Hyperspectral Imaging

Our hyperspectral imaging systems paint precise portraits of hidden worlds.

A New Way to Look at the World

A stretch of desert, an expanse of sea, a blanket of forest, a checkerboard of crops. Familiar vistas: scenic, but nothing out of the ordinary. Unless you know how to look.

With our hyperspectral imager, detailed pictures emerge: a vehicle hidden by camouflage, an area teeming with fish food, trees growing at different rates, and under-utilized fertile land.

By seeing what cannot be seen by the human eye, our hyperspectral imager gives farmers, foresters, urban planners, military commanders, and resource managers a powerful tool to help classify features, measure productivity and identify trends.

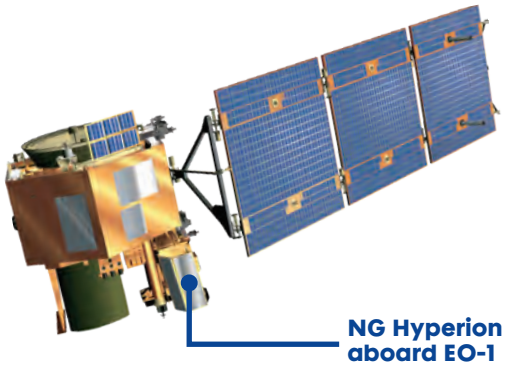
Bringing to Light

All objects — soil, water, trees, vegetation, structures, metals, paints, fabrics — possess a unique spectral fingerprint. A sensor measures reflected light invisible to human eyes to help identify them

Our state-of-the-art hyperspectral imaging systems operate across hundreds of wavelengths to paint precise portraits of this hidden world. Where a standard sensor with fewer than 10 broad bands is capable only of differentiating between general classes of vegetation, a hyperspectral imager can discriminate a maple from an oak, wheat from alfalfa, and is sensitive enough to separate healthy from unhealthy growth.

Images in Action

These finely tuned sensors are coupled with powerful processing algorithms to provide a tool that has as many applications as there are spectral bands. With our hyper-spectral imaging, a camouflaged missile suddenly becomes obvious, a fleet sets course for fertile fishing beds, tree growth patterns lead to harvesting efficiencies, and a farmer can strategically rotate crops.



NG Hyperion Sensor aboard EO-1

NORTHROP GRUMMAN

For more information, please contact:
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At Any Altitude and Scale

Northrop Grumman built and delivered Hyperion, NASA's first hyperspectral to become operational on-orbit. The 220-band instrument set the standard for orbiting spectral imagers and was key to new technologies and concepts for future Earth and space science missions. Our sensors can be incorporated on both spacecraft and aircraft.

Northrop Grumman has performed airborne data collection with a series of instruments having image spatial resolutions spanning less than 1 meter to more than 11 meters, with spectral coverage from 0.38 to 2.45 microns and 8.0 to 12.0 microns. Spectral resolution is 3 nm in the visible/near-infrared (380 - 1000 nm), 6 nm in the short wave infrared (1000 - 2450 nm), and 35 nm in the long wave infrared (8000 – 12000 nm).

Northrop Grumman is developing a new generation of miniature hyperspectral sensors, which use micro-fabricated photonic filters and heterogeneously integrated detectors to replace conventional free space spectrometer optics. Our standardized, repeatable microelectronic processes enable ultra-compact instrument packages and image acquisition in modes not possible with current land imaging instruments.

Sensors and Instruments

Northrop Grumman offers decades of experience as both an instrument developer and a systems integrator.

Our teams provide state-of-the-art modeling, design, engineering, analysis, test, and integration.

NASA recognized us with its prestigious Public Service Group Award for our design, fabrication, assembly, test, calibration and delivery of six Clouds and the Earth's Radiant Energy System (CERES) flight-qualified instruments.

Building upon our substantial experience, we continue to develop new technologies expanding the range of the sensors we build, improving our design and integration processes, and strengthening our capabilities in phenomenology and data exploitation.

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