Resonant Sensors Incorporated - Compact Bioassay System

GENERAL DESCRIPTION:

Resonant Sensors Incorporated (RSI) is developing a new compact photonic biosensor system for real time screening of an array of biotoxins, parasites and/or viruses in biological and environmental samples. Our products include a disposable sensor chip with an associated compact reader unit that can rapidly and simultaneously screen for an array of agents without requiring the use of chemical labels or post processing steps. This differentiating technology provides a new point-of-use diagnostic tool for first responders in the field.

Our sensor platform can be applied to monitor an array of bio- or chemical reactions in a variety of matrices (including serum, environmental water samples, and food). Selectivity is imparted on the sensor element using conventional surface chemistries (such as silane) to covalently attach commercially available antibody, aptamer, or DNA layers. As a test begins, the analyte binds to the detection-layer target, and the system monitors instantaneous changes at the sensor surface, thus providing real-time data. Test time is limited only by chemical binding dynamics, and is typically less than 10-15 minutes. Qualitative data is available immediately after sample introduction.

The RSI sensor chips are pre-sensitized to detect a target panel of 15 microbials and toxins in a single sample for applications such as infectious disease screening. The biochip will be operated without requiring any post-detection washing steps. This work is being performed in collaboration with our commercial partners at Raytheon ELCAN in Richardson, Texas.

TECHNICAL DESCRIPTION:

RSI's products are based upon guided-mode resonance (GMR) sensor technology that occurs in subwavelength waveguide-gratings. When these sensors are illuminated with a light source, a specific wavelength of light is reflected (with a corresponding transmission null) at a particular angle. Interaction of a target analyte with a biochemical layer on the sensor surface yields measurable angular shifts that directly identify the binding event without additional processing or foreign tags. The GMR sensor surface may be optimized with an array of capture molecules, allowing rapid detection of multiple analytes in a single test.

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	Second Tier	N/A	N/A
MOBILE Laboratory	Top Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

Resonant Sensors Incorporated
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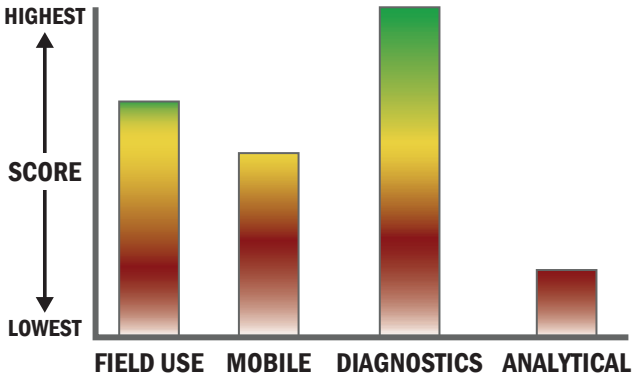
Arlington, TX 76010

COST

- $10,000/system
- $30/analysis

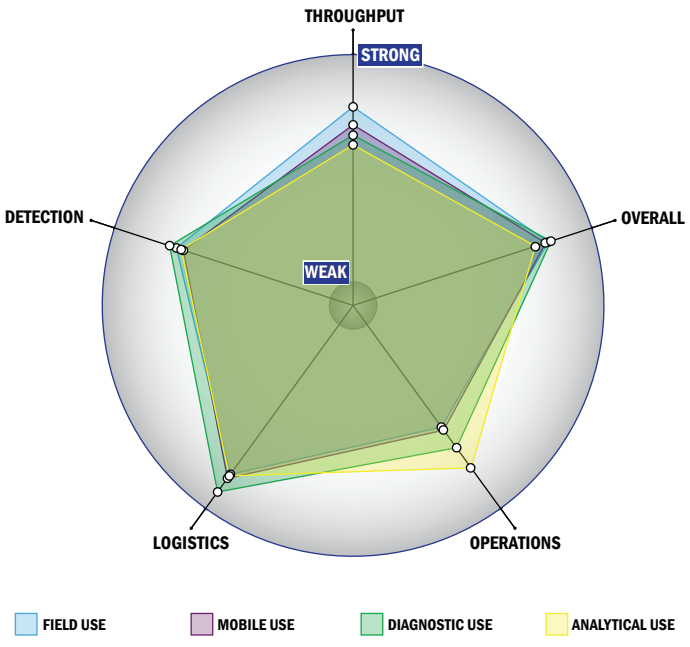
Scoring Analysis

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.



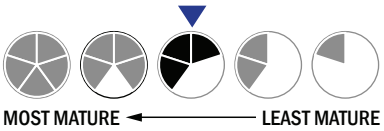
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 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
- 1 component
- 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 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 41°C
- Components must be stored at 4°C
- Between 1 to 6 months shelf life
- 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:

- Efforts are underway to achieve 510K clearance
- Efforts are underway to achieve FDA approval
- Less than 50 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- 1,000-10,000 CFU per mL
- 1-100 PFU per mL
- 10-100 ng per mL
- Manual kit not integrated with the system handles spore lysis