EDGEWOOD CHEMICAL BIOLOGICAL CENTER
U.S. ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND
Aberdeen Proving Ground, MD 21010-5424

ECBC-TR-1483

GLOBAL CBRN DETECTOR MARKET SURVEY

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Belcamp, MD 21017-1553

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U.S. ARMY RDECOM

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This survey was sponsored by the Joint Program Executive Office for Chemical and Biological Defense to create a market survey of technologies, which have applicability in detecting chemical, biological, and radiological agents. This survey encompasses a variety of systems (from manual to fully automated technologies). Some of the unique features of this market survey include (1) chemical, biological and radiological analysis platforms; (2) analyses of each technology in four scenarios of use; (3) an in-depth online survey consisting of 99 questions to capture each system in detail; and (4) a weighted scoring model based on subject matter expert opinion. The information in this report was gathered using a detailed online survey that was completed by the vendor. The intent was to ensure that the information was accurate and not derived from a third-party source or internet search that could result in incorrect or outdated information. The information was analyzed using a weighted system designed to determine the usefulness of each device in four different scenarios: (1) field or man portable; (2) mobile or field laboratory; (3) diagnostic laboratory or point of care; and (4) high sensitivity, high throughput analytical laboratory.

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PREFACE

The work described in this report was started in January 2014 and completed in March 2014.

The use of either trade or manufacturers' names in this report does not constitute an official endorsement of any commercial products. This report may not be cited for purposes of advertisement.

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This report has been approved for public release.

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EDGEWOOD CHEMICAL BIOLOGICAL CENTER
A U.S. Army RDECOM Laboratory

JOINT PROGRAM EXECUTIVE OFFICE
JPEO-CBD
CHEMICAL AND BIOLOGICAL DEFENSE

Dear Reader:

This *Global CBRN Detector Market Survey* is sponsored by the Joint Program Executive Office for Chemical and Biological Defense to create a market survey of technologies which have applicability in detecting chemical, biological, and radiological agents. This survey encompasses a variety of systems from manual systems to fully automated technologies. Some of the unique features of this market survey:

- Focus on **CHEMICAL**, **BIOLOGICAL** and **RADIOLOGICAL** analysis platforms
- Analysis of each technology in four scenarios of use
- In depth 99 question online survey to capture each system in detail
- Weighted scoring model based on subject matter expert opinion

The information in this book was gathered using a detailed online survey that was completed by the vendor. The intent was to ensure that the information was accurate and was not derived from a 3rd party source or internet search that could result in incorrect or outdated information. The information was analyzed using a weighted system designed to determine the device's usefulness in four different scenarios: Field/ Man portable; Mobile laboratory/ Field laboratory; Diagnostic laboratory/ Point of care; and High sensitivity, high throughput analytical laboratory.
We would like to suggest the following methodology for using this guide.

1. Review the four different scenarios and note how the technologies rank for a scenario of interest.
2. Remember that scores have a subjective component and that all the technologies are included in the ranking so don't go by ranked tier alone.
3. Go to the Detailed Technology Sheets Section and look up the technology by Company-Name for detailed information on the product.
4. Finally, contact the manufacturer for more information or visit their website.

The bulk of the survey is contained in the Detailed Product Sheets Section which includes product specifications in a standardized format for easy comparison. The devices are ***alphabetized by company name*** to make it easier to find a product of interest. We hope that you find this survey both helpful and interesting.

Sincerely,

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Matthew Caples Ph.D.
Booz Allen Hamilton
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TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

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INTRODUCTION

The *Global CBRN Detector Market Survey* is sponsored by the Biosurveillance Management Office at the Joint Program Executive Office for Chemical and Biological Defense. This survey is the latest offering from the BioSciences Division of the Edgewood Chemical Biological Center (ECBC), which has been providing the defense community comprehensive surveys and test results since 1974 (Figure 1). The *Global CBRN Detector Market Survey* builds upon the success of the 2011 *Chemical, Biological, Radiological Technology Survey* by incorporating improvements to create a more comprehensive and robust survey. Some of the improvements include:

- An increased focus on chemical and radiological detectors
- Additional questions for more specificity between the types of detectors
- Introduction of a simplified scoring and ranking system

The goal of the *Global CBRN Detector Market Survey* is to provide a snapshot of available detection and diagnostic technologies that can detect and/or identify the presence of biological, chemical, and radiological agents. A detailed online survey completed by the vendor was the primary source for the information in this book. The survey was publically available to all companies and widely publicized by ECBC. The technologies were scored using 99 specific questions that were weighted based on four scenarios of use: Field/Man portable; Mobile laboratory/ Field laboratory; Diagnostic laboratory/Point of care; and High sensitivity, high throughput analytical laboratory. The unique features of each scenario are detailed in the following section; each unique feature was considered in determining the weights of the survey evaluation criteria.



Figure 1: Previous Products From the BioSciences Division of ECBC

FOUR SCENARIOS OF USE

In order to capture the usefulness of each technology, four scenarios of use were devised: Field/Man portable; Mobile laboratory/Field laboratory; Diagnostic laboratory/Point of care; and High sensitivity, high throughput analytical laboratory. The four scenarios are designed to summarize the entire spectrum of detector and diagnostic utilization. Employing this approach, the *Global CBRN Detector Market Survey* can more accurately describe the usefulness of each system based on its specific characteristics.

FIELD/MAN PORTABLE

Field use detection technologies are typically used by CBRN defense and force health protection Warfighters or scientists conducting analyses. These technologies are used outdoors in a variety of environments (e.g., desert, forest, plains, urban) and subjected to various environmental conditions (e.g., heat, cold, humidity). Ideally, they are small, lightweight, and easy to carry; simple to operate; and should not require other machinery such as centrifuges or heat blocks. Kits or devices with limited electrical requirements are preferred. These devices can be disposable with a single use only or reusable with minimal cleaning. Signature is important in the operation of these devices or systems, as large ventilation systems or protective gear could jeopardize covert operations. Field use devices can have a narrow range of detectable agents, (i.e., can be specific for one particular target) because several different devices may be deployed on a mission.

MOBILE LABORATORY/FIELD LABORATORY

Mobile and field laboratory detection technologies are located in mobile laboratories. They are likely semi-automated or integrated into a system that is capable of a higher throughput of samples (e.g., 20-30 samples at a time). Some additional equipment such as centrifuges and vortexes can be used during operation, although smaller systems are preferred. Size is a concern with mobile laboratory components because space is limited and the detection device or system is likely only one component of the laboratory. A mobile laboratory ideally can operate for a longer period of time than a field use item; therefore, consumables and manpower are a concern. Signature is somewhat important for the mobile laboratory, as extensive safety precautions could hinder the mobility and camouflage of the mobile laboratory. Detection of a wide range of agents is preferable in a mobile laboratory detection device or system.

DIAGNOSTIC LABORATORY/POINT OF CARE

The diagnostic laboratory or point of care use scenario includes both brick and mortar laboratories, as well as non-laboratory spaces such as a physician office or clinic. The ability to obtain Food and Drug Administration (FDA) approval and 510k clearance were weighted heavily to emphasize diagnostic capability. The device or system must be able to detect agents from blood, tissue, cultured cells, and other typical samples. Logistical or operational concerns, such as size, weight, signature, transportation, additional equipment, and consumables were not considered essential for this scenario; however, logistics is important in moving point of care use forward in the Combat Health Support system. Ideally, the diagnostic laboratory or point of care detection technologies can detect biological agents from all encountered samples with a consistently high level of specificity and sensitivity.

HIGH SENSITIVITY, HIGH THROUGHPUT ANALYTICAL LABORATORY

Analytical laboratory detection technologies are typically located in a brick and mortar building, such as a hospital or laboratory. They should be fully automated devices capable of high throughput of samples. An ideal detection device can detect a variety of agents quickly, have a high level of sensitivity, and is easy to operate. Because of the location of the system, device characteristics such as signature, additional equipment,

and electrical requirements are of less concern. The device should be easily maintained with regularly scheduled maintenance and be relatively easy for a medical staff to operate.

EVALUATION PROCESS

The four scenarios detailed above represent distinctly different uses of detection technologies; in essence, each scenario involves different objectives and requirements. Once the objectives and requirements for the four scenarios were clearly defined, the authors generated an evaluation model. The foundation of the model is the evaluation criteria, which represent the important attributes for detection and are intended to differentiate the various types of technologies.

Each evaluation criterion was defined and survey questions were designed to collect the required data for each technology. Each multiple choice survey question was aligned to a performance scale; the scales provide a means of measuring how well each technology "performs" relative to each criterion. The performance scales can be quantitative (e.g., speed, measured in minutes) or qualitative (e.g., utility, measured by assessing the best fit). Each level on the scale was assigned a utility value, ranging from zero for the lowest expected performance to 100 for the highest level of expected performance. Intermediate levels of performance were assigned values between zero and 100. The final step in developing the evaluation model was to weight the criteria. The weights indicate the relative value of a criterion, as defined by its performance scale, compared to the other criteria. The criteria were weighted by distributing 100 points amongst the individual criteria under the four headings of Throughput, Logistics, Operations, and Detection. Because each scenario is concerned with different objectives and requirements, the criteria weights varied depending on the scenario. Table 1 shows how the weights were distributed relative to the different scenarios.

Each technology was scored relative to each criterion for each scenario. Overall scores and rankings were generated using IBM® Statistical Packages for Social Sciences (SPSS) Version 19 and Microsoft® Excel.

In evaluations where risk is assessed with mixtures of quantitative and qualitative data, the most useful summary metrics are measures of total effectiveness. Measures of total effectiveness are vastly superior to qualitative summaries and categorical means because they eliminate biases created by categorical limits and preserve variances in raw data throughout aggregate calculations. Furthermore, compared to less rigorous approaches, measures of total effectiveness are verifiable; effective at normalizing multiple inputs of unique scales; allow for visibility of influential data points; and improve overall reporting accuracy. For these reasons, measures of total effectiveness are the appropriate summary metrics to use in the analysis.

EVALUATION OF DETECTION TECHNOLOGIES

The evaluation section is split into the four different scenarios: Field/Man portable; Mobile laboratory/Field laboratory; Diagnostic laboratory/Point of care; and High sensitivity, high throughput analytical laboratory. Within each section, the results of the analyses are additionally split into three areas of focus: biological agent specific systems; chemical agent specific systems; and radiological agent specific systems. This report analyzed 304 different technologies; there are 177 biological detectors, 120 chemical detectors, 71 radiological detectors, and 46 multi-functional systems. For each scenario of use, the biological, chemical, and radiological detectors were equally divided into five tiers based on the overall score of the technologies. Due to space constraints in this section, only the top tier is listed for each type of detector. In addition, within each tier of detectors it is important to distinguish between technologies that are mature and commercially available and those that are not yet available to the community. Brass and bread board technologies are important to analyze as they represent the future of detection; however, as immature products, the data submitted to the survey is potentially untested or theoretical. For the top tier systems in this section we have identified the mature technologies so that they can be compared against each other.

		FIELD	MOBILE	DIAGNOSTIC	ANALYTICAL
THROUGHPUT	Throughput of Product	0.03	0.05	0.11	0.2
	Reuse	0.06	0.03	0.02	0.02
	Speed	0.06	0.06	0.06	0.06
LOGISTICS	Signature	0.06	0.04	0.03	0.01
	Training	0.01	0.01	0.01	0.01
	Mobility	0.24	0.12	0.01	0.01
	Physical System Requirements	0.16	0.12	0.08	0.03
	System Maturity	0.01	0.01	0.01	0.01
DETECTION	Sensitivity and Detection	0.03	0.12	0.24	0.27
	Versatility of Sample Input	0.01	0.17	0.23	0.26
OPERATIONS	Operational Conditions	0.14	0.1	0.05	0.01
	Maintenance	0.06	0.06	0.05	0.03
	Ease of Use	0.07	0.06	0.06	0.05
	Interoperability and System Complexity	0.06	0.05	0.04	0.03

Table 1: Weight Distributions for the Four Scenarios of Use

FIELD/MAN PORTABLE

In the evaluation of detection technologies for field use, factors pertaining to mobility, physical system requirements (e.g., battery power, water use), and operational conditions are the most important criteria (Figure 2). An ideal field use device is small and easily transportable, easy to maintain, able to operate in a variety of environmental conditions, and requires few manual steps to operate.

RESULTS

The top two tiers of biological detectors are populated with technologies that are small, lightweight, battery powered, and have excellent sensitivity to biological agents. The highest scoring systems, such as the Alexeter Technologies – Defender TSR System and Menon International - MENTOR-100, encompass the attributes of a field use system while employing non-traditional assays for agent detection. Other technologies of note in the top two tiers are: BioFire Diagnostics, Inc. - RAZOR EX BioThreat Detection System; Epistem - Genedrive; Meso Scale Diagnostics (MSD), LLC - Cartridge Reader; and ANP Technologies, Inc. - NIDS-3000 BioThreat Detection Kit.

The top chemical detectors include: Environics USA - ChemPro 100i and ChemPro PD; Smiths Detection - HazMatID Elite; and Bruker Detection Corporation - µRAID Portable Chemical Identifier. The top two tiers of chemical detectors are listed in. In general, these systems provide handheld chemical agent detection capability with strong batteries along with limited components and consumables, making these devices ideal for field use.

The top two tiers of radiological detectors continue the common theme of small and portable systems. In addition, most of the systems in these top tiers do not require consumables limiting the logistics needed for field operation. Some of the top scoring systems are: FLIR Systems - identiFINDER 2; Environmental Instruments Canada, Inc. - CT007 Personal Radiation Detector; and Smiths Detection - RadSeeker - Handheld Radioisotope Identifier.

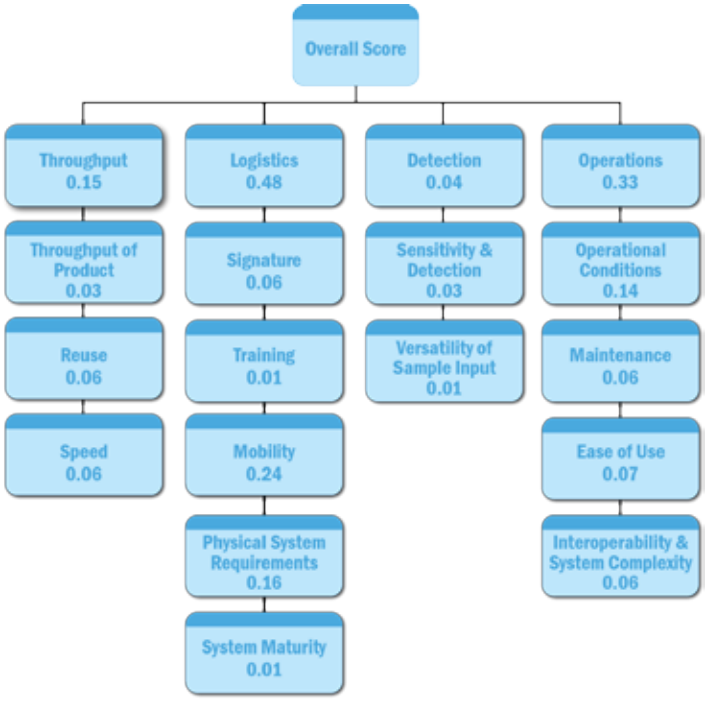


Figure 2: Field/Man Portable Weight Distribution

MOBILE LABORATORY/FIELD LABORATORY

In the evaluation of detection equipment for mobile laboratories, sensitivity, mobility, physical system requirements, operational conditions, and versatility of sample input are the most important criteria (Figure 3). An ideal mobile laboratory device requires few manual steps to operate; requires no or little additional equipment; and possesses increased throughput, speed, and potential for automation. There are obvious similarities to the technologies useful in the Field/Man portable scenario, so the top two tiers for each scenario have some of the same technologies listed.

RESULTS

While a number of biological detectors are the same in the top two tiers for the Mobile laboratory/Field laboratory and Field/Man portable use scenarios, there are some notable additions to the list, such as: Battelle Memorial Institute - Resource Effective BioIdentification System (REBS) - Laboratory Variant; Roche Applied Science - LightCycler 480; Meso Scale Diagnostics (MSD), LLC - SECTOR® PR2 Model 1500; and Luminex Corporation - MAGPIX System. The top scoring systems in this scenario (MagnaBioSciences - MICT (Magnetic Immuno-Chromatgraphic Test) System and Microscopes International - µScope MX - POC Diagnostics) ranked well in the Field/Man portable use scenario as well because they are small and portable.

The Mobile laboratory/Field laboratory criterion weighting created a shift in the top two tiers of chemical detectors, landing a number of tier two field systems on the tier one mobile laboratory system list. Systems, such as Inficon - HAPSITE ER Chemical Identification System and Smiths Detection - LCD-NEXUS, moved up the rankings because they are better fits for the mobile laboratory environment than the field. Other systems, such as the Smiths Detection - HazMatID 360 and HazMatID Elite and the Bruker Detection Corporation - Raid-M Handheld Chemical Detector & Identifier, were highly ranked in the Mobile laboratory/Field laboratory and Field/Man portable use scenarios.

Some radiological detection technologies join the top two tiers for the Mobile laboratory/Field laboratory from the third tier of Field/Man portable technologies. These systems include: FLIR - STRIDE systems; BPSI - BUILDING SENTRY ONE; and Technical Associates - Military Water Safety Test System - Portable. The major difference for these technologies between the two scenarios comes down to mobility.

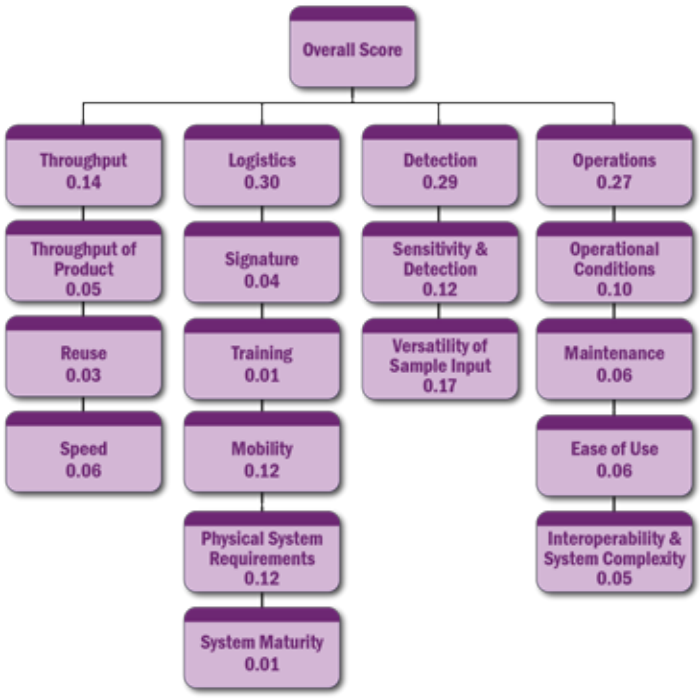
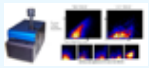
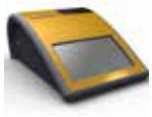


Figure 3: Mobile Laboratory/Field Laboratory Weight distribution

TOP TIER BIOLOGICAL DETECTORS

FIELD USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Advanced Liquid Logic		$20,000
Airogistic, LLC - BioTM-FD		Price not available/ Not mature
Alexeter Technologies - Defender TSR System		$15,000
ANP Technologies, Inc. - NIDS-3000 BioThreat Detection Kit		$4,500
ARA, Inc. - Manportable CBRNE Detection System		Price not available/ Not mature
BioFire Diagnostics, Inc. - RAZOR EX BioThreat Detection System		$38,500
Biomeme, Inc. - Mobile Real-Time qPCR Platform		$1,000
Building Protection Systems, Inc. (BPSI) - ALPHA SENTRY ONE		Price not available/ Not mature
Building Protection Systems, Inc. (BPSI) Global - METRO SENTRY ONE		Price not available/ Not mature
Environics - Envi Assay System and ChemPro reader Module		$15,000

FIELD USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
FLIR Systems - IBAC Bio-Aerosol Detector and Collector		$24,500
Holomic, LLC - Rapid Diagnostic Reader		$65,650
Integrated Nano-Technologies, LLC - Palladium		Price not available/ Not mature
MagnaBioSciences - MICT (Magnetic Immuno-Chromatgraphic Test) System		$5,000
MD Microscopes International - Home Healthcare Diagnostics		$400 - $10,000
Menon International - MENTOR-100		$120,000
Mesa Tech Intl, Inc. - MTIDx Rapid Multiplexed Molecular Diagnostics in a Stand-Alone Low Cost Disposable Platform		Price not available/ Not mature
Microscopes International - µScope MX - POC Diagnostics		$12,500
Mine Safety Appliances Co. (MSA), Inc. - Biosensor 2200R		$15,995
Mine Safety Appliances Co. (MSA), Inc. - BIOSENSOR 4000		$17,995

TOP TIER BIOLOGICAL DETECTORS

FIELD USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
New Horizons Diagnostics - Bioluminometer		$5,000
Prognosys, LLC - AIDA Autonomous Identification Diagnostics and Alert		Price not available/ Not mature
QTL Biosystems - Biosensor 2200R		$15,995
QTL Biosystems - BIOSENSOR 4000		$17,995
Rapid Diagnostek, Inc. - IntelliProbe		Price not available/ Not mature
Research International, Inc. - TacBio Aerosol Detector		$30,000
Resonant Sensors Incorporated - Compact Diagnostic System (Model CDS-100)		Price not available/ Not mature
T2 Biosystems - T2Dx		Price not available/ Not mature
Technical Associates - Ship Ballast CBRN Solar Powered Water Monitor - Portable		$272,800
Tetracore, Inc. - BioThreat Alert Reader and BioThreat Alert Strips		$5,500

FIELD USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Tetracore, Inc. - BioThreat Integrated Detection System		$21,500
Tetracore, Inc. - T-COR 4 Handheld Real-Time PCR Thermocycler		$16,000
TIRF Technologies, Inc. - TIRF Sense Handheld Chem-Biosensor		Price not available/ Not mature
TIRF Technologies, Inc. - TIRF Sense Portable Chem-Biosensor		$34,000
20/20 BioResponse - BioCheck		$26.20

TOP TIER CHEMICAL DETECTORS

FIELD USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
ARA, Inc. - Manportable CBRNE Detection System		Price not available/ Not mature
Block Engineering, LLC - LaserScan Analyzer		$50,000 - $90,000
Bruker Detection Corporation - µRAID Portable Chemical Identifier		$10,750
Bruker Detection Corporation - Raid-M Handheld Chemical Detector & Identifier		$18,975
Bruker Detection Corporation - RAID-XP Combined Chemical & Radiation Detector		$26,500
Chemring Detection Systems, Inc. - Juno		Price not available
Environics USA - ChemPro 100i		$14,000
Environics USA - ChemPro PD		$15,000
FLIR Systems, Inc. - CHIRP (Chemical Hazard Indicating and Ranging Pack)		Price not available
Morpho Detection, Inc. - StreetLab® Mobile		$35,000

FIELD USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Mine Safety Appliances Co. (MSA), Inc. - HAZMATCAD and HAZMATCAD Plus (Hazardous Material Chemical Agent Detector)		$5,500 - $8,000
PROENGIN SAS - AP4C		€ 20,000
Smiths Detection - HazMatID 360		>$50,000
Smiths Detection - HazMatID Elite		>$50,000
Smiths Detection - LCD 3.2e (Lightweight Chemical Detector)		Price not available/ Not mature
Smiths Detection - LCD 3.3		Price not available/ Not mature
Smiths Detection - Watford Limited - CAM (Chemical Agent Monitor)		Price not available/ Not mature
Snowy Range Instruments - CBEx Threat Identification System		$12,000
Spearhead Innovations - PASS (Product Acoustic Signature System)		$32,995
Thermo Fisher Scientific - FirstDefender RMX		$55,000

TOP TIER CHEMICAL DETECTORS

FIELD USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Thermo Fisher Scientific - Thermo Scientific TruDefender FTi		$46,500
TIRF Technologies, Inc. - TIRF Sense Handheld Chem-Biosensor		Price not available/ Not mature
TIRF Technologies, Inc. - TIRF Sense Portable Chem-Biosensor		$34,000

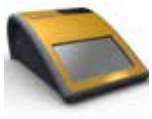
TOP TIER RADIOLOGICAL DETECTORS

FIELD USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
ARA, Inc. - Manportable CBRNE Detection System		Price not available/ Not mature
Bruker Detection Corporation - Radiation Backpack Sentry		$25,000
Bruker Detection Corporation - RAID-XP Combined Chemical & Radiation Detector		$26,500
Environics USA - ChemPro 100i		$14,000
Environics USA - ChemPro PD		$15,000
Environmental Instruments Canada, Inc. - CT007 Personal Radiation Detector		$450
FLIR Systems, Inc. - nanoRaider		Price not available/ Not mature
FLIR Systems, Inc. - radHUNTER		Price not available/ Not mature
FLIR Systems, Inc. Systems - identiFINDER 2		Price not available/ Not mature
RADeCO, Inc. - Tru-Dac		$5,750

FIELD USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Sensor Technology Engineering, Inc. - Radiation Pager		$1,300
Smiths Detection - RadSeeker - Handheld Radioisotope Identifier		Price not available/ Not mature
Technical Associates - Hydrofracking Radon Portable Air & Gas Monitor		$9,636
Trojan Defense, LLC - Carnyx Neutron Sensor	trojandefense	Price not available/ Not mature

TOP TIER BIOLOGICAL DETECTORS

MOBILE USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Advanced Liquid Logic		$20,000
Alexeter Technologies - Defender TSR System		$15,000
Alexeter Technologies - Guardian Reader System		$12,000
ANP Technologies, Inc. - NIDS-3000 BioThreat Detection Kit		$4,500
ARA, Inc. - Manportable CBRNE Detection System		Price not available/ Not mature
Battelle Memorial Institute - Resource Effective BioIdentification System (REBS) - Laboratory Variant		Price not available/ Not mature
BioFire Diagnostics, Inc. - RAZOR EX BioThreat Detection System		$38,500
Biomeme, Inc. - Mobile Real-Time qPCR Platform		$1,000
Bioneer Corporation - Exicycler 96		$40,000
Holomic, LLC - Rapid Diagnostic Reader		$65,650

MOBILE USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Integrated Nano-Technologies, LLC - Palladium		Price not available/ Not mature
MagnaBioSciences - MICT (Magnetic Immuno-Chromatgraphic Test) System		$5,000
MD Microscopes International - Home Healthcare Diagnostics		$400 - $10,000
Menon International - MENTOR-100		$120,000
Mesa Tech Intl, Inc. - MTIDx Rapid Multiplexed Molecular Diagnostics in a Stand-Alone Low Cost Disposable Platform		Price not available/ Not mature
Meso Scale Diagnostics (MSD), LLC - Cartridge Reader		Price not available/ Not mature
Microscopes International - µScope MX - POC Diagnostics		$12,500
Mine Safety Appliances Co. (MSA), Inc. - Biosensor 2200R		$15,995
Mine Safety Appliances Co. (MSA), Inc. - BIOSENSOR 4000		$17,995
New Horizons Diagnostics - Bioluminometer		$5,000

TOP TIER BIOLOGICAL DETECTORS

MOBILE USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Operational Technologies Corporation - FLASH Reader		Price not available/ Not mature
QTL Biosystems - Biosensor 2200R		$15,995
QTL Biosystems - BIOSENSOR 4000		$17,995
Research International, Inc. - BioHawk		$50,000
Resonant Sensors Incorporated - Compact bioassay system		Price not available/ Not mature
Resonant Sensors Incorporated - Compact Diagnostic System (model CDS-100)		Price not available/ Not mature
Roche Applied Science - LightCycler 480		$50,000
T2 Biosystems - T2Dx		Price not available/ Not mature
Tetracore, Inc. - BioThreat Alert Reader and BioThreat Alert Strips		$5,500
Tetracore, Inc. - BioThreat Integrated Detection System		$21,500

MOBILE USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Tetracore, Inc. - T-COR 4 Handheld Real-Time PCR Thermocycler		$16,000
TIRF Technologies, Inc. - FluoroGazer		Price not available/ Not mature
TIRF Technologies, Inc. - TIRF Sense Handheld Chem-Biosensor		Price not available/ Not mature
TIRF Technologies, Inc. - TIRF Sense Portable Chem-Biosensor		$34,000
3M - Integrated Cycler		$60,000

TOP TIER CHEMICAL DETECTORS

MOBILE USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Agilent Technologies, Inc. - Cary 60 UV-Visible Spectrophotometer		$10,000
Agilent Technologies, Inc. - Cary Eclipse Fluorescence Spectrophotometer		$30,000
Appealing Products, Inc. - Detectors		Price not available
ARA, Inc. - Manportable CBRNE Detection System		Price not available/ Not mature
Block Engineering, LLC - LaserScan Analyzer		$50,000 - $90,000
Bruker Detection Corporation - µRAID Portable Chemical Identifier		$10,750
Bruker Detection Corporation - Raid-M Handheld Chemical Detector & Identifier		$18,975
Bruker Detection Corporation - RAID-XP Combined Chemical & Radiation Detector		$26,500
Chemring Detection Systems, Inc. - Juno		Price not available
Electronic Sensor Technology, Inc. - zNose Portable, Explosive, Narcotics and Nerve Agent Detector		$40,000

MOBILE USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Environics USA - ChemPro 100i		$14,000
Gasmet Technologies, Inc. - DX4000/DX4015		$65,000
Inficon - HAPSITE ER Chemical Identification System		$123,485
Smiths Detection - HazMatID 360		>$50,000
Smiths Detection - HazMatID Elite		>$50,000
Smiths Detection - LCD 3.2e (Lightweight Chemical Detector)		Price not available/ Not mature
Smiths Detection - LCD 3.3		Price not available/ Not mature
Smiths Detection - LCD-NEXUS		Price not available/ Not mature
Snowy Range Instruments - CBEx Threat Identification System		$12,000
T2 Biosystems - T2Dx		Price not available/ Not mature

TOP TIER CHEMICAL DETECTORS

MOBILE USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Thales UK - Blacklight		Price not available/ Not mature
TIRF Technologies, Inc. - FluoroGazer		$95,000
TIRF Technologies, Inc. - TIRF Sense Handheld Chem-Biosensor		Price not available/ Not mature
TIRF Technologies, Inc. - TIRF Sense Portable Chem-Biosensor		$34,000

TOP TIER RADIOLOGICAL DETECTORS

MOBILE USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Building Protection Systems, Inc. (BPSI) - ALPHA SENTRY ONE		Price not available/ Not mature
Building Protection Systems, Inc. (BPSI) - BUILDING SENTRY ONE		Price not available/ Not mature
Building Protection Systems, Inc. (BPSI) Global - METRO SENTRY ONE		Price not available/ Not mature
Bruker Detection Corporation - Radiation Backpack Sentry		$25,000
Environmental Instruments Canada, Inc. - CT007 Personal Radiation Detector		$450
FLIR Systems, Inc. - nanoRaider		Price not available/ Not mature
FLIR Systems, Inc. - radHUNTER		Price not available/ Not mature
FLIR Systems, Inc. - STRIDE systems		Price not available/ Not mature
FLIR Systems, Inc. - identiFINDER 2		Price not available/ Not mature
RADeCO, Inc. - Tru-Dac		$5,750

MOBILE USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Sensor Technology Engineering, Inc. - Radiation Pager		$1,300
Smiths Detection - RadSeeker - Handheld Radioisotope Identifier		Price not available/ Not mature
Technical Associates - Hydrofracking Radiation Portable Water Monitor		$3,720
Trojan Defense, LLC - Carnyx Neutron Sensor		Price not available/ Not mature

DIAGNOSTIC LABORATORY/POINT OF CARE

In the evaluation of detection equipment for diagnostic laboratories, sensitivity and detection; versatility of sample input; and throughput of product are the most important criteria (Figure 4). An ideal diagnostic laboratory device requires quick performance and high sensitivity. The survey questions dealing with FDA approval and detection of agents in medical samples were highly weighted in this scenario to identify technologies approved for diagnostic use or have the ability to be approved.

RESULTS

The additional emphasis on the medically relevant survey questions in this scenario have produced a top tier that includes systems previously ranked in the third and fourth tiers for the Field/Man portable and Mobile laboratory/Field laboratory scenarios based on their diagnostic capabilities. These systems are either FDA-approved or in the process of being approved which makes them ideal candidates for this scenario, including: Luminex Corporation - Luminex 100/200 System and MAGPIX System; MagnaBioSciences - MICT (Magnetic Immuno-Chromatgraphic Test) System; and Applied Biosystems - 7500 Fast Dx Real-Time PCR Instrument.

The Diagnostic laboratory/Point of care use scenario does not directly apply to the chemical and radiological detectors in this survey; however, there are some interesting results for each category. In addition to the emphasis on questions such as FDA approval, there was also a shift in the weights from mobility to throughput and sensitivity. In the chemical detectors, this shift in focus brought new systems to the top two tiers of systems, including mass spectrometry systems like the Agilent Technologies, Inc. - 7000B Triple Quadrupole GCMS, 5975C Triple-Axis Detector GCMSD System, and 6500 Series Quadrupole Time of Flight Mass Spectrometer. The top two tiers of the radiological detectors were more consistent with the Mobile laboratory/Field laboratory use scenario because most of these technologies are fairly mobile; however, there were some new systems to note: FLIR - radHUNTER; JP Laboratories, Inc. - RADTriage; and Mirion Technologies (MGPI), Inc. - SPIR ID Handheld Detection & Identification.

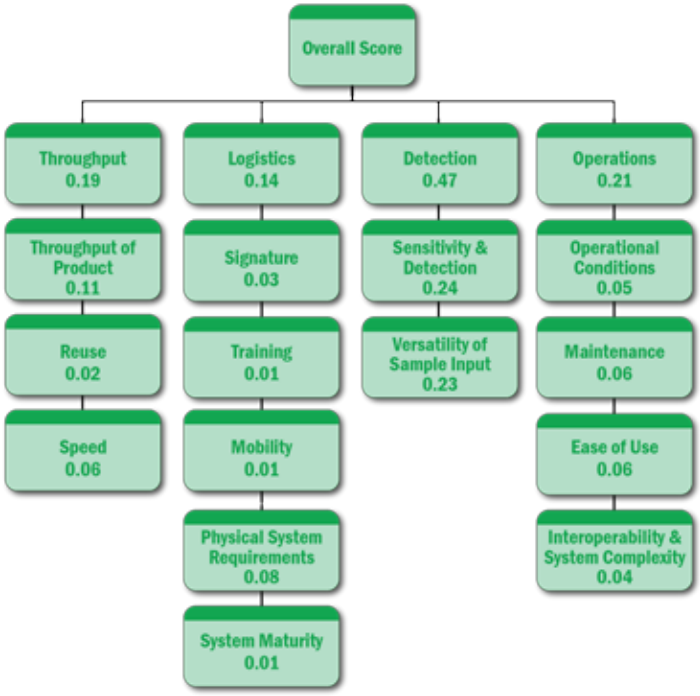


Figure 4: Diagnostics Laboratory/Point of Care Weight Distribution

HIGH SENSITIVITY, HIGH THROUGHPUT ANALYTICAL LABORATORY

In the evaluation of detection equipment for analytical laboratories, sensitivity and detection, versatility of sample input, and throughput of product are the most important criteria (Figure 5). While these top criteria are the same as for the Diagnostic laboratory/Point of care scenario, they were even more highly rated for the analytical laboratory as essential components of a successful technology. An ideal analytical laboratory device processes samples at a high speed with optimal sensitivity.

RESULTS

The High sensitivity, high throughput analytical laboratory and Diagnostic laboratory/Point of care scenarios of use have the same top evaluation criteria but with different weights (sensitivity and detection; versatility of sample input; and throughput of product) resulting in similar systems in the top two tiers but the rankings within the tiers changed for some systems. Some notable systems that made significant moves up the rankings in the biological detector category include: Roche Applied Science - LightCycler 480; Meso Scale Diagnostics (MSD), LLC - SECTOR PR2 Model 1800; and Battelle Memorial Institute - Resource Effective BioIdentification System (REBS) - Laboratory Variant. These three systems are representative of technologies that benefited from the increased weight on the sensitivity and throughput criteria and the decreased emphasis on diagnostics.

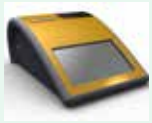
The chemical and radiological detectors had less movement within the top two tiers between the High sensitivity, high throughput analytical laboratory and Diagnostic laboratory/Point of care scenarios of use. In the chemical detector category, mass spectrometers made the biggest jump in the top two tiers. Some notable technologies include: Agilent Technologies, Inc. - Agilent 5975C Triple-Axis Detector GCMSD System, Agilent 5975T LTM GC/MSD, and Agilent 7000B Triple Quadrupole GCMS; and FLIR Systems - Griffin 460 Gas Chromatograph Mass Spectrometer. In general, the radiological detectors in this survey are not meant for laboratory use and therefore, there was very little change in the top two tiers of systems. Some radiological detectors that did move up the rankings include: Berkeley Nucleonics Corporation - Radionuclide Isotope Identifier - SAM 940; D-Tect Systems - Rad-DX; and Bruker Detection Corporation - RAID-XP Combined Chemical & Radiation Detector.



