

## **Fabry-Perot Scanning Spectrometer for Standoff Chemical Detection – Phase II Project Summary**

The overall objective of this U.S. Army Phase II SBIR program was to build an etalon imaging system for enhanced standoff chemical detection in the longwave infrared spectral region. The Fabry-Perot scanning spectrometer operates over the 8 to 12  $\mu\text{m}$  spectral range with a spectral resolution of 1% of the transmitted wavelength. The etalon operates in the first order with no requirement for additional filters for order sorting. The scanning is accomplished via piezo-electric actuators with the use of three of OPTRA's Nanogage® position sensors as feedback to correct for the nonlinearity and hysteresis of the piezos. The field of view is 22° with a 0.11° internal field of view. Key components of this imaging spectrometer include the tunable Fabry-Perot etalon, infrared imaging optics, the Nanogage position sensors, a closed-loop positioning system, an uncooled microbolometer focal plane array, and a graphical user interface.

The Phase II effort produced a working prototype system which was characterized for noise equivalent spectral radiance and spectral resolution and was also used for an open release measurement of sulfur hexafluoride. A picture of the complete hyperspectral imager is shown below.

**Prototype Fabry-Perot Scanning Spectrometer**

