A dual spectroradiometer system for the measurement of field reflectance spectra under variable atmospheric conditions
Brian Curtiss¹
¹ASD, Inc.
We have developed a software system for the measurement of accurate field reflectance spectra using a pair of synchronized field portable spectroradiometers. Ground truth reflectance spectra measured in the field are computed as a ratio of two measured radiance spectra: The radiance of a reference panel of known reflectance, and the radiance of the target surface. Implicit in this calculation is the assumption that the spectral irradiance illuminating both the reference panel and target surface is identical. Thus, rapidly changing atmospheric conditions pose one of the greatest obstacles to the collection of accurate field-collected reflectance spectra using solar illumination. Using a single field portable spectroradiometer, collection of field reflectance spectra is limited to days with stable atmospheric conditions. This then results in spending extended time in the field waiting for good weather. This limitation is overcome by using two field portable spectroradiometers to simultaneously measure both the reference panel and target surface. This software incorporates automated means to precisely intercalibrate both the wavelength and radiance scales which is required in order to compute accurate reflectance spectra. Presented are results that demonstrate the high level of accuracy that is achieved using a dual spectroradiometer system even under variable atmospheric conditions.