Figure 5: High Sensitivity, High Throughput Analytical Laboratory Weight Distribution

TOP TIER BIOLOGICAL DETECTORS

DIAGNOSTIC USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Advanced Liquid Logic		$20,000
Applied BioCode, Inc. - Biocode-1000		$45,000
Applied Biosystems - 7500 Fast Dx Real-Time PCR Instrument		$65,900
Applied BioSystems - 7500 Fast Real-Time PCR System		$4,850
Applied Biosystems - ViiA 7 Real-Time PCR System		$71,000
Axela, Inc.- dotLab mX		$73,500
Battelle Memorial Institute - Resource Effective BioIdentification System (REBS) - Laboratory Variant		Price not available/ Not mature
BioFire Diagnostics, Inc. - FilmArray Pathogen Detection System		$49,500
Bioforce Nanosciences, Inc. - ViriChip System		Price not available/ Not mature
Biomeme, Inc. - Mobile Real-Time qPCR Platform		$1,000

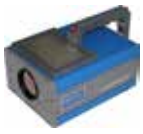
DIAGNOSTIC USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Bioneer Corporation - Exicycler 96		$40,000
Cepheid - SmartCycler System		$34,995
Holomic, LLC - Rapid Diagnostic Reader		$65,650
Integrated Nano-Technologies, LLC - Palladium		Price not available/ Not mature
Luminex Corporation - Luminex 100/200 System		$75,000
Luminex Corporation - MAGPIX System		$35,000
MagnaBioSciences - MICT (Magnetic Immuno-Chromatgraphic Test) System		$5,000
Menon International - MENTOR-100		$120,000
Mesa Tech Intl, Inc. - MTIDx Rapid Multiplexed Molecular Diagnostics in a Stand-Alone Low Cost Disposable Platform		Price not available/ Not mature
Microfluidic Systems - The Dragonfly System		Price not available/ Not mature

TOP TIER BIOLOGICAL DETECTORS

DIAGNOSTIC USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Microscopes International - µScope MX - POC Diagnostics		$12,500
Mine Safety Appliances Co. (MSA), Inc. - Biosensor 2200R		$15,995
Mine Safety Appliances Co. (MSA), Inc. - BIOSENSOR 4000		$17,995
New Horizons Diagnostics - Bioluminometer		$5,000
QTL Biosystems - Biosensor 2200R		$15,995
QTL Biosystems - BIOSENSOR 4000		$17,995
Resonant Sensors Incorporated - Bioassay Sensor System		$65,000
Resonant Sensors Incorporated - Compact bioassay system		Price not available/ Not mature
Roche Applied Science - LightCycler 480		$50,000
Tetracore, Inc. - BioThreat Integrated Detection System		$21,500

DIAGNOSTIC USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Tetracore, Inc. - T-COR 4 Handheld Real-Time PCR Thermocycler		$16,000
TIRF Technologies, Inc. - FluoroGazer		$95,000
TIRF Technologies, Inc. - TIRF Sense Handheld Chem-Biosensor		Price not available/ Not mature
TIRF Technologies, Inc. - TIRF Sense Portable Chem-Biosensor		$34,000
3M - Integrated Cycler		$60,000

TOP TIER CHEMICAL DETECTORS

DIAGNOSTIC USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Agilent Technologies, Inc. - Agilent 7000B Triple Quadrupole GCMS		Price not available
Agilent Technologies, Inc. - Cary 60 UV-Visible Spectrophotometer		$10,000
Agilent Technologies, Inc. - Cary Eclipse Fluorescence Spectrophotometer		$30,000
Appealing Products, Inc. - Detectors		Price not available
ARA, Inc. - Manportable CBRNE Detection System		Price not available/ Not mature
Battelle Memorial Institute - Resource Effective BioIdentification System (REBS) - Laboratory Variant		Price not available/ Not mature
Block Engineering, LLC - LaserScan Analyzer		$50,000 - $90,000
Bruker Detection Corporation - Raid-M Handheld Chemical Detector & Identifier		$18,975
Chemring Detection Systems, Inc. - Juno		Price not available/ Not mature
Electronic Sensor Technology, Inc. - zNose Portable, Explosive, Narcotics and Nerve Agent Detector		$40,000

DIAGNOSTIC USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Gasmet Technologies, Inc. - DX4000/DX4015		$65,000
Inficon - HAPSITE ER Chemical Identification System		$123,485
Smiths Detection - GID-3		Price not available/ Not mature
Smiths Detection - HazMatID 360		>$50,000
Smiths Detection - HazMatID Elite		>$50,000
Smiths Detection - LCD 3.2e (Lightweight Chemical Detector)		Price not available
Smiths Detection - LCD 3.3		Price not available/ Not mature
Smiths Detection - LCD-NEXUS		Price not available/ Not mature
Snowy Range Instruments - CBEx Threat Identification System		$12,000
Thales UK - Blacklight		Price not available/ Not mature

TOP TIER CHEMICAL DETECTORS

DIAGNOSTIC USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
TIRF Technologies, Inc. - FluoroGazer		Price not available/ Not mature
TIRF Technologies, Inc. - TIRF Sense Handheld Chem-Biosensor		Price not available/ Not mature
TIRF Technologies, Inc. - TIRF Sense Portable Chem-Biosensor		$34,000

TOP TIER RADIOLOGICAL DETECTORS

DIAGNOSTIC USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Building Protection Systems, Inc. (BPSI) - ALPHA SENTRY ONE		Price not available/ Not mature
Building Protection Systems, Inc. (BPSI) Global - METRO SENTRY ONE		Price not available/ Not mature
Bruker Detection Corporation - Radiation Backpack Sentry		$25,000
FLIR Systems, Inc. - nanoRaider		Price not available/ Not mature
FLIR Systems, Inc. - radHUNTER		Price not available/ Not mature
FLIR Systems, Inc. - STRIDE systems		Price not available/ Not mature
FLIR Systems, Inc. - identiFINDER 2		Price not available/ Not mature
JP Laboratories, Inc. - RADSticker		$5.00
JP Laboratories, Inc. - RADTriage		$15.00
RADeCO, Inc. - Tru-Dac		$5,750

DIAGNOSTIC USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Smiths Detection - RadSeeker - Handheld Radioisotope Identifier		Price not available/ Not mature
Technical Associates - Hydrofracking Radiation Portable Water Monitor		$3,720
Technical Associates - Military Water Safety Test System - Portable		$23,400
Trojan Defense, LLC - Carnyx Neutron Sensor		Price not available/ Not mature

TOP TIER BIOLOGICAL DETECTORS

ANALYTICAL USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Advanced Analytical Technologies, Inc. (AATI) - Fragment Analyzer		$20,000
Advanced Liquid Logic		$20,000
Akonni Biosystems, Inc. - TruArray		$40,000
Applied BioCode, Inc. - Biocode-1000		$45,000
Applied BioSystems - 7500 Fast Real-Time PCR System		$4,850
Applied Biosystems - ViiA 7 Real-Time PCR System		$71,000
Arrayit Corporation - InnoScan		$125,000
Axela, Inc.- dotLab mX		$73,500
Battelle Memorial Institute - Resource Effective BioIdentification System (REBS) - Laboratory Variant		Price not available/ Not mature
Bioneer Corporation - Exicycler 96		$40,000

ANALYTICAL USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Cepheid - SmartCycler System		$34,995
Integrated Nano-Technologies, LLC - Palladium		Price not available/ Not mature
Luminex Corporation - Luminex 100/200 System		$75,000
Luminex Corporation - MAGPIX System		$35,000
MagnaBioSciences - MICT (Magnetic Immuno-Chromatgraphic Test) System		$5,000
Menon International - MENTOR-100		$120,000
Mesa Tech Intl, Inc. - MTIDx Rapid Multiplexed Molecular Diagnostics in a Stand-Alone Low Cost Disposable Platform		Price not available/ Not mature
Meso Scale Diagnostics (MSD), LLC - SECTOR® PR2 Model 1500		$90,000
Meso Scale Diagnostics (MSD), LLC - Cartridge Reader		Price not available/ Not mature
Meso Scale Diagnostics (MSD), LLC - SECTOR PR2 Model 1800		$80,000

TOP TIER BIOLOGICAL DETECTORS

ANALYTICAL USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Microscopes International - µScope MX - POC Diagnostics		$12,500
Mine Safety Appliances Co. (MSA), Inc. - Biosensor 2200R		$15,995
Mine Safety Appliances Co. (MSA), Inc. - BIOSENSOR 4000		$17,995
QTL Biosystems - Biosensor 2200R		$15,995
QTL Biosystems - BIOSENSOR 4000		$17,995
Resonant Sensors Incorporated - Bioassay Sensor System		$65,000
Resonant Sensors Incorporated - Compact bioassay system		Price not available/ Not mature
Resonant Sensors Incorporated - Compact Diagnostic System (model CDS-100)		Price not available/ Not mature
Resonant Sensors Incorporated - Vides Bioassay System		$75,000
Roche Applied Science - LightCycler 480		$50,000

ANALYTICAL USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
T2 Biosystems - T2Dx		Price not available/ Not mature
Tetracore, Inc. - BioThreat Integrated Detection System		$21,500
Tetracore, Inc. - T-COR 4 Handheld Real-Time PCR Thermocycler		$16,000
TIRF Technologies, Inc. - FluoroGazer		$95,000
TIRF Technologies, Inc. - TIRF Sense Handheld Chem-Biosensor		Price not available/ Not mature
TIRF Technologies, Inc. - TIRF Sense Portable Chem-Biosensor		$34,000
3M - Integrated Cycler		$60,000

TOP TIER CHEMICAL DETECTORS

ANALYTICAL USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Agilent Technologies, Inc. - Agilent 5975C Triple-Axis Detector GCMSD System		Price not available/ Not mature
Agilent Technologies, Inc. - Agilent 5975T LTM GC/ MSD		Price not available/ Not mature
Agilent Technologies, Inc. - Agilent 7000B Triple Quadrupole GCMS		Price not available/ Not mature
Agilent Technologies, Inc. - Cary 60 UV-Visible Spectrophotometer		$10,000
Agilent Technologies, Inc. - Cary Eclipse Fluorescence Spectrophotometer		$30,000
ALMSCO International - BenchTOF-dx		$150,000
Battelle Memorial Institute - Resource Effective BioIdentification System (REBS) - Laboratory Variant		Price not available/ Not mature
Block Engineering, LLC - LaserScan Analyzer		$50,000 - $90,000
Bruker Detection Corporation - Raid-M Handheld Chemical Detector & Identifier		$18,975
Bruker Detection Corporation - RAID-XP Combined Chemical & Radiation Detector		$26,500

ANALYTICAL USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Electronic Sensor Technology, Inc. - zNose Portable, Explosive, Narcotics and Nerve Agent Detector		$40,000
FLIR Systems - Griffin 460 Gas Chromatograph Mass Spectrometer		Price not available/ Not mature
Gasmet Technologies, Inc. - DX4000/DX4015		$65,000
Inficon - HAPSITE ER Chemical Identification System		$123,485
Smiths Detection - GID-3		Price not available/ Not mature
Smiths Detection - HazMatID Elite		>$50,000
Smiths Detection - LCD 3.3		Price not available/ Not mature
Smiths Detection - LCD-NEXUS		Price not available/ Not mature
Snowy Range Instruments - CBEx Threat Identification System		$12,000
Syft Technologies, Inc. - Voice200		$225,000

TOP TIER CHEMICAL DETECTORS

ANALYTICAL USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
TIRF Technologies, Inc. - FluoroGazer		$95,000
TIRF Technologies, Inc. - TIRF Sense Handheld Chem-Biosensor		Price not available/ Not mature
TIRF Technologies, Inc. - TIRF Sense Portable Chem-Biosensor		$34,000

TOP TIER RADIOLOGICAL DETECTORS

ANALYTICAL USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Building Protection Systems, Inc. (BPSI) - ALPHA SENTRY ONE		Price not available/ Not mature
Building Protection Systems, Inc. (BPSI) - BUILDING SENTRY ONE		Price not available/ Not mature
Building Protection Systems, Inc. (BPSI) Global - METRO SENTRY ONE		Price not available/ Not mature
Bruker Detection Corporation - Radiation Backpack Sentry		$25,000
FLIR Systems, Inc. - nanoRaider		Price not available/ Not mature
FLIR Systems, Inc. - radHUNTER		Price not available/ Not mature
FLIR Systems, Inc. - STRIDE systems		Price not available/ Not mature
FLIR Systems, Inc. - identiFINDER 2		Price not available/ Not mature
Nucsafe, Inc. - Guardian Predator		$52,000
RADeCO, Inc. - Tru-Dac		$5,750

ANALYTICAL USE SCENARIO		
TECHNOLOGY	**PICTURE**	**PRICE**
Smiths Detection - RadSeeker - Handheld Radioisotope Identifier		Price not available/ Not mature
Technical Associates - Hydrofracking Radiation Portable Water Monitor		$3,720
Technical Associates - Military Water Safety Test System - Portable		$23,400
Trojan Defense, LLC - Carnyx Neutron Sensor		Price not available/ Not mature

MULTI-FUNCTIONAL TECHNOLOGIES

Multi-functional technologies can detect more than one biological, chemical, or radiological threat. In this survey, we identified systems that can address: biological and chemical agents; chemical and radiological agents; and biological, chemical, and radiological agents. Multi-functional technologies are ranked in the individual category rankings for each of the four scenarios, as well as highlighted in this section. For example, the T2 Biosystems - T2Dx can identify both chemical and biological agents; therefore, it will be found in the biological-specific as well as the chemical-specific rankings for each scenario and in Table 2.

SUMMARY

In this survey, technology information was collected using an extensive questionnaire that examined 14 evaluation criteria covering the capabilities and requirements of technologies for agent detection and identification. Completed surveys submitted by vendors were entered into a weighted model developed by subject matter experts, and while these rankings may vary slightly from person to person, they were developed to approximate the general opinions of the detection and identification community at large. The evaluation criteria were established to differentiate between competing technologies and used to generate overall rankings for four different usage scenarios. Appendix A lists the specific questions posed and the weights provided for each answer.

A valuable way to use this guide is to review the operational scenario that most relates to a specific area of interest, identify which products scored well in the evaluation for each technology, and then closely examine these products using the information contained within the Detailed Product Sheets section. The Detailed Product Sheets present key answers to survey questions as well as the technologies' overall ranking in the four scenarios of use, the technology Impact Chart (a normalized representation of the overall score in each scenario), and a Scoring Analysis section that identifies the best scenario for each technology. It is important to note that all of the information conveyed in this survey is vendor supplied. The authors suggest that for any technology of interest, the reader contact the vendor for more information using the provided contact information.

Bio/Chem
Agilent 5975T LTM GC/MSD
Agilent 5975T LTM GC/MSD
Agilent 6100 Series Single Quadrupole Mass Spectrometer
Agilent 6200 Series Time of Flight Mass Spectrometer
Agilent 6400 Series Triple Quadrupole Mass Spectrometer
Agilent 6500 Series Quadrupole Time of Flight Mass Spectrometer
AP4C-FB
Cary 60 UV-Visible Spectrophotometer
Cary Eclipse Fluorescence Spectrophotometer
Chemical Biological Mass Spectrometer/Chemical Biological Detection System (CBMS/CBDS)
Chemical-Biological Detection System (CBDS)
Ciencia FluorSPR
Diagnostic Biosensors Field System
EAGLE
FALCON II Widefield Raman Chemical Imaging System
Falcon II Wide-Field RCI System
FLASH Reader
FluoroGazer - TIRF-EC microarray chem-biosensor Instrument
Hach GuardianBlue Early Warning System
Handheld FRET-Aptamer Sensor for CB Detection
ICS-5000 Ion Chromatography system
Morphix ChemBio Detector
Raman Shifted Eyesafe Aerosol Lidar (REAL)
Resource Effective BioIdentification System (REBS) - Laboratory Variant
T2Dx
TIRF Sense Handheld Chem-Biosensor
TIRF Sense Portable Chem-Biosensor
Universal Mass Spectrometer Sensor

Chem/Rad
AreaRAE GAMMA Steel
ChemPro 100i
ChemPro PD
HGVI
RAID-XP Combined Chemical & Radiation Detector
SAFESITE MTX (Multi-Threat Monitor)
Bio/Chem/Rad
AbleSentry
AIROCOLLECT-DETECT-288
ALPHA SENTRY ONE
ASAP V
BIOWARD
BUILDING SENTRY ONE
DCI-I
Manportable CBRNE Detection System
METRO SENTRY ONE
MicroPEM Personal Exposure Monitor
Ship Ballast CBRN Solar Powered Water Monitor - Portable
Ship Ballast CBRN Water Monitor

Table 2: List of Multi-functional Technologies

ALPHABETICAL LIST OF TECHNOLOGIES

TECHNOLOGY	COMPANY	PAGE
µRAID Portable Chemical Identifier	Bruker Detection Corporation	186
µScope MX - POC Diagnostics	Microscopes International	406
451P microR Ion Chamber Survey Meter	Fluke Biomedical	300
ABI 2720	Applied BioSystems	114
ABI 7500 Fast Dx Real-Time PCR Instrument	Applied Biosystems	116
ABI 7500 Fast Real-Time PCR System	Applied BioSystems	118
ABI 7900HT Fast Real-Time PCR System	Applied BioSystems	120
ABI 9700	Applied BioSystems	122
ABI ViiA 7 Real-Time PCR System	Applied Biosystems	124
AbleSentry	Lockheed Martin	370
Adaptive Infrared Imaging Spectroradiometer - Wide Area Detector (AIRIS-WAD)	Physical Sciences, Inc.	460
Advanced Liquid Logic	Advanced Liquid Logic	48
Agentase CAD-Kit	FLIR Systems, Inc.	272
Agentase Disclosure Spray for Blister Agents	FLIR Systems, Inc.	274
Agentase Disclosure Spray for Nerve Agents	FLIR Systems, Inc.	276
Agilent 4100 MP-AES Microwave Plasma Atomic Emission Spectrometer	Agilent Technologies, Inc.	58
Agilent 5975C Triple-Axis Detector GC/MSD System	Agilent Technologies, Inc.	60
Agilent 5975T LTM GCMSD	Agilent Technologies, Inc.	62
Agilent 6100 Series Single Quadrupole Mass	Agilent Technologies, Inc.	64
Agilent 6200 Series Time of Flight Mass Spectrometer	Agilent Technologies, Inc.	66
Agilent 6400 Series Triple Quadrupole Mass Spectrometer	Agilent Technologies, Inc.	68
Agilent 6500 Series Quadrupole Time of Flight Mass Spectrometer	Agilent Technologies, Inc.	70
Agilent 700 Series Inductively Coupled Plasma Optical Emission Spectrometers (ICP-OES)	Agilent Technologies, Inc.	56
Agilent 7000B Triple Quadrupole GC/MS	Agilent Technologies, Inc.	72
Agilent 7700 Series Inductively Coupled Mass Spectrometer	Agilent Technologies, Inc.	74
Agilent 8800 Triple Quadrupole Inductively Coupled Plasma (ICP) Mass Spectrometer	Agilent Technologies, Inc.	76
Agilent Atomic Absorption Spectrometers	Agilent Technologies, Inc.	78
Agilent G6080AA MassCode PCR LC/MS Bundle	Agilent Technologies, Inc.	80
AIDA: Autonomous Identification Diagnostics and Alert	Prognosys LLC	474
AIR (Arrayed Imaging Reflectometry) Bioassay System	Research International, Inc.	496
AIRGARD and AIRGARD Plus (w/EC sensor)	MKS Instruments, Inc.	422
AIRGARD FTIR Air Monitor	MKS Instruments, Inc.	424
AIROCOLLECT-DETECT-288	Partner Airogistic, LLC	454
ALPHA SENTRY ONE	Building Protection Systems, Inc. (BPSI)	202
AP4C	PROENGIN SAS	466
AP4C-FB	PROENGIN SAS	468
AP4C-V	PROENGIN SAS	470
AreaRAE GAMMA Steel	RAE Sytems, Inc.	488
ASAP II	Research International, Inc.	498

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TECHNOLOGY	COMPANY	PAGE
ASAP V	Research International, Inc.	500
ATHINA Biological Security System (ABSS)	Chemring Detection Systems, Inc.	226
BADD Single Agent Detection Test	AdVnt Biotechnologies, LLC	52
BeadXpress Reader	Illumina, Inc.	322
BenchTOF-dx	ALMSCO International	96
BioAdvise Portable Detection Device	Lynntech, Inc.	378
Bioassay Sensor System	Resonant Sensors Incorporated	510
BioCapture 650	FLIR Systems, Inc.	278
BioCheck	20/20 BioResponse	642
Biocode-1000	Applied BioCode, Inc.	112
Biodetection Enabling Analyte Delivery System (BEADS)	Battelle - Pacific Northwest National Laboratory	136
BioFlash-E	PathSensors, Inc.	458
BioHawk	Research International, Inc.	502
Bioluminometer	New Horizons Diagnostics	436
Bio-Plex 200 Suspension ArraySystem	Bio-Rad Laboratories	172
Bio-Plex 2200	Bio-Rad Laboratories	174
Bio-Seeq PLUS Biological Agent Identifier	Smiths Detection	546
Biosensor 2200R	Mine Safety Appliances (MSA) Co., Inc.	408
Biosensor 2200R	QTL Biosystems	478
BIOSENSOR 4000	Mine Safety Appliances (MSA) Co., Inc.	410
BIOSENSOR 4000	QTL Biosystems	480
BioSentryPlus	JMAR Technologies, Inc.	356
BioThreat Alert ELISA Kit(s)	Tetracore, Inc.	610
BioThreat Alert Reader and BioThreat Alert Strips	Tetracore, Inc.	612
BioThreat Integrated Detection System	Tetracore, Inc.	614
BioTM-FD	Airogistic, LLC	88
BIOWARD	THALES Defense&Security	618
Blacklight	Thales UK	622
BoTest Botulinum Neurotoxin Detection Assays	BioSentinel	180
BUILDING SENTRY ONE	Building Protection Systems, Inc. (BPSI)	204
C1000 Thermal Cycler	Bio-Rad Laboratories	176
CALS (Chemical Agent Line Sensor)	MIT Lincoln Laboratories	420
CAM (Chemical Agent Monitor)	Smiths Detection - Watford Limited	572
CANARY-3	Defiant Technologies, Inc.	236
Carbon14 Air Monitor	Technical Associates	582
CARD Device	Rheonix, Inc.	520
Carnyx Neutron Sensor	Trojan Defense LLC	634
Cartridge Reader	Meso Scale Diagnostics (MSD), LLC	394
Cary 60 UV-Visible Spectrophotometer	Agilent Technologies, Inc.	82
Cary Eclipse Fluorescence Spectrophotometer	Agilent Technologies, Inc.	84
CBEx Threat Identification System	Snowy Range Instruments	574
CDS Simultantest Set	Draeger Safety, Inc.	246

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Ceeker	Veritide	640
C-FLAPS Biological Detection System	Dycor Technologies Ltd.	252
CFX Real-Time PCR Detection System	Bio-Rad Laboratories	178
Chameleon	Morphix Technologies	426
Chemical Biological Mass Spectrometer/Chemical Biological Detection System (CBMS/CBDS)	Hamilton Sundstrand Corporation	314
Chemical-Biological Detection System (CBDS)	Science & Engineering Services, Inc.	530
ChemPro 100i	Environics USA	262
ChemPro PD	Environics USA	264
ChemSight	Avir Sensors, LLC	130
CHIRP (Chemical Hazard Indicating and Ranging Pack)	FLIR Systems, Inc.	280
Combined Gamma Dosimeter and Chemical Agent Detector PM2012M	Polimaster, Inc.	462
Compact bioassay System	Resonant Sensors Incorporated	512
Compact Diagnostic System (Model CDS-100)	Resonant Sensors Incorporated	514
Coriolis FR	Bertin Technologies	144
Coriolis RECON	Bertin Technologies	146
CRITICAL Monitoring Badges and Taggants	Research Support Instruments, Inc.	508
CT007 Personal Radiation Detector	Environmental Instruments Canada, Inc.	266
D1000	Duvas Technologies Ltd.	250
DCI-I	Partner Airogistic, LLC	456
Defender TSR System	Alexeter Technologies	92
DETECTIVE-200	AMETEK, Inc.	98
DETECTIVE-EX-100T	AMETEK, Inc.	100
Detectors	Appealing Products, Inc.	110
DISe	Adaptive Methods	42
dotLab mX	Axela, Inc.	132
DX4000/DX4015	Gasmet Technologies, Inc.	302
EAGLE	ChemImage Corporation	218
Eco Real-Time PCR System	Illumina, Inc.	324
EncompassMDx	Rheonix, Inc.	522
Envi Assay System and ChemPro Reader Module	Environics	256
Envi BioScout	Environics	258
Exicycler 96	Bioneer Corporation	168
ExiStation Molecular Diagnostic Platform	Bioneer Corporation	170
Exoscan/Flexscan handheld FTIR	Agilent Technologies, Inc.	86
FALCON II Widefield Raman Chemical Imaging System	ChemImage Corporation	220
Falcon II Wide-Field RCI System	ChemImage Corporation	222
Field System	Diagnostic Biosensors, LLC	242
FilmArray Pathogen Detection System	BioFire Diagnostics, Inc.	152
FirstDefender RMX	Thermo Fisher Scientific	624
FLASH Reader	Operational Technologies Corporation	442
Fluorescence Aerosol Particle Sensor (FLAPS III™) Model 3317	TSI Incorporated	636
FluoroGazer	TIRF Technologies, Inc.	628

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FluorSPR	Ciencia, Inc.	230
Food Safety Security Module	Science & Engineering Services, Inc.	532
Fragment Analyzer	Advanced Analytical Technologies, Inc. (AATI)	46
FROG-4000	Defiant Technologies, Inc.	238
GammaRAE II R	RAE Sytems, Inc.	490
GasID	Smiths Detection	548
Genedrive	Epistem	268
GeneXpert System	Cepheid	214
Genome Analyzer IIx	Illumina, Inc.	326
GID-3	Smiths Detection	550
Griffin 460 Gas Chromatograph Mass Spectrometer	FLIR Systems, Inc.	282
Griffin 824 Trace Detection Mass Spectrometer	FLIR Systems, Inc.	284
Guardian Predator	Nucsafe, Inc.	440
Guardian Reader System	Alexeter Technologies	94
GuardianBlue Early Warning System	Hach Company	312
GUARDION GC/MS	Smiths Detection	552
Handheld FRET-Aptamer Sensor for CB Detection	Operational Technologies Corporation	444
HAPSITE ER Chemical Identification System	Inficon	338
Hardened MobileTrace	Morpho Detection, Inc.	430
Hazardous Gas and Vapor Identifier (HGVI)	Smiths Detection	558
HAZMATCAD and HAZMATCAD Plus (Hazardous Material Chemical Agent Detector)	Mine Safety Appliances (MSA) Co., Inc.	412
HazMatID 360	Smiths Detection	554
HazMatID Elite	Smiths Detection	556
HDS-101GN Search and Identification	Mirion Technologies, Inc. (MGPI)	416
HiScanSQ Systems	Illumina, Inc.	328
HiSeq 1000 Sequencing System	Illumina, Inc.	330
HiSeq 2000 Sequencing System	Illumina, Inc.	332
Home Healthcare Diagnostics	MD Microscopes International	384
Hydrofracking Radiation Portable Water Monitor	Technical Associates	584
Hydrofracking Radium Portable Water Monitor System	Technical Associates	586
Hydrofracking Radon Portable Air & Gas Monitor	Technical Associates	588
Hydrofracking Radon Portable Water Monitor System	Technical Associates	590
IBAC Bio-Aerosol Detector and Collector	FLIR Systems, Inc.	286
ICS-5000 Ion Chromatography system	Dionex Corporation	244
identiFINDER 2	FLIR Systems, Inc.	288
IMMULITE 2000 Immunoassay System	Siemens Healthcare Diagnostics	544
InnoScan	Arrayit Corporation	128
InSyte	BioGene Ltd.	162
Integrated Cycler	3M	644
IntelliProbe	Rapid Diagnostek, Inc.	494
IPDS-LR Shipboard Chemical Detection System	Bruker Detection Corporation	188

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iScan System	Illumina, Inc.	334
JBAIDS (Joint Biological Agent Identification and Diagnostic System)	BioFire Diagnostics, Inc.	154
Joint Biological Standoff Detection System, Increment 1	Science & Engineering Services, Inc.	534
Joint Biological Tactical Detection System (JBTDS)	Program of Record	476
JSLSCAD	General Dynamics Armament and Technical Products (GDATP)	306
Juno	Chemring Detection Systems, Inc.	228
KIM	Bertin Technologies	148
LabChip GXII	Caliper Life Sciences	208
Laser Photo-Acoustic Spectrometer	Science & Engineering Services, Inc.	536
LaserScan Analyzer	Block Engineering, LLC	184
Lawrence Livermore Microbial Detection Array (LLMDA)	Lawrence Livermore National Laboratory	364
LightCycler 480	Roche Applied Science	524
Lightweight Chemical Detector (LCD) 3.2e	Smiths Detection	560
Lightweight Chemical Detector (LCD) 3.3	Smiths Detection	562
Lightweight Chemical Detector (LCD)-NEXUS	Smiths Detection	564
LISA Manportable Standoff Chemical Detection System	ITT Corporation	346
Low-Cost Biological Standoff Detection System	Science & Engineering Services, Inc.	538
Ludlum Model 9DP	Ludlum Measurements, Inc.	372
Luminex 100/200 System	Luminex Corporation	374
MAB	PROENGIN SAS	472
MAGPIX System	Luminex Corporation	376
MailPoint	FLIR Systems, Inc.	290
Manportable CBRNE Detection System	ARA, Inc.	126
Mass Spectrometers	AB SCIEX	38
MBio MQ	MBio Diagnostics, Inc.	382
MENTOR-100	Menon International	390
METRO SENTRY ONE	Building Protection Systems, Inc. (BPSI)	206
MICRO-DETECTIVE	AMETEK, Inc.	102
MICRO-DETECTIVE-HX	AMETEK, Inc.	104
Microfluidic - Bioagent Autonomous Networked Detector (M-BAND)	Microfluidic Systems	400
MicroPEM Personal Exposure Monitor	RTI International	526
MICT (Magnetic Immuno-Chromatgraphic Test) System	MagnaBioSciences	380
Military Water Safety Test System - Portable	Technical Associates	592
MINICAMS	CMS Field Products	232
MiSeq System	Illumina, Inc.	336
Mobile Radiation Detection & Monitoring System	Radiation Solutions, Inc.	486
Mobile Real-Time qPCR Platform	Biomeme, Inc.	164
Model DX4040 Portable FTIR Gas Analyzer	Gasmet Technologies, Inc.	304
Morphix ChemBio Detector	Morphix Technologies	428
MTIDx Rapid Multiplexed Molecular Diagnostics in a Stand-Alone Low Cost Disposable Platform	Mesa Tech Intl, Inc.	392
Multiplo Rapid Test For The Detection of Antibodies	MedMira, Inc.	386

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TECHNOLOGY	COMPANY	PAGE
MX300	CustomArray, Inc.	234
nanoRaider	FLIR Systems, Inc.	292
Nanosecond X-Ray Detector	Technical Associates	594
NeutronRAE II	RAE Sytems, Inc.	492
Next Gen Autonomous Detection System (NG-ADS)	Northrop Grumman Corporation	438
NIDS ACE Test System	ANP Technologies, Inc.	106
NIDS-3000 BioThreat Detection Kit	ANP Technologies, Inc.	108
NQAD QT-500 Detector	Quant Technologies	482
NucliSens easyQ	bioMerieux, Inc.	166
Overhoff Model 357RM Tritium Monitor	Overhoff Technology Corporation	446
Overhoff Technology Model 400AC	Overhoff Technology Corporation	448
Palladium	Integrated Nano-Technologies, LLC	342
PanNAT system	Micronics, Inc.	404
PASS (Product Acoustic Signature System)	Spearhead Innovations	576
Personal Compact Dosimeter PM1604A (B)	Polimaster, Inc.	464
Personal Genome Machine	Ion Torrent Systems, Inc.	344
PLEX-ID System	Abbott Ibis Biosciences	40
Portable Liquid Scintillation Counter	Technical Associates	596
Prime Alert Biodetection System	GenPrime, Inc.	308
Pro-Strip Rapid Screening System	AdVnt Biotechnologies, LLC	54
pTD	Bruker Detection Corporation	190
QFlu Combo Test for POC Flu Diangosis and Drug Resistance Detection	Cellex, Inc.	210
QFlu Combo Test for Rapid and Simultaneous Flu Diagnosis and Drug Resistance Detection	Cellex, Inc.	212
qNano	Izon Science USA	354
R.A.P.I.D. BioThreat Detection System	BioFire Diagnostics, Inc.	156
Rad-DX	D-Tect Systems	248
radHUNTER	FLIR Systems, Inc.	294
Radiation Alert Inspector	S.E. International, Inc.	528
Radiation Backpack Sentry	Bruker Detection Corporation	192
Radiation Control Monitor	Technical Associates	598
Radiation Pager	Sensor Technology Engineering, Inc.	542
Radiation Survey Meter and Surface Monitor	Technical Associates	600
Radionuclide Isotope Identifier - SAM 940	Berkeley Nucleonics Corporation	142
RADIR	Thales Group UK	620
RadSeeker - Handheld Radioisotope Identifier	Smiths Detection	566
RadSmart	Universal Detection Technology	638
RADSticker	JP Laboratories, Inc.	358
RADTriage	JP Laboratories, Inc.	360
RAID-AFM Autonomous Facility Chemical Monitor	Bruker Detection Corporation	194
Raid-M Handheld Chemical Detector & Identifier	Bruker Detection Corporation	196
RAID-XP Combined Chemical & Radiation Detector	Bruker Detection Corporation	198
Raman Shifted Eyesafe Aerosol Lidar (REAL)	ITT Corporation	348
RAMP Reader System	Response Biomedical	518

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TECHNOLOGY	COMPANY	PAGE
RANIDPRO 200 - Portable Radiological and Nuclear Identification, Monitoring and Measuring Unit	Environics	260
Rapid Detection of Ultra-Trace Levels of Pathogens	Battelle - Pacific Northwest National Laboratory	138
Rapid Diagnostic Reader	Holomic, LLC	318
Rapid Flow-through Diagnostic Technology Platform	MedMira, Inc.	388
Rapid plus Standoff Chemical Detector	Bruker Detection Corporation	200
Rapid Portable Biosensor	Adaptive Methods	44
RapidHIT 200 Rapid DNA Profiling System	IntegenX, Inc.	340
RapidPlex	ICx Biosystems	320
Raptor	Research International, Inc.	504
RAZOR EX BioThreat Detection System	BioFire Diagnostics, Inc.	158
ReporteR	DeltaNu	240
Resource Effective BioIdentification System (REBS) - Laboratory Variant	Battelle Memorial Institute	140
RespondeR RCI	Smiths Detection	568
SAFESITE MTX (Multi-Threat Monitor)	Mine Safety Appliances (MSA) Co., Inc.	414
Scanning Aerosol Micropulse LIDAR -Eyesafe (SAMPLE)	ITT Information Systems	352
Second Sight	Bertin Technologies	150
SECTOR® PR2 Model 1500	Meso Scale Diagnostics (MSD), LLC	396
SECTOR® PR2 Model 1800	Meso Scale Diagnostics (MSD), LLC	398
Ship Ballast CBRN Solar Powered Water Monitor - Portable	Technical Associates	602
Ship Ballast CBRN Water Monitor	Technical Associates	604
SilverQuant Pathogen Detection System	Gentel Biosciences	310
SIRAD-TLD	JP Laboratories, Inc.	362
SmartBio Sensor (SBS)	Smiths Detection	570
SmartCycler System	Cepheid	216
Spectroscopic Detection Instrument	Advanced Nuclear Devices Corp.	50
SPIR ID Handheld Detection & Identification	Mirion Technologies, Inc. (MGPI)	418
Standoff UV Raman HSI Chemical detector	ChemImage Corporation	224
StepOne 48 Well Real-Time Polymerase Chain Reaction System	Life Technologies	366
StreetLab® Mobile	Morpho Detection, Inc.	432
STRIDE Systems	FLIR Systems, Inc.	296
T2Dx	T2 Biosystems	580
TacBio Aerosol Detector	Research International, Inc.	506
T-COR 4 Handheld Real-Time PCR Thermocycler	Tetracore, Inc.	616
TechniCART	Pajarito Scientific Corporation	452
TessArray RPM-Flu Respiratory Pathogen Assay	TessArae, LLC	606
TessArray RPM-TEI Tropical and Emerging Infections Assay	TessArae, LLC	608
Test-mate ChE Cholinesterase Test System	EQM Research, Inc.	270
The BioMark and BioMark HD System for Real-Time PCR	Fluidigm	298
The Dragonfly System	Microfluidic Systems	402
Thermo Scientific TruDefender FTi	Thermo Fisher Scientific	626

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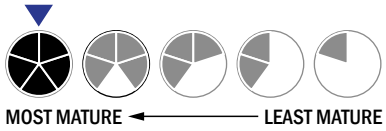
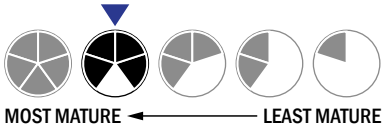
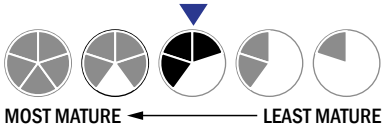
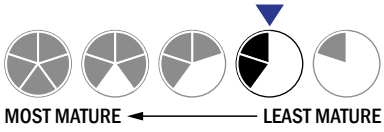
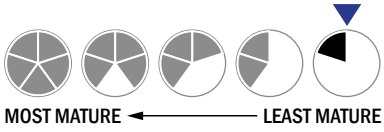
TECHNOLOGY	COMPANY	PAGE
ThreatShield-C	Hamilton Sundstrand Corporation	316
TIRF Sense Handheld chem-biosensor	TIRF Technologies, Inc.	630
TIRF Sense portable chem-biosensor	TIRF Technologies, Inc.	632
TruArray	Akonni Biosystems, Inc.	90
Tru-Dac	RADeCO, Inc.	484
UGV-Based Mountable and Dismountable Standoff Chemical Sensor	ITT Corporation	350
Universal Mass Spectrometer Sensor	Science & Engineering Services, Inc.	540
Verigene System	Nanosphere, Inc.	434
Veriti Thermal Cycler	Life Technologies	368
VeroTect	Biral	182
Vides Bioassay System	Resonant Sensors Incorporated	516
ViriChip System	Bioforce Nanosciences, Inc.	160
Voice200	Syft Technologies, Inc.	578
Warlock	Pacific Advanced Technology	450
Ziplex Automated Work Station	Axela, Inc.	134
zNose Portable, Explosive, Narcotics and Nerve Agent Detector	Electronic Sensor Technology, Inc.	254

DETAILED SUMMARY SHEETS

LIST OF SYMBOLS

Symbol	Definition
	**Chemical**
	**Biological**
	**Radiological**
	**Top Tier**
	**Second Tier**
	**Third Tier**
	**Fourth Tier**
	**Bottom Tier**
	**Commercially Available and Meets Military Specifications**
	**Commercially Available**
	**Brass Board**
	**Bread Board**
	**White Board**

AB SCIEX - Mass Spectrometers

GENERAL DESCRIPTION:



AB SCIEX helps to improve the world we live in by enabling laboratory analysts to push the limits in their field and address the complex analytical challenges for testing the varied matrices they face. The company's global leadership and world-class service and support in the mass spectrometry industry have made it a trusted partner to thousands of the scientists and lab analysts worldwide. With over 25 years of proven innovation, AB SCIEX excels in LC-MS/MS and MALDI MS/MS with reliable, sensitive and intuitive solutions that continue to redefine what is achievable complex analysis.

TECHNICAL DESCRIPTION:

Innovative LC/MS/MS technology from AB SCIEX delivers superior accuracy, sensitivity and higher throughput. Our unique hybrid triple-quadrupole linear ion-trap (QTRAP® System) technologies enable rapid screening, identification and quantitation of compounds in a single analysis.

