ChemImage Sensor Systems – VeroVision

GENERAL DESCRIPTION:

VeroVision is a unique, portable shortwave infrared (SWIR) hyperspectral imaging (HSI) sensor. This sensor is specifically designed to help address the growing need for portable, safe, easy-to-use sensing technology for military, public safety, explosive ordnance disposal, law enforcement and first responder personnel to screen for/detect explosives, precursors, chemical threats and/or illicit drugs. Through advanced widefield multispectral imaging and analysis of light that is invisible to the naked eye, VeroVision can rapidly detect and classify materials of interest. Once a threat has been detected, VeroVision can acquire high-resolution hyperspectral data to identify the material of interest. When new threats are discovered, high-resolution spectral data is collected and automatically analyzed with specialized algorithms to down select the wavelengths to the optimal spectral components required for multispectral detection. The result is then saved to the VeroVision library for future use. The system is tripod mounted and highly portable. VeroVision can operate outdoors using only the sun as the light source. With auxiliary lighting, VeroVision can operate in the nighttime, indoors, or in other low light level conditions.

TECHNICAL DESCRIPTION:

VeroVision incorporates shortwave infrared (SWIR) hyperspectral imaging (HSI) technology. HSI combines conventional spectroscopy with digital imaging to provide images where contrast is indicative of the varying amount of absorbance, reflectance, or scatter associated with the materials present in the field of view (FOV). Facilitated by a liquid crystal tunable filter, images are collected as a function of wavelength. The resulting hypercube exhibits fully resolved spectra for each pixel present in the image. These spectra are compared to a library of known threats using various pattern matching algorithms. When an unknown spectrum is consistent with a material of interest, the software indicates a detection through a false color overlay on the SWIR image. For faster analysis, a multispectral dataset can be collected, using a subset of wavelengths from the whole hyperspectral datacube. Oftentimes, the multispectral data combined with advanced detection algorithm image processing provides enough information to make a preliminary detection. Once a detection has been made, high spectral resolution hyperspectral data can be collected for material classification/ identification.

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

	Biological	Chemical	Radiological
FIELD USE System	N/A	Second Tier	N/A
MOBILE Laboratory	N/A	Third Tier	N/A
DIAGNOSTIC Laboratory	N/A	Second Tier	N/A
ANALYTICAL Laboratory	N/A	Third Tier	N/A

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

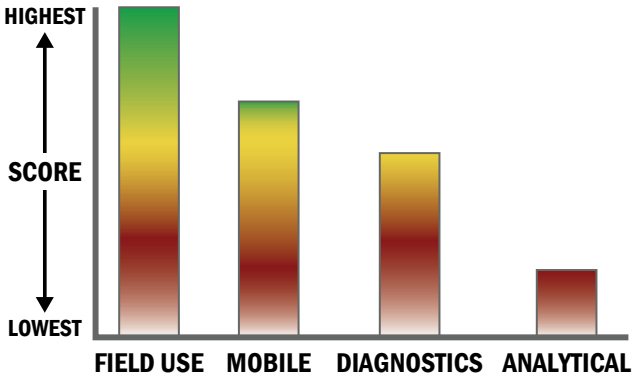
Mr. Steven Mitts, Director, Corporate Strategy & Business Development ChemImage Sensor Systems
7301 Penn Ave
Pittsburgh, PA 15208
mittss@chemimage.com
503-332-5452

COST

- $125,000-$150,000/system
- N/A/analysis

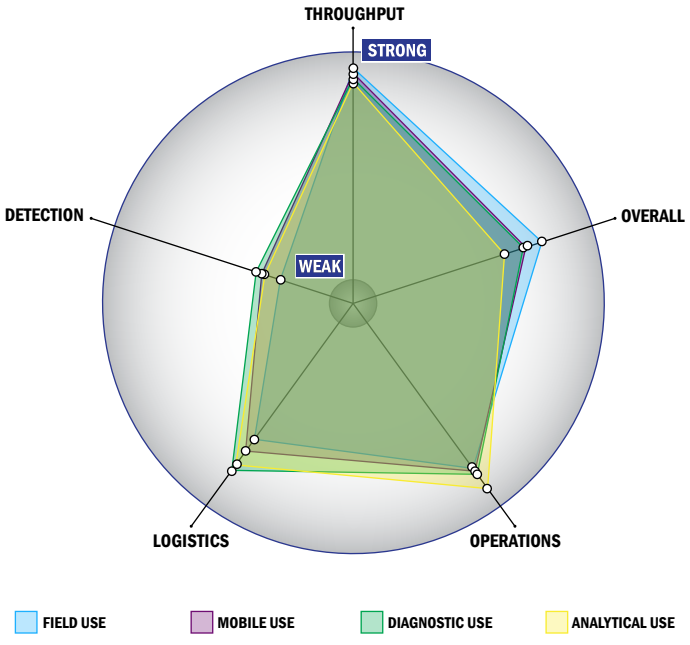
Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

The Impact Chart is a spider graph representing specific categories and designed to give the reader a visual depiction of how a particular system is expected to operate across the four different scenarios. The score for each of the seven categories is presented as the percentage of the total possible score. Higher category scores extend the spokes of a graphic toward the outer edge of the chart. The area graphed for each of the four scenarios relates to how well the system performed in that scenario. Graphics for each of the four scenarios are super-imposed for ease of comparison.



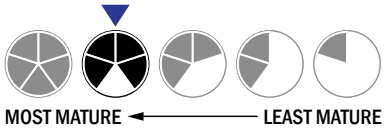
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- Less than 5 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a carry-on luggage suitcase
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 2–4 hours battery life



Operations:

- Can be used from 25 °C to 37 °C
- This system does not require consumable components
- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- Possible the system could receive FDA approval, no current efforts at this time
- Less than 10 µl
- Fair specificity. System has a consistent level of false alarms (5-10%)
- > 1 ppt Not possible for the system to identify aerosolized chemical agent
- System currently can identify liquid chemical agent