# MIT Lincoln Laboratories - CALS (Chemical Agent Line Sensor)

GENERAL DESCRIPTION:

The Chemical Agent Line Sensor (CALS) detects and identifies releases of chemical warfare agents (CWAs) and toxic industrial agents (TICs) over a line path. The system can be used by several types of large open-volume facilities to determine whether a covert chemical release is occurring. It was specifically designed for low maintenance, no consumables, low cost, rapid deployment, and high detection performance to fit a wide array of facility constraints.
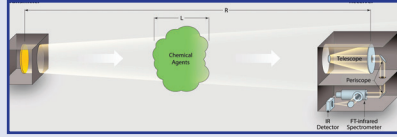
TECHNICAL DESCRIPTION:

The CALS system is an open path Fourier Transform Infrared (FTIR) chemical sensor. The system transmits Long Wave Infrared (LWIR) energy from a filament to a spectrometer spatially partitioned from the transmitter. The amount of absorbance at each wavelength is measured and used to identify the amount and type of agent present between the transmitter and receiver.

CONTACT INFORMATION

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COST

- $70,000/system
- N/A/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

Notes

Not to be confused with the DoD's Common Analytical Laboratory System (CALS) which shares the same acronym.
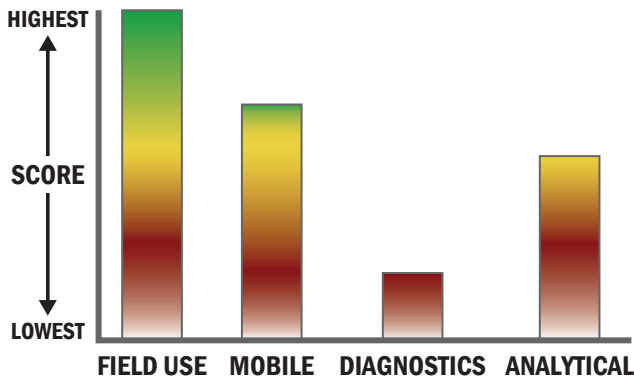
Survey Source

Vendor and Internet 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.
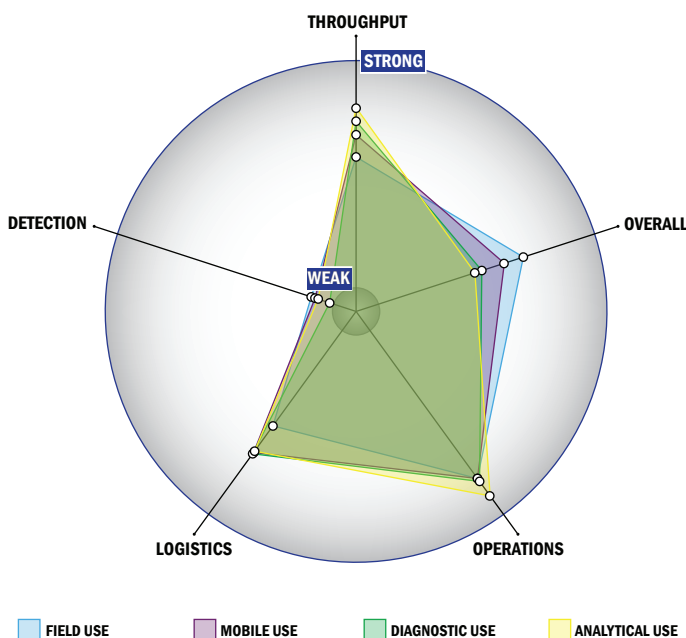

Evaluation Criteria

Throughput:
• 2 minutes or less for detection
• Multiple samples, single tests/sample per run
• System is continuous and provides real time analysis with no defined tests/samples
• The system or device is currently fully automated
• Device or system is intended for multiple detection assays
• 0-1 solutions, buffer, eluents, and/or reagents
• 10-20 minutes is required for set-up
• 1-2 steps are required for detection

Logistics:
• Very brief (minutes-hours) training and minimal technical skills
• Approximately the size of a carry-on luggage suitcase
• More than 50 kg
• Satellite, wireless and wired connections are available
• System or device has 110V electrical requirement

MOST MATURE ← → LEAST MATURE
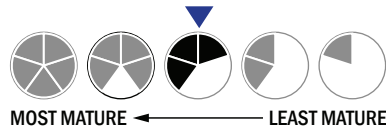
Operations:
• Can be used from < -21°C to > 42°C (All temperatures)
• This system does not require consumable components
• Greater than 3 years shelf life
• Greater than 10 years expected life
• Results can be viewed in real-time
• The system or device is currently fully autonomous
• The system software is open and available for modification
• The system hardware is open and available for modification

Detection:
• Not possible for the system to achieve 510K clearance
• Not possible for the system to achieve FDA approval
• This system does not test liquids
• System can currently identify aerosolized chemical agent
• Not possible for system to identify liquid chemical agent