CONTACT INFORMATION

AB SCIEX
110 Marsh Dr
Foster, City, CA 94404 US
Belle.Neumann@absciex.com
(650) 627-2928
www.absciex.com

COST

- $60,000/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

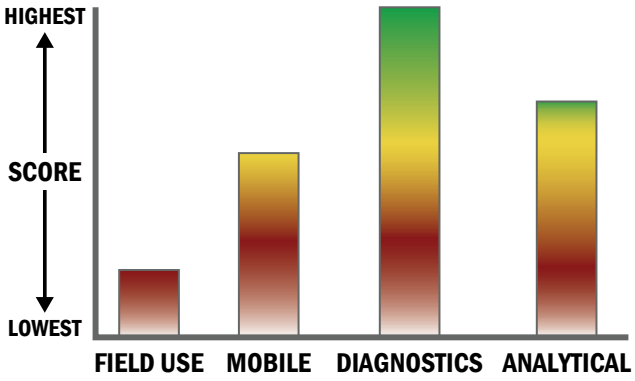
	Biological	Chemical	Radiological
FIELD USE System	N/A	●	N/A
MOBILE Laboratory	N/A	●	N/A
DIAGNOSTIC Laboratory	N/A	●	N/A
ANALYTICAL Laboratory	N/A	●	N/A

Survey Source

Vendor Supplied Information

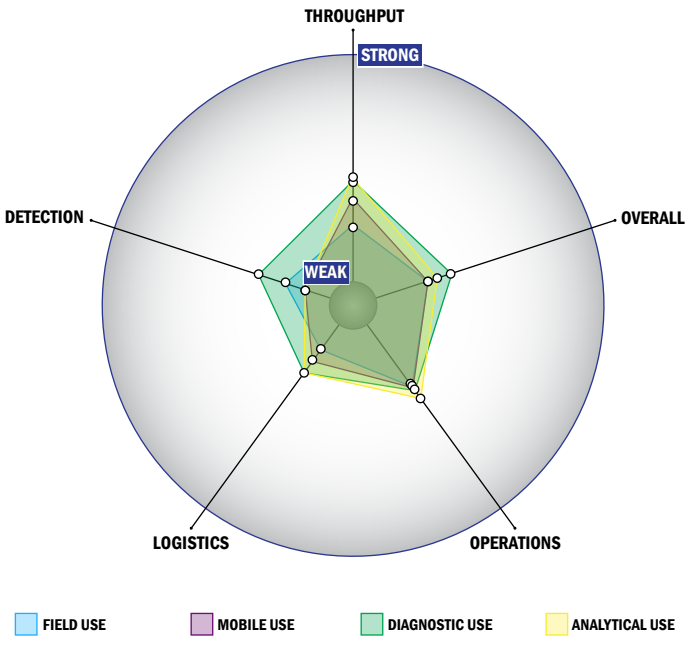
Scoring Analysis

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.



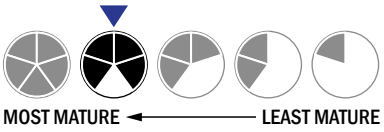
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 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
- 4 solutions, buffer, eluents, and/or reagents
- 5 or more components
- Greater than 20 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Larger than a home dishwasher
- More than 50kg
- Wireless and wired connections are available
- System or device has 220V electrical requirement
- The device is not intended for portable use
- Is commercially available



Operations:

- Components must be stored at room temperature (27°C)
- Device must be used in a temperature stable, dry environment for optimum performance
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- 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
- Efforts are underway to achieve FDA approval
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)

Abbott Ibis Biosciences - PLEX-ID System

GENERAL DESCRIPTION:



Ibis personnel invented and developed the Ibis TIGER/T5000 Universal Biosensor, which has been further developed into the Abbott/Ibis PLEX-ID. The biosensor originated from a DARPA program to develop revolutionary sensor technology to meet the needs of the Department of Defense. The technology that resulted from this program is widely held to be a major DARPA success story and the fundamentals of the technology and its validation have been documented in peer-reviewed publications.

The Ibis Technology (now commercially available as the PLEX-ID) represents a universal pathogen detection platform capable of identification and strain typing of a broad range of pathogens. The platform employs the PCR (polymerase chain reaction) with primers that amplify relatively conserved regions of the genome(s) present in a sample. Using high-performance electrospray ionization mass spectrometry (ESI-MS), the base composition (i.e., the number of A's, G's, C's, and T's) of each amplicon is determined and the combination of base compositions from multiple primer pairs is assembled to yield the identity of the organism (s) in the sample. The platform has far-reaching applications in areas such as food safety, biological products screening, and clinical diagnostics. Initial deployments are for the purpose of identification and strain-typing of pathogens associated with biowarfare/ bioterrorism events and naturally occurring emerging infectious disease.

TECHNICAL DESCRIPTION:

In each PCR/ESI-MS assay, multiple pairs of primers are used to amplify carefully selected regions of pathogen genomes; the primer target sites are broadly conserved, but the amplified region carries information on the microbe's identity in its unique nucleotide base composition. Regions of this nature appear in the DNA that encodes ribosomal RNA and in housekeeping genes that encode essential proteins. Following PCR amplification, a fully automated ESI-MS analysis is performed. This PCR/ESI-MS technology has been successfully used to identify pathogenic bacteria and viruses from a variety of clinical and environmental samples.

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

CONTACT INFORMATION

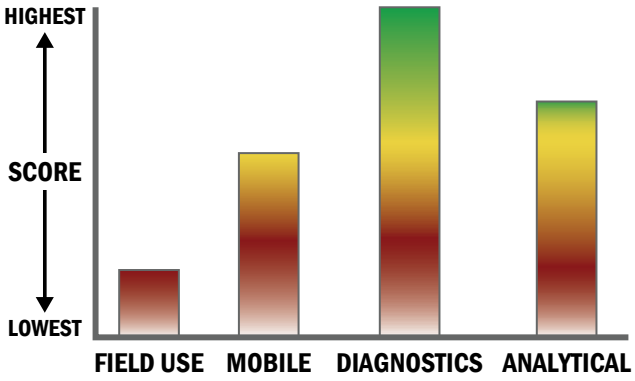
Abbott Ibis Biosciences
2251 Faraday Ave. Suite 150
Carlsbad, CA 92008

COST

- $450,000/system
- $50-$90/analysis

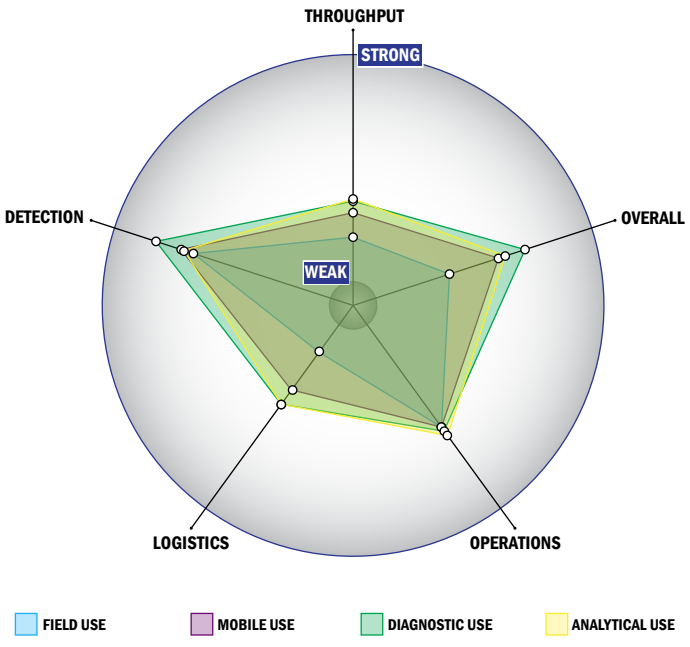
Scoring Analysis

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.



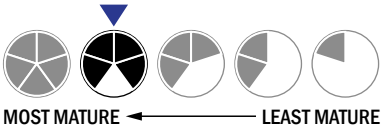
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 5 or more components
- 5-10 minutes is required for set-up
- 6-8 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be frozen (-20 °C)
- Device or system has peak performance at normal relative humidity conditions
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- 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 100 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Semi-automated spore lysis

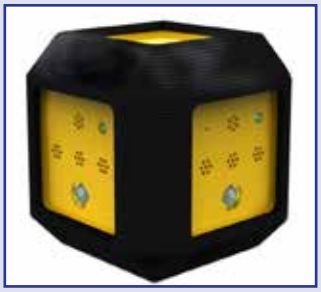
Adaptive Methods - DISe

GENERAL DESCRIPTION:

"DISe" - A rugged, portable, hand-deployable environmental sensor that provides remote situational awareness to damage control teams in hazardous areas by providing video, audio, and environmental data wirelessly.

TECHNICAL DESCRIPTION:

Not provided.



CONTACT INFORMATION

Adaptive Methods
15825 Shady Grove Road, Suite 135
Rockville, Maryland 20854
POC: Mark Meister
mmeister@adaptivemethods.com
301.840.9722 x107

COST

- $8,000-$15,000/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

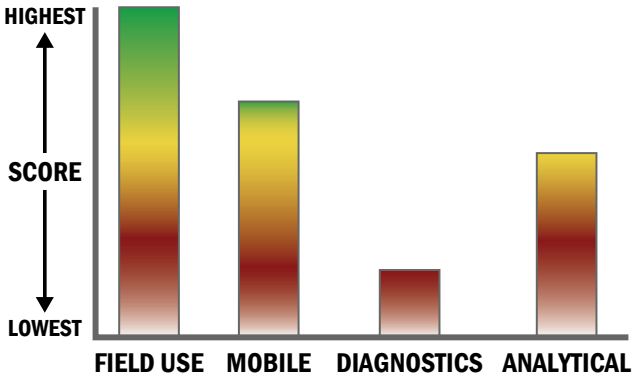
	Biological	Chemical	Radiological
FIELD USE System	N/A	Top Tier	N/A
MOBILE Laboratory	N/A	Third Tier	N/A
DIAGNOSTIC Laboratory	N/A	Fourth Tier	N/A
ANALYTICAL Laboratory	N/A	Third Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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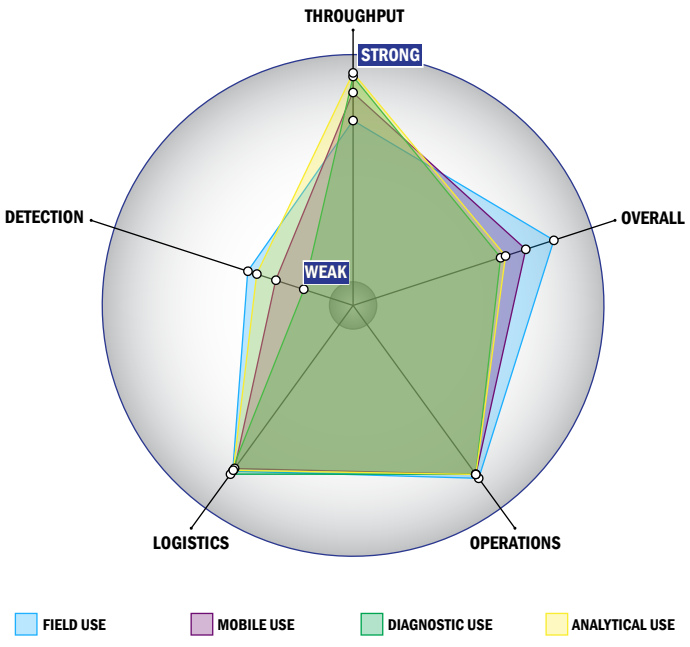


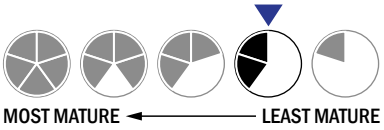
Evaluation Criteria

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 or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system 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 soda can
- 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 < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- 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
- < $1x10^{-6}$ mg/m^3
- < 1 ppb
- Possible system could be adapted to identify aerosolized chemical agent

Adaptive Methods - Rapid Portable Biosensor

GENERAL DESCRIPTION:



Economical, rapid (i.e., near real time), sensitive, and specific detection or diagnosis of exposure to biowarfare agents (i.e., bacteria, virus, toxins). With little or no sample-prep and minimal training required, the shirt-pocket size "reader" with disposable sample cartridge facilitates use in the field (including austere environments) or point-of-care settings. Supports single analyte or multiplex testing, in complex matrices including environmental or human derived samples.

TECHNICAL DESCRIPTION:

Our device is based on surface acoustic wave (SAW)-based sensor technology that directly detects virus, bacteria, or toxin through binding of the target agent to an antibody or peptide coupled to a piezoelectric surface. This binding results in a change to the electrical transfer function of the device which can be measured at its output. Sensitivity and selectivity are conferred through the use of selected ligands.

CONTACT INFORMATION

Adaptive Methods
15825 Shady Grove Road, Suite 135
Rockville, Maryland 20854
POC: Mark Meister
mmeister@adaptivemethods.com
301-840-9722 x107
www.adaptivemethods.com

COST

- $1,000/system
- $10/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

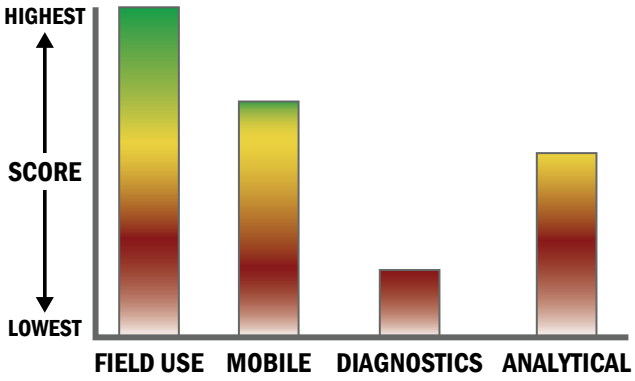
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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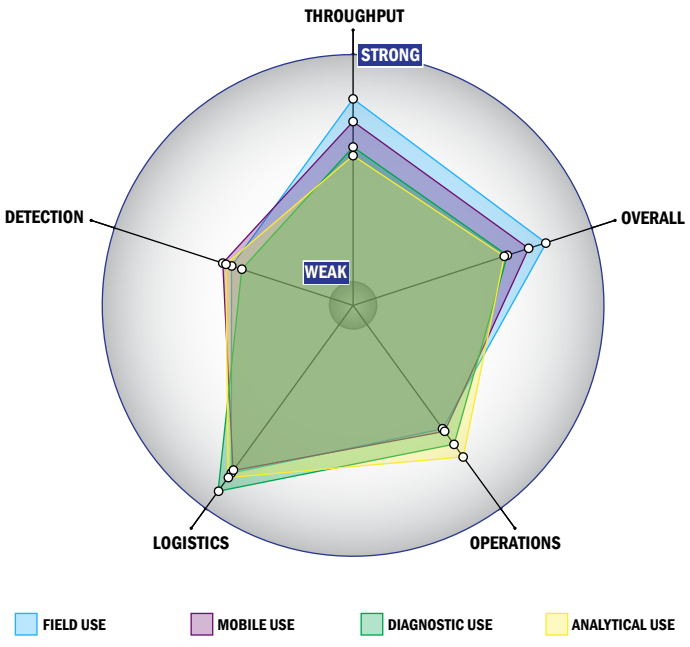


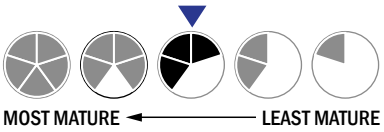
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, <10 tests/sample per run
- Less than 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
- 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 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 room temperature (27 °C)
- Between 1 to 6 months shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is closed and not available for modification
- 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
- Less than 250 µL
- 1-100 CFU per mL
- 100-1,000 PFU per mL
- Spore lysis not necessary for detection by system

Advanced Analytical Technologies, Inc. (AATI) - Fragment Analyzer

GENERAL DESCRIPTION:



The FRAGMENT ANALYZER(TM) is capable of analyzing a variety of DNA and RNA fragments for identification. The instrument can be coupled with end-point PCR (polymerase chain reaction) for the determination pathogens such as salmonella, shigella, etc. The system is designed for laboratory analysis, and is versatile and adaptable for many matrices. The system is based on the use of capillary electrophoresis, and can analyze either 12 or 96 samples simultaneously. It can be used in a variety of applications, including end-point PCR (pathogen detection), genetic mutation screening, and as a tool to estimate the quality of genomic DNA and fragmented DNA for DNA sequencing.

TECHNICAL DESCRIPTION:

Currently, real-time PCR (RT-PCR) is used as a method for the detection of pathogens. Multiplex RT-PCR can be used to analyze the presence or absence of multiple pathogens. The drawback to these technologies is that a false-positive reaction may occur. With the FRAGMENT analyzer technology, coupled with PCR or RT-PCR, the fragments can be analyzed after a positive response to confirm that the amplified DNA fragments are in fact the fragments of interest. The FRAGMENT Analyzer(TM) uses either 12 - or 96 capillaries to analyze samples in parallel, allowing users to evaluate a very large number of samples in a short period of time. Up to 3000 samples/day can be analyzed in a 96-channel system and 300 samples/day in a 12-channel system. The system is based on the use of a low-cost light-emitting diode detection technology, allowing the instrument cost to be one of the lowest in the industry.

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

CONTACT INFORMATION

Advanced Analytical Technologies, Inc. (AATI)
Suite 4150 Ames, IA 50010
slasky@aati-us.com
(515) 299-025

COST

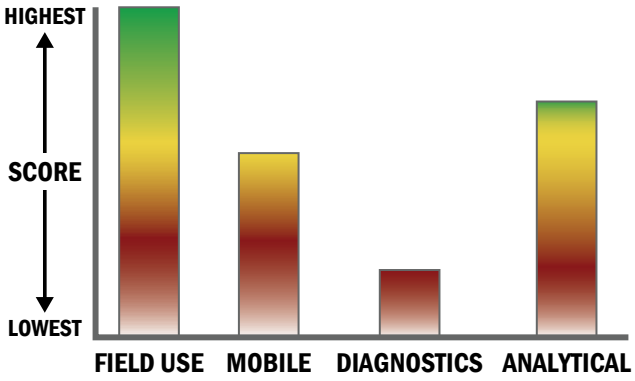
- $36,000/system
- $1/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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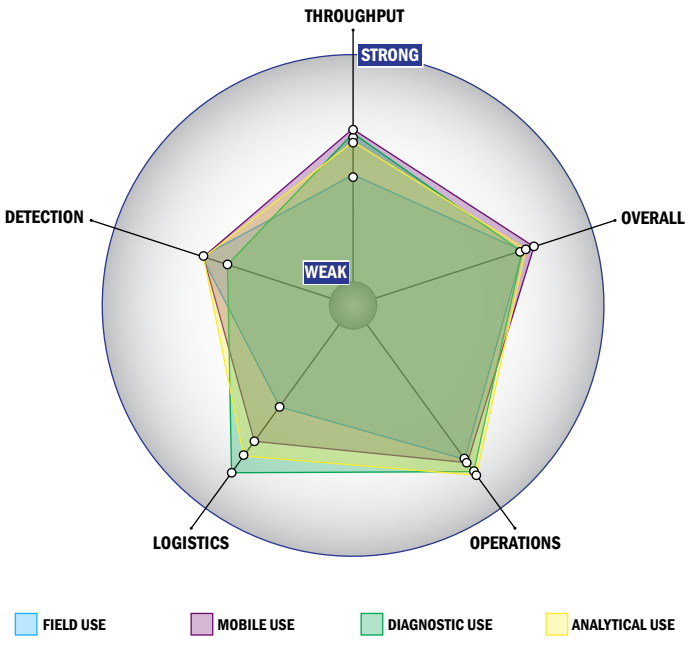


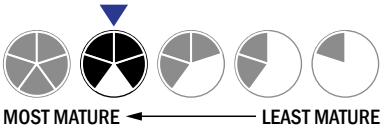
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples in 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 3 components
- No set-up of the system is required
- Almost instantaneous, no downtime

Logistics:

- A day of training and technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 25 and 50 kg
- Wired connections are available
- System or device has 110V electrical requirement
- 2–4 hours battery life
- Is commercially available



Operations:

- Can be used from 4°C to 41°C
- Components must be frozen (-20°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 50 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU/mL of original sample
- 100-1,000 PFU/mL of original sample
- Manual kit not integrated with the system handles spore lysis

Advanced Liquid Logic

GENERAL DESCRIPTION:



Advanced Liquid Logic, Inc. (ALL) is committed to the development of cost-effective automation solutions for complex bioassay workflows. Our proprietary digital microfluidics technology is broadening the availability of molecular diagnostics, enabling new bioanalytical products and accelerating and improving life science research. ALL has developed a patented liquid handling technology called “digital microfluidics’ that drastically reduces the cost, complexity and time required for fully automated sample-in/answer-out workflows. The key factors that differentiate the ALL system are:

- Assay flexibility
- Low cost
- Broadly deployable

An exhaustive range of assay formats, relevant to clinical diagnostics and general life sciences research, have been translated to ALL’s digital microfluidics technology. Some of the assays that have been implemented on our system include:

- Sample-in/answer-out (qPCR, immunoassays & DNA sequencing)
- Sample extraction & purification
- Next-gen sequencing template prep
- Real-time and Endpoint qPCR
- Immunoassays
- DNA sequencing (pyrosequencing)
- Newborn screening (enzymatic activity assays)
- Cell-based assays
- Clinical chemistry
- Coagulation monitoring

TECHNICAL DESCRIPTION:

The instrument and cartridge-based platform developed by ALL eliminates the need for cumbersome pumps, valves and tubes by manipulating liquid droplets on an array of electrodes. The so-called “electrowetting” effect provides a motive force that is flexibly controlled through software. In conventional microfluidics liquid handling is directed by networks of tubes or channels that must be redesigned for every unique application. ALL's digital microfluidic systems shatter this traditional "one device-one workflow" paradigm. Within the ALL cartridge, electrode arrays are arranged on inexpensive printed circuit boards (PCBs). An injection molded plastic plate above the PCB creates a chamber where droplets are manipulated. Reagents are pre-placed in the cartridge at the time of manufacture to enable minimally-trained personnel to run complex bioanalytical protocols.

CONTACT INFORMATION

Advanced Liquid Logic
615 Davis Drive, Suite 800
Research Triangle Park, NC 27709
POC David S. Cohen, Ph.D.
919-287-9010 x 36

COST

- $20,000/system
- $20/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

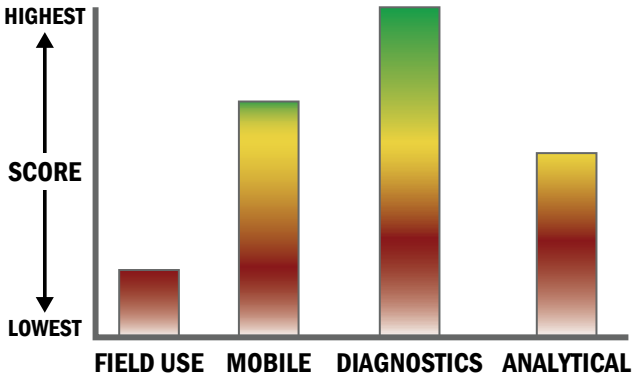
	Biological	Chemical	Radiological
FIELD USE System	Top Tier	N/A	N/A
MOBILE Laboratory	Top Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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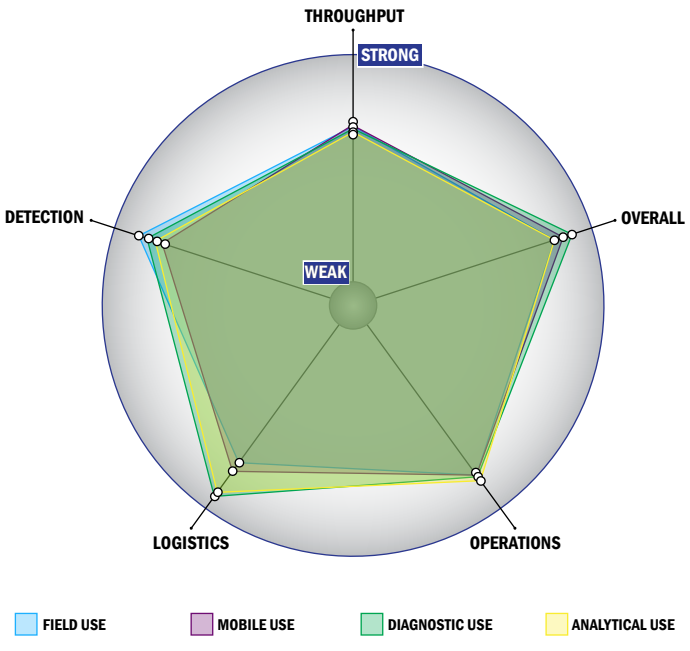


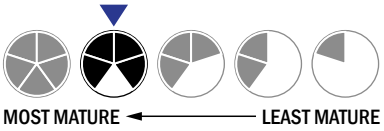
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 1 component
- Less than 5 minutes is required for setup
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25 kg
- 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 room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 3-5 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Efforts are underway to achieve 510K clearance
- Efforts are underway to achieve FDA approval
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU/mL
- 100-1,000 PFU/mL
- Less than 1 ng/mL
- Add on capability that is full or semi-automated for spore lysis

Advanced Nuclear Devices Corporation - Spectroscopic Detection Instrument

GENERAL DESCRIPTION:

The Spectroscopic Detection Instrument is embedded in an information and communication system designed to detect and quantify radiologic threats from energetic particles directionally and at a standoff distance and with a minimum of innocent alarms subsequently both notify local responders as to the threat and catalog the incident.

TECHNICAL DESCRIPTION:

Product is a nuclear hardened, field deployable information system consisting of a computer used for software interpretation of events, a communications system for remote and local reporting, and a sensor consisting of a gas pressure vessel containing a mixture of non 3He gasses deployed under low pressure whose interaction is designed to accurately and quickly detect radiological threats from energetic particles from a wide range of potential threats.

CONTACT INFORMATION

Advanced Nuclear Devices Corporation
14 Black Tern Road
Hilton Head Island, SC 29928
POC: Christopher J Gintz, CEO

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

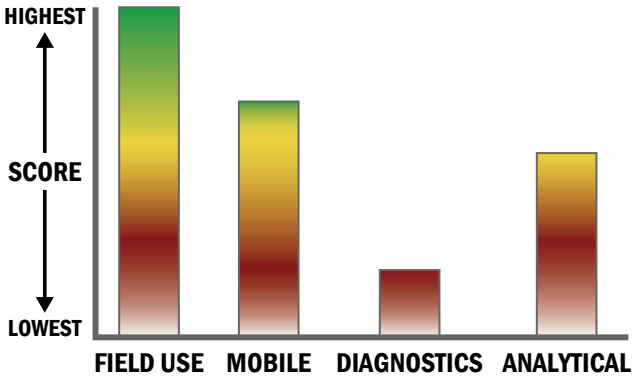
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Third Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Third Tier
ANALYTICAL Laboratory	N/A	N/A	Third Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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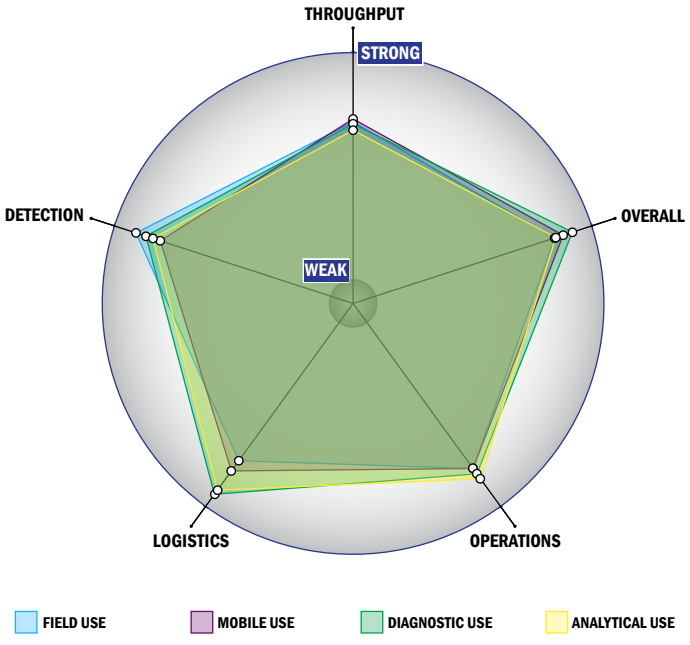


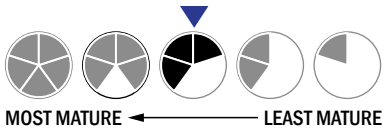
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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 intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a home dishwasher
- More than 50 kg
- Satellite, wireless and wired connections are available
- System or device has 110V electrical requirement
- 2-4 hours battery life



Operations:

- Can be used from -21°C to 41°C
- Greater than 10 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 open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected
- Down to background level radiation for count rate
- System is used for surveying

AdVnt Biotechnologies, LLC - BADD Single Agent Detection Test

GENERAL DESCRIPTION:



BADD Single Agent Detection Test is certified and designated by DHS under the Safety Act and is the first HHA designed to detect and identify multiple bio-threat agents using one sample. Each test is packaged in a protective foil pouch then placed alongside our unique all-in-one buffer collection tube then sealed in a red Mylar pouch which doubles as a re-sealable bio-hazard bag. Our BADD line of products is the HHA of choice for inclusion in North America's entire premiere Biological Hazmat Training Programs.

Features include:

- No Electronic Readers or additional collection kits required
- Results in as little as 3 minutes
- Excellent detection capabilities
- No cross-reactivity to dozens of near neighbor strains
- No Cross-reactivity to common household substances such as flour, yeast, baby powder, sugar, etc.
- Portable, easy to carry and easy to store
- Cost effective
- Easily deployable

TECHNICAL DESCRIPTION:

AdVnt Biotechnologies BADD Single Agent Detection Test is a colloidal gold/antibody conjugate-based immunoassay designed to provide a quick presumptive identification of selected biological agents. Antibodies are carefully selected based on their superior specificity and affinity levels. The sample is collected with a specially designed bottle that is then applied to the BADD test device. The target binds first to the detection antibody that is conjugated to gold particles. The target agent – loaded gold particles diffuse through the nitrocellulose membrane and pass Test line marked "T". There, another specific antibody is coated on membrane at this place, the target agent – gold particles were bound specifically and become visible as Test line T. Conjugate-specific antibodies that apply on the membrane are functioning as Control line marked "C". Here, the residual gold conjugate is capture and formed a well visible line during the incubation time.

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

CONTACT INFORMATION

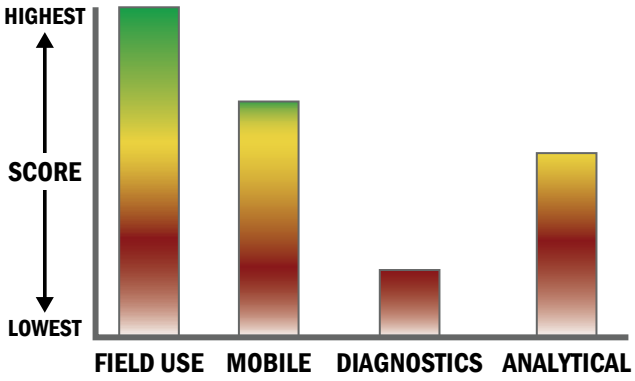
AdVnt Biotechnologies, LLC
22510 N. 18th Dr.
Phoenix, AZ. 85027
412-423-2100

COST

- $24.50/system
- N/A/analysis

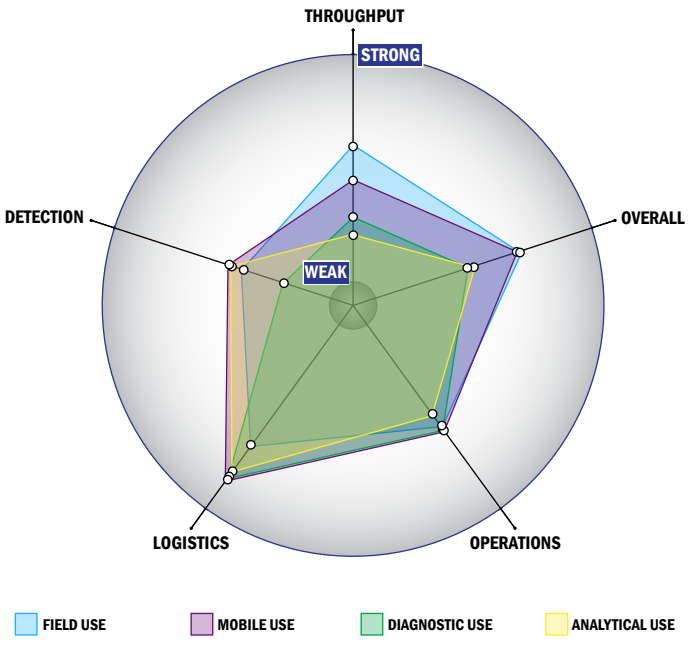
Scoring Analysis

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.



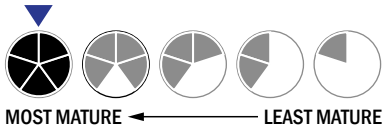
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, single test/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- 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 soda can
- Less than 1 kg
- This system is not capable of transmitting data
- There is no electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system does not employ any software

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
- Less than 100 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 10,000-100,000 CFU per mL
- 10-100 ng per mL
- Spore lysis not necessary for detection by system

AdVnt Biotechnologies, LLC - Pro-Strip Rapid Screening System

GENERAL DESCRIPTION:



Pro-Strips were introduced in 2006 and are certified and designated by the DHS Safety Act. Pro-Strips is the first HHA designed to detect and identify multiple bio-threat agents using one sample. No additional collection kits or expensive readers are required. Each test is packaged in a protective, foil pouch then placed alongside our unique all-in-one buffer collection tube and instruction sheet and "Chain of Custody" label then sealed in a red mylar pouch which doubles as a re-sealable bio-hazard bag to aid in transportation.

Features include:

- Results in as little as 3 minutes
- Excellent detection capabilities
- No cross-reactivity to dozens of near neighbor strains including bacillus thuringensis and bacillus globigii
- No Cross-reactivity to common household substances such as flour, yeast, baby powder, sugar, etc.
- Cost effective

TECHNICAL DESCRIPTION:

AdVnt's Bio-Warfare agent detection systems come in the form of a immunochromatogarphy assay, designed to provide a quick presumptive identification of selected biological warfare agents. Polyclonal antibodies are used because of their superior sensitivity. Monoclonal antibodies are used for their high degree of specificity and sensitivity. These "capture" antibodies are able to grab onto to portion of an antigen with their antigen binding sites

Detector antibodies conjugate to colloidal gold allowing for visualization of the antibody. The capture antibodies are what make up the "T" or test line on the ticket. The collected agents are first introduced into a buffer solution that allows for transport across a wicking pad. As the sample makes its way across the pad it comes into contact with the antispecies line to indicate the test is working properly, then makes contact with the antibodies on the test line. If the antibodies bind with the sample the test line will indicate a positive result.

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	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

CONTACT INFORMATION

AdVnt Biotechnologies, LLC
22510 N. 18th Dr
Phoenix, AZ 85027

COST

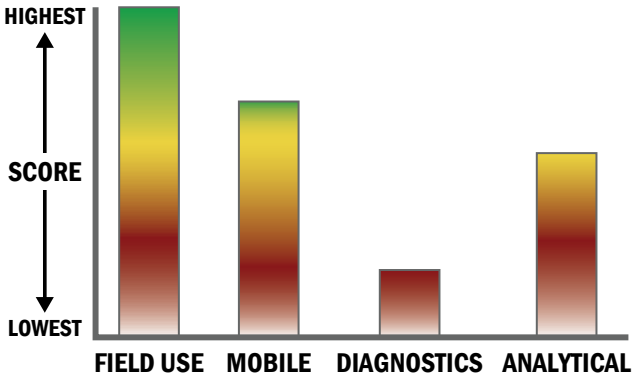
- $699.50/system
- $69.95/analysis

Survey Source

Vendor Supplied Information

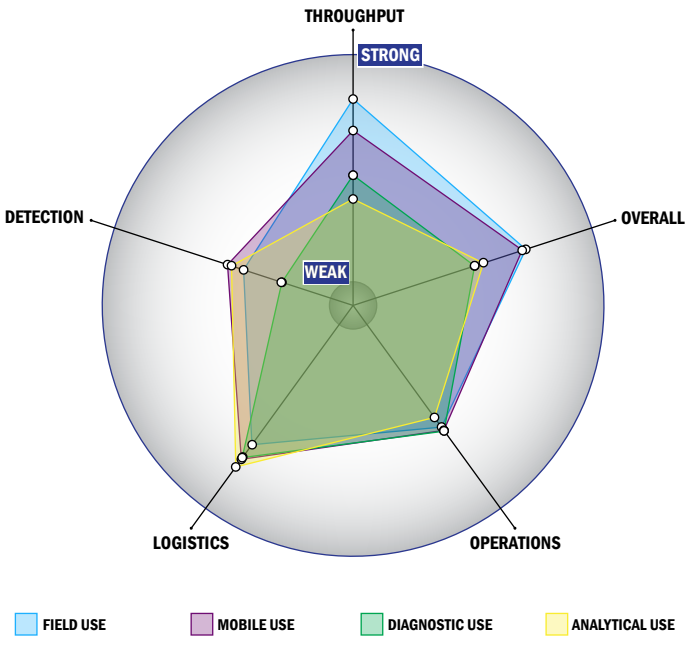
Scoring Analysis

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.



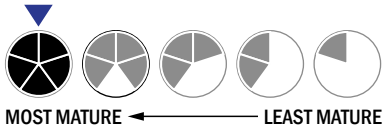
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, <10 tests/sample per run
- The system could be adapted to a semi-automated system with some effort
- Device or system is designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- 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 soda can
- Less than 1 kg
- This system is not capable of transmitting data
- There is no electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy

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
- Less than 100 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 10,000-100,000 CFU per mL
- 10-100 ng per mL
- Spore lysis not necessary for detection by system

Agilent Technologies, Inc. - Agilent 700 Series Inductively Coupled Plasma Optical Emission Spectrometers (ICP-OES)

GENERAL DESCRIPTION:



The Agilent 700 Series ICP-OES Inductively Coupled Plasma Optical Emission Spectrometers are compact, bench mounted elemental analyzers for use in the laboratory. They are used for the simultaneous determination of trace to % levels of elements in a wide range of matrix types.

The Agilent 700 Series ICP-OES are the world's most productive high-performance simultaneous ICP-OES.

