

A novel macro-imaging sensor for collection of multi-modal hyperspectral image cubes of paintings and illuminated manuscripts

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A multi-modal imaging scanner able to cover an area up to 1.5-by-1.5 m has been designed and constructed to provide high spatial- and spectral-resolution image cubes of works of art. The scanner has linear encoders providing micrometer positional information and can move the artwork across an array of imaging sensors in three different collection modes: raster scan, line scan, and step/stare. The three imaging modalities include optical reflectance imaging spectroscopy from the visible to near infrared (400 nm to 2500nm, 2.5 nm sampling), fluorescence imaging spectroscopy in the visible to near infrared using variable excitation light sources, and X-ray fluorescence imaging spectroscopy. The first two provide molecular information and the third elemental information of the artists' material used. Such information provides insight into how the artworks were constructed. A systems engineering description of the sensor will be presented along with results of its use in examining paintings by Picasso, Van Gogh, Pollock, and an illumination by Pacino.