



Research International, Inc. – RSN 5100

GENERAL DESCRIPTION:

The Remote Sensor Node 5100 (RSN 5100) is a field-portable instrument system that uses multiple technologies to monitor for the presence of chemical, biological, radiological and nuclear threats. It is the only product of its kind currently available in the world, integrating detection technologies from the world's leading suppliers into a complete, networked CBRN monitoring solution. It has been developed for use in military, homeland security, public safety and public health applications.



The RSN 5100 is modular in design and can be configured with all or just some of the sensor subsystems depending on customer requirements. Available sensors include:

- State-of-the-art chemical detectors
- An ultraviolet fluorescence-based biological particle detector for suspicious changes in bioaerosol concentrations.
- A sensitive gamma ray detector that detects suspicious changes in background radiation.

If alarm levels are exceeded, a secondary air sampling circuit is automatically activated to collect a permanent aerosol particle sample onto a special high-efficiency filter element. Any particulates collected can then be analyzed with a portable or laboratory-based biological, chemical or radiological system.

TECHNICAL DESCRIPTION:

The RSN 5100 normally operates in a background monitoring mode. In this condition it samples air at 2 liters/minute. The air stream is analyzed with an ion mobility spectrometer to detect and identify chemical warfare agents. It is further analyzed with an array of 6 electrochemical gas detectors for common toxic industrial chemicals. A gamma ray monitor is used to detect radiation in the air sample. Finally, this air sample is tested for suspicious increases in bioaerosol concentration with the TacBio bioaerosol monitoring instrument. This device passes the air stream through an optical chamber where particulates are irradiated with 365 nm light. Both fluorescence signals and photon scattering events are collected and analyzed to look for an increase in biological particle concentration. If an instrument alarms (or under remote control), an embedded air sampler, based on the SASS 3100, is turned on which collects particulates at 300 liters/minute onto a proprietary electret filter for later analysis of captured biological or other particulates.

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	●	◐	○
MOBILE Laboratory	○	◐	○
DIAGNOSTIC Laboratory	◑	◐	○
ANALYTICAL Laboratory	◑	○	◑

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

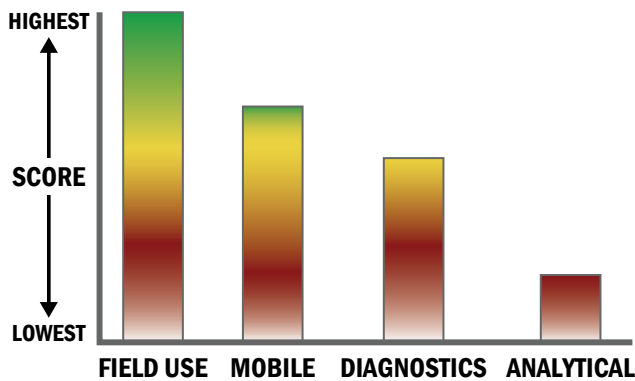
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COST

- \$25,000–60,000/system
- N/A/analysis

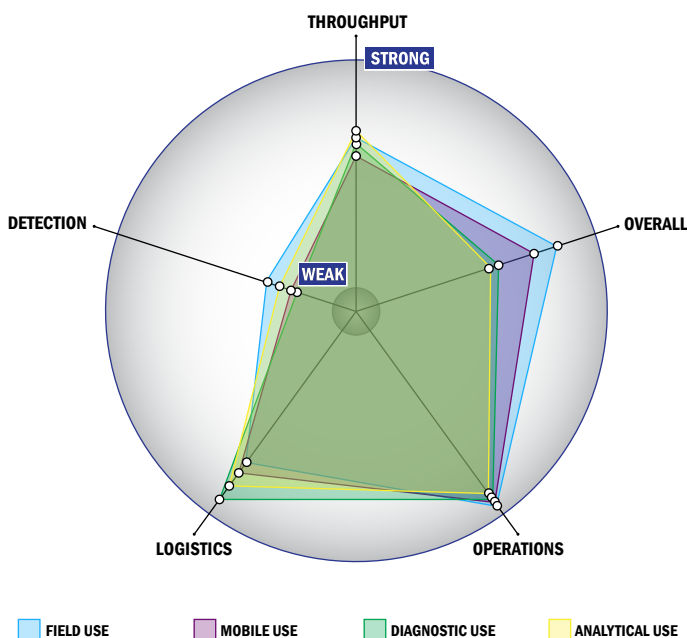
Scoring Analysis

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.



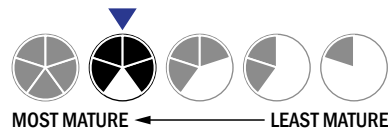
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- 349-96 samples every 2 hours
- 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
- 0 components
- Greater than 20 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a carry-on luggage suitcase
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from $< -21^{\circ}\text{C}$ to $> 42^{\circ}\text{C}$ (All temperatures)
- This system does not require consumable components
- Performance is not influenced by relative humidity
- 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 but modification requires licensing
- 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
- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions ($< 2\%$)
- $> 1 \times 10^{-3} \text{ mg/m}^3$
- 1 ppm-100 ppm
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent
- Only dose rate
- Down to background level radiation for dose rate