- Continuous wavelength coverage provides extended dynamic range and reduced interferences, giving you maximum confidence in your results
- Robust plasma ensures reliable and reproducible results — even with the most complex matrices
- One view, one step measurement of major, minor, and trace elements, plus the fastest warm-up, increases throughput and productivity
- Choice of optimized axial or radial configurations to suit your application needs
- Superior software features providing enhanced productivity and outstanding ease-of-use

TECHNICAL DESCRIPTION:

A robust, argon based plasma is used to excite the elements of interest. The resultant emissions are directed through a thermostated, simultaneous echelle based optical system to a custom designed Peltier cooled CCD detector, allowing for fast simultaneous detection of elemental concentrations. Quantitative or semi-quantitative survey analysis modes are available. These instruments include a free-running, air-cooled 40 MHz RF generator with solid state HV power supply, purged echelle polychromator and full PC control of plasma viewing positioning and plasma gas flows. Fully web-integrated ICP Expert II software uses Agilent's worksheet concept for ease of use, rapid operator training, and commonality with other Agilent spectroscopy products.

CONTACT INFORMATION

Agilent Technologies, Inc.
8825 Stanford Blvd. Suite 300
Columbia, MD 21045
POC: Beverly Lesko
beverly_lesko@agilent.com
443-285-7854
www.agilent.com/chem

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

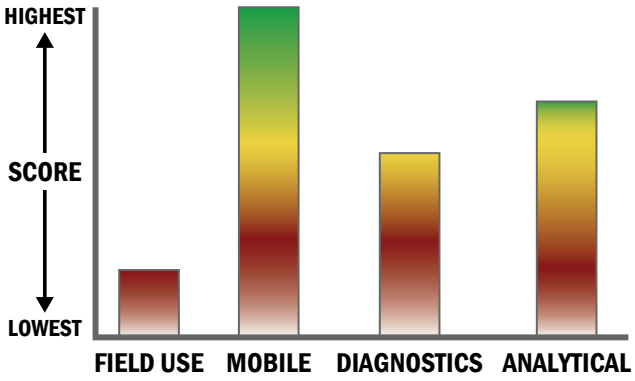
	Biological	Chemical	Radiological
FIELD USE System	N/A		N/A
MOBILE Laboratory	N/A		N/A
DIAGNOSTIC Laboratory	N/A		N/A
ANALYTICAL Laboratory	N/A		N/A

Survey Source

Vendor Supplied Information

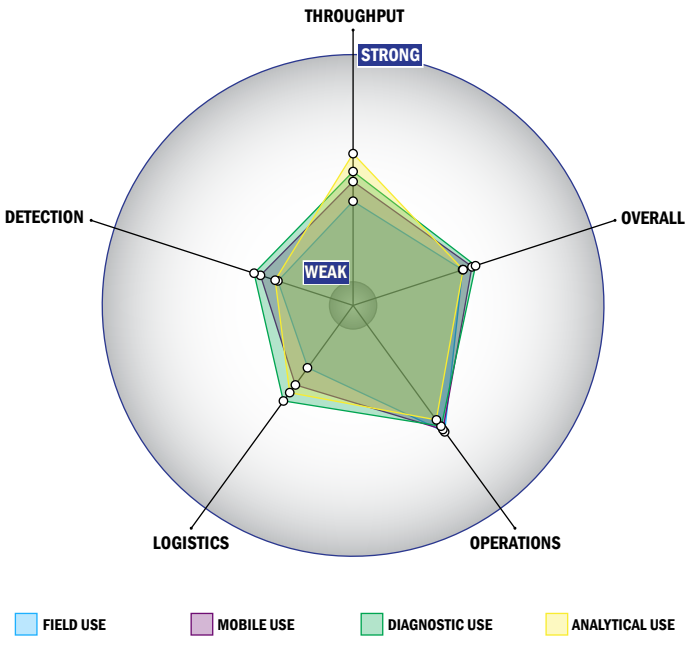
Scoring Analysis

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.



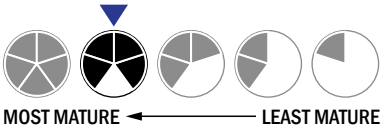
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 5 or more components
- 10-20 minutes is required for setup
- Almost instantaneous detection

Logistics:

- More than a day of training and significant technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 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:

- 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
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)

Agilent Technologies, Inc. - Agilent 4100 MP-AES Microwave Plasma Atomic Emission Spectrometer

GENERAL DESCRIPTION:



The Agilent 4100 MP-AES Microwave Plasma Atomic Emission Spectrometer is a compact, bench mounted elemental analyzer for use in the laboratory. It is used for the determination of trace to % levels of elements in a wide range of matrix types. The Agilent 4100 MP-AES delivers:

- Lowest cost of ownership — the Agilent 4100 MP-AES runs unattended without flammable or expensive gas supply, dramatically reducing your operating costs
- High-performance — magnetically excited microwave plasma source provides superior detection limits to flame AA
- Ease of use — application-specific software applets plus plug-and-play hardware ensure any user can set up quickly without method development or alignment, and with minimal training
- Improved laboratory safety — in addition to eliminating flammable and oxidizing gases, the 4100 MP-AES eliminates the need to plumb multiple gases into the laboratory, or manually transport and handle gas cylinders
- Robustness and reliability — ideal for industries such as mining, food and agriculture, chemicals, petrochemicals, and manufacturing, and for remote locations

TECHNICAL DESCRIPTION:

A robust, nitrogen based plasma is used to excite the elements of interest. The resultant emissions are directed through a fast scanning, high resolution optical system to a Peltier cooled solid state CCD detector, allowing for fast detection of elemental concentrations. These instruments include a microwave excitation assembly which features a solid state HV power supply and an industrial-grade, air cooled magnetron operating at 2450 MHz. Plasma power is fixed at 1 kW for ease of operation. Vertically-oriented plasma provides improved matrix handling while end-on or axial viewing provides optimum sensitivity and best detection limits. Fully web-integrated MP Expert software uses Agilent's worksheet concept for ease of use, rapid operator training, and commonality with other Agilent spectroscopy products.

CONTACT INFORMATION

Agilent Technologies, Inc.
8825 Stanford Blvd. Suite 300
Columbia, MD 21045
POC: Beverly Lesko
443-285-7854
beverly_lesko@agilent.com

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

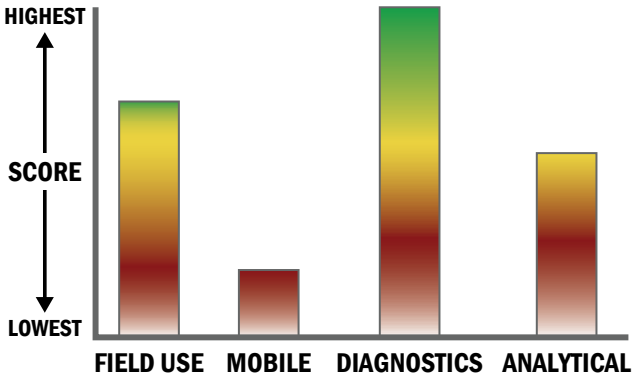
	Biological	Chemical	Radiological
FIELD USE System	N/A		N/A
MOBILE Laboratory	N/A		N/A
DIAGNOSTIC Laboratory	N/A		N/A
ANALYTICAL Laboratory	N/A		N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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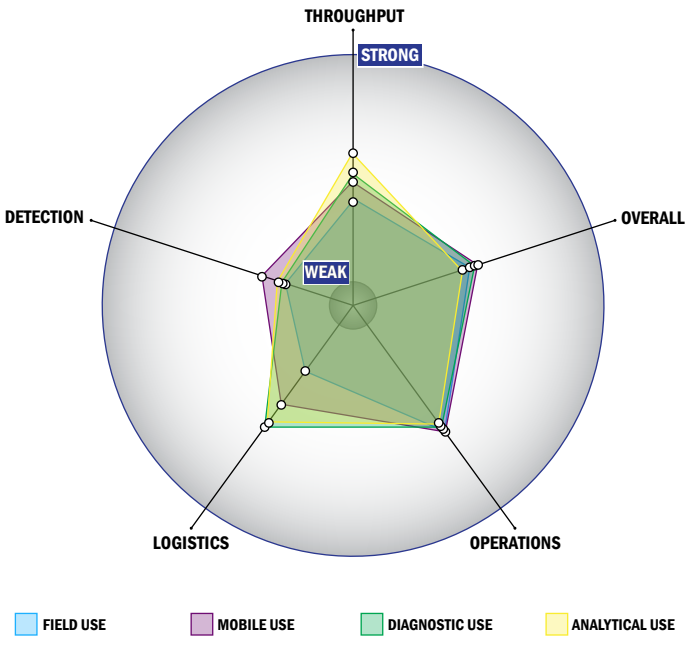


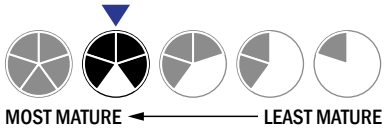
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 5 or more components
- 10-20 minutes is required for setup

Logistics:

- A day of training and technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has a greater than 220V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 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:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)

Agilent Technologies, Inc. - Agilent 5975C Triple-Axis Detector GC/MSD System

GENERAL DESCRIPTION:



The Agilent 5975C TAD Series GC/MSD System uses Gas Chromatography and Mass Spectrometry to deliver high confidence results. The Triple-Axis HED EM Detector provides the flexibility, capabilities, and performance demanded by modern applications in all industries. The mass selective detector (MSD) is configured for electron ionization. The auto sampler systems can be selected to meet different requirements. Injection systems can range from an injector tower to a flexible CTC-PAL auto-sampling system. Other sampling devices are available from Agilent and third parties.

TECHNICAL DESCRIPTION:

The Agilent 5975C TAD Series GC/MSD System uses Gas Chromatography and Mass Spectrometry to deliver high confidence results. The Triple-Axis HED EM Detector provides the flexibility, capabilities, and performance demanded by modern applications in all industries. The mass selective detector (MSD) is configured for electron ionization. The auto sampler systems can be selected to meet different requirements. Injection systems can range from an injector tower to a flexible CTC-PAL auto-sampling system. Other sampling devices are available from Agilent and third parties.

Gold quartz quadrupole with proprietary design enhances both performance and reliability up to 1050 u, covering all applications from routine EI to 1050 u mass range extends system performance for all models, and delivers superior performance for even the most demanding high mass applications; industry's lowest mass deviation ensures longer-lasting tuning and calibration demanding CI analyses.

350°C inert ion sources now programmable up to 350°C, delivers enhanced response for active compounds and late eluters.

Trace Ion Detection technology Lowers detection limits in complex matrices; together with the high temperature inert ion source, this new technology gives your lab powerful new analytical capabilities.

Synchronous SIM/Scan mode lets you selectively monitor for ions of interest at high sensitivity while simultaneously acquiring library-searchable scan data.

All ionization modes in one automated sequence Electron impact (EI) ionization with standard CI ion source; Auto CI feature makes CI as easy as EI.

New hydrogen EI signal-to-noise specification permits faster analysis under safe conditions with no compromise on analytical quality.

CONTACT INFORMATION

Agilent Technologies, Inc.
8825 Stanford Blvd. Suite 300
Columbia, MD 21045
POC: Beverly Lesko
beverly_lesko@agilent.com
443-285-7854
www.agilent.com/chem

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

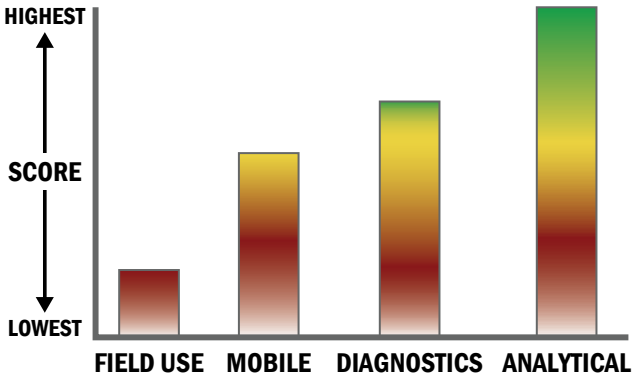
	Biological	Chemical	Radiological
FIELD USE System	N/A	Bottom Tier	N/A
MOBILE Laboratory	N/A	Fourth Tier	N/A
DIAGNOSTIC Laboratory	N/A	Second Tier	N/A
ANALYTICAL Laboratory	N/A	Top Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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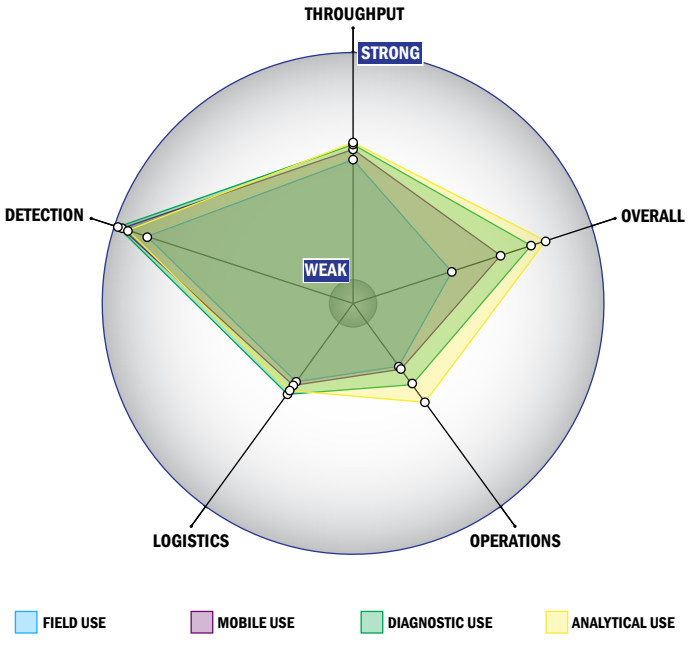


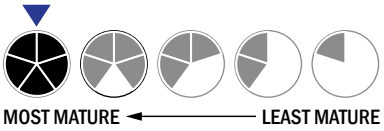
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system 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 setup
- 1-2 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- $<1x10^{-6}$ mg/m^3
- < 1 ppb
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Agilent Technologies, Inc. - Agilent 5975T LTM GC/MSD

GENERAL DESCRIPTION:



The Agilent 5975T LTM GC/MSD is the first commercial transportable GC/MS system that delivers laboratory quality analysis. The 5975T takes advantage of Agilent's proprietary LTM technology. These column modules provide rapid heating and cooling of the column for higher throughput. The LTM GC system requires less power compared to a conventional GC, reducing the required power supply from the mobile lab. The Agilent fifth generation EPC and digital circuitry ensures retention time precision, and allows easy operation, which makes it ideal for onsite, fast analysis.

The 5975T is seamlessly integrated with LTM GC technology to be a fast, high performance, high reliability, transportable GC/MSD system. The Agilent 5975T LTM GC/MSD with the Triple-Axis HED EM Detector provides the flexibility, capabilities, and performance demanded by modern applications in all industries. The mass selective detector (MSD) is configured for electron ionization. Injection systems can range from an injector tower to a flexible CTC-PAL auto-sampling system. Other sampling devices are available from Agilent and third parties.

TECHNICAL DESCRIPTION:

The Agilent 5975T LTM GC/MSD System uses Low Thermal Mass Gas Chromatography and Single Quadrupole Mass Spectrometry Detection to perform both qualitative and quantitative analysis. Technology features include:

- Agilent proprietary LTM technology
- SemiQuant for estimating concentrations of non-calibrated compounds
- Inert electron ionization (EI) source for better performance on active compounds
- Higher sensitivity with the Triple-Axis HED-EM Detector
- Mass range up to 1050 u
- High performance SIM/scan with automated SIM setup
- Mass stability with better than 0.10 u over 48 hours
- Performance electronics for 12,500 u/s scan speed (8,000 u/s write-to-disk)
- Proprietary hyperbolic gold coated quadrupole
- Heatable quadrupole to 200°C
- Easy access to full ion optics
- Compatibility with many third party sampling devices

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
MOBILE Laboratory			N/A
DIAGNOSTIC Laboratory			N/A
ANALYTICAL Laboratory			N/A

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

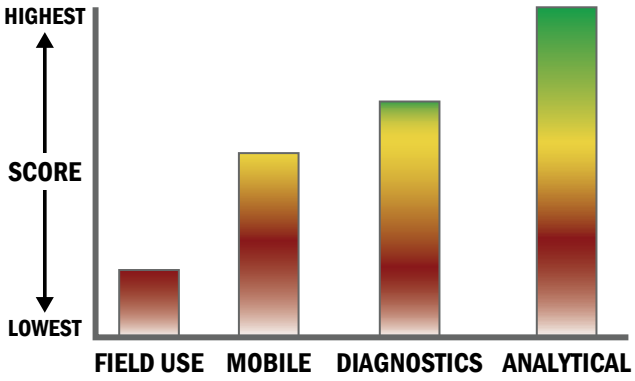
Agilent Technologies, Inc.
8825 Stanford Blvd. Suite 300
Columbia, MD 21045
POC: Beverly Lesko
beverly_lesko@agilent.com
443-285-7854
www.agilent.com/chem

COST

- $95,000-$125,000/system
- N/A/analysis

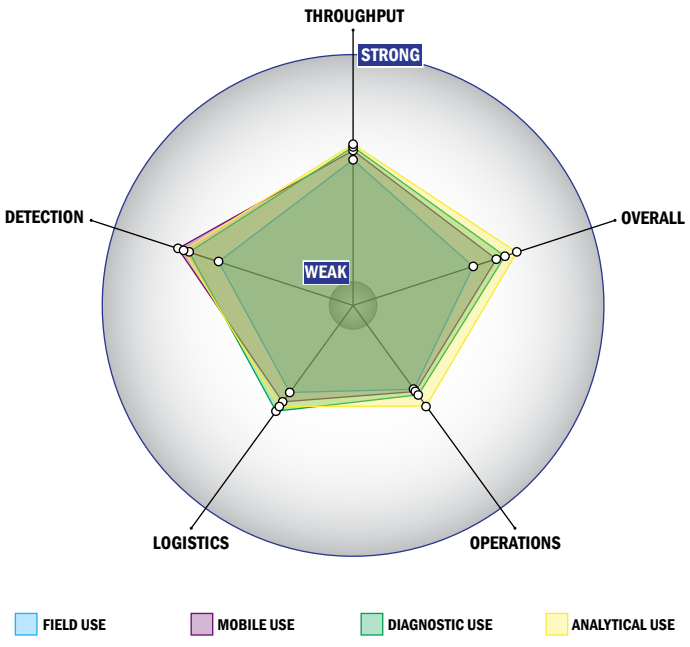
Scoring Analysis

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.



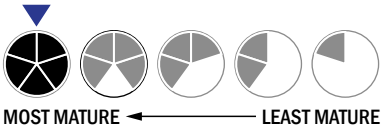
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 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
- 10-20 minutes is required for setup
- 1-2 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- < $1x10^{-6}$ mg/m^3
- < 1 ppb
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Agilent Technologies, Inc. - Agilent 6100 Series Single Quadrupole Mass

GENERAL DESCRIPTION:



Agilent 6100 Series Single Quadrupole LC/MS Systems deliver unmatched analytical performance and proven day-after-day reliability. Available with performance characteristics to match your needs and budget, they offer best-in-class data quality in a space-saving benchtop package. The 6100 Series Single Quadrupole Systems are compatible with electrospray ionization (ESI), atmospheric pressure chemical ionization (APCI), simultaneous ESI and APCI, and atmospheric pressure photoionization (APPI) for the introduction and ionization of liquid samples. Additionally, the 6100 series instruments can be combined with desorption electrospray ionization (DESI) and/or direct analysis in real time (DART) ionization sources for the introduction and ionization of compounds desorbed from solids. To maximize your return on investment, the performance capabilities of Agilent 6100 Series LC/MS systems can be easily upgraded to keep pace with your future requirements. The easy-to-use 6100 Series platform gives you the capability to:

- Rapidly screen compounds and confirm molecular weights
- Purify target compounds in complex mixtures
- Quantitate target compounds
- Identify impurities Simple, intuitive operation saves time and improves results
- Intuitive Agilent OpenLAB CDS ChemStation Edition software lets you set up and control the LC and MS from a single screen.
- Agilent's powerful Autotune feature boosts productivity by eliminating the need for manual recalibration.
- Comprehensive automation features allow multi-user, walk-up sample submission and unattended operation

TECHNICAL DESCRIPTION:

The 6100 series Single Quadrupole LC/MS system is a family of instruments comprised of 3 different models of single quadrupole mass spectrometers. These instruments have a variety of performance characteristics from the budget friendly 6120 to the 6150 with its unsurpassed data quality for UHPLC and high-throughput screening, enabled by scan speeds up to 10,000 Dalton/s and the Agilent Jet Stream ion source technology for enhanced sensitivity. All of these instruments are capable of detecting multiple different analytes from the same sample in one injection.

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	Bottom Tier	Bottom Tier	N/A
MOBILE Laboratory	Bottom Tier	Bottom Tier	N/A
DIAGNOSTIC Laboratory	Fourth Tier	Third Tier	N/A
ANALYTICAL Laboratory	Fourth Tier	Third Tier	N/A

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

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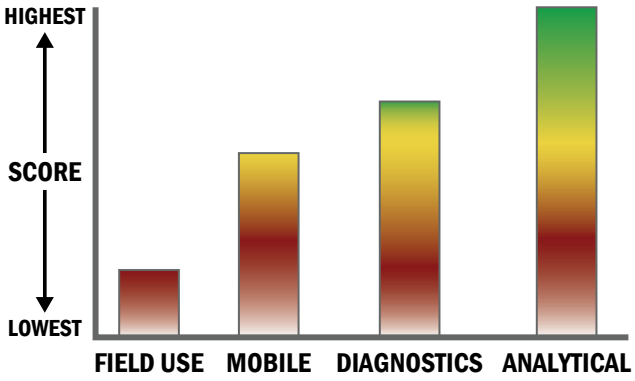
POC: Beverly Lesko
beverly_lesko@agilent.com
443-285-7854
www.agilent.com/chem

COST

- $130,000-$175,000/system
- N/A/analysis

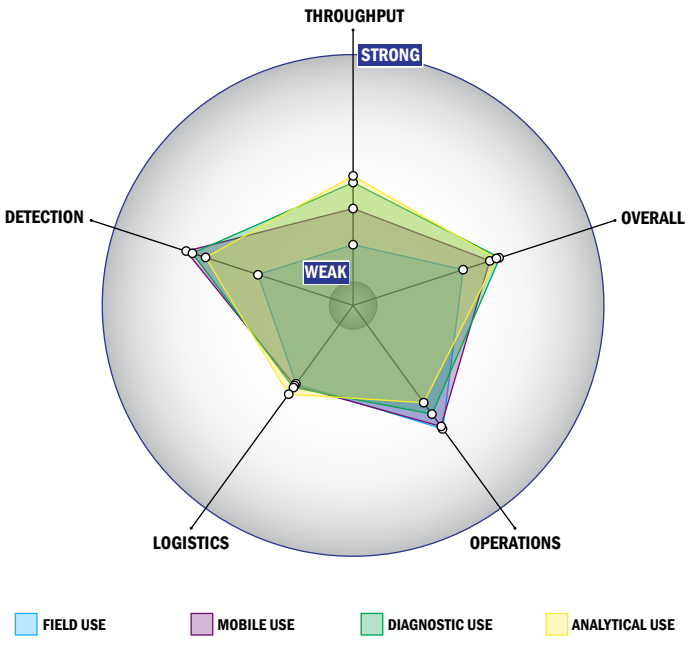
Scoring Analysis

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.



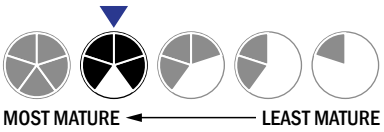
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 10-20 minutes is required for setup
- Almost instantaneous detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a carry-on luggage suitcase
- More than 50 kg
- Wireless and wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- Not possible for the system to achieve FDA approval
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Agilent Technologies, Inc. - Agilent 6200 Series Time of Flight Mass Spectrometer

GENERAL DESCRIPTION:



The 6200 series instruments are time of flight mass spectrometers designed to be coupled to liquid chromatography systems for sample separation and introduction. They are compatible with electrospray ionization (ESI), atmospheric pressure chemical ionization (APCI), and atmospheric pressure photoionization (APPI) for the introduction and ionization of liquid samples. Additionally, the 6200 series instruments can be combined with desorption electrospray ionization (DESI) and/or direct analysis in real time (DART) ionization sources for the introduction and ionization of solids. The information obtained from the 6200 series instruments can be used to identify and unknown compound and/or determine how much of a particular compound is present in a sample. The 6200 series achieve industry-leading TOF mass resolution and mass accuracy without sacrificing data acquisition speed, dynamic range, mass range, or sensitivity. They provide speed needed for ultra-high pressure LC (UHPLC) separations, plus performance needed for analysis of complex, real-world samples.

- Data acquisition rates up to 20 spectra per second
- Up to five orders in-spectrum dynamic range reveals trace-level targets in presence of vastly more abundant compounds.
- Exceptional sensitivity finds and identifies compounds at extremely low concentrations.

TECHNICAL DESCRIPTION:

The 6200 series is comprised of 2 different models of TOF mass spectrometer. They each feature 2-3 ppm mass accuracy and 20,000 FWHM resolution suitable all your accurate mass analytical challenges. Both 6200 series QTOF instruments incorporate the following technology:

- Proprietary orthogonal spray ion source maximizes ion generation and reduces noise.
- Proprietary INVAR flight tube sealed in vacuum-insulated shell eliminates thermal mass drift due to temperature changes, maintaining excellent mass accuracy, 24/7.
- Analog-to-digital (ADC) detection records multiple ion events, allowing very accurate mass assignments over a wide mass range and dynamic range of concentrations.
- 4GHz ADC electronics enable high sampling rate (32 Gbit/s), improving resolution, mass accuracy, and sensitivity for low-abundance samples.

CONTACT INFORMATION

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beverly_lesko@agilent.com
443-285-7854
www.agilent.com/chem

COST

- $175,000-$225,000/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

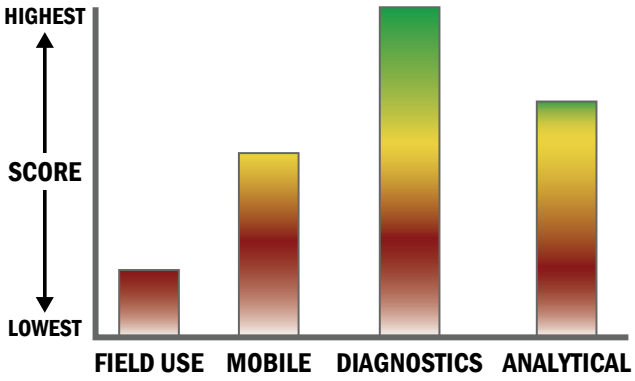
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	Bottom Tier	N/A
MOBILE Laboratory	Bottom Tier	Bottom Tier	N/A
DIAGNOSTIC Laboratory	Third Tier	Third Tier	N/A
ANALYTICAL Laboratory	Fourth Tier	Fourth Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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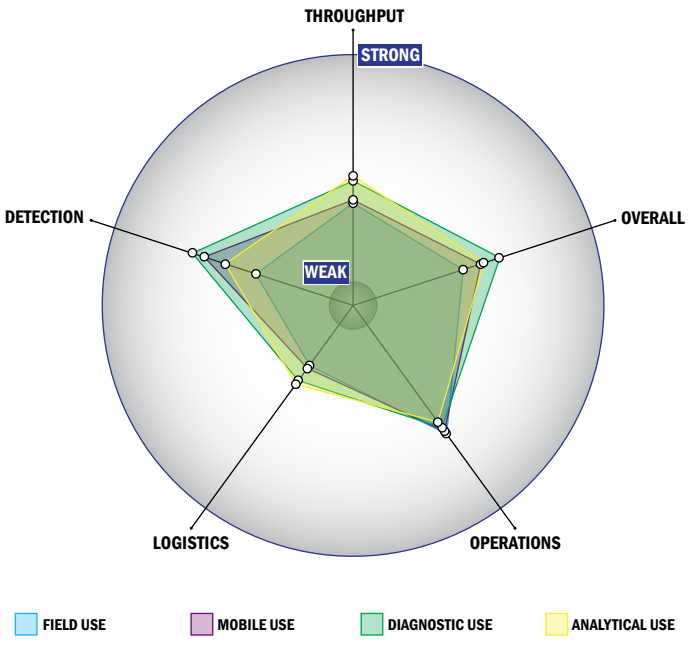


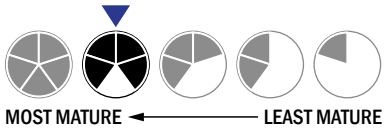
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- 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
- Greater than 20 minutes is required is required for setup
- Almost instantaneous detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Device or system has peak performance at normal relative humidity conditions
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Agilent Technologies, Inc. - Agilent 6400 Series Triple Quadrupole Mass Spectrometer

GENERAL DESCRIPTION:



The 6400 series instruments are triple quadrupole mass spectrometers designed to be coupled to a liquid chromatography system for sample separation and introduction. The information obtained from the 6400 series instruments can be used to confirm the identity of a compound or determine how much of a particular compound is present. Agilent 6400 Series Triple Quadrupoles are designed and constructed using the latest electronics and hardware manufacturing techniques. The Hyperbolic quadrupole provides unrivaled ion transmission and spectral resolution. The high-pressure hexapole collision cell with linear acceleration yields optimized MS/MS fragmentation without cross-talk effects. The off-axis, high-energy dynode detector enables rapid polarity switching, with low noise, and delivers the widest dynamic range available. The 6400 Series Triple Quadrupole instruments are integrated with MassHunter software, which contains the Autotune algorithm and numerous other data acquisition and processing tools, to deliver the highest quantitative performance available.

TECHNICAL DESCRIPTION:

The 6400 series Triple Quadrupole LC/MS system is a family of instruments comprised of 4 different models of triple quadrupole mass spectrometer. These instruments have a variety of performance characteristics. The 6420 is economical and easy to use, a perfect workhorse instrument. The 6430 offers improved sensitivity to yield more precise quantitation for most assays. The 6460 adds Agilent Jet Stream Technology to dramatically increase sensitivity. The 6490 Includes novel iFunnel technology for ultra trace quantitation to address your most demanding quantitative applications. Triggered MRM (tMRM) acquisition is available on all Agilent 6400 Series Triple Quadrupole LC/MS Systems, enabling quantitative and qualitative analysis in a single run. Triggered MRM acquisition effectively combines MRM quantitative analysis with data dependent acquisition of a product ion spectrum for use in library search, identification, and confirmation. tMRM product ion spectra can be searched against application-specific libraries, such as the Agilent Personal Compound Database and Library (PCDL), or large public spectral libraries.

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	Bottom Tier	Bottom Tier	N/A
MOBILE Laboratory	Bottom Tier	Bottom Tier	N/A
DIAGNOSTIC Laboratory	Fourth Tier	Fourth Tier	N/A
ANALYTICAL Laboratory	Fourth Tier	Third Tier	N/A

CONTACT INFORMATION

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beverly_lesko@agilent.com
443-285-7854
www.agilent.com/chem

COST

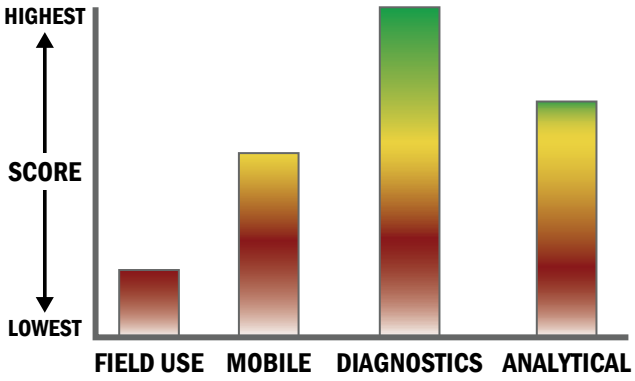
- $350,000/system
- N/A/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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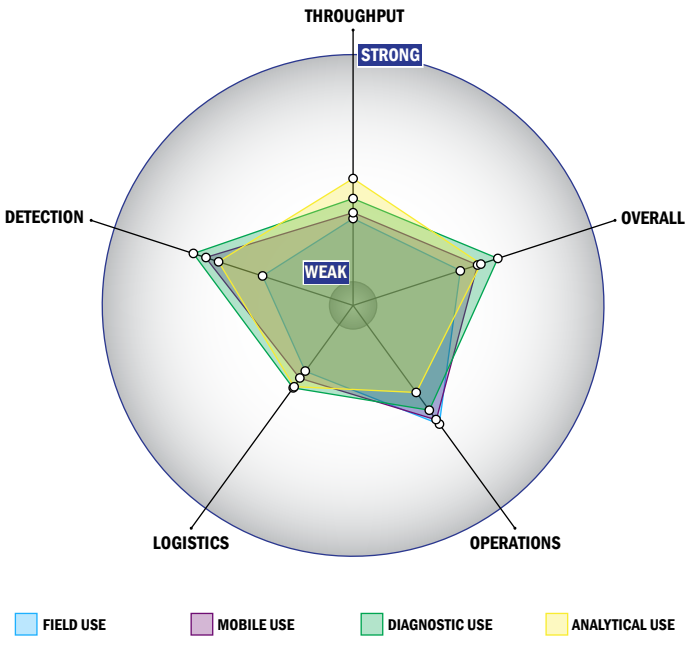


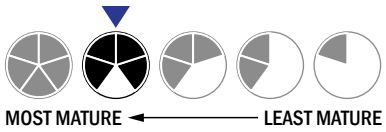
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently fully automated
- 0-1 solutions, buffer, eluents, and/or reagents
- 10-20 minutes is required for setup

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- This system does not require consumable components
- Device or system has peak performance at normal relative humidity conditions
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Agilent Technologies, Inc. - Agilent 6500 Series Quadrupole Time of Flight Mass Spectrometer

GENERAL DESCRIPTION:



The 6500 series instruments are quadrupole time of flight mass spectrometers (QTOF) designed to be coupled to liquid chromatography systems for sample separation and introduction. They provide accurate mass (<1 ppm mass error) and high resolution (>42,000 FWHM) required for compound identification. They are compatible with a wide-range of ionization techniques, please contact POC for more information. The 6500 series instruments can be used to identify unknown compounds, confirm identity of compounds or determine how much of a compound is present in samples.

TECHNICAL DESCRIPTION:

The 6500 series is comprised of 3 different models of QTOF mass spectrometer with a variety of performance characteristics to meet any budgetary and/or application need. The 6520 is the workhorse QTOF instrument, providing 2 ppm mass accuracy and 20,000 FWHM resolution suitable for most routine analyses. The 6540 instrument provides 1 ppm mass accuracy and 40,000 resolution for those more demanding applications. Designed for the most challenging assays, the 6550 QTOF with Ion Funnel Technology provides <1 ppm mass accuracy and >40,000 FWHM resolution and is the most sensitive accurate mass instrument available. All 6500 series QTOF instruments incorporate the following technology:

- Proprietary orthogonal spray ion source maximizes ion generation and reduces noise, while maintaining excellent accurate mass with automated introduction of an internal reference mass.
- Pioneering design of the collision cell and ion optics allows same reference mass calibration to be used for both MS and MS/MS. Resulting MS mass accuracy and precise isotopic ratios greatly improve confidence in molecular formula generation.
- Proprietary INVAR flight tube sealed in vacuum-insulated shell eliminates thermal mass drift due to temperature changes, maintaining excellent mass accuracy, 24/7.
- Analog-to-digital (ADC) detection records multiple ion events, allowing very accurate mass assignments over a wide mass range and dynamic range of concentrations.
- 4GHz ADC electronics enable high sampling rate (32 Gbit/s), improving resolution, mass accuracy, and sensitivity for low-abundance samples.
- Dual gain amplifiers simultaneously process detector signals through both low-gain and high gain channels, extending dynamic range to 10x5.

CONTACT INFORMATION

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COST

- $525,000/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

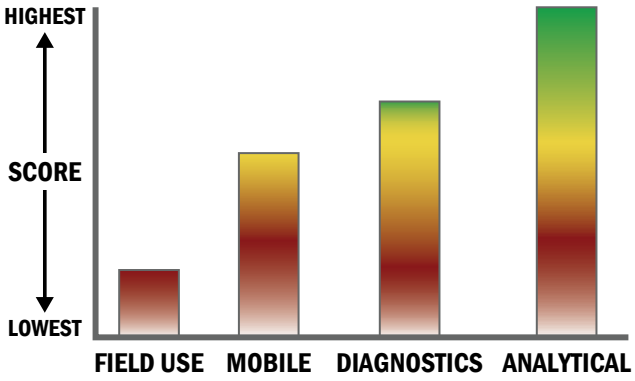
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	Bottom Tier	N/A
MOBILE Laboratory	Bottom Tier	Fourth Tier	N/A
DIAGNOSTIC Laboratory	Third Tier	Second Tier	N/A
ANALYTICAL Laboratory	Fourth Tier	Second Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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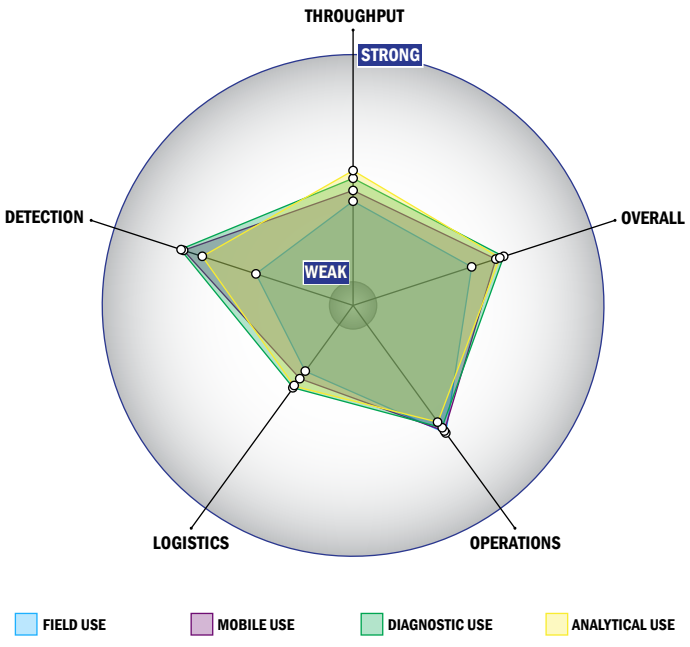


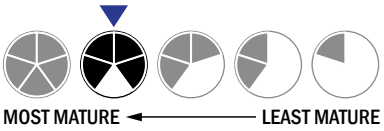
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 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
- Greater than 20 minutes is required for setup
- Almost instantaneous detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Device or system has peak performance at normal relative humidity conditions
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- < 1 ppb
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Agilent Technologies, Inc. - Agilent 7000B Triple Quadrupole GC/MS

GENERAL DESCRIPTION:

The 6200 series is comprised of 2 different models of TOF mass spectrometer. They each feature 2-3 ppm mass accuracy and 20,000 FWHM resolution suitable all your accurate mass analytical challenges. Both 6200 series QTOF instruments incorporate the following technology:



- Proprietary orthogonal spray ion source maximizes ion generation and reduces noise.
- Proprietary INVAR flight tube sealed in vacuum-insulated shell eliminates thermal mass drift due to temperature changes, maintaining excellent mass accuracy, 24/7.
- Analog-to-digital (ADC) detection records multiple ion events, allowing very accurate mass assignments over a wide mass range and dynamic range of concentrations.
- 4GHz ADC electronics enable high sampling rate (32 Gbit/s), improving resolution, mass accuracy, and sensitivity for low-abundance samples.

