Research Support Instruments, Inc. - CRITICAL Monitoring Badges and Taggants

GENERAL DESCRIPTION:

The Colorimetric Retroreflecting Indicator Tags for Identification of Chemical Agents at Locations (CRITICAL) system consists of indicator badges and loose taggants for monitoring for CWA releases in the field. The CRITICAL indicator badges can be placed at strategic locations at DOD or industrial facilities and continuously monitored with standard networked CMOS cameras or by facility personnel at a long range. Further, when dispersed uniformly over an open area, CRITICAL taggants can be monitored to indicate and track CWA releases real-time. The taggants will work for a long duration in a range of environments, with the ability to be tailored to rainy, snowy, or dusty locations if needed. Readout of the badges and taggants will be simple enough for facility personnel with minimal training, and will require standard cameras and light sources to minimize infrastructure costs. The fabrication protocols scale up to mass-production, resulting in low cost for large facilities.

TECHNICAL DESCRIPTION:

Colorimetric dyes on retroreflective microstructures and cheaply mass-fabricated retroreflector elements are the key technologies of the CRITICAL system. The dyes darken in the presence of various CWA's and TIC's. The resulting contrast on the retoreflector faces causes a sharp decrease in the returned signal from a broadband light source. The retroreflectors provide narrow reflected beam divergence, with correspondingly long detection range and the ability to operate covertly, and are easily mass-fabricated to cover large areas of installations or produce large quantities of indicator badges.

CONTACT INFORMATION

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COST

N/A

Tier Selection

Final tier assignment is based on overall product score.

- ● Top Tier
- ◐ Second Tier
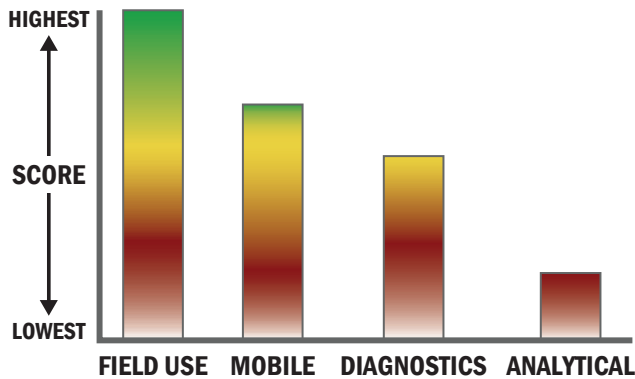- ○ Third Tier
- ◔ Fourth Tier
- ● Bottom Tier

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 |
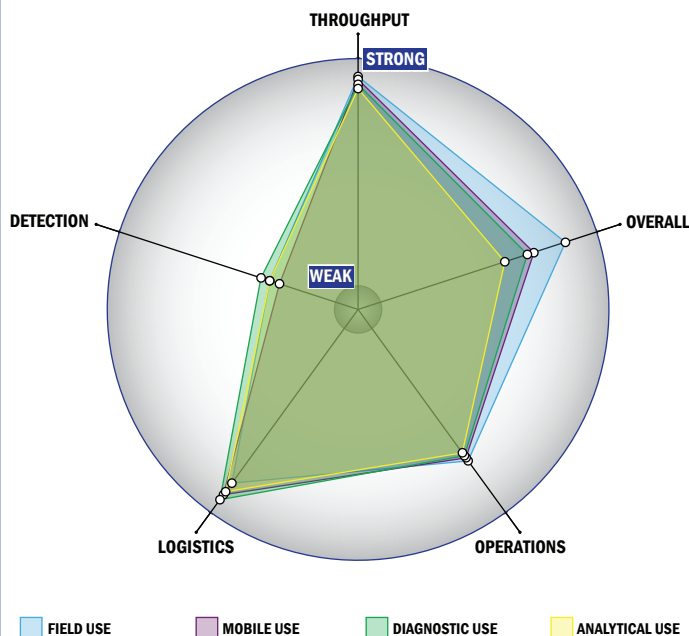
Evaluation Criteria

Throughput:
- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- System is continuous and provides real time analysis with no defined tests/samples
- The system could easily be adapted into a fully automated system
- Device or system is designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- Less than 5 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
- Less than 1 kg
- Wireless and wired connections are available
- There is no electrical requirement

MOST MATURE ← LEAST MATURE
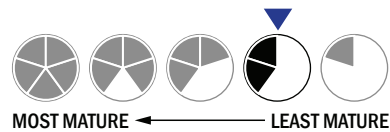
Operations:
- Can be used from -21°C to 41°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with some effort

Detection:
- Less than 50 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- >1×10^{-3} mg/m^3
- 1 ppm-100 ppm
- Possible system could identify aerosolized chemical agent
- Possible system could identify liquid chemical agent