Application Note

Artwork & Document Analysis
Hyperspectral Imaging

Easily deployable, hyperspectral sensors are used to reveal secrets of famous documents such as the Gettysburg Address, ancient maps, and archeological artifacts such as pottery shards (ostracons) that represent the oldest known representation of Hebrew writing.

Hyperspectral imagers offer researchers and scientists unique advantages:

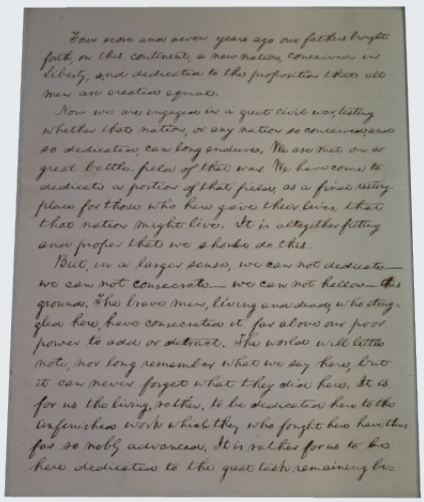
- Forensic analysis & validation of documents and artifacts
- Discover original intent elements & authenticity
- Identify regions for restoration
- Assess original coloring and pigmentation
- Enhance faded or hidden attributes

Since no preparation of the document or artifact is necessary, this non-destructive spectral technique is invaluable for a wide range of historical research relating to changes in color, chemical and substrates. Within the field of view of the Hyperspec® sensor, hyperspectral imaging simultaneously yields precise information for all wavelengths across the complete spectral range of the sensor. With the creation of the hyperspectral datacube, a data set that includes all of the spatial and spectral information within the field of view, research teams are able to more thoroughly evaluate documents and other artifacts that will greatly enhance knowledge of the spectral composition and uniqueness of these samples.

Hyperspec Starter Kit

Headwall's Hyperspec® Starter Kits are available in both standard and large-format configurations. These systems represent complete, turnkey solutions that can be easily adapted to any of Headwall's Hyperspec sensors...from UV-VIS up to the SWIR spectral range. Each kit contains gantry, moving stage, proper illumination for the spectral range of interest, and Headwall's Hyperspec® III software.

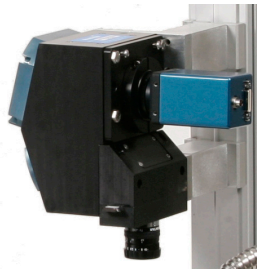

Copernicus book


Gettysburg Address

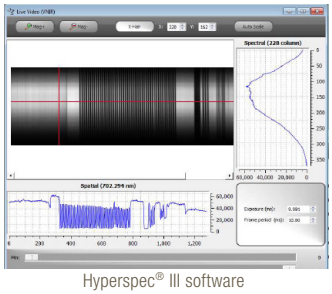

Dead Sea Scrolls

PRECISION SPECTRAL ANALYSIS OF DOCUMENTS AND ARTIFACTS

Headwall specializes in hyperspectral imagers that precisely analyze color and chemical composition useful for the detection and measurement of changes while also examining repairs and restorations. Headwall's Hyperspec® sensors are available for the VIS (380-825nm), VNIR (380-1000nm), Extended VNIR (550-1700nm), NIR (900-1700nm), SWIR (950-2500nm) ranges and beyond. These sensors are used in conjunction with Headwall's advanced and easy to use Hyperspec® III software.

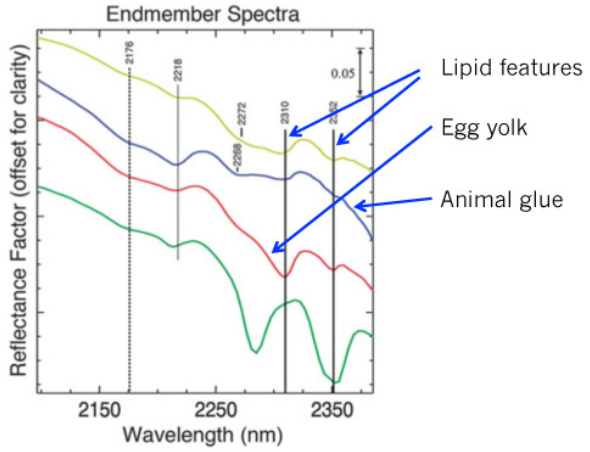


Hyperspec® sensor



Hyperspec® III software

Pigment & Binder Mapping



Dooley et al. Mapping of egg yolk and animal skin glue paint binders in Early Renaissance paintings using near infrared reflectance imaging spectroscopy. Analyst. 2013, Vol. 138 , pp. 4838-4848.

Spectral Imaging to Detect Corrosion from iron-gall Inks

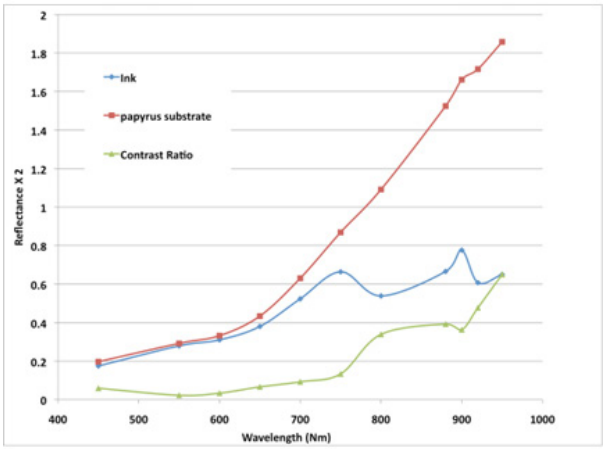
Ink drawing with iron-gall ink corrosion, which also appears black

False color composite shows corroded areas in black, on lower right, and ink in red

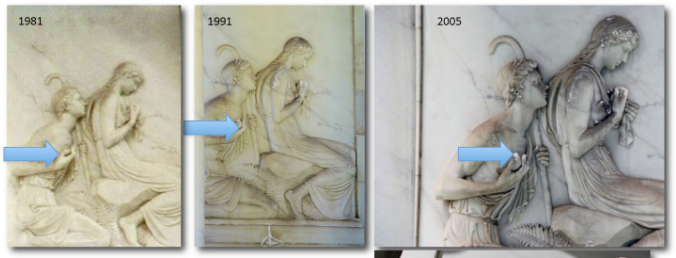
Papyrus Example

450 nm image

940 nm image



Analyze stone destruction over time with hyperspectral imaging



Qualitative change over time: Progression of salt-weathering at Huntingto Mausoleum, San Marino, CA

About Headwall Photonics: Headwall is the leading designer and manufacturer of imaging spectrometers and spectral instrumentation for industrial, commercial, and government markets. Headwall's high performance spectrometers, spectral engines, and holographic diffraction gratings have been selected by OEM and end-user customers around the world for use in critical application environments. As a pioneer in advanced, patented optics technology, Headwall enjoys a market-leading position through the design and manufacture of spectral instrumentation that is customized for application-specific performance.

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