TECHNICAL DESCRIPTION:

Agilent's new 7000B Triple Quadrupole GC/MS delivers advanced high-speed GC/MS/MS quantitation for ultra-trace analysis of the most complex samples. Engineered from the ground up for ease of use and routine high performance operation, this is the world's first MS/MS designed specifically for GC analyses. MassHunter software maximizes your GC/MS/MS productivity.

CONTACT INFORMATION

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www.agilent.com/chem

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

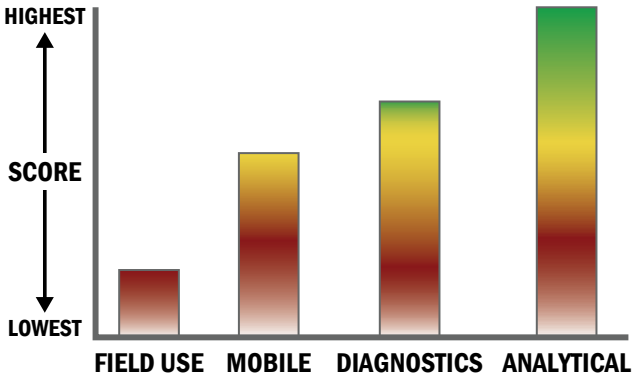
	Biological	Chemical	Radiological
FIELD USE System	N/A	Bottom Tier	N/A
MOBILE Laboratory	N/A	Fourth Tier	N/A
DIAGNOSTIC Laboratory	N/A	Top Tier	N/A
ANALYTICAL Laboratory	N/A	Top Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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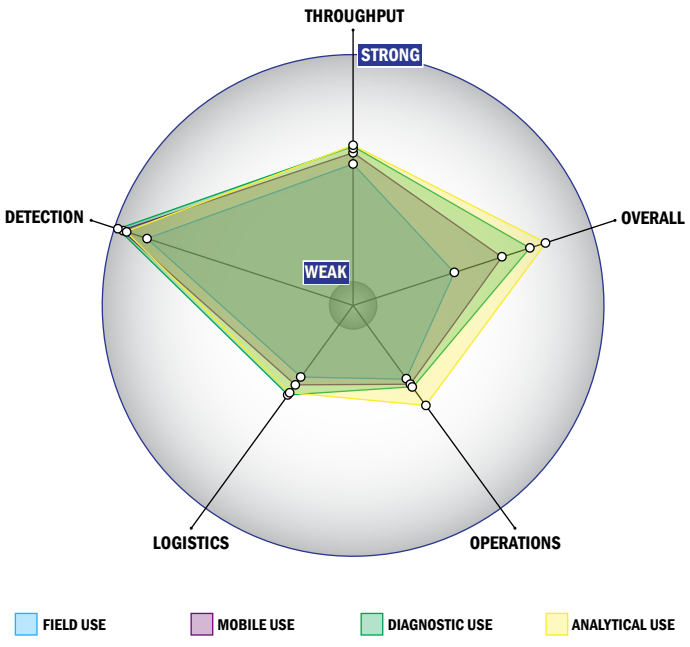


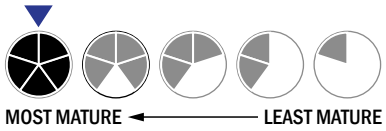
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system 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 setup
- 1-2 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- System or device has 110V electrical requirement



Operations:

- Can be used from -21°C to 41°C
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- < $1x10^{-6}$ mg/m^3
- < 1 ppb
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Agilent Technologies, Inc. - Agilent 7700 series Inductively Coupled Mass Spectrometer

GENERAL DESCRIPTION:



The 6400 series Triple Quadrupole LC/MS system is a family of instruments comprised of 4 different models of triple quadrupole mass spectrometer. These instruments have a variety of performance characteristics. The 6420 is economical and easy to use, a perfect workhorse instrument. The 6430 offers improved sensitivity to yield more precise quantitation for most assays. The 6460 adds Agilent Jet Stream Technology to dramatically increase sensitivity. The 6490 Includes novel iFunnel technology for ultra trace quantitation to address your most demanding quantitative applications. Triggered MRM (tMRM) acquisition is available on all Agilent 6400 Series Triple Quadrupole LC/MS Systems, enabling quantitative and qualitative analysis in a single run. Triggered MRM acquisition effectively combines MRM quantitative analysis with data dependent acquisition of a product ion spectrum for use in library search, identification, and confirmation. tMRM product ion spectra can be searched against application-specific libraries, such as the Agilent Personal Compound Database and Library (PCDL), or large public spectral libraries.

TECHNICAL DESCRIPTION:

All 7700 Series ICP-MS systems feature:

- Sample Introduction - includes an efficient, low-flow concentric nebulizer, a temperature-controlled spray chamber and a high precision, 10-roller peristaltic pump.
- Plasma RF Generator - high power-transfer efficiency and maintenance-free solid state digital drive 27 MHz RF generator with variable-frequency impedance matching.
- Torch - Easy-mount, one-piece quartz torch with wide 2.5mm internal ID injector maintains the highly robust plasma needed to efficiently decompose the sample matrix.
- Ion Lenses - Redesigned extraction and off-axis ion lenses provide high ion transmission for high sensitivity and low backgrounds, combined with uniform mass response across the mass range.
- Octopole Reaction System –The ORS3 is longer and narrower than the 7500 Series ORS cell, and operates at higher frequency, higher cell gas pressure and higher kinetic energy discrimination (KED) bias voltage.
- Quadrupole Mass Analyzer - The 7700 uses a true hyperbolic quadrupole, unique in ICP-MS, operating at high (3MHz) frequency.

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	Bottom Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Fourth Tier
ANALYTICAL Laboratory	N/A	N/A	Fourth Tier

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

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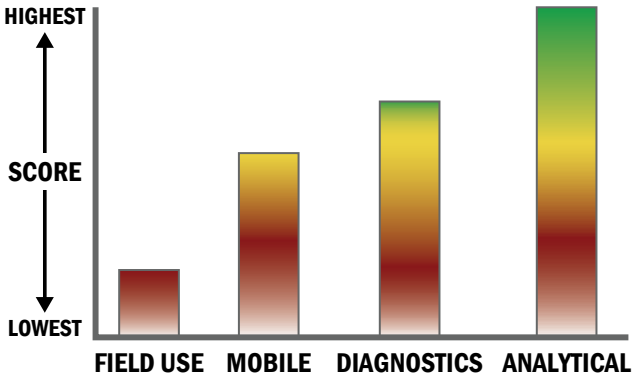
COST

N/A

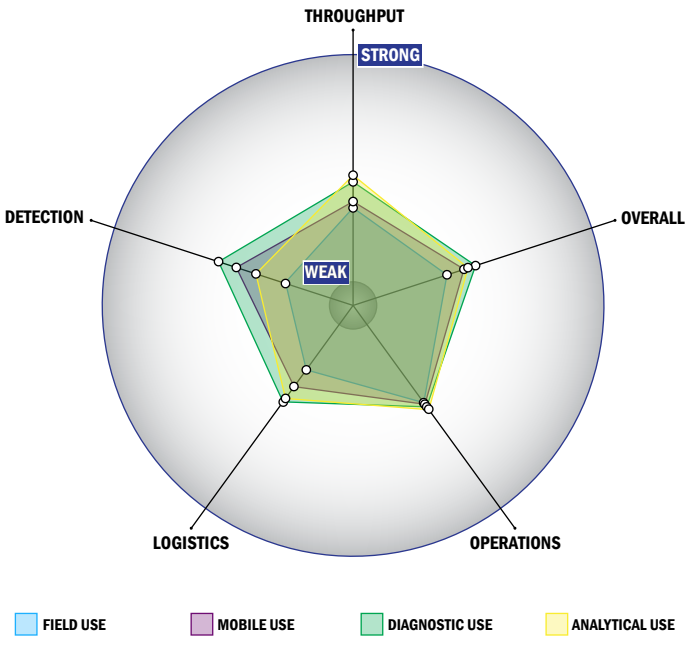
Scoring Analysis

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.



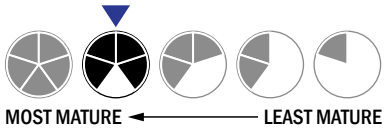
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- Greater than 20 minutes is required for setup
- Almost instantaneous for detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 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:

- 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
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)

Agilent Technologies, Inc. - Agilent 8800 Triple Quadrupole Inductively Coupled Plasma (ICP) Mass Spectrometer

GENERAL DESCRIPTION:



The Agilent 8800 ICP-QQQ provides unmatched flexibility never available before in ANY ICP-MS instrument. The 8800 ICP-QQQ was designed for those unique challenges that current HR-ICP-MS, DRC-ICP-MS or CRC-ICP-MS systems cannot address. This new instrument, while unique in its configuration and performance, shares many hardware components and software of Agilent's best-selling 7700 Series single-quad ICP-MS. The ground-breaking 8800 ICP-QQQ offers:

- Proven reliability and performance – The 8800 ICP-QQQ maintains the proven capabilities of the 7700 Series ICP-MS.
- Unrivalled performance – The 8800 ICP-QQQ has better signal to noise than any existing single-quad ICP-MS instrument.
- Results you can trust – The 8800 maintains the same performance in the acclaimed He mode.
- Unique configuration – The design of the 8800 ICP-QQQ enables MS/MS operation, providing precise control of reaction processes in the ORS3 collision/reaction cell (CRC).
- Maximum flexibility – The 8800 ICP-QQQ provides improved performance in semiconductor manufacturing, advanced materials, clinical and life-science, and a wide range of research and routine applications.

TECHNICAL DESCRIPTION:

The 8800 ICP-QQQ features both single-quad and MS/MS mode. Because the first and second quadrupole can be operated independently the reaction processes in the cell can be investigated with unprecedented control. Technical features shared with the 7700 ICP-MS series include:

- Sample introduction - system includes a Micro-Flow nebulizer, a temperature-controlled spray chamber and a high precision, 10-roller peristaltic pump.
- Plasma RF Generator - High power-transfer efficiency and maintenance-free solid state digital drive 27 MHz RF generator with variable-frequency impedance matching.
- Octopole Reaction System - Enables fast analysis with uniform conditions, for stability and consistent interference removal.
- First and Third Quadrupole Mass Analyzer - The 8800 uses a true hyperbolic quadrupole, unique in ICP-MS, operating at high frequency..
- Detector - Unique, auto-switching, dual-mode discrete dynode electron multiplier detector provides a full 9 orders of dynamic range with standard hardware and operating conditions.

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

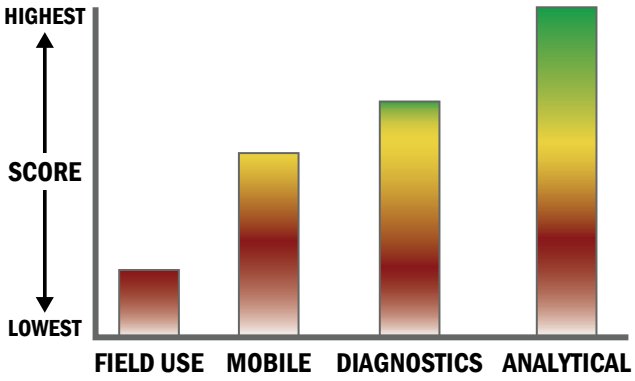
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Bottom Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Fourth Tier
ANALYTICAL Laboratory	N/A	N/A	Fourth Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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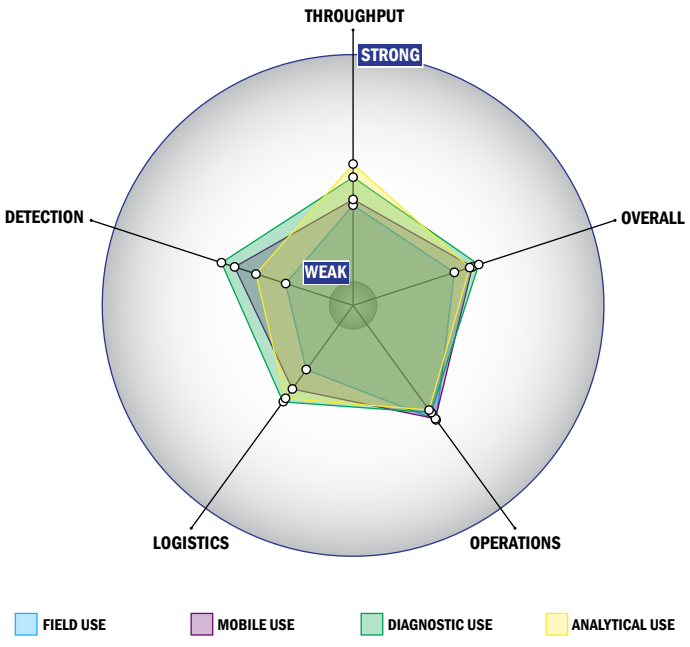


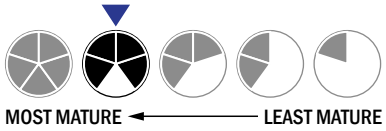
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 5 or more components
- Greater than 20 minutes is required for setup
- Almost instantaneous detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 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:

- 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
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)

Agilent Technologies, Inc. - Agilent Atomic Absorption Spectrometers

GENERAL DESCRIPTION:



The Agilent AA Atomic Absorption Spectrometers are compact, bench mounted elemental analyzers for use in the laboratory. They are used for the determination of trace to % levels of elements in a wide range of matrix types. Agilent's AA range is productive, user-friendly and utterly reliable. The instruments deliver the high performance that analysts require, while being equally at home in routine laboratories where reliability and simple operation are vital.

- Agilent's 55 and 240 AA combine flexibility with reliable hardware, providing budget-sensitive users with a high performance AA for routine flame/ furnace/vapor analyses.
- Agilent's 240FS/280FS AA are the world's fastest, and most productive flame AA systems, with Fast Sequential operation doubling sample throughout and dramatically reducing running costs. Able to handle multi-element suites with ease, they are ideal for food and agriculture or any high throughput labs.
- Agilent's 240 and 280 AA Zeeman Graphite Furnace AA (GFAA) systems are productive and precise, providing superior furnace performance and accurate background correction.
- Double your productivity with Agilent's AA Duo, the world's only AA systems that provide true simultaneous operation of flame and graphite furnace without changeover delays.

TECHNICAL DESCRIPTION:

Element specific source lamps produce light which is passed through an atomization device and directed through an automated optical system to a selected wide range photomultiplier tube detector, allowing for fast detection of elemental concentrations. Atomization device is selectable – flame, furnace or vapor generation – depending on elemental detection limits required for the analysis. These instruments utilize 2, 4 or 8 source lamps, deuterium (flame, furnace or vapor generation operation) or Zeeman (furnace operation) background correction and include numerous interlocks for safe, reliable operation. Unique Fast Sequential operation can double sample throughput versus convention AA operation. Fully web-integrated SpectrAA software uses Agilent's worksheet concept for ease of use, rapid operator training, and commonality with other Agilent spectroscopy products.

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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

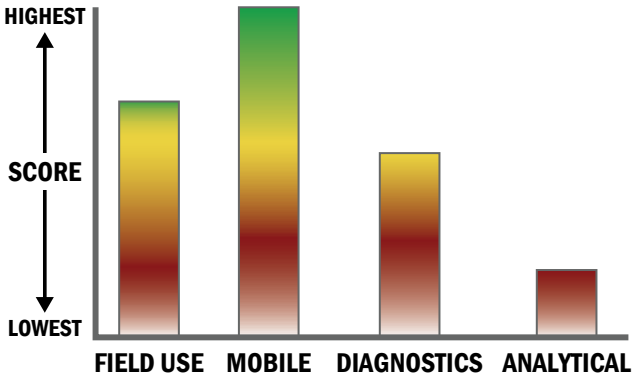
	Biological	Chemical	Radiological
FIELD USE System	N/A	●	N/A
MOBILE Laboratory	N/A	●	N/A
DIAGNOSTIC Laboratory	N/A	●	N/A
ANALYTICAL Laboratory	N/A	●	N/A

Survey Source

Vendor Supplied Information

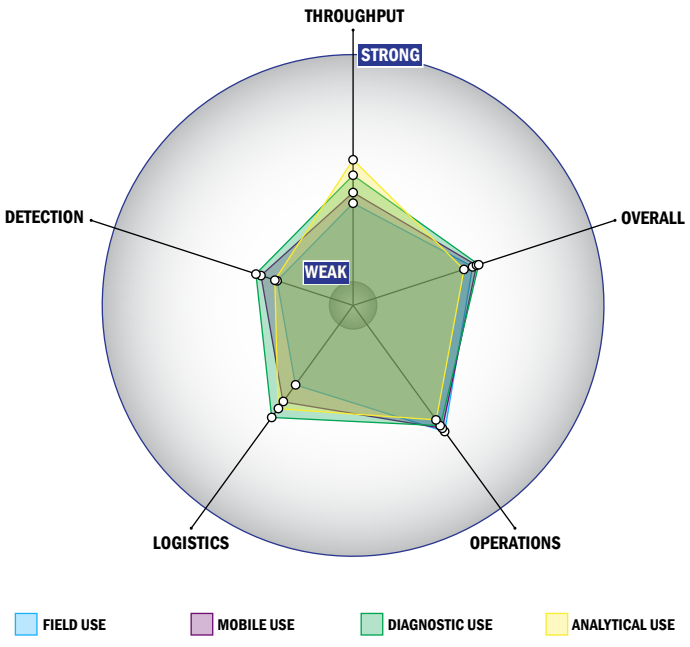
Scoring Analysis

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.



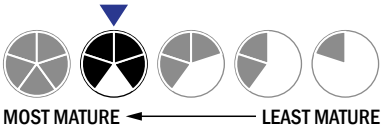
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 5 or more components
- Greater than 20 minutes is required for setup
- Almost instantaneous detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 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:

- 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
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)

Agilent Technologies, Inc. - Agilent G6080AA MassCode PCR LC/MS Bundle

GENERAL DESCRIPTION:



MassCode Polymerase Chain Reaction (PCR) technology is suitable for any research application that requires mid-level multiplexed detection of nucleic acid sequences through design of consensus PCR primers, and is ideal for high-throughput detection of about 10-30 target sequences simultaneously.

TECHNICAL DESCRIPTION:

After extraction of nucleic acids from samples of interest, the MassCode PCR workflow starts with Reverse Transcription PCR (RT-PCR) on the source material in 96-well plate format. PCR primers for each target are designed to minimize primer-dimer formation and to be specific for a set of inclusive sequences, e.g. multiple viral nucleic acid targets, while being exclusive for non-desired sequences, such as all other targets in the reaction and potential contaminating sequences. Each forward and reverse primer is conjugated with a small molecule tag of a specific mass to provide a dual signal for a given target sequence. After RT-PCR, the reaction is subjected to selective depletion of excess primers and unwanted side reactions. The entire 96-well plate is then loaded into the LC autosampler for automated processing through an ultra violet (UV) unit which cleaves the small molecule tags from the amplified target. Subsequent flow injection into the single quadrupole mass spectrometer equipped with an Atmospheric Pressure Chemical Ionization (APCI) source enables detection of the respective tags. MassCode PCR Application Software automatically analyses the data and reports results for each target of interest.

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

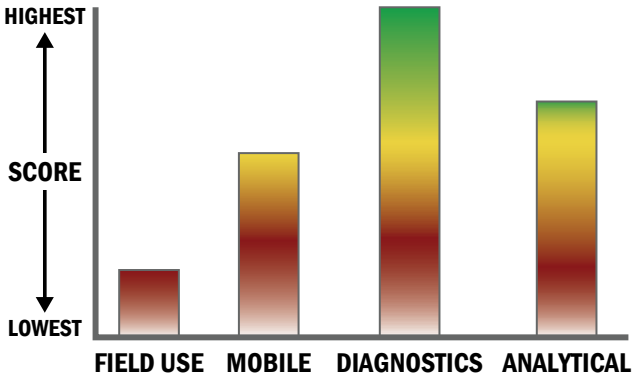
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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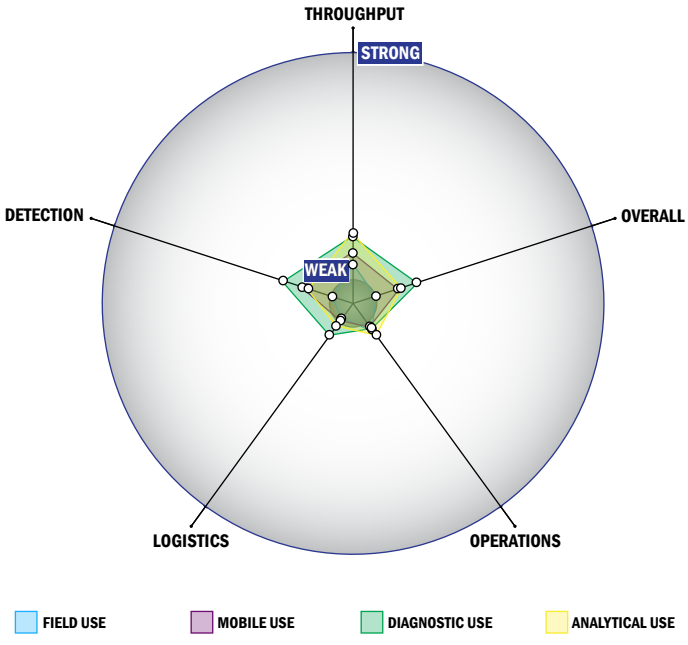


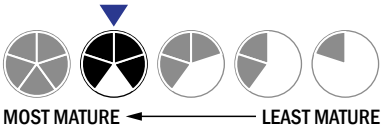
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 5 or more components
- Greater than 20 minutes is required for setup
- Almost instantaneous detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg



Operations:

- Components must be frozen below -20°C (cryo-storage)
- Between 6 months and 1 year shelf life
- The system is not capable of autonomy

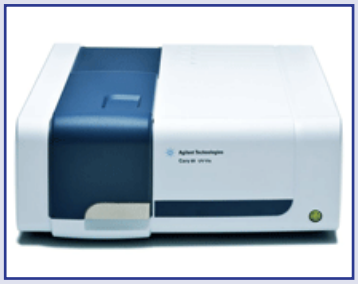
Detection:

No detection information available

Agilent Technologies, Inc. - Cary 60 UV-Visible Spectrophotometer

GENERAL DESCRIPTION:

The Agilent Cary 60 UV-Vis Spectrophotometer is efficient, accurate and flexible, and is designed to meet your immediate and future challenges. With remote sampling options, proven performance and low cost of ownership, you can be sure that the Agiletn Cary 60 UVOVis will give you answers you can trust.



TECHNICAL DESCRIPTION:

Lowest cost of ownership - with an exceptionally long lifetime of 3 billion flashes, the lamp typically lasts 10 years, minimizing lamp replacement and instrument revalidation costs.

No need for cuvettes - the optional fiber probe delivers more accurate results in a fraction of the time, and with no cuvette or sipper, sample measurements are less prone to error

Measures precious samples with ease - the highly focused beam image of the Agilent Cary 60 is perfect for measuring small volumes accurately and reproducibly.

Exceptionally fast data collection - with scan rate of up to 24,000 nm/min, you can scan the entire wavelength range (190-1100 nm) in under 3 seconds.

Performance enhancing accessories assures you can handle the widest variety of sample sizes and types with liquid sampling accessories including fiber options probes and couplers, Peltier and water thermostated single and multicell holders, temperature probes, microvolume sampling cells and rapid mix accessory for stopped flow kinetics. For solid samples, choose from solid sample holder, fiber optic reflectance probe and coupler and fixed angle specular reflectance accessories (SRA).

Software designed for real samples - Agilent Cary WinUV software can be tailored to suit your analytical requirements from QA/QC to research.

CONTACT INFORMATION

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COST

- $10,000/system
- $1.00-$100,000/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

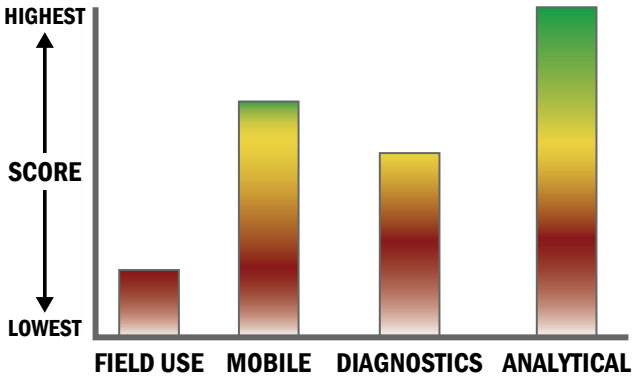
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	Third Tier	N/A
MOBILE Laboratory	Second Tier	Top Tier	N/A
DIAGNOSTIC Laboratory	Second Tier	Top Tier	N/A
ANALYTICAL Laboratory	Second Tier	Top Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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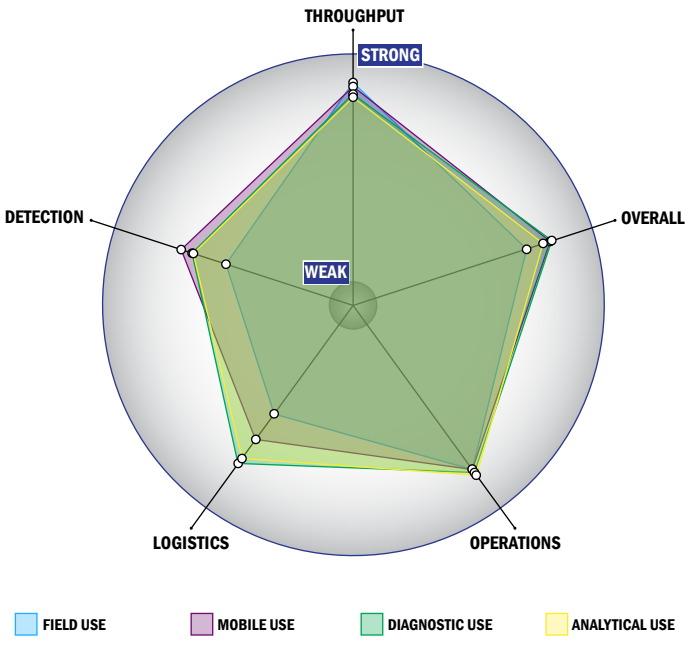


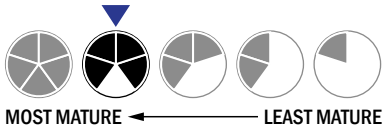
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- The system could be adapted to a fully automated system with some effort
- 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
- 3-5 steps are required for 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
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Device or system has peak performance at normal relative humidity conditions
- Greater than 3 years shelf life
- Greater than 10 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:

- 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
- Less than 10 µL
- Superior specificity. False alarm rate approaching zero (~0%)
- > $1x10^{-3}$ mg/m^3
- 1 ppm-100 ppm
- System can currently identify aerosolized chemical agent
- System can currently identify liquid chemical age

Agilent Technologies, Inc. - Cary Eclipse Fluorescence Spectrophotometer

GENERAL DESCRIPTION:



The Cary Eclipse Spectrophotometer uses a Xenon flash lamp for superior sensitivity, high signal-to-noise, and fast kinetics. It measures the emission of light from samples in four modes. Using Xenon lamp technology, it captures a data point every 12.5 ms and scans at 24,000 nm/min without peak shifts. The Cary Eclipse if the only spectrophotometer with room light immunity. With an optional microplate reader, if offers full wavelength scanning of 384 samples. A BioMelt package provides the capability of thermal denaturation studies.

TECHNICAL DESCRIPTION:

Four collection modes: fluorescence, phosphorescence, chemi/bio-luminescence, and time resolved phosphorescence.

Molecular software: application focused software for novice and expert users

High Sensitivity: red-sensitive photomultiplier tube detectors extends to 900 nm

Small volume samples: measures low-volume picomolar fluorescein concentrations (<0.5mL) and large, odd-sized samples.

Fast kinetics: scans at 24,000 nm/min without peak shifts using Xenon flash lamp technology and up to 80 points per second in steady-state fluorescence mode.

Fast reactions of 1-2 seconds can be measured using the rapid mix accessory or the stopped flow accessory.

Room light immunity: the instrument operates with the front and top panels removed for easy access to sample and fast installation of large accessories.

CONTACT INFORMATION

Agilent Technologies, Inc.
8825 Stanford Blvd. Suite 300
Columbia, MD 21045
POC: Beverly Lesko
beverly_lesko@agilent.com
443-285-7854

COST

- $30,000/system
- $1.00-$100,000/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

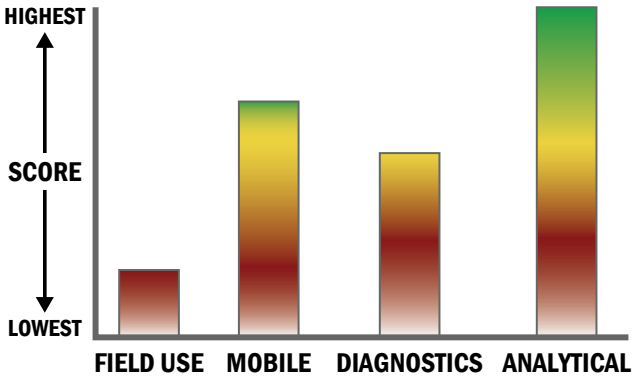
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	Third Tier	N/A
MOBILE Laboratory	Second Tier	Top Tier	N/A
DIAGNOSTIC Laboratory	Second Tier	Top Tier	N/A
ANALYTICAL Laboratory	Second Tier	Top Tier	N/A

Survey Source

Vendor Supplied Information

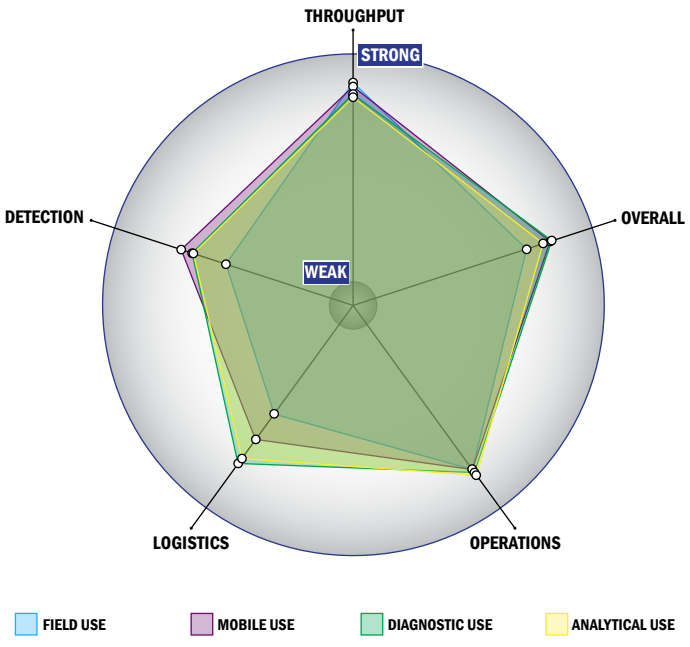
Scoring Analysis

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.



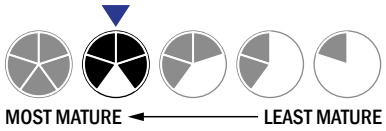
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- The system could be adapted to a fully automated system with some effort
- 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
- 3-5 steps are required for 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
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Device or system has peak performance at normal relative humidity conditions
- Greater than 3 years shelf life
- Greater than 10 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:

- 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
- Less than 10 µL
- Superior specificity. False alarm rate approaching zero (~0%)
- > $1x10^{-3}$ mg/m^3
- 1 ppm–100 ppm
- System can currently identify aerosolized chemical agent
- System can currently identify liquid chemical agent

Agilent Technologies, Inc. - Exoscan/Flexscan Handheld FTIR

GENERAL DESCRIPTION:

Hand Held, Portable and small laboratory infrared spectrometers that can be used for the identification and quantification of liquid and solid chemical entities



TECHNICAL DESCRIPTION:

FTIR infrared spectrometers that provided chemical signatures or spectra of liquids and solids. This provides identification via commercial libraries or user built libraries

CONTACT INFORMATION

Agilent Technologies, Inc.
8825 Stanford Blvd. Suite 300
Columbia, MD 21045
POC: Beverly Lesko
beverly_lesko@agilent.com
443-285-7854

COST

- $35,000 - $50,000/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

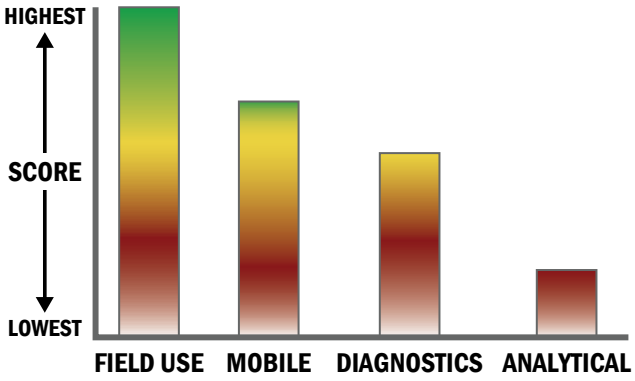
	Biological	Chemical	Radiological
FIELD USE System	N/A	Second Tier	N/A
MOBILE Laboratory	N/A	Second Tier	N/A
DIAGNOSTIC Laboratory	N/A	Third Tier	N/A
ANALYTICAL Laboratory	N/A	Bottom Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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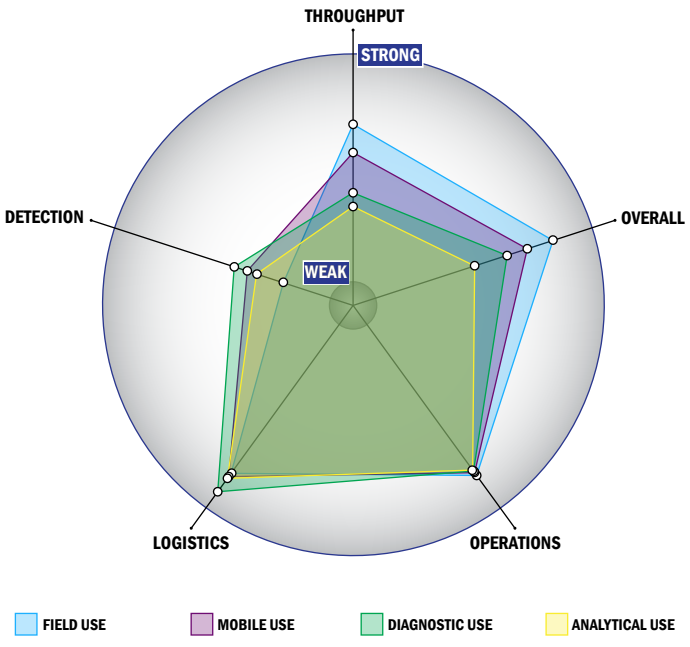


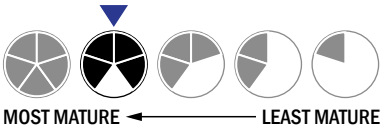
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/sample per run
- 95-32 samples every 2 hours
- The system or approach is not amenable to full or semi-automation
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- 5-10 minutes is required for set-up
- 3-5 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
- 2-4 hours battery life



Operations:

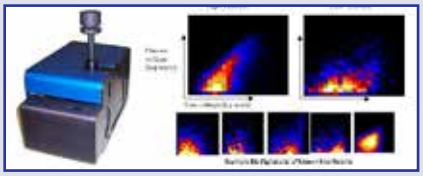
- Can be used from -21°C to 41°C
- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and 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
- Greater than 250 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- 100 ppm-1 ppt
- Possible system can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Airogistic, LLC - BioTM-FD

GENERAL DESCRIPTION:



The BIOTM-FD is a laser induced florescence (LIF) detector that continuously analyzes air samples for airborne pathogens. The device is capable of alerting or triggering real-time air sample collection if a known and dangerous pathogen is present. This product is designed to be power efficient and operate as a standalone unit with minimal training or interaction. The detector employs a unique technology for determining the threat level based on characterized signatures of florescence vs. size and the statistical distributions for common pathogens. The system is flexible in that it can be trained to adapt to background particulates, look for new pathogens, and ignore known interferents.

TECHNICAL DESCRIPTION:

The BioTM-FD LIF detector employs a unique design using an air inlet with and integrated aerosol concentrator for enriching the particle stream before interrogating the sampled air. The principle of detection is based on its use of Mie scattering, concurrently examining each particle for the presence of the metabolites NADH and riboflavin, which are necessary intermediates for metabolism of living organisms, such as bacteria and fungi. The detector simultaneously measures particle size and florescence with a single illumination correlating the two resulting signals in real time. The signals generated are processed statistically through maximum likelihood algorithms that compare samples to known bio-agent signatures.

