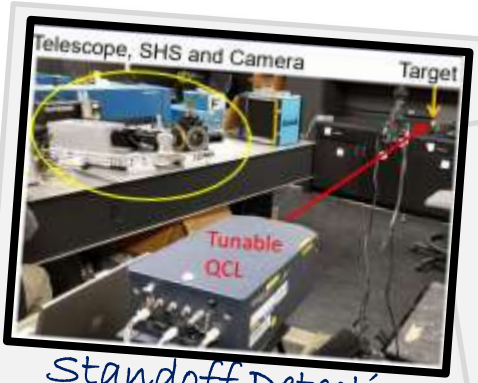
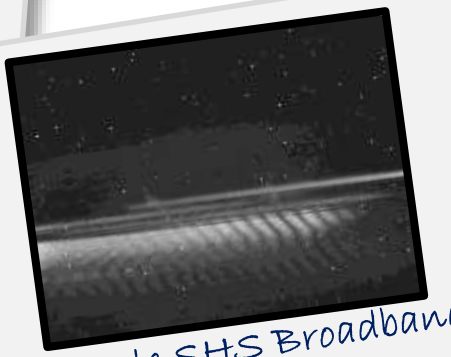
Spectral Processing of Spatial Heterodyne Spectrometer (SHS) Images

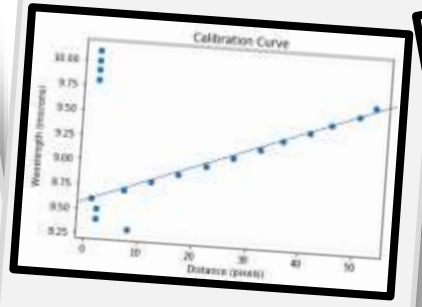
NRL DC / Code 6365 / Tim Vu



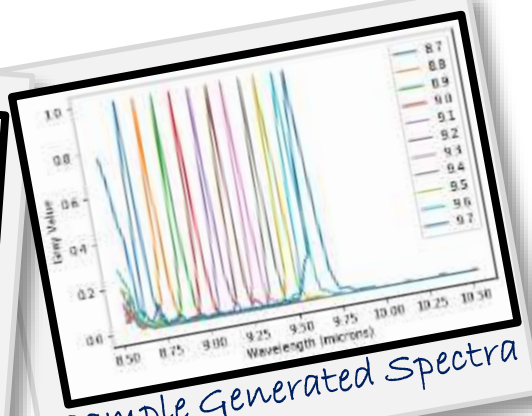
Standoff Detection SHS Demonstration



Sample SHS Broadband Image



Calibration Curve



Sample Generated Spectra

Objective

- Demonstrate standoff detection by a single "snapshot" method
- Our specific task goal was to process SHS broadband images into spectra for analysis
- Explore advantages and disadvantages of SHS imaging

Intern Contribution

- Utilized Python and ImageJ to optimize Fourier processing of images from SHS camera into spectra
- Developed quantitative metrics to optimize spectral extraction based on frequency filtering and image processing parameters.

Results

- Surpassed existing processing routines with regards to maximizing signal to noise ratio and spectral resolution of generated spectra
- Developed and documented improved methods for processing broadband images

Next Steps…

- In the future, this work will be able to help:
  - Guide Code 6365 with more efficient data collection, processing, and analysis
  - Integrate SHS into a remote sensing system for the standoff detection of threat chemicals in a single "snapshot"