architecture.

Multi/Super Spectral/Calibration

Reduced Envelope Multispectral Imager (REMI)

REMI achieves Landsat continuity in a significantly smaller instrument with no image quality loss. In a single, compact sensor, REMI yields visible (VIS) through thermal (TIR) data equivalent to that currently delivered by Landsat's OLI and TIRS instruments.

- More than 40% reduction in size and cost over OLI
- Airborne instrument proven during test flights

Reduced Envelope Multispectral Infrared Radiometer

Incorporates additional thermal bands to extend REMI's successful architecture, working in the longwave infrared (LWIR).

- Maintains size and cost reductions over OLI
- Airborne flights planned for 2024

Hyperspectral

Compact Hyperspectral Prism Spectrometer (CHPS)

CHPS provides Landsat continuity and the enhanced science potential of a compact hyperspectral spectrometer. In a small-format sensor, CHPS delivers VIS through shortwave infrared (SWIR) data while enabling new science applications, such as mineral mapping and categorizing plant species.

- More than 30% reduction in size and cost over OLI
- Airborne instrument proven during test flights

Calibration

Landsat Calibration Satellite-Breadboard (LCS-B)

LCS-B demonstrates the design and capability for using the moon as both a spatial and spectral calibration source, in addition to a radiometric source as currently used by many missions.

- Demonstrates the capability to compactly measure the lunar surface at 10nm resolution across the VIS-SWIR and at spatial resolutions equivalent to 5m on the Earth.

TransCal

Develops a potential on-board calibration system based on a polymer dispersed liquid crystal. Such a system could potentially calibrate land science missions without any moving parts.

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