CONTACT INFORMATION

Airogistic, LLC
5204 Wheeler Branch Circle Suite 111L
Austin, TX 78701
POC: Jeff Michalski
512-743-3271
michalski@airogistic.com
www.airogistic.com

COST

- $25,000-$50,000/system
- $0.00/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

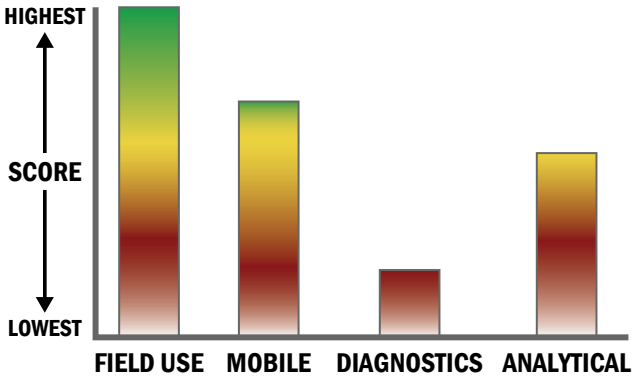
	Biological	Chemical	Radiological
FIELD USE System	Top Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

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

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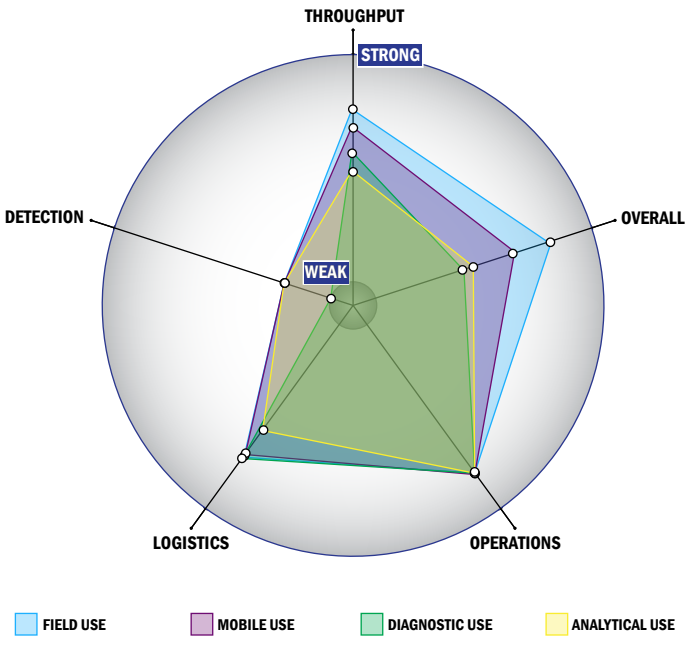


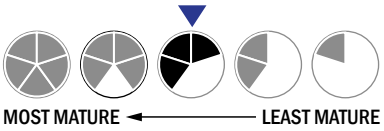
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 10. Continuous operation with no defined runs
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- 5-10 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 toaster
- Between 1 and 5 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 5-10 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 open but modification requires licensing

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
- 1-100 CFU per mL
- Spore lysis not necessary for detection by system

Akonni Biosystems, Inc. - TruArray

GENERAL DESCRIPTION:



The Akonni TruArray is a portable microarray in vitro diagnostic device employing a dual nucleic acid and immunoassay test methodology to increase diagnostic confidence limits of rare and emerging infectious diseases. The platform includes sample preparation, reagents, microarray detection, and all hardware and software to run an end-to-end protocol. Because of the unique attributes of gel element arrays and the disposable fluidic cartridge, Akonni can offer a user the ability to analyze for hundreds of genetic- or immuno-based disease traits in one, rapid, simple to use platform. The state-of-the-art technology can easily be adapted to custom DHHS or DOD applications and can be quickly re-configured for new or emerging infectious disease targets. Military, EMT and medical personnel could use the portable device, with minimal training and expense, to identify the presence of pathogens.

TECHNICAL DESCRIPTION:

The instrument and cartridge-based platform developed by ALL eliminates the need for cumbersome pumps, valves and tubes by manipulating liquid droplets on an array of electrodes. The so-called “electrowetting” effect provides a motive force that is flexibly controlled through software. In conventional microfluidics liquid handling is directed by networks of tubes or channels that must be redesigned for every unique application. ALL's digital microfluidic systems shatter this traditional "one device-one workflow" paradigm. Within the ALL cartridge, electrode arrays are arranged on inexpensive printed circuit boards (PCBs). An injection molded plastic plate above the PCB creates a chamber where droplets are manipulated. Reagents are pre-placed in the cartridge at the time of manufacture to enable minimally-trained personnel to run complex bioanalytical protocols.

CONTACT INFORMATION

Akonni Biosystems, Inc.
400 Sagner Ave., Suite 300
Frederick, MD 21701
POC: Charles Daitch
301-698-0101
info@akonni.com

COST

- $40,000/system
- $30/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

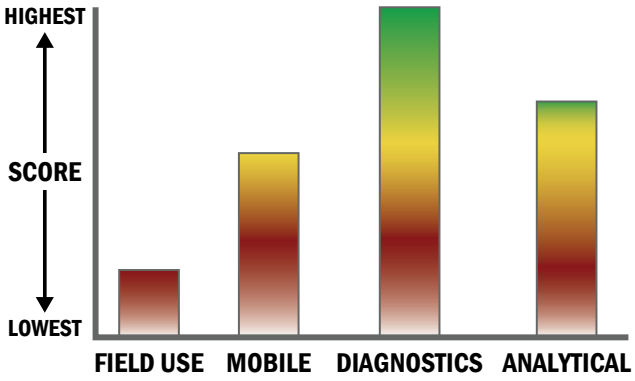
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Second Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

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

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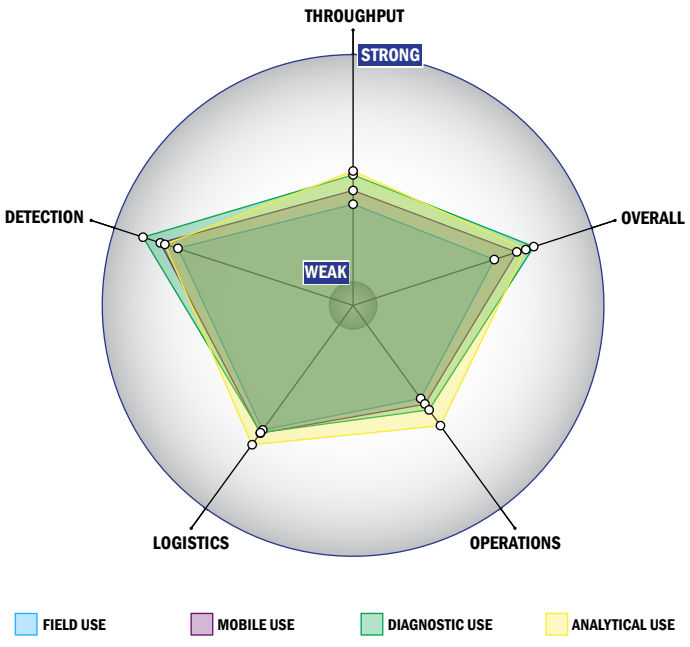


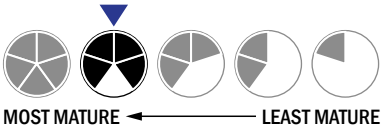
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, >10 tests/sample per run
- 749-350 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 4 solutions, buffer, eluents, and/or reagents
- 3 components
- 5-10 minutes is required for set-up
- 9-12 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a toaster
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 1-2 hours battery life



Operations:

- Can be used from 4°C to 37°C
- Components must be frozen (-20°C)
- Between 6 months and 1 year shelf life
- Results cannot be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Efforts are underway to achieve 510K clearance
- System currently has FDA approval
- Greater than 250 µL
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- 1-10 ng per mL
- Semi-automated spore lysis

Alexeter Technologies - Defender TSR System

GENERAL DESCRIPTION:

The Defender TSR System is designed to detect and identify the following biological agents, in the field, with a 15-minute test: anthrax, ricin, botulinum toxin, staphylococcal enterotoxin B, plague, tularemia, brucella and orthopox. The Defender TSR Reader, part of the system is an optical reader which evaluates the test strips, documents the results and delivers a report to the user. A protein detection test is also part of the system.



TECHNICAL DESCRIPTION:

Hand held immunochromatographic assays that use colloidal gold labeled antibodies, optional Reader for objective evaluation and documentation.

CONTACT INFORMATION

Alexeter Technologies

COST

- $15,000/system
- $26.00/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	Top Tier	N/A	N/A
MOBILE Laboratory	Top Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Notes

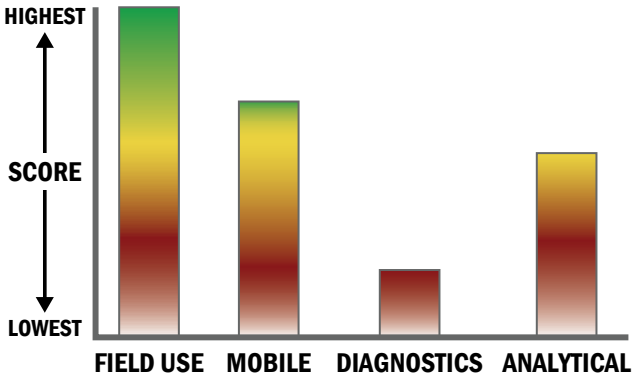
The Defender TSR System reads Tetracore BioThreat Alert Strips.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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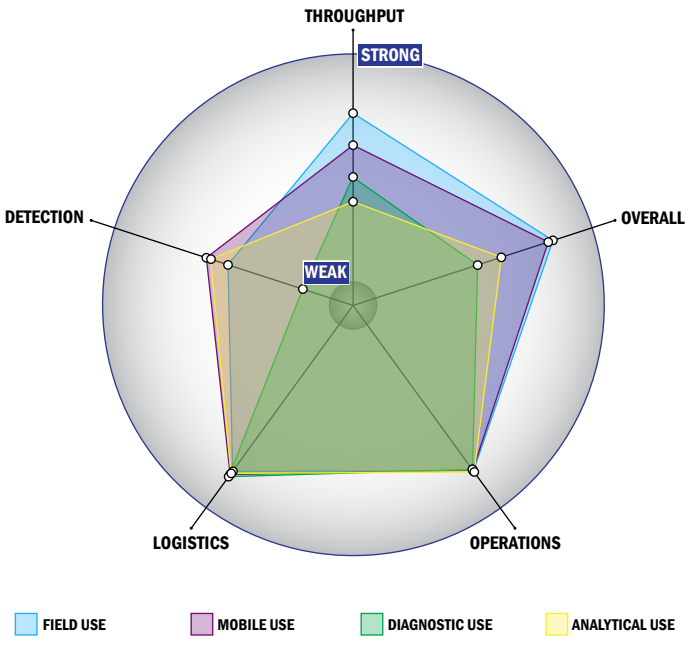


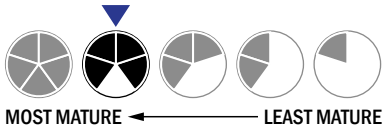
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, >10 tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- 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
- 3-5 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 room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- Less than 50 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 10,000-100,000 CFU per mL
- Greater than 100,000 PFU per mL
- 10-100 ng per mL
- Spore lysis not necessary for detection by system

Alexeter Technologies - Guardian Reader System

GENERAL DESCRIPTION:



The Guardian Reader System is designed to detect and identify the following biological agents, in the field, with a 15-minute test: anthrax, ricin, botulinum toxin, staphylococcal enterotoxin B, plague, tularemia, brucella and orthopox. The Guardian Reader, part of the system is an optical reader which evaluates the test strips, documents the results and delivers a report to the user. Alternatively, the system may be supplied with the Defender TSR (Test Strip Reader) a hand-held optical reader. A protein detection test is also part of the system.

TECHNICAL DESCRIPTION:

Hand held immunochromatographic assays that use colloidal gold labeled antibodies, optional Reader for objective evaluation and documentation.

CONTACT INFORMATION

Alexeter Technologies
877-591-5571
www.alexeter.com

COST

- $12,000/system
- $26.00/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	Second Tier	N/A	N/A
MOBILE Laboratory	Top Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

Notes

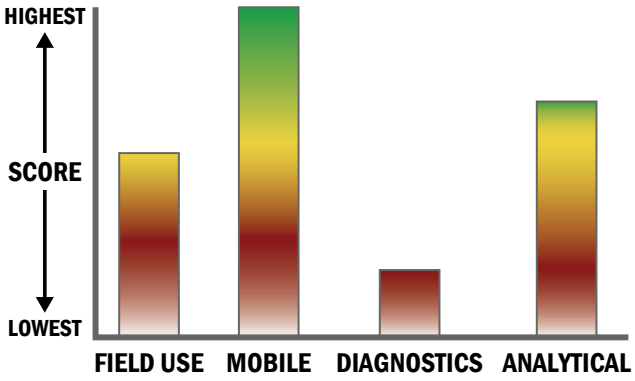
The Guardian Reader System reads Tetracore BioThreat Alert Strips.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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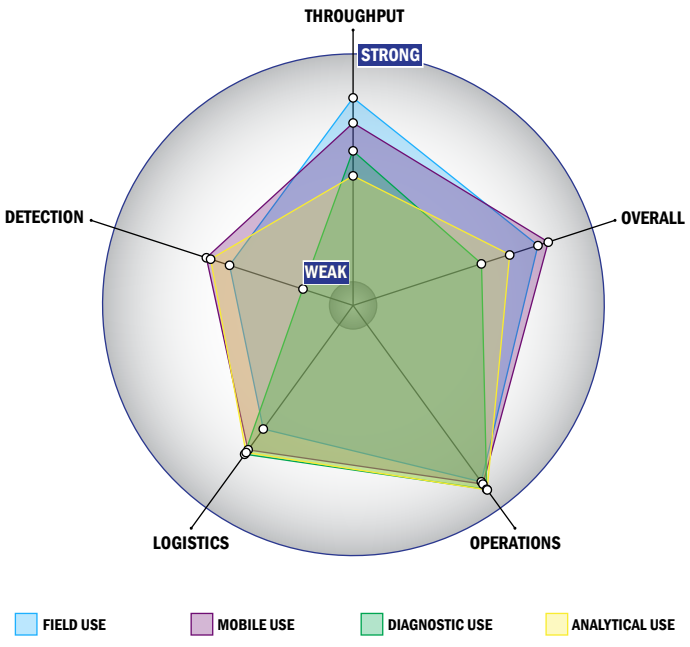


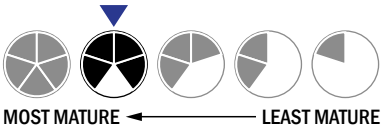
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required for set-up
- 3-5 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a toaster
- Between 5 and 25 kg
- This system is not capable of transmitting data
- System or device has 110V electrical requirement
- 1-2 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Less than 50 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 10,000-100,000 CFU per mL
- Greater than 100,000 PFU per mL
- 10-100 ng per mL
- Spore lysis not necessary for detection by system

ALMSCO International - BenchTOF-dx

GENERAL DESCRIPTION:



BenchTOF-dx is a high performance GC based time-of-flight mass spectrometer for the detection of both target and unknown compounds in complex matrices. The MS detector has a "bench top" size, approximately equivalent to a conventional GC. It is compatible with every GC application and offers full spectral sensitivity (1-1500 Da) at similar levels to the selective ion monitoring (SIM) mode of quadrupoles. The instrument can be located in either a conventional laboratory or transported in a mobile laboratory environment, with no reduction in performance. BenchTOF-dx is GC platform neutral. GC control and data analysis uses existing vendor software or proprietary data analysis software (MOSAIG) is available. BenchTOF-dx is currently being used in a broad range of applications e.g. CWA, environmental, toxicology and food safety.

TECHNICAL DESCRIPTION:

BenchTOF-dx MS detector is designed specifically for the analysis of CWA compounds. BenchTOF-dx is a reflectron based TOF instrument which incorporates innovative design features. The TOF detection technology is based on the flight time of charged ions derived from electron ionization of compounds within an ion source. This time interval accurately identifies the mass of all the ions generated for a compound and ultimately creates a spectrum. By careful design of the ion optics, flight tube and detector, spectra created by BenchTOF-dx have a classical profile which allows conventional identification of both target and unknown compounds at trace levels using well known MS libraries. The ionization technique is based on direct extraction in which both ionization and extraction down the flight tube occur within the same ion source volume. BenchTOF resolution is sub unit mass and sufficient to exclude matrix effects and chemical noise. System sensitivity with full spectrum data is equivalent to Selected Ion Monitoring (SIM) using quadrupole detection.

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

CONTACT INFORMATION

ALMSCO International
US Laboratory and Support Center
11126-D Kenwood Road
Cincinnati, Ohio 45242
POC: Kurt Thaxton
513-707-2769 or 866-483-5684
www.almsco.com

COST

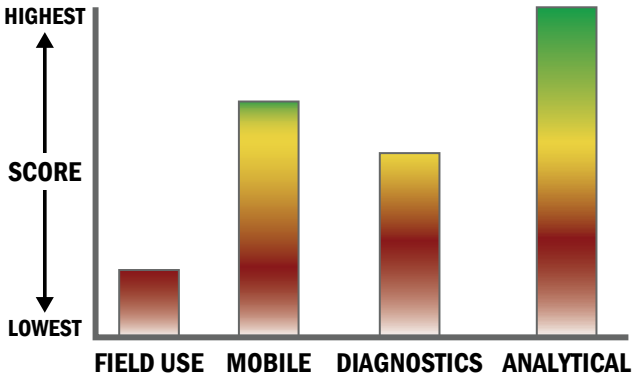
- $150,000/system
- N/A/analysis

Survey Source

Vendor Supplied Information

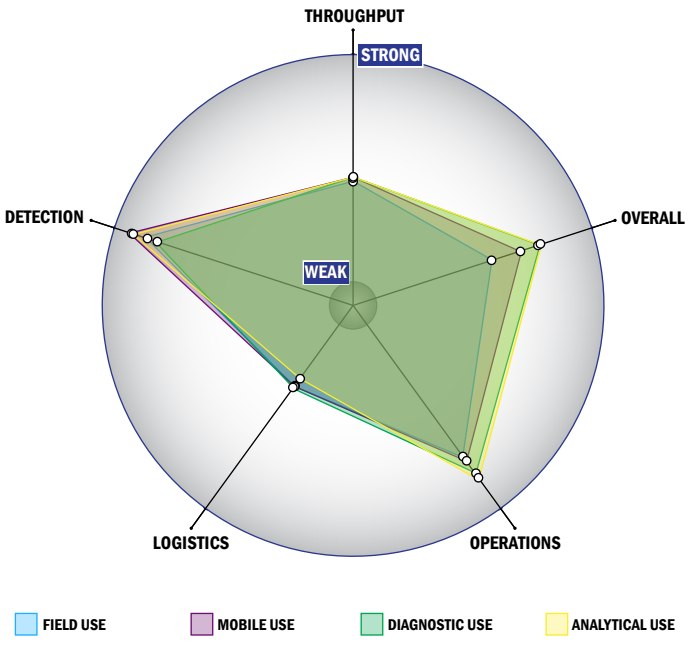
Scoring Analysis

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.



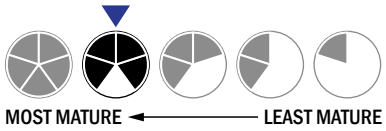
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, >10 tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 1 component
- Less than 5 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Device must be used in a temperature stable, dry environment for optimum performance
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 50 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- $<1x10^{-6}$ mg/m^3
- 1 ppb – 1 ppm
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

AMETEK, Inc. - DETECTIVE-200

GENERAL DESCRIPTION:

Ruggedized, Ultra-High-Sensitivity, Transportable HPGe Radionuclide Identification System. Applications for Wide-Area Search, Maritime, and Choke Point Monitoring.

TECHNICAL DESCRIPTION:

High-resolution, high-purity germanium (HPGe) detector. Mechanically cooled by miniature Stirling-cycle cooler. Internal GM tube provides gamma dose rate. Battery operated.



CONTACT INFORMATION

ORTEC, Advanced Measurement Technology AMETEK, Inc.
801 South Illinois Ave
Oak Ridge, TN 37831
POC: Ronald A. Zeszut DC Region Key Account Manager
216.328.1404 (Office)
Ron.Zeszut@ametek.com
www.ortec-online.com

COST

- $139,000/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

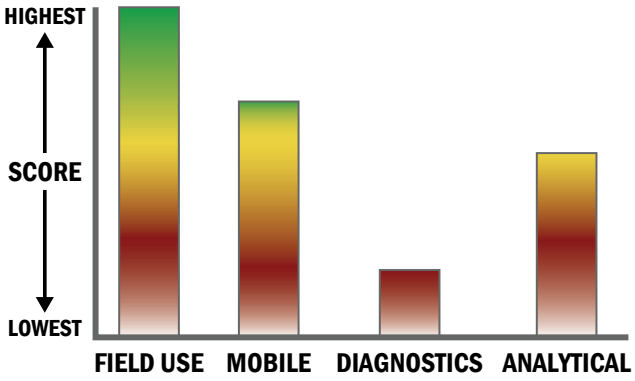
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Second Tier
MOBILE Laboratory	N/A	N/A	Second Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Second Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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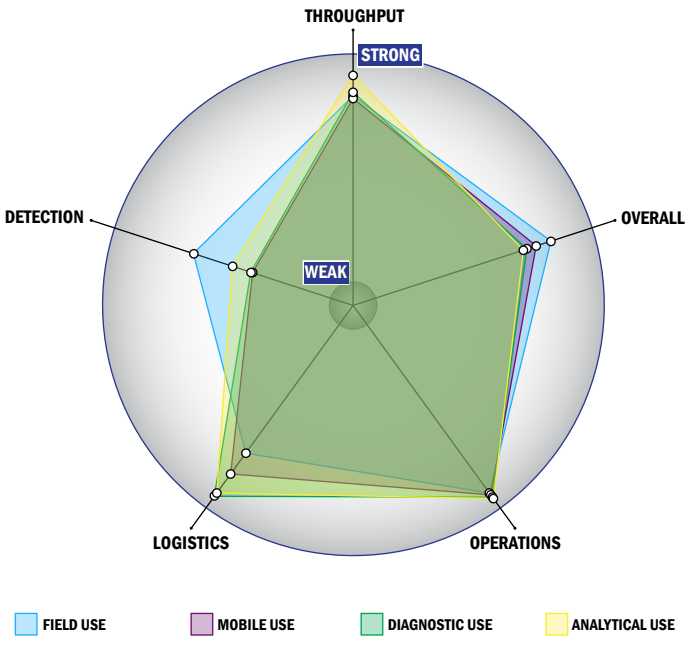


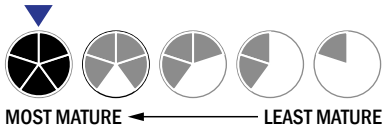
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- Greater than 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
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Not possible for the system to achieve 510K clearance
- Possible the system could receive FDA approval, no current efforts at this time
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

AMETEK, Inc. - DETECTIVE-EX-100T

GENERAL DESCRIPTION:

HPGe-based (High Purity Germanium) Portable Hand-Held Radioisotope Identifier. High resolution gamma spectroscopy and neutron detection.

TECHNICAL DESCRIPTION:

High-resolution, high-purity germanium (HPGe) detector. Mechanically cooled by miniature Stirling-cycle cooler. Internal GM tube provides gamma dose rate. Battery operated.



CONTACT INFORMATION

AMETEK, Inc.
801 South Illinois Ave
Oak Ridge, TN 37831
POC: Ronald A. Zeszut DC Region Key Account Manager
216.328.1404 (Office)
Ron.Zeszut @ametek.com www.ortec-online.com

COST

- $105,000/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

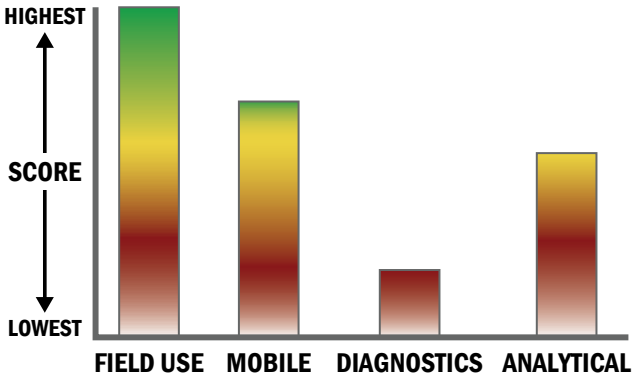
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Second Tier
MOBILE Laboratory	N/A	N/A	Second Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Second Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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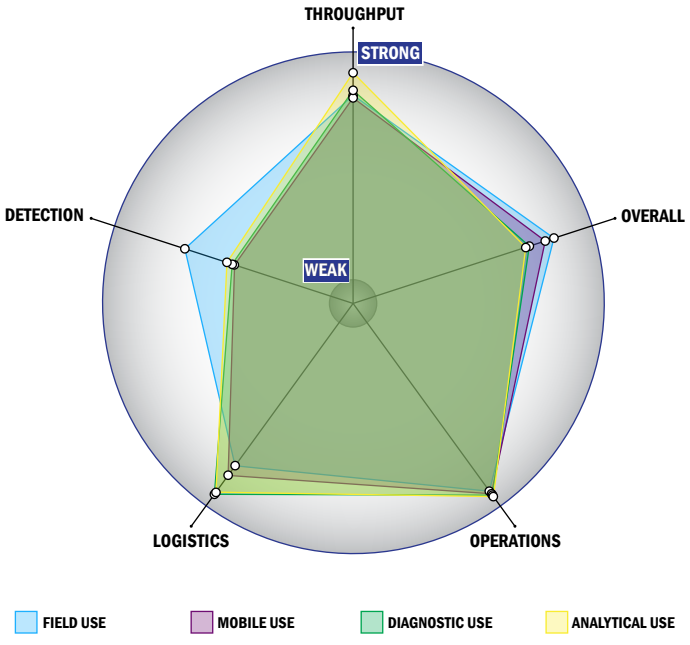


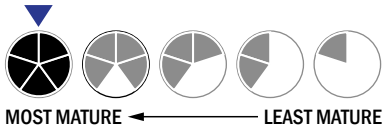
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- Greater than 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 toaster
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Not possible for the system to achieve 510K clearance
- Possible the system could receive FDA approval, no current efforts at this time
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

AMETEK, Inc. - MICRO-DETECTIVE

GENERAL DESCRIPTION:

Lightweight, HPGe-based (High Purity Germanium) Portable Hand-Held Radioisotope Identifier. High resolution gamma spectroscopy and neutron detection.



TECHNICAL DESCRIPTION:

High-resolution, high-purity germanium (HPGe) detector. Mechanically cooled by miniature Stirling-cycle cooler. Internal GM tube provides gamma dose rate. Battery operated.

CONTACT INFORMATION

ORTEC, Advanced Measurement Technology AMETEK, Inc.
801 South Illinois Ave
Oak Ridge, TN 37831
POC: Ronald A. Zeszut DC Region Key Account Manager
216-328-1404 or 216-225-7808
Ron.Zeszut @ametek.com

COST

- $105,000/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

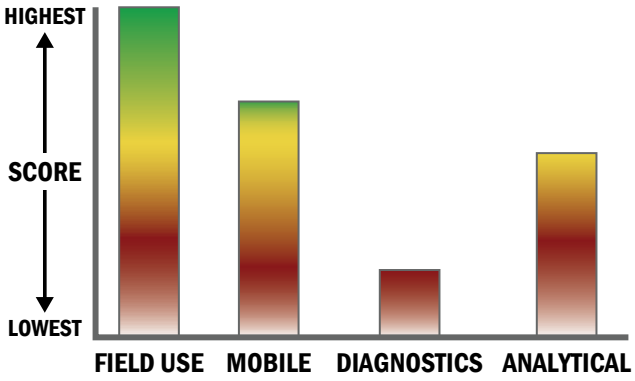
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Second Tier
MOBILE Laboratory	N/A	N/A	Second Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Second Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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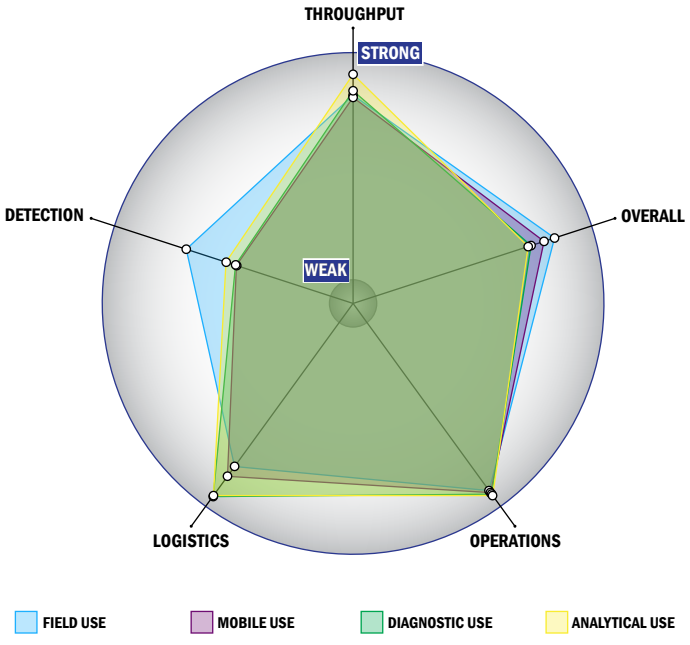


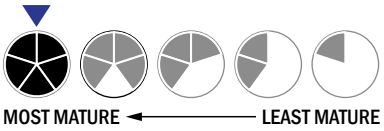
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- Greater than 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 toaster
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose, dose rate and count rate with simultaneous display readout
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

AMETEK, Inc. - MICRO-DETECTIVE-HX

GENERAL DESCRIPTION:

Lightweight, HPGe-based (High Purity Germanium) Portable Hand-Held Radioisotope Identifier. High resolution gamma spectroscopy and neutron detection.



TECHNICAL DESCRIPTION:

High-resolution, high-purity germanium (HPGe) detector. Mechanically cooled by miniature Stirling-cycle cooler. Internal GM tube provides gamma dose rate. Battery operated.

CONTACT INFORMATION

ORTEC, Advanced Measurement Technology AMETEK, Inc.
801 South Illinois Ave
Oak Ridge, TN 37831
POC: Ronald A. Zeszut DC Region Key Account Manager
216-328-1404 or 216-225-7808
Ron.Zeszut @ametek.com

COST

- $105,000/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

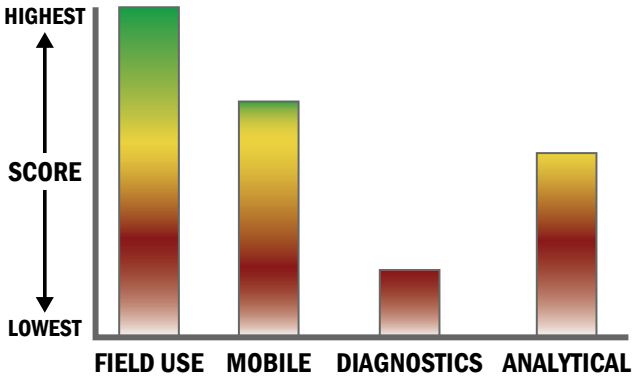
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Second Tier
MOBILE Laboratory	N/A	N/A	Second Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Second Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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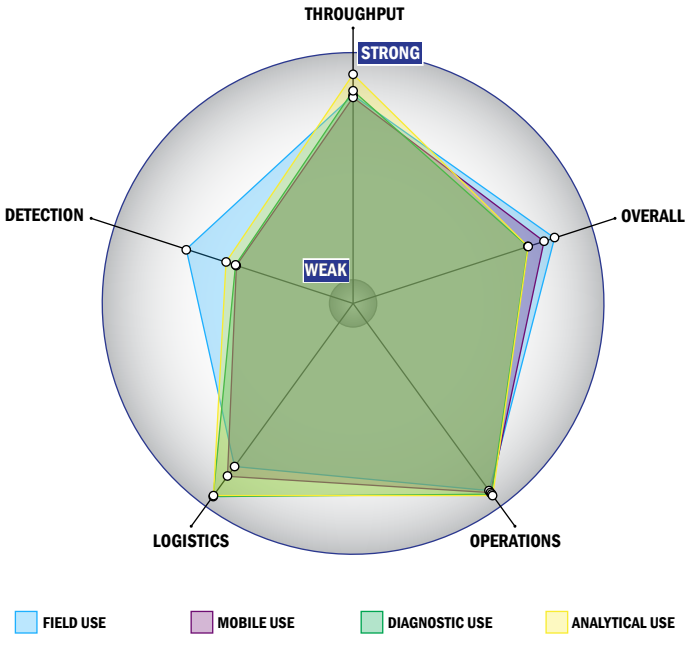


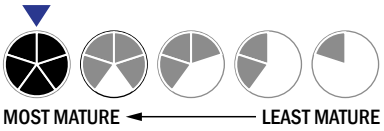
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- Greater than 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 toaster
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose, dose rate and count rate with simultaneous display readout
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

ANP Technologies, Inc. - NIDS ACE Test System

GENERAL DESCRIPTION:



The NIDS® ACE Test is an in vitro analytical test for the rapid qualitative detection of acetylcholinesterase-inhibiting pesticides, nerve agents, and heavy metals in water and food. Acetylcholine is a neurotransmitter that stimulates muscle contraction. In humans and other vertebrates, Acetylcholinesterase (AChE) is the enzyme that hydrolyzes acetylcholine, thereby regulating its levels. When AChE is inhibited, the excess acetylcholine causes the nervous system to lose control over the muscular system, resulting in convulsions, asphyxia, heart arrest, and death. Many pesticides, such as organophosphates, carbamates, and chemical warfare nerve agents, are AChE inhibitors. These classes of contaminants may be present in drinking water as the result of farm irrigation run-off where pesticides have been used or possibly by the intentional contamination of water by terrorist groups. The ACE Test is a quick method for the determination of possible water contamination by these classes of contaminants.

TECHNICAL DESCRIPTION:

The NIDS® ACE Test is based on the inhibition of acetylcholinesterase and other enzymes by pesticides and neurotoxins. Two different enzymes are used, Reagent A and Reagent B. Reagents A and B contain enzymes which have different reactivities with different acetylcholinesterase-inhibiting compounds. The reagents are lyophilized to ensure long term stability. A sample of water is introduced into a vial of Reagent A and Reagent B. A negative control composed of purified water is introduced into similar vials of Reagent A and Reagent B. The vials are mixed and allowed to react with any compounds present in the water. Acetylcholinesterase-inhibiting compounds in the water will deactivate one or both of the lyophilized enzymes. The negative control, which does not contain acetylcholinesterase inhibiting compounds, will not be deactivated. Samples from the test and control vials are introduced into designated wells on test tickets which contain filter pads that have been treated with a fluorescent substrate. The sample and control are allowed to react with the fluorescent substrate and then the level of fluorescent product in each well is measured by a reader. If the test sample contains acetylcholinesterase-inhibiting compounds, then the level of fluorescence in the test well will be significantly lower than in the control well in one or both of the tests.

CONTACT INFORMATION

ANP Technologies, Inc.
824 Interchange Boulevard
Newark, DE 19711
POC: Yli Vallejo

COST

- $10,000/system
- $20/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

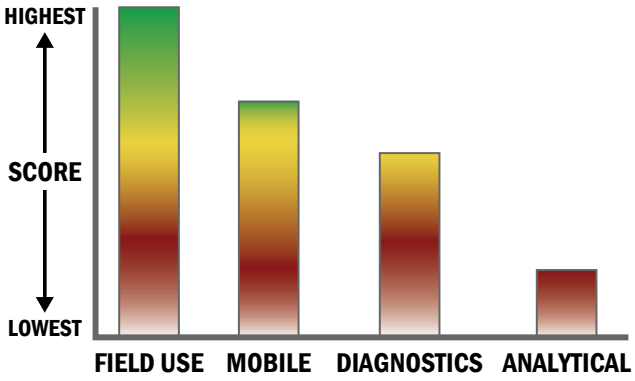
This system is the core technology in the DoD's Water Monitoring System.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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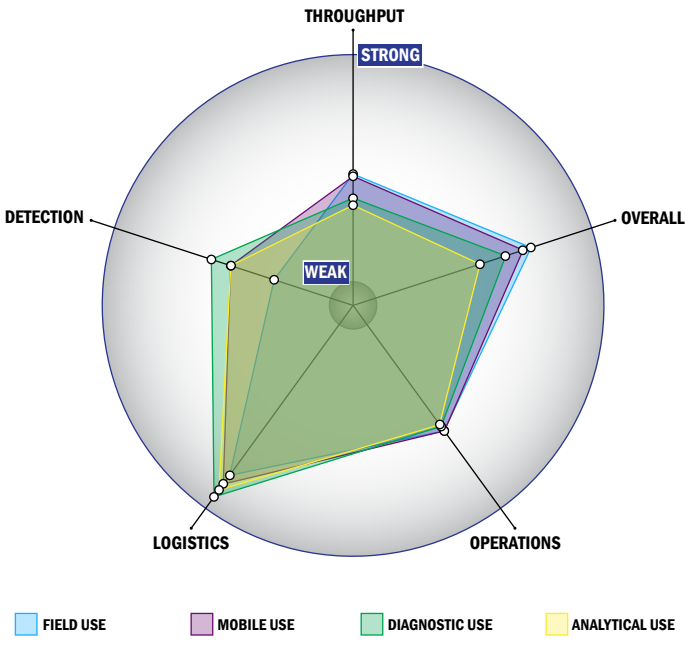


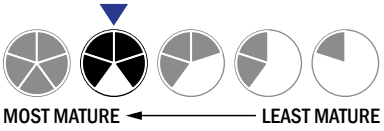
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, single tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 3 components
- Less than 5 minutes is required
- 6-8 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
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- The system could be adapted to a fully autonomous system with significant effort
- The system software is closed and not available for modification
- 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
- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1 ppb-1 ppm
- Possible system could identify aerosolized chemical agent
- System currently can identify liquid chemical agent

ANP Technologies, Inc. - NIDS-3000 BioThreat Detection Kit

GENERAL DESCRIPTION:

The NIDS BioThreat Detection Kit uses next generation multiplexed lateral flow assays to analyze powders and waters for biothreats. Coupled with the handheld reader, results are as accurate as those in a laboratory setting. The assays have 5 targets per ticket, can be stored at room temperature for up to 3 years, and do not suffer from the Hook Effect, a false negative at high concentrations.



TECHNICAL DESCRIPTION:

The next generation lateral flow assay uses our nano-manipulation technology that orients antibodies on the molecular level so that their biosensing region is always available for sensing, producing a highly sensitive assay that does not suffer from the Hook Effect as traditional lateral flow assays do.

CONTACT INFORMATION

ANP Technologies, Inc.
824 Interchange Boulevard
Newark, DE 19711
POC: Yli Vallejo

COST

- $4,500/system
- $50/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	Top Tier	N/A	N/A
MOBILE Laboratory	Top Tier	N/A	N/A
DIAGNOSTIC Laboratory	Second Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

Notes

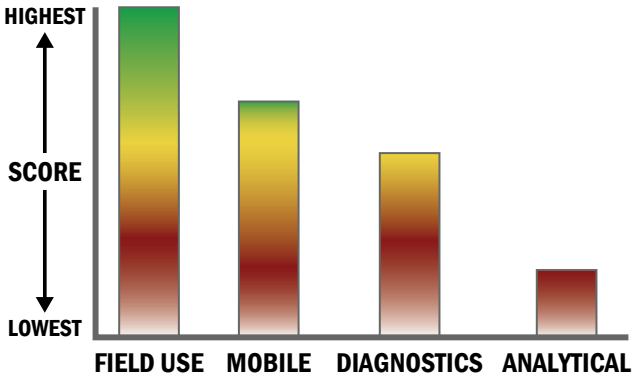
This system is the core technology in the DoD's Water Monitoring System.

