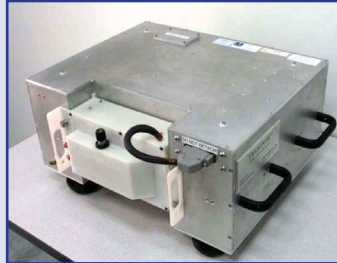# Science & Engineering Services, Inc. - Laser Photo-Acoustic Spectrometer

GENERAL DESCRIPTION:

The Laser Photo-Acoustic Spectrometer (LPAS) is a high-sensitivity, optically-based sensor for detection and identification of trace levels of volatile explosives and chemicals. Developed as a commercial product by our Pranalytica partner www.prananytic.com, LPAS was originally created for environmental monitoring of semi-conductor manufacturing sites. The high sensitivity and reliability attributes of LPAS are now being ported to explosive and chemical sensing needs. In terms of logistics, the only daily-use consumable is electricity and train-up for non-technical users is one day.

TECHNICAL DESCRIPTION:

The Laser Photo-Acoustic Spectrometer (LPAS) was developed as a commercial product by our Pranalytica partner www.prananytic.com and utilizes multiple quantum cascade lasers combined with a smart algorithm for rapid detection and identification of chemicals or explosives to the ppb level. The optical system is open architecture and the smart algorithm is trainable within one day against new target analytes.

CONTACT INFORMATION

Science & Engineering Services, Inc.
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POC: Robert M. Serino, Ph.D
443-539-0139
www.sesius.com

COST

- $250,000/system
- <$1/analysis

Tier Selection

Final tier assignment is based on overall product score.

● Top Tier ◐ Second Tier ○ Third Tier
◑ Fourth Tier ● Bottom Tier

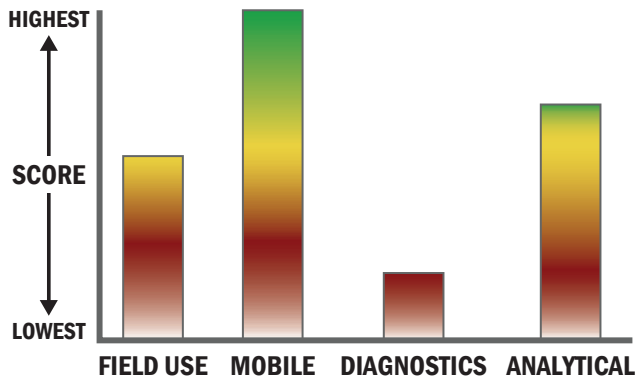| RANKINGS	Biological	Chemical	Radiological
FIELD USE System	N/A	●	N/A
MOBILE Laboratory	N/A	○	N/A
DIAGNOSTIC Laboratory	N/A	○	N/A
ANALYTICAL Laboratory	N/A	○	N/A

## Survey Source

Vendor Supplied Information

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.

FIELD USE   MOBILE USE   DIAGNOSTIC USE   ANALYTICAL USE
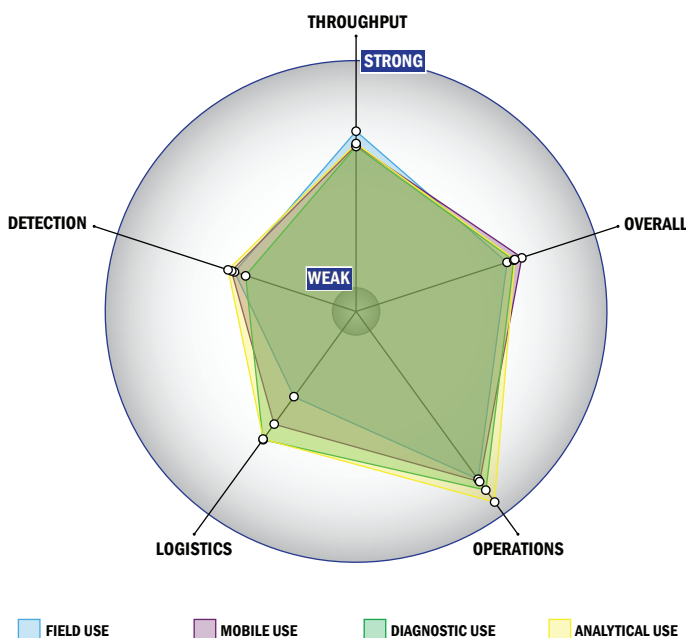
Evaluation Criteria

Throughput:
- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- 95-32 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
- 1 component
- 10-20 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 25 and 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement

MOST MATURE ◄——— LEAST MATURE
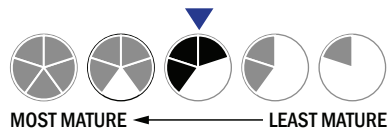
Operations:
- Can be used from 25 °C to 37 °C
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:
- This system does not test liquids
- Good specificity. System has a consistently low level of false alarms (2-5%)
- $1 \times 10^{-4} – 1 \times 10^{-3}$ mg/m^3
- <1 ppb
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent