



HAWAI'IVIEW REMOTE SENSING ACTIVITIES 2014 - 2015

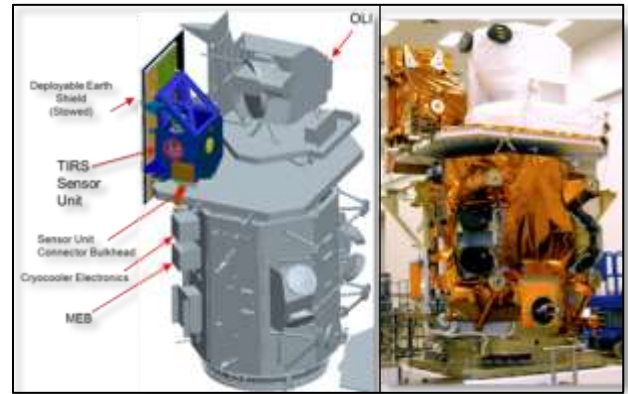


BRINGING LANDSAT INTO THE CLASSROOM

"Landsat in a Box" for All Grades

The reliable performance of the 2013-launched Landsat 8 satellite continues the over four-decade program of monitoring the Earth from space. To encourage understanding of the impact of the data and the science and technology behind the mission among students, Hawai'iView developed self-contained "Landsat 8 Science Kits". The general topics handled are satellites, remote sensing, heat, and light.

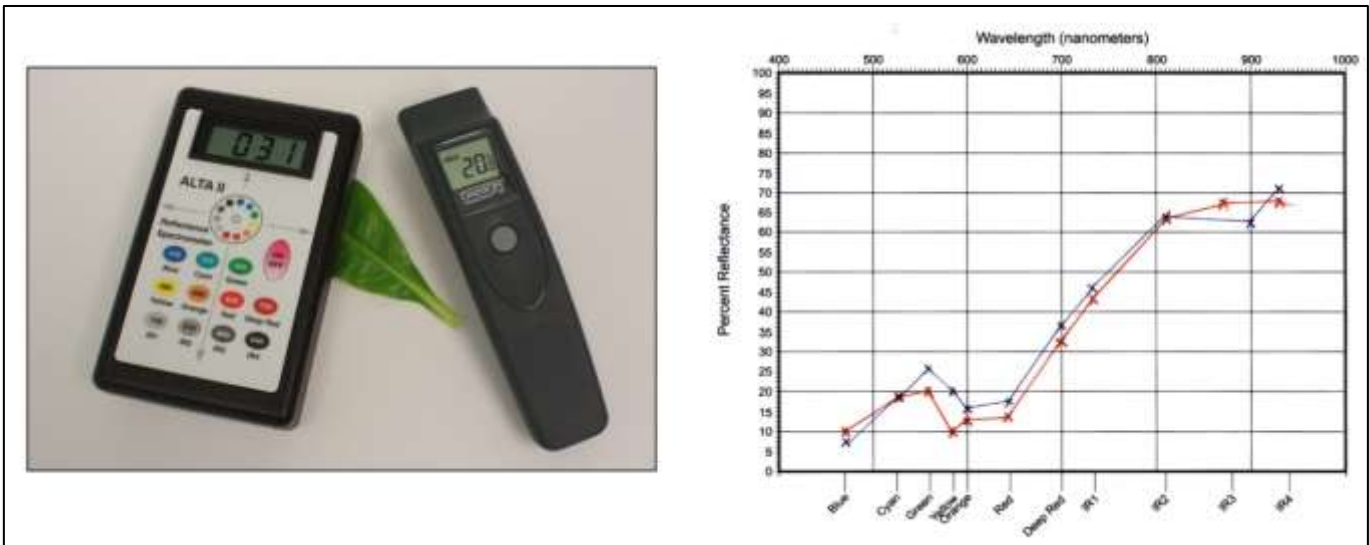
OLI is a push-broom sensor with a four-mirror telescope and 12-bit quantization. OLI collects data for visible, near infrared, and short wave infrared spectral bands as well as a panchromatic band. The Thermal Infrared Sensor (TIRS) was added to the Landsat 8 payload to continue thermal imaging and to support emerging applications such as evapotranspiration rate measurements for water management.



The Landsat 8 spacecraft design graphic of the satellite elements (left) and prior to launch (right)
Information obtained from <http://landsat.gsfc.nasa.gov>

Replicating OLI and TIRS on the Desktop

Although the OLI and TIRS instruments orbit at an altitude of 705 kilometers above the Earth's surface, with a velocity of 7.5 kilometers per second, students can replicate the sensors' measurements in their classroom using a low cost instrument set. While having fun, they also more easily grasp the underlying sensor technology principles deployed on a sophisticated space-durable satellite system. Each of the Hawai'iView Science Kits contains a handheld reflectance spectrometer and a handheld infrared radiometer. Students make measurements using these instruments and plot the data themselves.



Left: The reflectance spectrometer and infrared radiometer included in the science kits to replicate the measurements made by the Landsat 8 spacecraft. Right: examples of leaf spectra made by a student during one of Hawai'iView's workshops

Hawai'iView is a member of the AmericaView Consortium, a nationally coordinated network of academic, agency, non-profit, and industry partners and cooperators that share the vision of promoting and supporting the use of remote sensing data and technology within each state.



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FUN LEARNING WITH THE SELF-CONTAINED EDUCATIONAL RESOURCE

The Hawai'iView Landsat 8 science kits contain everything needed to conduct the experiments, including stationery that changes color using the heat from your hands. Landsat 8 makes measurements of the amount of light and heat reflected and emitted from Earth's surface. Heat sensitive pencils, rulers, and diffraction glasses promote learning under the guise of play. In workshops, designed by Hawai'iView to explain how these instruments work, participants are introduced to concepts of light and heat using some simple experiments and professional instruments like the Alta II Reflectance Spectrometer and IR Temperature Sensor.



BENEFITS TO HAWAI'I

Providing students with the hands-on experience of making remote sensing measurements in the classroom is beyond the budget of the majority of classroom teachers. The Landsat 8 Science kits are available free of charge, and in 2015, Hawai'iView took the kits into the classroom to introduce 192 students (grades 4 through 12, with girls making up 54% of participants), 11 teachers, and 26 parents to the Landsat 8 mission.



Above and upper right: Students at Stevenson Middle School making spectral reflectance measurements and learning about how diffraction allows us to split white light into its component wavelengths *Lower right:* A teacher and her class learning about Landsat 8

EARTH OBSERVATION DAY

To support this AmericaView program, Hawai'iView worked on plans to debut an EarthFEST (Families Enjoying Science Together) night, a hands-on-science event for 50-60 parents and their elementary-aged students at a public school on the island of O'ahu for Earth Observation Day.

ABOUT HAWAI'IVIEW

Hawai'iView is based within the Hawai'i Institute of Geophysics and Planetology, at the University of Hawai'i at Mānoa. Mrs. Amber Imai-Hong (amber@hsfl.hawaii.edu) is the Hawai'iView outreach specialist, collaborating with the NASA Hawai'i Space Grant Consortium. The vision is to increase public appreciation for the contribution that Earth observation makes to our nation's ability to monitor its natural resources, by hosting exciting, hands-on educational workshops for school children, their teachers, and their parents.

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