Survey Source

Vendor Supplied Information

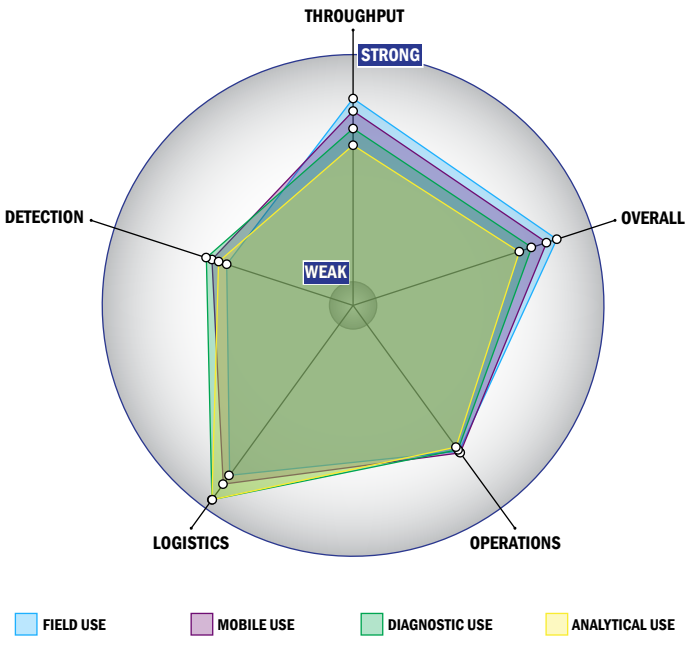
Scoring Analysis

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.



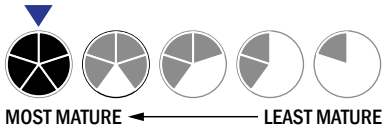
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, single tests/sample per run
- 349-96 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
- 2 components
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Between 1 and 5 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 10,000-100,000 CFU per mL
- Greater than 100,000 PFU per mL
- 1-10 ng per mL
- Spore lysis not necessary for detection by system

Appealing Products, Inc. - Detectors

GENERAL DESCRIPTION:

The POISON DETECTORS use a single prepared sample of the food to detect INSTANTLY three classes of poisons, including about 30 of the poisons most used to kill people. The poisons are detected via a characteristic color change.



The EXPLOSIVES Detectors use a single sample of the suspect material or surface to detect INSTANTLY five classes of explosives, including aromatic nitro compounds, aliphatic nitro compounds, nitramines inorganic nitrates and precursors to homemade explosives. The explosives are detected via a characteristic color change.

The TOXIC GASES Detectors and DOSIMETERS use a nanofilm of chromogenic material which changes its color in relation to the exposure dose of the toxic gas. The color change can be read manually and compared to a color chart or electronically using a reader attached to a computer. The electronic reader may be stationary or wireless.

TECHNICAL DESCRIPTION:

All the detectors use thin micro or nano layers with chromogenes embedded or bonded to the later. The material to be detected causes a color change in the layer which is subsequently detected visually or electronically.

CONTACT INFORMATION

Appealing Products, Inc.
840 Main Campus Drive Suit 3530
Raleigh, NC 27606
POC: A.J. Attar
919-515-0741
ajattar@appealingproducts.com
www.Appealingproducts.com

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

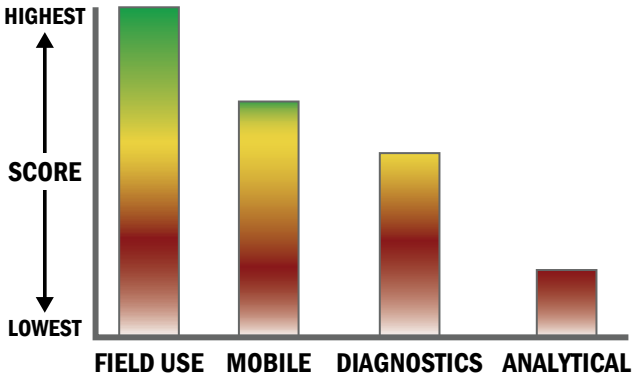
	Biological	Chemical	Radiological
FIELD USE System	N/A	Second Tier	N/A
MOBILE Laboratory	N/A	Top Tier	N/A
DIAGNOSTIC Laboratory	N/A	Top Tier	N/A
ANALYTICAL Laboratory	N/A	Second Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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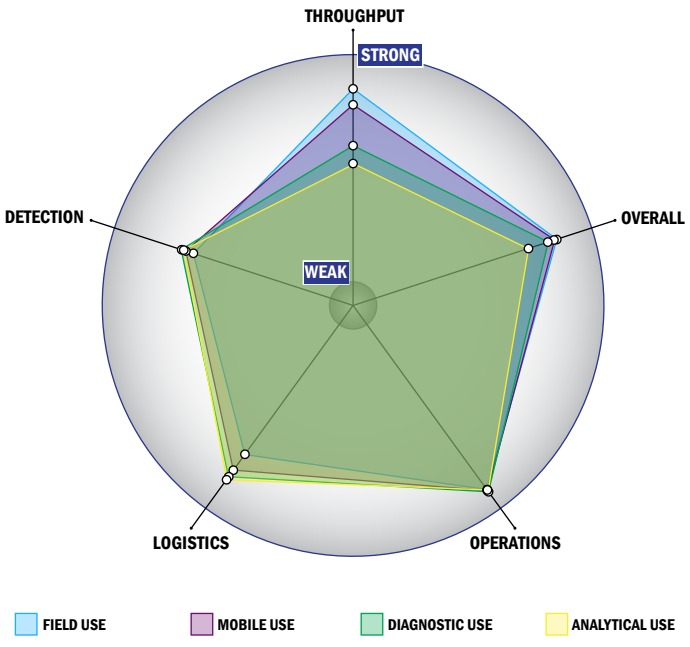


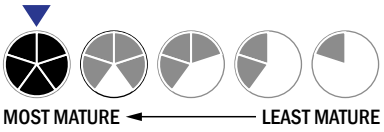
Evaluation Criteria

Throughput:

- Detection is instantaneous
- 1 sample, >10 tests/sample per run
- 349-96 samples every 2 hours
- The system or approach is not amenable to full or semi-automation
- Device or system is designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- This system is not capable of transmitting data
- There is no electrical requirement



Operations:

- Can be used from < -21 °C to > 42 °C (All temperatures)
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is open but modification requires licensing

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
- Less than 50 µL
- Poor specificity. System has a consistently high level of false alarms (>10%)
- < $1x10^{-6}$ mg/m^3
- < 1 ppb
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Applied BioCode, Inc. - Biocode-1000

GENERAL DESCRIPTION:



Applied BioCode, Inc. (ABC) has combined digital barcodes with immuno and molecular chemistry to create a new, patented Barcoded Magnetic Bead (BMB) technology. The BMBs' barcode patterns give a high-contrast transmitted signal and no fluorescence background, allowing the barcode to be identified easily and accurately, with near 100% decoding accuracy. Barcoded Magnetic Beads, are functionalized with nucleic acids, proteins or other probe molecules, offer the highest multiplex capacities available (up to 128 targets or tests) in one sample in homogeneous media. Optically bar-coded polymer beads are mass produced at low cost by well established semiconductor processes. Biocode-1000 analyzer offers 128 tests per microwell in less than one minute. BMBs have 128 digital codes. Analyzer is a BMB imaging system for a 96-well microplate format. System reads and displays the barcode and fluorescence intensity for each BMB once they settle to the bottom of the well. The Analyzer has an XY translational stage and a 12-bit CCD camera. Typically uses PE (phycoerythrin), but other fluorophores can be used by switching the optical filter sets. Sources: LED for bright field decoding and Lamp for fluorescence detection. Sensitivity: 0.5 fmole of DNA, 1.0 pg/mL protein. Dynamic range: 3-4 orders of magnitude. Beads are 70 x25 x 6 µm. File export to Excel, CSV, and other formats.

TECHNICAL DESCRIPTION:

Barcoded Magnetic Beads (BMB): From 1 to 128 tests per microwell in 40 seconds! The BMB have 128 digital codes, and a diverse range of bioassay applications can be explored using BMB with the BioCode-1000A Analyzer. BioCode-1000A Analyzer: The BioCode-1000A Analyzer is a rapid BMB imaging system with auto loader for optional robotic loading for a 96-well microplate format. The system rapidly displays the barcode and fluorescence intensity for each BMB. BioCode-1000A Software: The BioCode-1000A software is a powerful, but easy to use control program and user interface for operating the BioCode-1000A Analyzer.

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

CONTACT INFORMATION

Applied BioCode, Inc.
10020 Pioneer Blvd. #102
Santa Springs, CA 90670
POC: Winston Ho, PhD.
562-801-2088 ext 228
who@apbiocode.com

COST

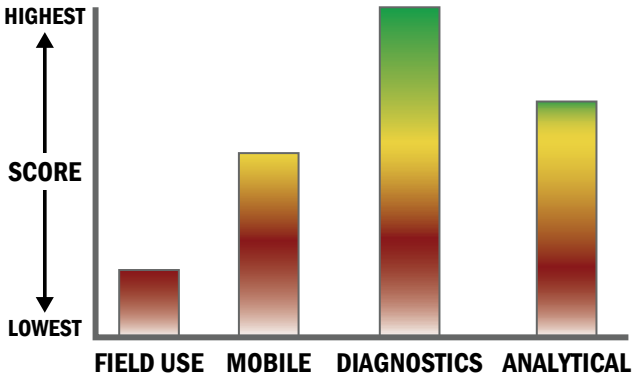
- $45,000/system
- $0.50-$1.00/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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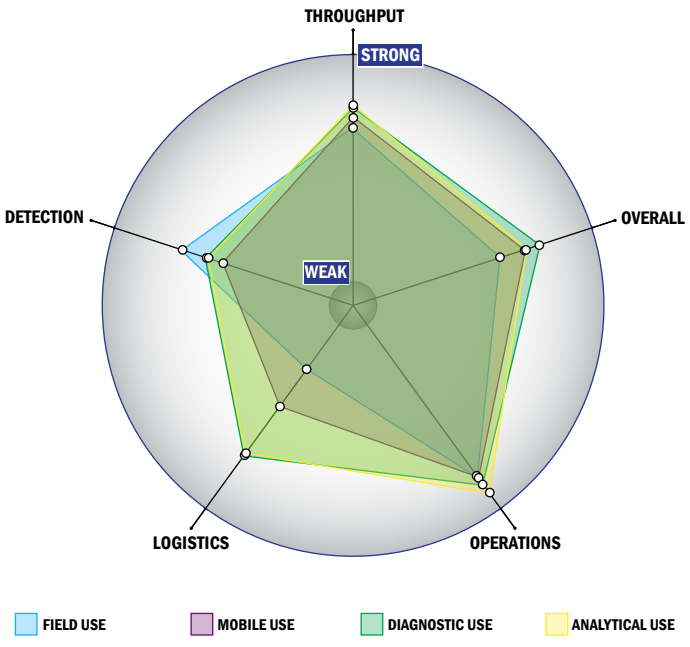


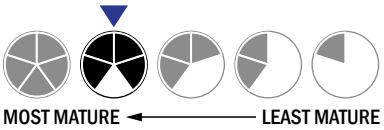
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 2 components
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Between 25 and 50 kg
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 250 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL
- System does not detect spores

Applied Biosystems - 2720

GENERAL DESCRIPTION:



The Applied Biosystems 2720 Thermal Cycler is an automated instrument, specifically designed for the amplification of nucleic acids using the GeneAmp Polymerase Chain Reaction (PCR) process. The instrument has an integrated 96-well sample block, which houses an internal Peltier heating/cooling unit. The sample block is made of aluminum to provide optimal thermal transfer rate. Platinum sensors provide a wide temperature range (4˚C to 99.9˚C), accurate measurements (±0.25˚C from 35˚C to 100˚C) and long term stability and high reliability. The sample block accommodates several different types of MicroAmp® disposable tubes and plates, which must be used in order to create a sealed chamber.

TECHNICAL DESCRIPTION:

The Applied Biosystems 2720 Thermal Cycler allows for fast and easy detection of genetic signatures using Polymerase Chain Reaction (PCR). PCR uses naturally occurring biological components to amplify genetic material (RNA or DNA) from a variety of biological and environmental sources by making billions of copies from a single copy. This amplification process requires repetitive and precise cycling of temperatures provided by Peltier-based thermal cycling elements in the 2720 combined with specialized liquid reagents and plastic disposable reaction vessels. PCR amplifies specific genetic signatures (pathogens, human genetic signatures) only if they are present in the starting material.

CONTACT INFORMATION

Applied Biosystems, Part of Life Technologies
5791 Van Allen Way
Carlsbad, CA 92008
POC: Cain Murphy
760-603-7200
cain.murphy@lifetech.com
www.lifetechnologies.com

COST

- $4,580/system
- $1.50/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	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Notes

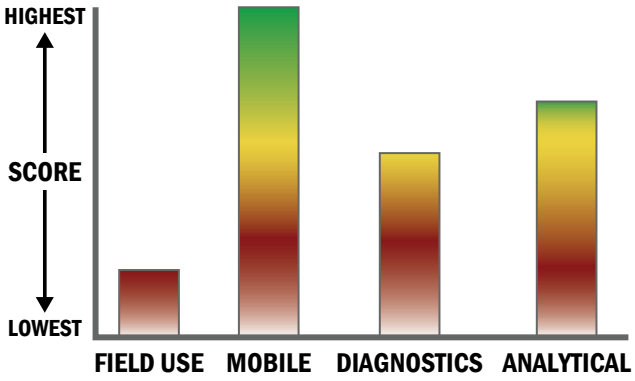
The ABI 2720 is a traditional thermocycler that does not perform real-time analysis. This system is popular as a workhorse PCR machine. The lower rankings are a result of comparison to other devices with automation and optics.

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

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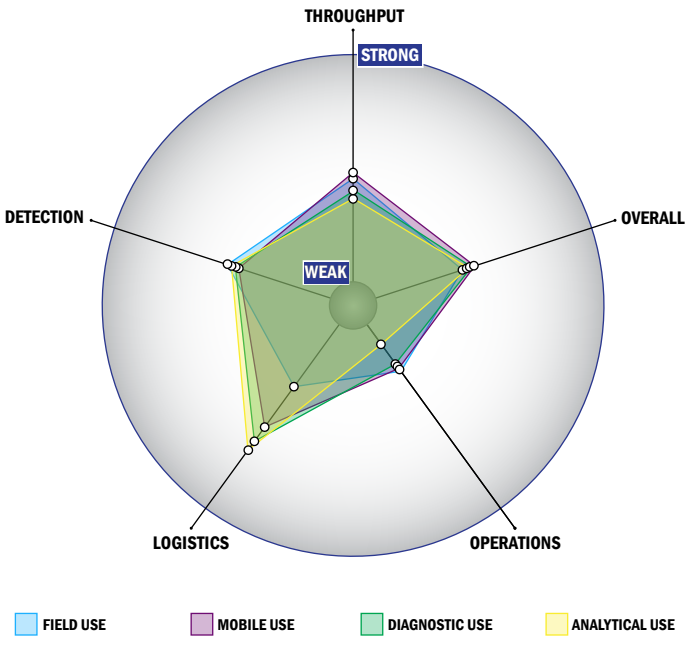


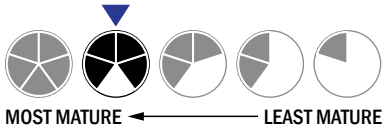
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 2 components
- 10-20 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25kg
- This system is not capable of transmitting data
- System or device has 110V electrical requirement
- The device is not intended for portable use
- Is commercially available
- The device is not intended for portable use
- Is commercially available



Operations:

- Can be used from 4˚C to 37˚C
- Components must be frozen (-20˚C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 3-5 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- 1-100 CFU/mL of original sample
- 1-100 PFU/mL of original sample
- Manual kit not integrated with the system handles spore lysis

Applied Biosystems - 7500 Fast Dx Real-Time PCR Instrument

GENERAL DESCRIPTION:

The Applied Biosystems® 7500 Fast Dx Real-Time PCR Instrument is a real-time PCR instrument used in conjunction with FDA-cleared assays for diagnostic detection of genetic material. Available assays include the CDC's H1N1 flu virus and Dengue assays.



TECHNICAL DESCRIPTION:

The Applied Biosystems® 7500 Fast Dx Real-Time PCR Instrument, with SDS v1.4 Software, is a 96-well, 5-color real-time PCR instrument available for in vitro diagnostic use in the laboratory that employs real-time TaqMan® polymerase chain reaction amplification of genes on a peltier-based thermocycling apparatus.

CONTACT INFORMATION

Applied Biosystems
850 Lincoln Centre Drive
Foster City, CA 94404
650-638-5800
www.appliedbiosystems.com

COST

- $65,900/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	Fourth Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

Notes

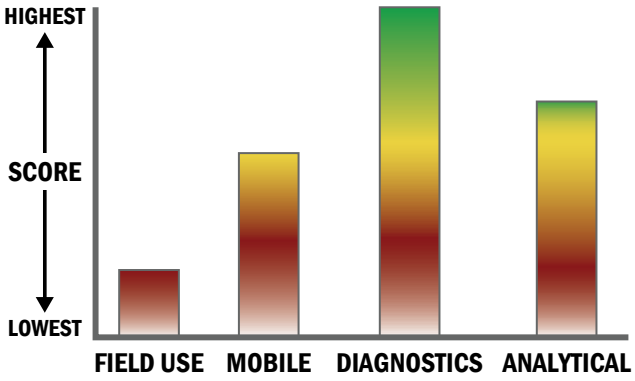
This device is used by the DoD and CDC LRN laboratories for real-time PCR analysis.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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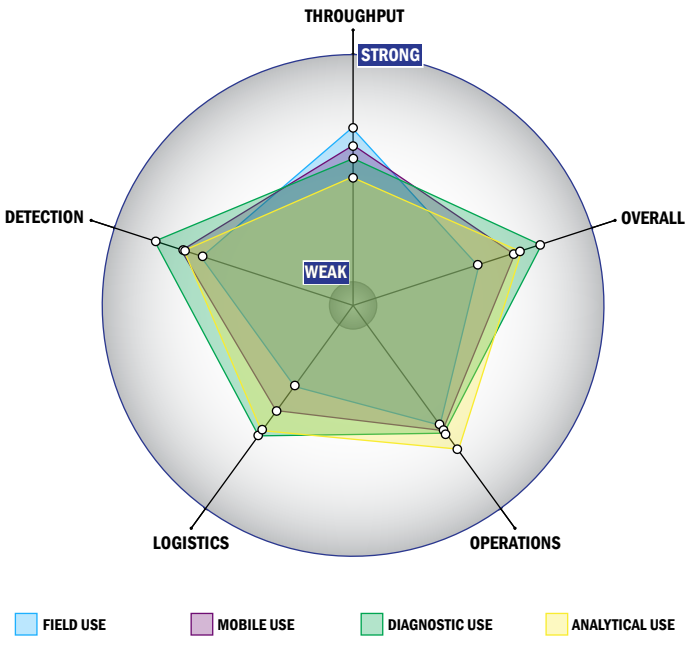


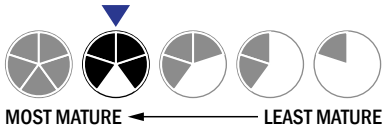
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 3 components
- No set-up of the system is required
- 3-5 steps are required for detection

Logistics:

- A day of training and technical skills are 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



Operations:

- Can be used from 25°C to 37°C
- Components must be frozen (-20°C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- System currently has 510k clearance
- System currently has FDA approval
- Less than 50 µL
- 1-100 CFU per mL
- 1-100 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Applied Biosystems - 7500 Fast Real-Time PCR System

GENERAL DESCRIPTION:



For Research Use Only. Not for use in diagnostic procedures. ABI 7500 Fast Real-Time PCR System is used for molecular biology applications via quantitative or real-time PCR, including quantitative gene expression analysis, genotyping, SNP analysis, pathogen detection, drug target validation and for measuring RNA interference. 7500 Fast can also be used to quantify messenger RNA (mRNA) and MicroRNA (miRNA) in cells or tissues. Customers may develop/design their own assays or take advantage of Applied Biosystems/Life Technologies pre-designed, fully-optimized assays.

TECHNICAL DESCRIPTION:

ABI 7500 Fast uses detection systems that employ real-time TaqMan® polymerase chain reaction amplification of genes on a Peltier-based thermocycling apparatus, or customer-designed SYBR-based assays.

CONTACT INFORMATION

Life Technologies
850 Lincoln Centre Drive
Foster City, CA 94404
POC: Lance Wakida
www.lifetechnologies.com

COST

- $49,9000/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	Fourth Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Notes

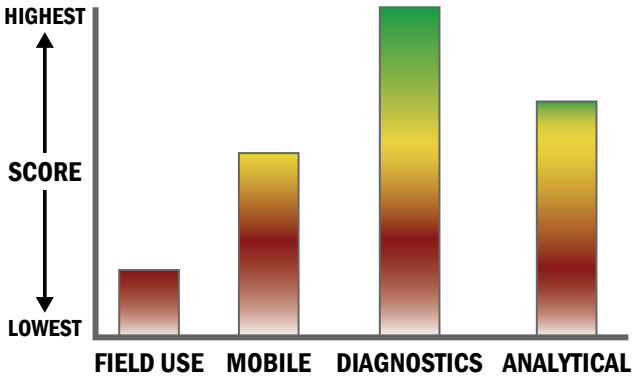
This device is used by the DoD and CDC LRN laboratories for real-time PCR analysis.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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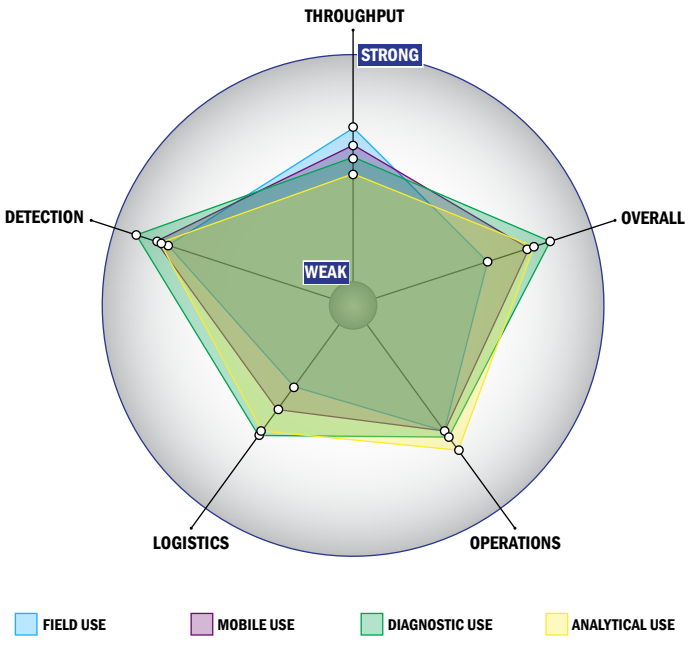


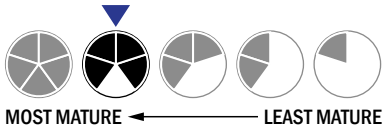
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system could be adapted to a fully automated system with some effort
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 3 components
- No set-up of the system is required
- 3-5 steps are required for detection

Logistics:

- A day of training and technical skills are 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
- The device is not intended for portable use
- Is commercially available



Operations:

- Can be used from 4˚C to 37˚C
- Components must be frozen (-20˚C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 3-5 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- 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
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU/mL of original sample
- 1-100 PFU/mL of original sample
- Manual kit not integrated with the system handles spore lysis

Applied Biosystems - 7900HT Fast Real-Time PCR System

GENERAL DESCRIPTION:



The Applied Biosystems 7900HT Fast Real-Time PCR System is the only real-time quantitative PCR system that combines 96- and 384-well plate compatibility and the TaqMan® Low Density Array with fully automated robotic loading-and now also offers optional Fast real-time PCR capability. The system is intended for laboratory analysis and is versatile and adaptable for many matrices.

TECHNICAL DESCRIPTION:

High Throughput (HT) Real-time TaqMan® and other probe/dye polymerase chain reaction amplification of genes on a Peltier-based thermocycling apparatus.

CONTACT INFORMATION

Life Technologies
850 Lincoln Centre Dr MS 407
Foster City, CA 94404
POC: Levente Egry
650-554-3447
levente.egry@lifetech.com
www.lifetechnologies.com

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	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Notes

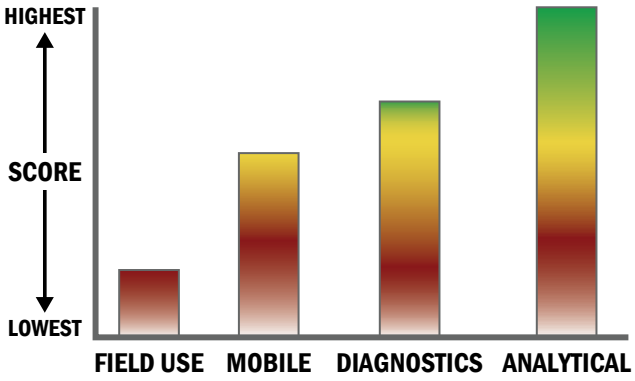
The model 7900 is popular when high throughput is a priority. When lower numbers of samples and lower cost is desired the model 7500 is often selected.

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

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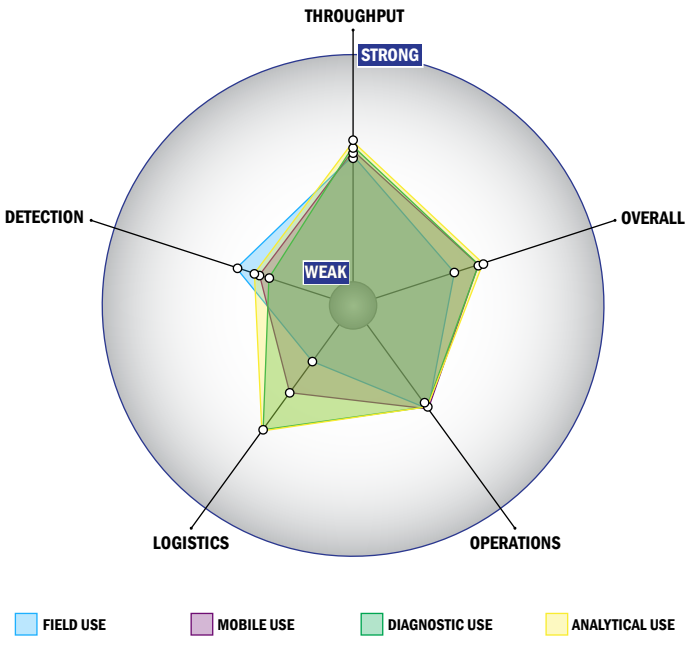


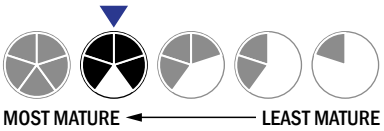
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours per assay
- Multiple samples, multiple tests/sample per run
- Greater than 750 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 2 components
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a home dishwasher
- Weighs more than 50 kg
- Wired connections are available
- System or device has 220V electrical requirement
- The device is not intended for portable use
- Is commercially available



Operations:

- Can be used from 4°C to 37°C
- Components must be frozen (-20°C)
- Yes, device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years
- 5-10 years shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- Less than 50 µL per analysis
- 1-100 CFU/mL of original sample
- 1-100 PFU/mL of original sample
- Manual kit not integrated with the system handles spore lysis

Applied Biosystems - 9700

GENERAL DESCRIPTION:



The GeneAmp PCR System 9700 is an automated instrument, specifically designed for the amplification of nucleic acids using the Polymerase Chain Reaction (PCR) process. The user interface consists of a control panel with a full numeric keypad, soft keys, and a graphical display screen that shows the time and temperature profile for each run. The sample compartment holds up to 96 MicroAmp Reaction Tubes (0.2 mL). The internal Peltier heating/cooling unit is housed in the sample block module. Platinum sensors provide a wide temperature range (4°C to 99.9°C), accurate measurements (±0.25°C from 35°C to 100°C) and long term stability and high reliability.

TECHNICAL DESCRIPTION:

The Applied Biosystems 9700 Thermal Cycler allows for fast and easy detection of genetic signatures using Polymerase Chain Reaction (PCR). PCR uses naturally occurring biological components to amplify genetic material (RNA or DNA) from a variety of biological and environmental sources by making billions of copies from a single copy. This amplification process requires repetitive and precise cycling of temperatures provided by Peltier-based thermal cycling elements in the 9700 combined with specialized liquid reagents and plastic disposable reaction vessels. PCR amplifies specific genetic signatures (pathogens, human genetic signatures) only if they are present in the starting material.

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	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

CONTACT INFORMATION

Applied Biosystems part of Life Technologies
5791 Van Allen Way
Carlsbad, CA 92008
POC: Cain Murphy
760-603-7200
cain.murphy@lifetech.com
www.lifetechnologies.com

COST

- $8,010 - $15,820/system
- $1.50/analysis

Notes

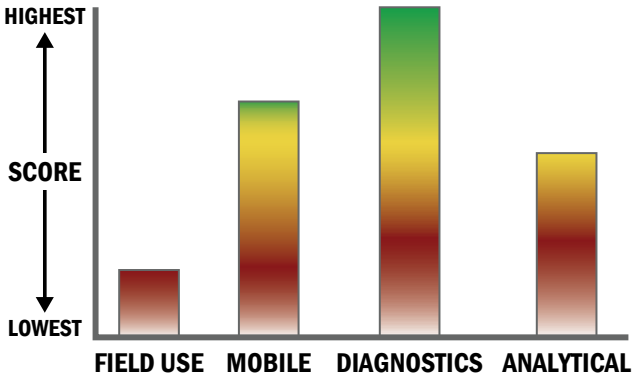
The ABI 9700 is a traditional thermocycler that does not perform real-time analysis. This system is popular as a workhorse PCR machine. The lower rankings are a result of comparison to other devices with automation and optics.

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

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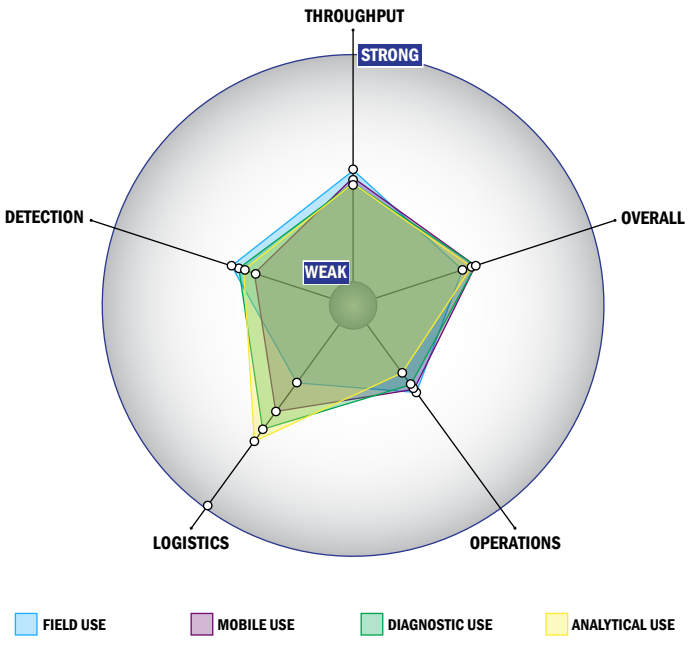


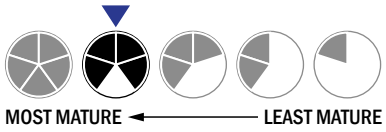
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 2 components
- 10-20 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25 kg
- This system is not capable of transmitting data
- System or device has 110V electrical requirement
- The device is not intended for portable use
- Is commercially available



Operations:

- Can be used from 4 °C to 37 °C
- Components must be frozen (-20 °C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 3-5 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- 1-100 CFU/mL of original sample
- 1-100 PFU/mL of original sample
- Manual kit not integrated with the system handles spore lysis

Applied Biosystems - ViiA 7 Real-Time PCR System

GENERAL DESCRIPTION:

ViiA 7 Real-Time PCR System can serve various purpose from testing environmental samples, verifying and quantifying bacterial or viral existence, and validating DNA/RNA sequence existence.



TECHNICAL DESCRIPTION:

Instrument that employs real-time TaqMan® polymerase chain reaction amplification of genes on a peltier-based thermocycling apparatus. The ViiA 7 Real-Time PCR System is available in 384-well, 96-well, Fast 96-well or proprietary TaqMan Array 384-well low volume format.

CONTACT INFORMATION

Applied Biosystems
850 Lincoln Centre Drive
Foster City, CA 94404
650-638-5800
www.appliedbiosystems.com

COST

- $71,000/system
- $1-2/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier
Fourth Tier Bottom Tier

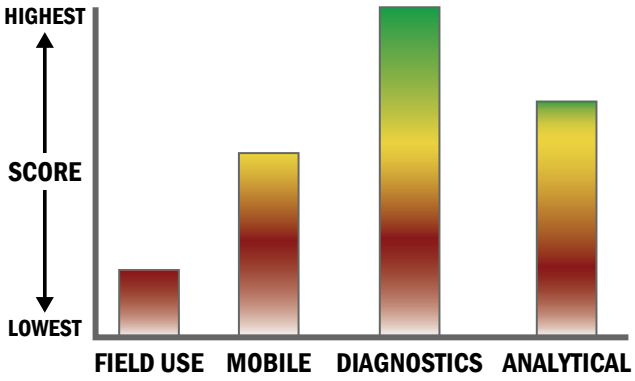
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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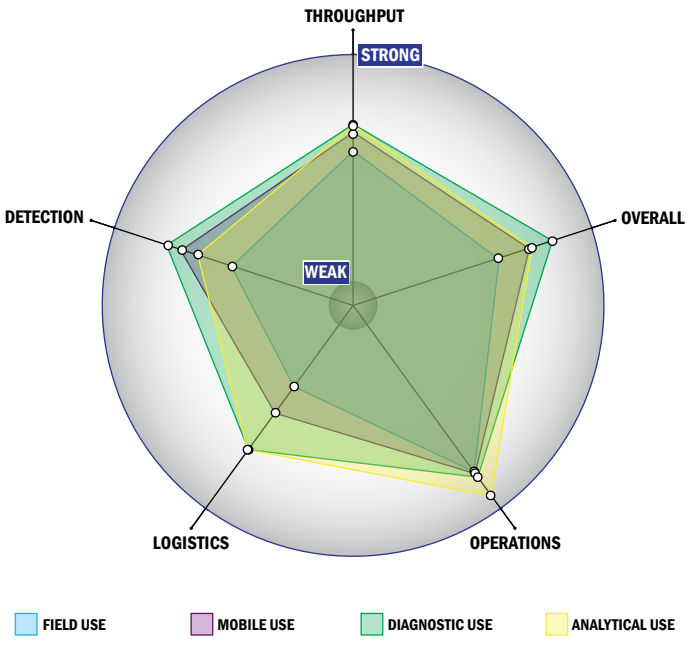


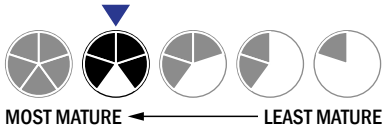
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 2 components
- 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 home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at 4 °C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 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 open but modification requires licensing

Detection:

- Efforts are underway to achieve 510K clearance
- Efforts are underway to achieve FDA approval
- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Spore lysis not necessary for detection by system

ARA, Inc. - Manportable CBRNE Detection System

GENERAL DESCRIPTION:



The Manportable CBRNE Detection System is a backpack-style field instrument intended for first responders and other users. It is intended for many different types of samples from environmental through industrial, and has been shown adaptable to many matrices. A unique feature is that the analysis is usually conducted in situ; i.e., without taking samples or preparing material. The system is comprised of a backpack and a handheld optical probe. Detections of threat and non-threat materials are reported to the operator on a display within about 2 seconds in a user-friendly format. Dozens of distinct materials, including nuclear, radiological, explosive materials and bacterial strains, have been detected with this instrument. When nuclear material is detected, an attachment can be quickly connected to enable the fast determination of isotopic enrichment of the material. This rugged instrument is currently at the TRL-6 level, and has undergone extensive testing.

TECHNICAL DESCRIPTION:

The Manportable CBRNE Detection System is based on laser-induced breakdown spectroscopy (LIBS). Miniaturized components permit adaptation to a compact, backpack-style system. In LIBS, a laser pulse is used to create a spark on a material surface. Optical emission from this spark is analyzed using a compact spectrometer. This spectrum is automatically processed using an on-board micro-computer to generate a report of materials detected. Dozens of threat and non-threat materials have been detected with this system, including uranium, plutonium, specific explosives, and bacterial strains. The use of advanced chemometric techniques permits identification of a wide range of complex materials. High-resolution spectroscopy is conducted using a compact attachment on nuclear materials, enabling isotopic ratios to be determined quickly in the field.

