analytik

Headwall APPLICATION NOTE

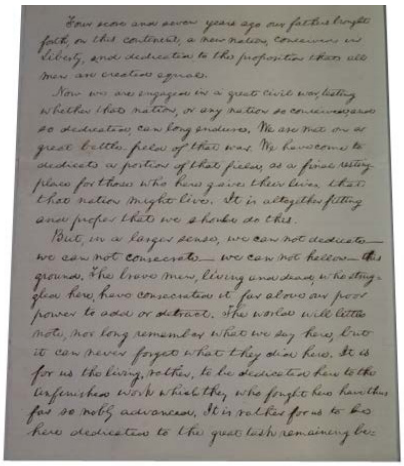
Artwork and Document Analysis

Using Real-Time Industrial Hyperspectral Imaging

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



Gettysburg Address

Dead Sea Scrolls

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 and validation of documents and artifacts
- Discover original intent elements and 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 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.

Headwall's MV.Scan packages represent complete, turnkey solutions that can be easily adapted to a variety of sensors...from VNIR up to the SWIR spectral range. We also have a full-featured hyperspectral UV scanning system with the inno-spec BlueEye camera (220-380nm) that includes protective enclosure, lighting, and an ozone-mitigation system. Our packages contain mounting hardware, computer-controlled scanning stage, proper illumination for the spectral range of interest, and perClass Mira® acquisition and analysis software.

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 VNIR (400-1000nm), NIR (900-1700nm), and SWIR (950-2500nm) ranges.

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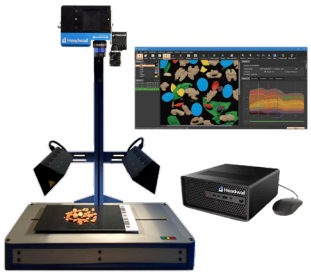
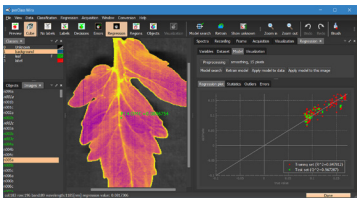


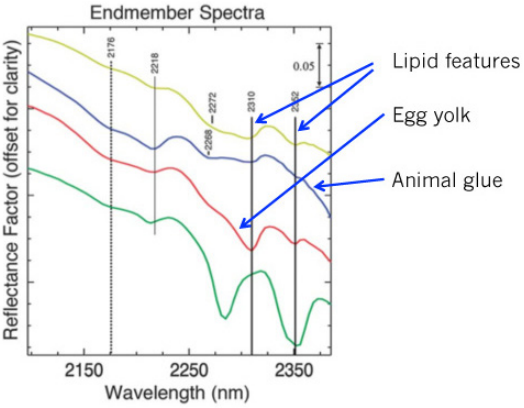
MV.Scan system for VNIR to SWIR



perClass Mira® acquisition and analysis software

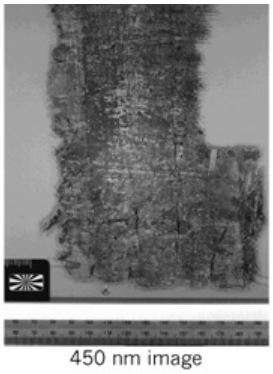
Copernicus book

PIGMENT & BINDER MAPPING



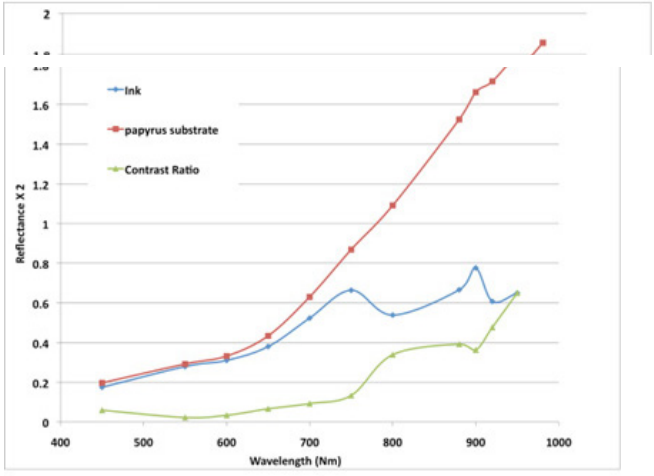
Dooley et al. Mapping of egg yolk and animal skin glue paint binders in Early Renaissance paintings using near infrared reflectance imaging spectroscopy. Analyst. 2013, Vol. 138 , pp. 4838-4848.

PAPYRUS EXAMPLE

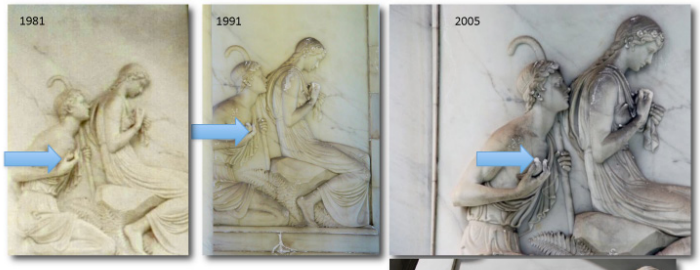


450 nm image

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

Manufactured by Headwall Photonics, distributed in the UK and Ireland by **analytik**.