Atmospheric Correction of Commercial Thermal Infrared Hyperspectral Imagery Using FLAASH-IR

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Keywords: atmospheric compensation, correction, LWIR, hyperspectral, HSI, infrared, HyperCam

Within the last few years, several commercial long-wave infrared (LWIR) hyperspectral imaging (HSI) systems have been developed for remote sensing of the ground from aircraft. While much less expensive and more practical to operate than sensors such as SEBASS and MAKO, which have been developed primarily for research and Government use, the commercial systems have poorer signal-to-noise and/or spectral resolution. We investigate the utility of three commercial systems—the Telops Hyper-Cam, SPECIM AisaOWL, and ITRES TASI-600—for quantitative retrieval of surface temperature and emissivity spectra. Atmospheric retrieval, correction and temperature-emissivity separation are performed on example data from these sensors using FLAASH-IR, a first-principles algorithm that incorporates radiation transport calculations and atmosphere models from MODTRAN. The results from the commercial sensors are noisy compared with SEBASS and MAKO but otherwise appear to be reasonable. Applying a noise suppression algorithm to the radiance data yields better temperature retrievals and much cleaner emissivity spectra, with minimal loss of information, and should benefit scene classification applications.