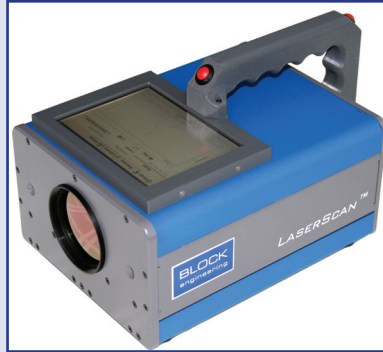


Block Engineering, LLC - LaserScan Analyzer



GENERAL DESCRIPTION:

The LaserScan Analyzer is a handheld, battery-operated device that is capable of detecting surface contamination, due to the presence of chemical threats, within seconds and in a standoff mode. The system utilizes Quantum Cascade Lasers (QCLs) with the widest tuning range available today, covering the 6-12 microns infrared spectrum, and offers the chemical identification through the use of infrared spectroscopy. The current device, developed under funding from JIEDDO, Army SBIR and Congressional Adds, is capable of detecting trace explosives in the 1-10 micrograms/sq. cm from approximately 6-12 inches standoff distance. Longer distances could also be achieved with properly sized optics. The system has built-in libraries to detect and identify the explosives of interest and has been tested with numerous backgrounds and surfaces. A built-in LCD displays the identified chemical as well as the actual infrared spectrum, if needed. Furthermore, the same device, but with a different software package could be used for the detection of Chemical Warfare Agents (CWAs) and Toxic Industrial Chemicals (TICs) as Low Volatility Contaminants on surfaces. The system is currently at TRL6 or TRL7 levels. Alternative configurations include built-in gas and vapor detection capability, enabling the potential for LaserScan to detect both surface contaminations in standoff, as well as gases and vapors by collecting air samples. Infrared spectroscopy is also capable of detecting pathogens and other biological threats and feasibility has been demonstrated by several groups. LaserScan could potentially be able to identify such threats by developing appropriately prepared samples and software algorithms.



TECHNICAL DESCRIPTION:

The technology behind the operation of the LaserScan Analyzer is laser-based infrared spectroscopy. A Quantum Cascade Laser (QCL) in an External Cavity Configuration is used to tune across the infrared spectrum of 6-12 microns within a few seconds. A built-in infrared detector is used to collect the reflection of the infrared laser light as it bounces off the target and sophisticated, built-in, ultra-fast electronics generate an infrared spectrum of the chemical substance that was found on the target. High-speed, embedded software algorithms compare this spectrum to built-in infrared libraries and provide real-time identification of the chemical.

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	●	N/A
MOBILE Laboratory	N/A	●	N/A
DIAGNOSTIC Laboratory	N/A	●	N/A
ANALYTICAL Laboratory	N/A	●	N/A

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

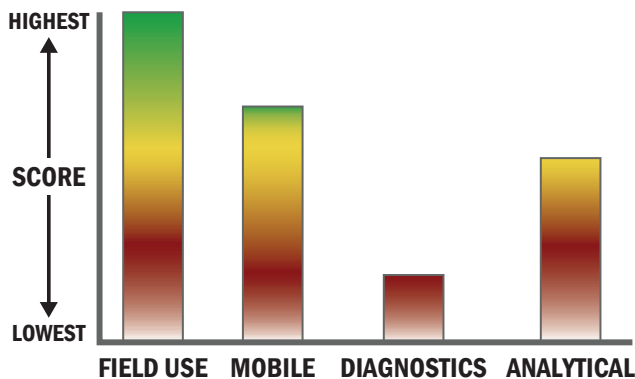
Ward Tucker
 Block Engineering, LLC
 377 Simarano Drive
 Marlborough, MA 01752

COST

- \$50,000-\$90,000/system
- N/A/analysis

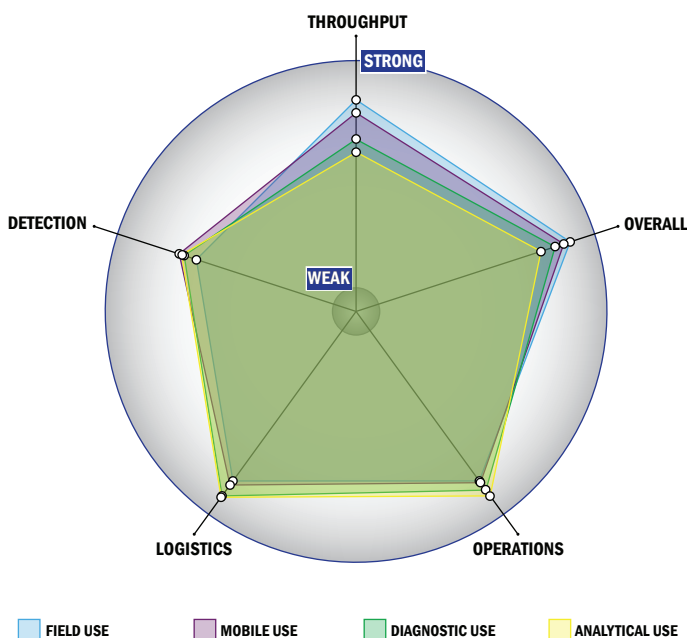
Scoring Analysis

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.



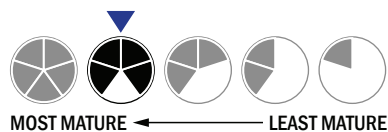
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/sample per run
- 749-350 samples every 2 hours
- The system could easily be adapted into a fully automated system
- 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
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- Wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Performance is not influenced by relative humidity
- 3-5 years expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with some effort
- 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
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1×10^{-4} - 1×10^{-3} mg/m³
- 1 ppb-1 ppm
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

