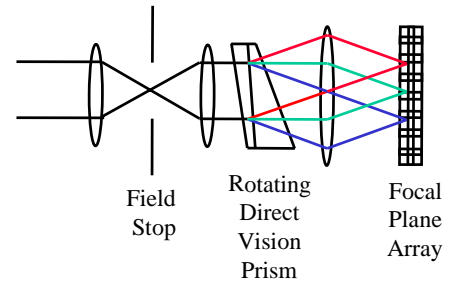
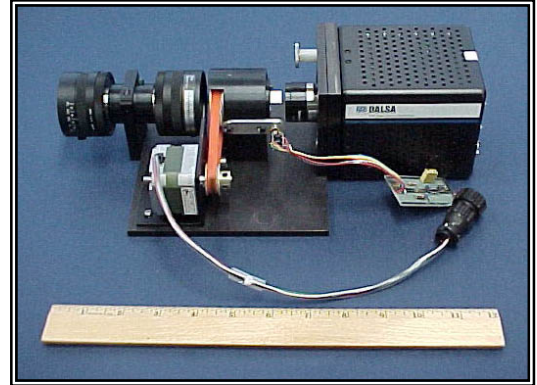


Visible/NIR Hyperspectral Imaging System

The visible/near infrared chromotomographic hyperspectral imaging system (CTHIS) is a high throughput imaging sensor, capable of determining the spectral components of scenes or objects over wide dynamic range. The sensor can also resolve the time evolution of sub pixel flame, plume and flash source spectra.

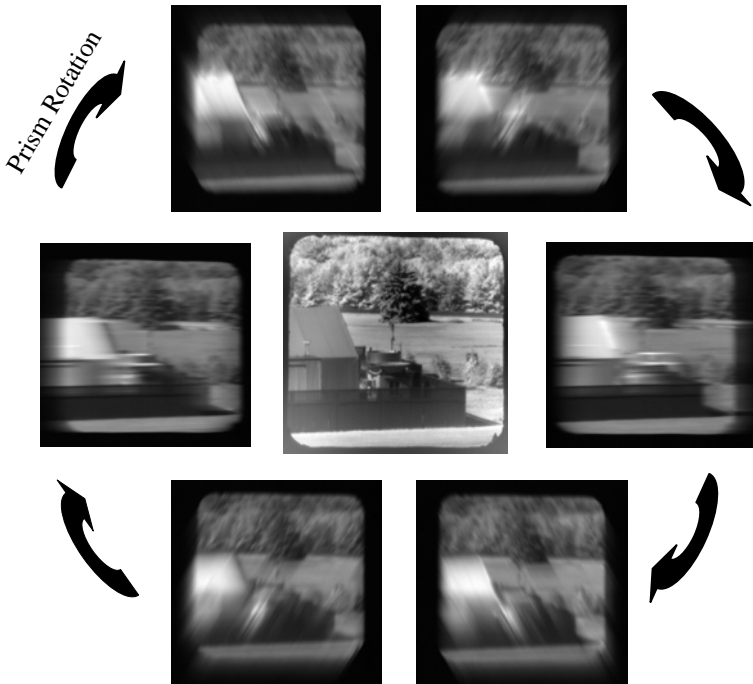
The visible/NIR CTHIS sensor features a field stop aperture for 100% optical efficiency, a rotating direct view prism for color separation, and a variable frame rate camera. The use of a field stop increases sensing efficiency relative to slit based systems; while prism rotation homogenizes pattern noise related to detector response variation. Both features support measurements over wide dynamic range.



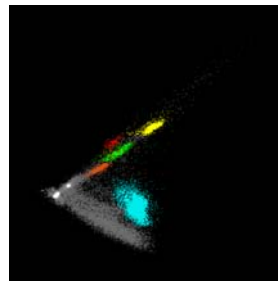
Data

Image Projection Data

Unprocessed sensor output used in image reconstruction. The continuously rotating prism is synchronized with the imager top-of-frame pulse.

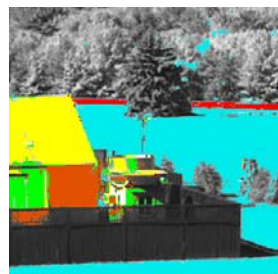


Reconstruction algorithm similar to that used in computed tomography "CAT Scan".



Scatter Plot

2-dimensional spectral image histogram projected onto second and third principal components



Eigen-Image

First principal component image with spectral features color-coded in the scatter plot.

Specifications:

- Approximate Size: Height 4" Length: 12" Width: 6"
- Approximate Weight: 4 lbs.
- Spectral range 400 to 900 nm
- Spectral resolution 64 bands
- Camera frame rate Variable up to 900 Hz
- Format 256x256
- Data dynamic range 8-bits

- Imaging mode:
 - Image cube rate up to 10 hypercubes/sec

- Non-imaging mode:
 - Wide field, staring detection of point-like transient events. Complete spectra measured at each instant. Up to 955 spectra/second.

Applications:

- Earth resource mapping
 - Crop management
 - Water management
 - Pollution control
 - Mineral exploration
- Military reconnaissance and surveillance
 - Camouflage detection
 - Dynamic battle damage assessment
 - Plume and flash detection/measurement
 - Laser Identification
- Art evaluation
 - Pigment identification
 - Buried detail detection
- Industrial
 - Surface corrosion and aging
 - Plume emission spectra (in image)
 - Water effluent mapping and characterization
- Medical
 - Eye examination
 - Skin condition
 - Melanin variation
 - Surface capillary networks
 - Water content

Advantages:

- Sensitivity at every pixel and every wavelength at every instant
- Efficient use of very large format staring focal plane arrays
- High photon efficiency
- Capable of characterizing point-like transient events
- Robust to FPA nonuniformities

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