DEVELOPMENT AND TESTING OF A HYPER-SPECTRAL IMAGING INSTRUMENT FOR FIELD SPECTROSCOPY

JEAN-FRANCOIS LEGAULT and KARL SCHWANTES, *Telops USA, Inc., 1410 Production Rd., Fort Wayne, IN*; MARTIN CHAMBERLAND, CHARLES BELZILE and VINCENT FARLEY, *Telops, Inc., 4940 Pierre-Georges-Roy, St-Augustin, Quebec, Canada*.

Advancements in Mercury Cadmium Telluride (MCT) focal plane arrays (FPA) in recent years have allowed high performance longwave infrared imagers to prosper. In particular molecular and gas/chemical spectroscopy applications can be vastly advanced with these new products. However, for the transition from single pixel spectrometers to FPA based imaging spectrometers to succeed, a couple of parallel advancements must be made as well. Most Fourier transform spectrometers currently available are designed specifically for a 1 mm single pixel detector. Scientists who try to convert these systems into imaging spectrometers quickly run into throughput issues when FPAs reach sizes of up to 12.5mm, thus limiting the performance and greatly impacting the chemical detection capabilities. Furthermore, for large FPAs the readout time can be significantly longer than the integration time. In turn, this requires slower sweep speeds with a higher degree of control of the scanning mechanism. The benefit of these new technologies in spectroscopy can only be demonstrated with a system optimally designed for imaging spectroscopy. This paper will address the issues of imaging spectroscopy and will show how an instrument designed for specifically imaging applications can dramatically improve the performance of the system and quality of the data acquired form chemical detection.