Imaging Spectroscopy, the collection of spatially coregistered images in many contiguous spectral bands, has been developed for remote sensing of the Earth utilizing reflectance or luminescence. In this talk we present findings on the use of imaging spectroscopy to identify and map artist pigments and improve the visualization of preparatory sketches. Two novel hyperspectral cameras, one operating from the visible to near-infrared (VNIR) and the other in the shortwave infrared (SWIR), have been used to collect diffuse reflectance spectral image cubes from a variety of paintings. The resulting cubes (VNIR 400 to 900 nm, 230 bands, and SWIR 950 to 1700 nm, 80 bands) were calibrated to reflectance and resulting spectra compared with results from a fiber spectrometer (350 to 2500 nm). In addition a calibrated luminescent multispectral camera (600 to 950 nm, 8 bands) was used to obtain a luminescent spectral image cubes after exciting paintings in the blue. False color Reflectograms obtained from the SWIR hyperspectral images of paintings having large and complex rework, e.g. Picassos’ The Tragedy (1903) are found to give improved visualization of these changes. Spectral image processing on the VNIR and SWIR reflectance image cubes have been used to identify the primary pigments or pigment mixtures. Kubelka-Munk theory was used in part to determine the mixtures. For example the primary pigments and the distribution in Picasso’s Harlequin Musician (1924), Peonies (1901) was determined and compared with X-ray fluorescence analysis and SEM-EDS. The results show that inclusion of the NIR and SWIR reflectance (e.g. blue and green pigments), along with the luminescence, (e.g. yellow to red pigments) provides for a more robust ability for the assignment of pigments than with visible spectroscopy alone.