

NAVY SBIR/STTR Technologies

Compact, High-throughput Fabry-Perot Spectrometer

PI: Chris Manning / Manning Applied Technology - Troy, ID

Contract No.: N0014-03-M-0174



SBIR
STTR

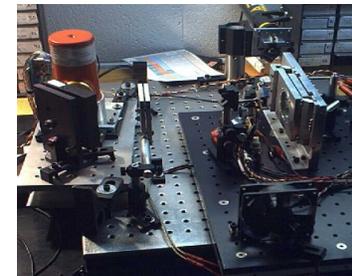
Identification and Significance of Innovation:

The proposed innovations are as follows:

1. Use of a high-throughput Fabry-Perot interferometer for Fourier spectrometry.
2. Deconvolution of signals from multiply-modulated radiation.
3. Digital signal processing (DSP) correction of alignment imperfections.
4. Implementation of DSP algorithms on field programmable gate array (FPGA).

The significance is:

1. More compact instrument with higher performance.
2. Decreased system cost by software compensation of opto-mechanical imperfections.
3. Decreased system cost with FPGA data processing.
4. System reconfiguration/upgrade through FPGA reprogramming.



Technical Objectives:

- Demonstrate operation and quantify characteristics
- Calculate theoretical performance
- Identify optimal detector cooling system
- Demonstrate signal processing on prototype DSP hardware

Work Plan:

- Construct and test prototype scanning etalon
- Mathematical modeling of etalon spectrometer
- Detector cooling
- Test DSP electronics and data processing

Navy/DoD Applications:

Passive remote detection of chemical and biological agents
Active detection of chemical and biological agents
Replace conventional FT-IR spectrometers or conventional Fabry-Perot spectrometers.
Passive remote sensing from spacecraft, aircraft and ground vehicles
Shipboard air quality monitoring
Substantially higher performance per unit weight and volume
Good candidate for a handheld FT-IR spectrometer.

Private Sector Applications:

Commercial applications include a range of process and quality control, spectral imaging, environmental and occupational health monitoring, laboratory research, field measurements and remote sensing. Conservative estimates indicate a \$10 million per year market for the technology. Cost-effectiveness insures capture of a significant market share.

Contacts:

Dr. Christopher Manning
Manning Applied Technology
419 South Main Street / PO Box 265
Troy, ID 83871
tel: 208-835-5402 fax: 208-835-5403
email: chris@appl-tech.com