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	Top Tier	Top Tier	Top Tier
MOBILE Laboratory	Top Tier	Top Tier	Second Tier
DIAGNOSTIC Laboratory	Second Tier	Top Tier	Second Tier
ANALYTICAL Laboratory	Second Tier	Second Tier	Second Tier

CONTACT INFORMATION

ARA, Inc.
4300 San Mateo Blvd NE
Albuquerque, NM 87110
POC: Randy Jones
505-881-8074

COST

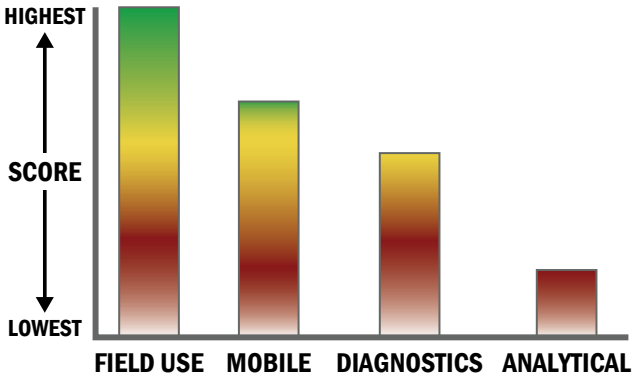
- $70,000 - $140,000/system
- $0/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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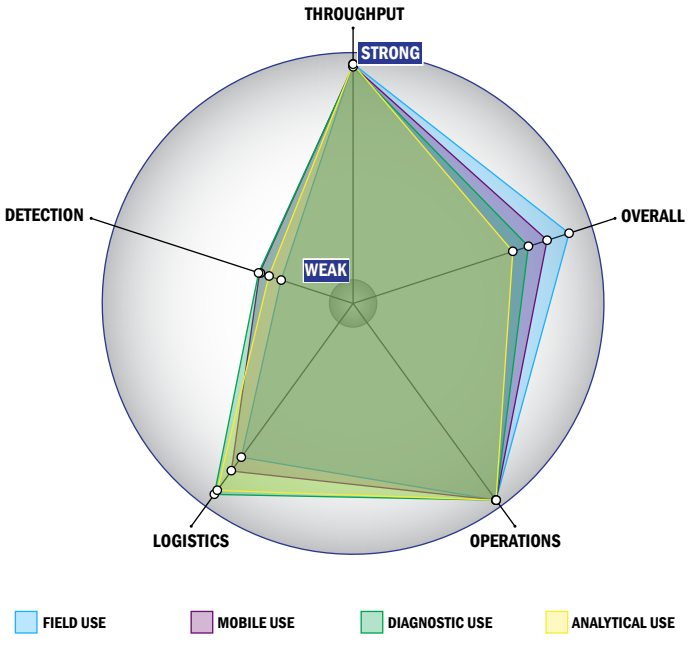


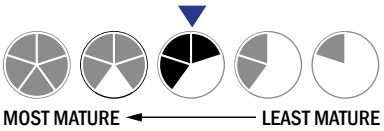
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- 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
- 0 components
- 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
- 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°C to 41°C
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 3-5 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:

- 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
- Less than 50 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Possible the system could identify liquid chemical agent
- System is used for surveying

Arrayit Corporation - InnoScan

GENERAL DESCRIPTION:

0.5 micron resolution microarray scanner, fluorescence based, designed for laboratory analysis



TECHNICAL DESCRIPTION:

Next generation microarray scanning technology. World's only sub 1 µm microarray substrate slide scanner on the market. Proprietary rotary scanning architecture permits the fastest scanning speeds. 3 minutes to scan an entire 25 x 76 mm substrate slide. Scan 24 substrate slides in 100 minutes with autoload feature. Rotary scanning architecture reduces vibrational noise and increases image quality. Much greater reliability and longevity than conventional raster scanners. High resolution acquisition system: scans spot sizes down to 5 µm diameter. Real-time image acquisition for all microarray types including but not limited to in-situ high density glass slide microarrays, spotted microarrays of all kinds, tissue and cell microarrays. Low background noise and high sensitivity system. Uniform scanning across the entire microarray surface regardless of substrate type (glass, membrane and plastic). Not sensitive to shocks, vibrations and slide deformation (portable). Delivered with Mapix® software: an easy to use data acquisition and image analysis software including automatic spot recognition and powerful image analysis. Software for various OS environments (Linux, Windows). Ethernet interface allows easy data sharing (scanner can be shared over network by several users). Affordable price, low maintenance. Lightweight, robust structure makes it portable system. Small footprint for laboratory space saving.

CONTACT INFORMATION

Arrayit Corporation
524 East Weddell Drive
Sunnyvale, CA 94089
POC: Rene Schena, CEO
408-744-1331
www.arrayit.com

COST

- $125,000/system
- $100/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

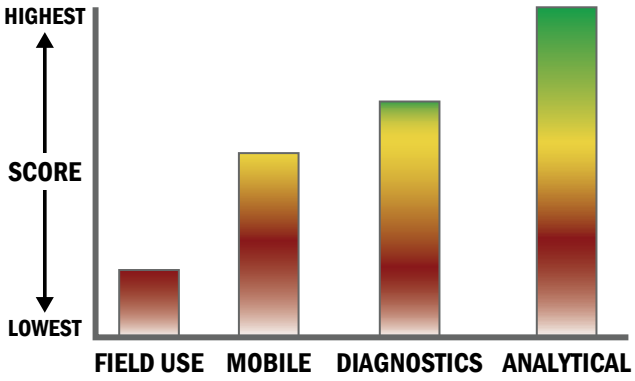
	Biological	Chemical	Radiological
FIELD USE System	Top Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Second Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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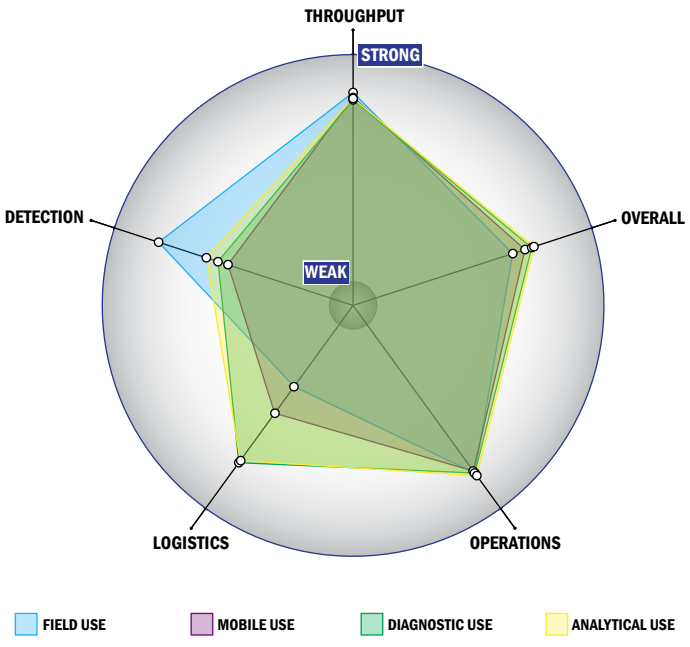


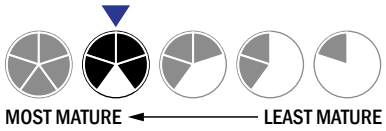
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 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
- Less than 5 minutes is required for set-up
- 3-5 steps are required for 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
- System or device has 110V electrical requirement



Operations:

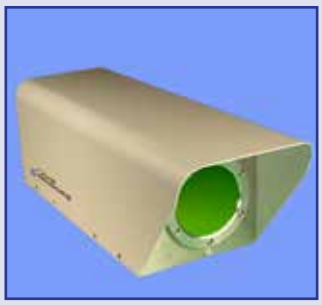
- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL

Avir Sensors, LLC - ChemSight

GENERAL DESCRIPTION:



The ChemSight® detector can identify minute quantities of hazardous gaseous chemicals (CWAs and TICs) over a wide coverage area, has minimal operating costs and is designated as a Qualified Anti-Terrorism Technology. The ChemSight® Chemical detector from Avir Sensors puts unprecedented detection and identification capability into the hands of safety officers by delivering comprehensive information about chemical threats in a matter of seconds. The ChemSight® detector is a continuously operating, open path detector that uses infrared spectroscopy. It can reliably monitor lines of sight of up to 45 meters and detect and identify multiple chemicals and interferants. The ChemSight® detector is particularly suitable to monitor large facilities military bases and perimeters, indoor or outdoors, that face constantly varying challenges by multiple threats. It is robust, easy to install and operate — even by untrained personnel. The ChemSight's exceptionally low-maintenance schedule and no consumables make it the only "install-and-forget" detector in the field. Unlike point detectors that can provide only localized snapshot views of the protected area, the ChemSight® detector offers a global view and fast response to nearly all chemical challenges and interferants. The ChemSight® detector can be used with confidence in security applications because it detects and identifies a wide range of TICs (toxic industrial chemicals) and interferants. Identify high and low concentrations without risking poisoning its detector elements. New signatures can be uploaded into ChemSight® detector through standard wired and wireless networks. SiteProtector™ software readily integrates with industry standard security network systems or can act as its own autonomous detector system.

TECHNICAL DESCRIPTION:

The ChemSight® is an open-path chemical detector. It includes an eye-safe IR source that projects a collimated spectrally-broad beam (blackbody emission) towards the detector where the beam is analyzed spectroscopically by a multi-spectral, room temperature detector array. Chemicals intercepting the IR beam absorb portion of the energy and are detected, identified and quantified by matching their IR absorption spectrum against signatures stored in the detector's digital library. By avoiding air sampling it can provide fast detection and recovery (1 sec), months - or even years - of continuous operation with no consumables and only minimal and infrequent maintenance.

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	Fourth Tier	N/A
MOBILE Laboratory	N/A	Bottom Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Bottom Tier	N/A

Survey Source

Vendor and Internet Supplied Information

CONTACT INFORMATION

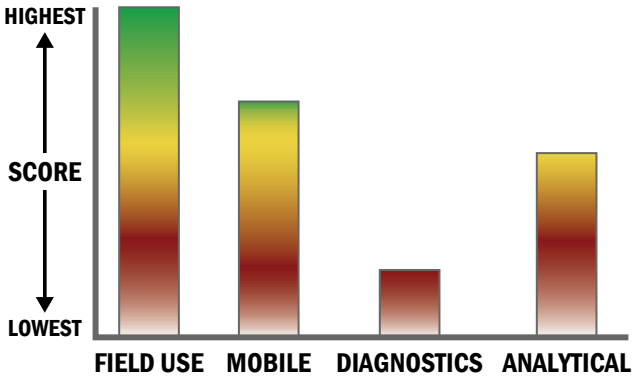
Avir Sensors, LLC
1484 Greenbrier Place
Charlottesville, VA 22901
www.avirsensors.com

COST

- $31,000/system
- $0.00/analysis

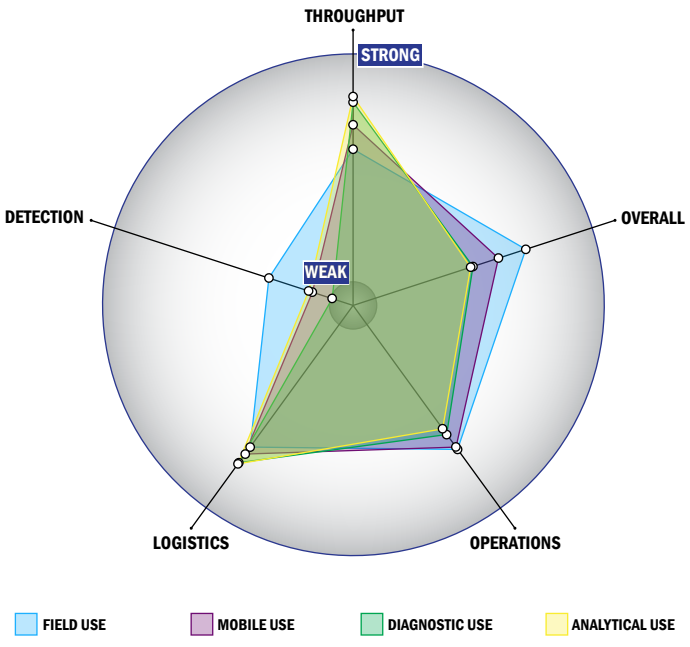
Scoring Analysis

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.



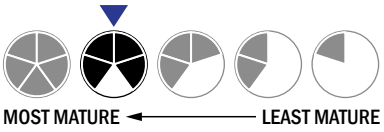
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple 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
- Greater than 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 toaster
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 1-2 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Performance is not influenced by relative humidity
- 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 closed and not available for modification
- The system hardware is closed and not 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Possible system could be adapted to identify aerosolized chemical agent

Axela, Inc.- dotLab mX

GENERAL DESCRIPTION:



The dotLab® mX System uses a novel, flow based Diffractive Optics Technology (dot®) to combine multiplex immunoassay formats with real time measurements. The result is a highly flexible, easy to use and low cost platform that can provide more informative immunoassays compared to traditional techniques. Together these features are designed to address the growing need for running routine, multiplex assays on a variety of crude biological samples. With the dotLab® mX System, researchers will have the abilities to qualify reagents during immunoassay development, develop novel diagnostic tests, or investigate disease biomarkers for potential clinical applications.

One of the key applications for the dotLab® mX System is the development of rapid diagnostic tests for infectious diseases which can be performed at the point of testing. The System is also well adapted to analyze fresh samples as they are acquired and can analyze intact pathogens eliminating sample preparation.

TECHNICAL DESCRIPTION:

Diffractive optics technology combines grating-based light diffraction and immobilized capture surfaces. Capture molecules are immobilized on an ordered pattern of lines that form a diffraction grating on the prism-shaped dotLab® Sensor. Diffraction beams are generated when the patterned molecules are illuminated with a laser. Binding of biomolecules to the patterned capture molecules increases the height of the surface pattern, producing an increased phase shift in the reflected beams, which in turn increases diffraction signal intensity that is detected in real time by a photodiode detector below the sensor. The laser beam doesn't pass though the bulk solution in the flow channel significantly reducing the effects of sample refractive index which allows for the direct analysis of crude biological samples. Its picomolar sensitivity and extended dynamic range of detection (> 7 logs) enable the analysis of both high and low abundance analytes without the need to perform sample dilutions. Finally, multiplex optical sensors have been created that can be customized by the user to analyze a multiple of biomarkers of their choice.

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

CONTACT INFORMATION

Axela, Inc.
50 Ronson Drive, Suite 105
Toronto, ON M9W 1B3
POC: Naomi Wessel
n.wessel@axela.com

COST

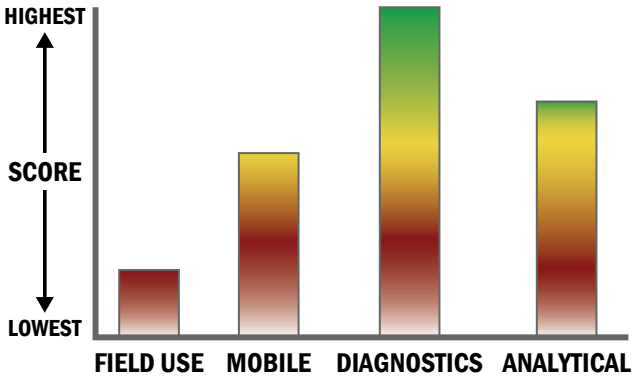
- $73,500/system
- $5-$10/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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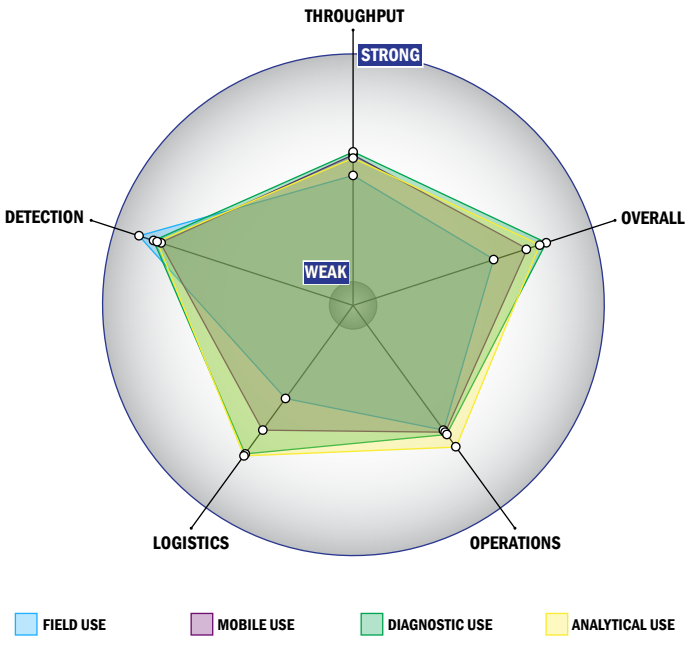


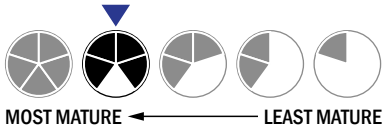
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 4 solutions, buffer, eluents, and/or reagents
- 3 components
- Less than 5 minutes is required for set-up
- 3-5 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
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at 4 °C
- Device or system has peak performance at normal relative humidity conditions
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Not possible for the system to achieve 510K clearance
- Efforts are underway to achieve FDA approval
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL
- Manual kit not integrated with the system handles spore lysis

Axela, Inc.- Ziplex Automated Work Station

GENERAL DESCRIPTION:



The Ziplex® is a automated microarray platform that is designed for routine and focused multiplex analysis for both RNA and protein research. The Ziplex uses a highly reproducible, medium density array to provide users with expression information. It uniquely combines and automates three separate functions (biomolecular binding, washing/labeling and imaging) into a single bench top instrument. Other features of the Ziplex® include:

- Flow-Thru Microarray Chip Technology that enables fast oligonucleotide hybridization and protein binding
- Medium Density Microarrays that provides quantitative data on 120 or more different biomarkers
- Automated functionality minimizing user interaction to only sample preparation, workflow entry, and sample/reagent loading
- Rapid Throughput running up to 8 gene expression samples per run in just 3 hours allowing up to 24 tests per day
- Built-in image capture and analysis software
- High Sensitivity for low abundant biomarkers
- Single, Robust Platform for both gene and protein expression analysis
- Affordable with low cost per data point.

TECHNICAL DESCRIPTION:

Axela's automated Ziplex System uses a unique flow thru technology within a single-use TipChip consumable. The TipChip is a disposable device consisting of a 6.5 mm square chip mounted on a plastic tube. The chip is made of porous silicon with >200,000 microchannels. This approach facilitates the interaction between target molecules and immobilized probes resulting in fast oligonucleotide hybridization or protein binding. Features of the TipChip Arrays are the following:

- Ideal for automated multiplex analysis of gene and protein expression
- Designed to contain up to 576 spots per chip ("features")
- Each microarray can provide quantitative data on 120 or more different biomarkers.
- Up to eight TipChip arrays can be run on the Ziplex system simultaneously
- Binding activity on each feature is detected by chemiluminescence using a CCD camera

The embedded software built into the Ziplex System automatically analyzes the images, quality controls the data and outputs the microarray data.

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

CONTACT INFORMATION

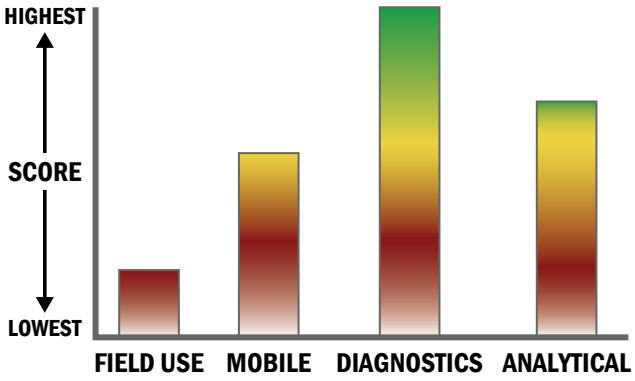
Axela, Inc.
50 Ronson Drive, Suite 105
Toronto, ONTARIO M9W 1B3
POC: Naomi Wessel
n.wessel@axela.com
416-798-1625

COST

- $85,000/system
- $75-$100/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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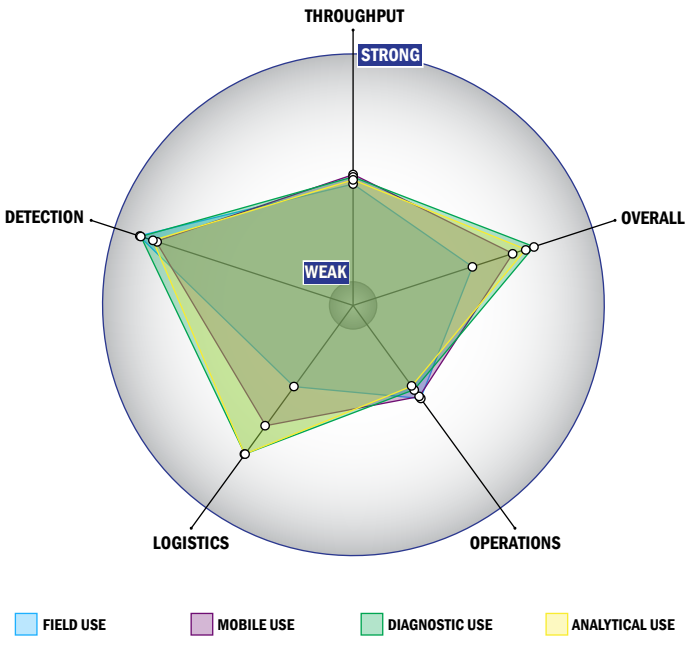


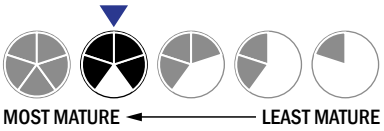
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 2 components
- Less than 5 minutes is required for set-up
- 6-8 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

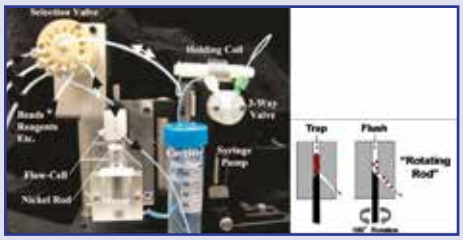
- Can be used from 4 °C to 37 °C
- Components must be frozen (-20 °C)
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- Efforts are underway to achieve FDA approval
- Less than 50 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL
- Manual kit not integrated with the system handles spore lysis.

Battelle - Pacific Northwest National Laboratory - Biodetection Enabling Analyte Delivery System (BEADS)

GENERAL DESCRIPTION:



BEADS is a universal fluidics platform that enables automated processing of surface functionalized magnetic and non-magnetic beads. BEADS enables faster more sensitive assays for a wide range of biothreat targets including DNA/RNA, bacteria, viruses, spores, oocytes, proteins, etc. BEADS enables a high degree of sample purification and concentration and is applicable for a broad range of matrices. BEADS serves as a front-end to a variety of detectors (e.g., PCR, Flow Cytometry, Electrochemical detectors, Fluorescence or Absorbance Detectors, etc.) or can be integrated with robotic systems . BEADS can serve as a sample purification and concentration front-end, or detectors can be integrated within BEADS.

TECHNICAL DESCRIPTION:

The key enabling technology is a bead trap/flow-cell. The flow cell isolates surface functionalized magnetic or non-magnetic beads in a mini-column, which allows sample, reagents, and wash solutions to be passed over the bead column, resulting in significantly improved mass transport and faster, more sensitive assays. The microbeads can be functionalized with a wide range of target analyte capture ligands including oligonucleotides, antibodies and lectins. Semi-selective beads (e.g., silica, hydroxyapatite) can also be used to capture a wide range of pathogens or nucleic acids utilizing electrostatic capture.

CONTACT INFORMATION

Battelle - Pacific Northwest National Laboratory
P.O. Box 999, Battelle Blvd.
Mail Stop P7-50
Richland, WA 99352
Attn: Dr. Richard M. Ozanich
richard.ozanich@pnl.gov
www.pnl.gov

COST

- $1,000-$4,000/system
- $10-$20/assay

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

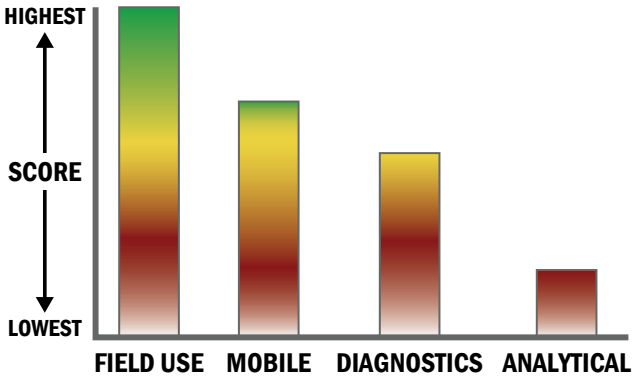
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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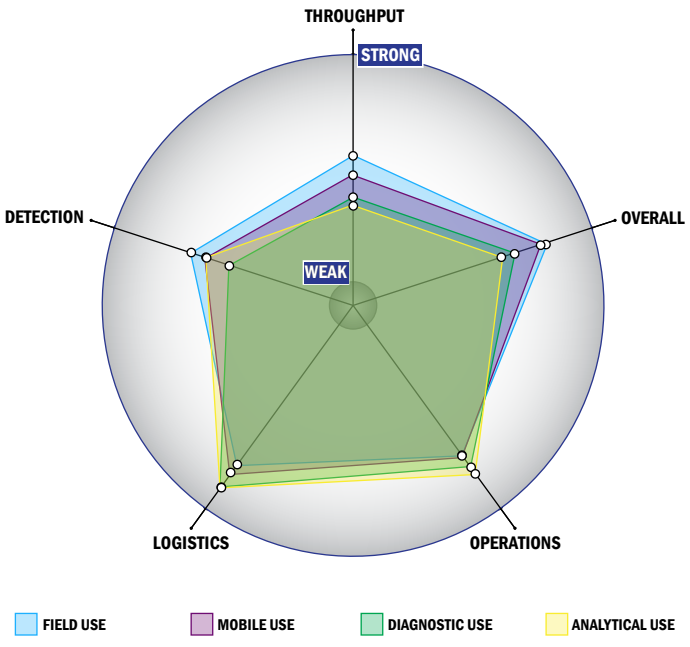


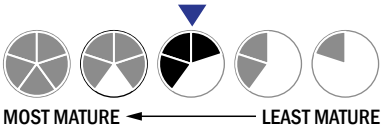
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a fully automated system with some effort
- Device or system is intended for multiple detection assays
- 3 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
- Between 5 and 25 kg
- Satellite, wireless and wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at 4°C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 3-5 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:

- 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
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 colony forming units (CFU) per mL
- 1-100 plaque forming units (PFU) per mL
- Add on capability that is full or semi-automated for spore lysis

Battelle - Pacific Northwest National Laboratory - Rapid Detection of Ultra-Trace Levels of Pathogens

GENERAL DESCRIPTION:



A protocol has been optimized to enable rapid enrichment, concentration, purification and polymerase chain reaction (PCR) detection of pathogenic organisms. While the developed protocol is specifically for Listeria monocytogenes, other pathogenic organisms could also be processed with variations to the protocol. The sample preparation and detection approach is amenable to multiplexing to allow detection of multiple pathogens (bacterial and viral) in a single sample. The protocol was developed specifically for analyzing surface swabs from food processing plant surfaces, but could be adapted to other surfaces, bodily fluids, environmental samples, and food.

TECHNICAL DESCRIPTION:

We have investigated and developed unique enrichment broths to enable rapid enrichment (4-6 hours) of pathogenic organisms. We have also developed protocols to remove debris and interfering substances using a combination of filtration and immunomagnetic beads, which also provide a high degree of pathogen concentration and sample purification. We have also optimized PCR detection of Listeria monocytogenes.

CONTACT INFORMATION

Battelle - Pacific Northwest National Laboratory
P.O. Box 999, Battelle Blvd.
Mail Stop P7-50
Richland, WA 99352
POC: Attn: Dr. Richard M. Ozanich
richard.ozanich@pnl.gov

COST

- $30,000-$40,000/system
- $20-$30/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

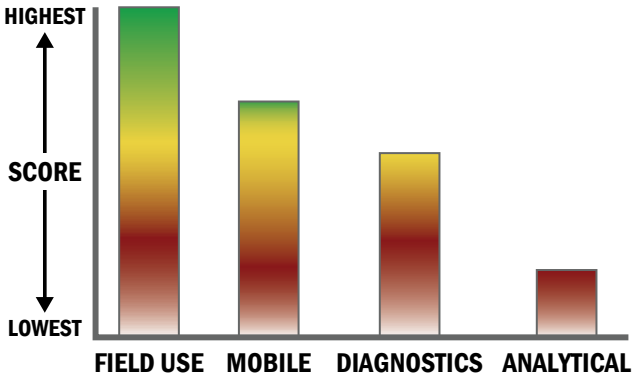
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Fourth Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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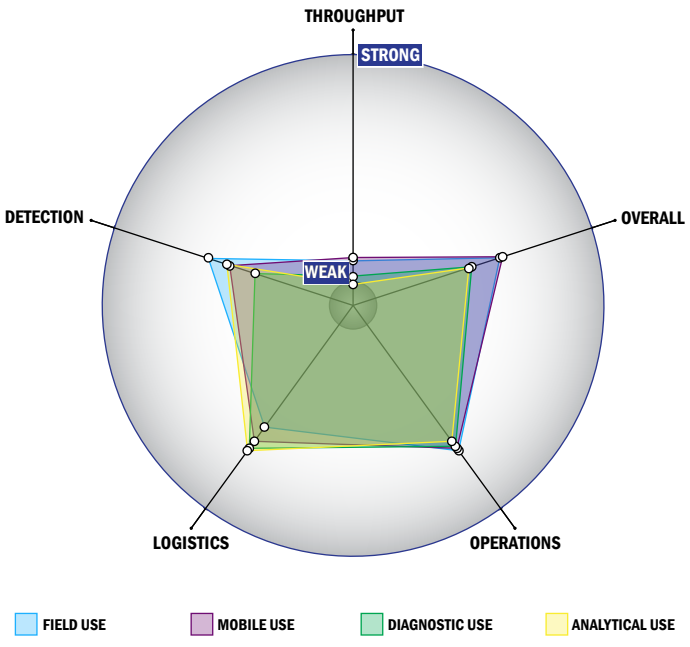


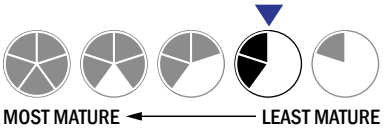
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- 1 sample, single test/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 4 solutions, buffer, eluents, and/or reagents
- 5 or more components
- Less than 5 minutes is required for set-up
- Greater than 12 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 5 and 25 kg
- Satellite, wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year 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 significant effort
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Battelle Memorial Institute - Resource Effective BioIdentification System (REBS) - Laboratory Variant

GENERAL DESCRIPTION:



The Resource Effective BioIdentification System (REBS) -Laboratory Variant is a microbial identification technology that enumerates and identifies microbes using a combination of microscopic imaging and Raman microspectroscopy. The measurement process begins when the system collects particulate material on a solid substrate within a defined region. Next, using standard microscopy techniques, the collected material is imaged at a high magnification, and each field of view is recorded and indexed as the macroscopic collection region is scanned. This iterative process continues until the entire collected region has been scanned. From these images, all particles are located automatically by image processing algorithms, and their morphological properties are used as a first test to discriminate biological particles from non-biological particles. The collection substrate is then moved to bring each particle directly below the microscope objective in order to measure its Raman spectrum. This spectral signature provides accurate discrimination of biological particles from non-biological particles. Moreover, the particle can be identified by matching the measured spectrum to a database of spectra for known materials. Identification is supported only if spectral signatures of the material are available in the spectral database.

TECHNICAL DESCRIPTION:

Battelle has developed an autonomous micro-Raman spectroscopy technology that enables chemical and biological aerosol identification. The technology incorporates automated sample analysis, single particle Raman spectroscopy, and multivariate signature analysis methods to analyze the chemical and biological materials.

CONTACT INFORMATION

Battelle Memorial Institute
505 King Avenue
Columbus, Ohio 43201
POC: Andrew P. Bartko, Ph.D.
bartkoa@Battelle.org

COST

- $N/A/system
- $0.003/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier
Fourth Tier Bottom Tier

RANKINGS

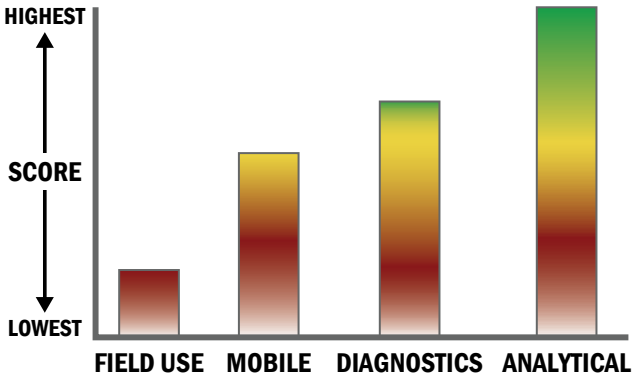
	Biological	Chemical	Radiological
FIELD USE System	Third Tier	Bottom Tier	N/A
MOBILE Laboratory	Top Tier	Second Tier	N/A
DIAGNOSTIC Laboratory	Top Tier	Top Tier	N/A
ANALYTICAL Laboratory	Top Tier	Top Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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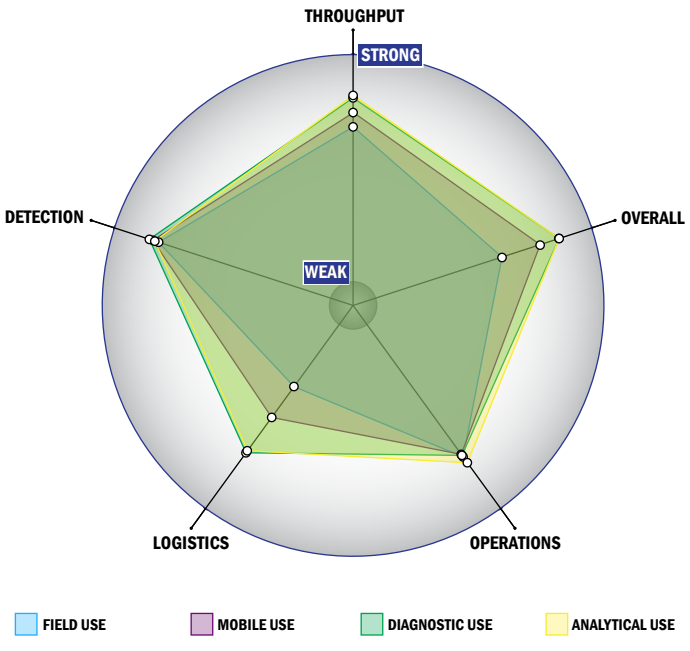


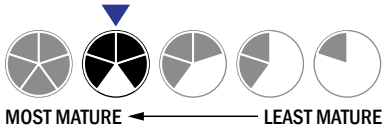
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- System is continuous and provides real time analysis with no defined tests/samples
- 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
- 5 or more components
- 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 carry-on luggage suitcase
- Between 25 and 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 3-5 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Efforts are underway to achieve 510K clearance
- Efforts are underway to achieve FDA approval
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 100-1,000 PFU per mL
- 1-10 ng per mL
- Spore lysis not necessary for detection by system
- 1 ppb–1 ppm
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Berkeley Nucleonics Corporation - Radionuclide Isotope Identifier - SAM 940

GENERAL DESCRIPTION:

Identification of known and unknown radio-isotopes for environmental, security and anti-terrorism activities. Identify multiple nuclear isotopes, shielded nuclear isotopes, highly enriched uranium and weapons grade Pu.



TECHNICAL DESCRIPTION:

Scintillator or solid state detectors coupled with collector electronics and a multi-channel analyzer. Fast microprocessors (released in 2009) allow peak and template matching with full background and compton subtraction. Identification is then achievable at levels 100X below background radiation (ambient levels).

CONTACT INFORMATION

Berkeley Nucleonics Corporation
2955 Kerner Blvd
San Rafael, CA 94901

COST

- $10,000/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

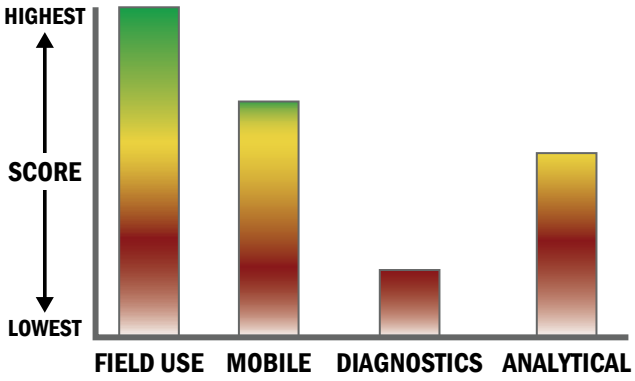
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Second Tier
MOBILE Laboratory	N/A	N/A	Second Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Second Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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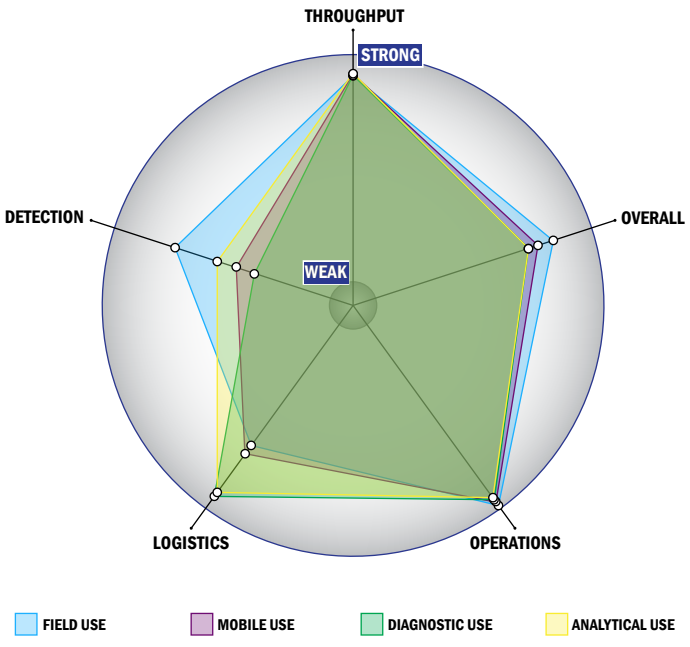


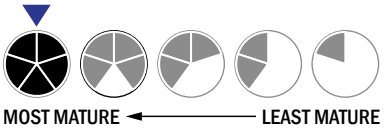
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 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
- 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 toaster
- Between 1 and 5 kg
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- 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 but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

Bertin Technologies - Coriolis FR

GENERAL DESCRIPTION:



Coriolis® FR is a bio-aerosol sampler, dedicated to first responders, with quick deployment in case of an event with biothreat suspicion. Coriolis® FR is efficient, light and has been ruggedized for use in indoor and outdoor environments.

Based on a wet cyclone, it has been designed to collect a large wide of aerosols from 0.5 to 20 µm into a liquid sample, for a rapid identification of pathogens (anthrax, botulinum toxin, ricin, etc.).

TECHNICAL DESCRIPTION:

Coriolis FR uses proven wet-wall cyclone technology for collection of all biological air content. This technology enables both high flow rate (300 liter per minutes) and high collection efficiency (third party evaluation available).

First, the operator pours the sterile collection liquid in the cone and screws it on the air inlet. When triggered by the operator, the air is drawn in a whirling motion to form a vortex. Particles are pulled against the wall due to centrifugal force, separated from air and concentrated into the liquid. After 10 minutes, the concentration of particles in the collection liquid is sufficient for reliable downstream analysis. Cone can be easily disassembled and closed (single-use). The system is ready for the next sampling without any cross contamination.

CONTACT INFORMATION

Bertin Technologies
POC: Antonin Duval
240-428-1047
duval@bertin-corp.com

COST

- $12,530/system
- $20/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

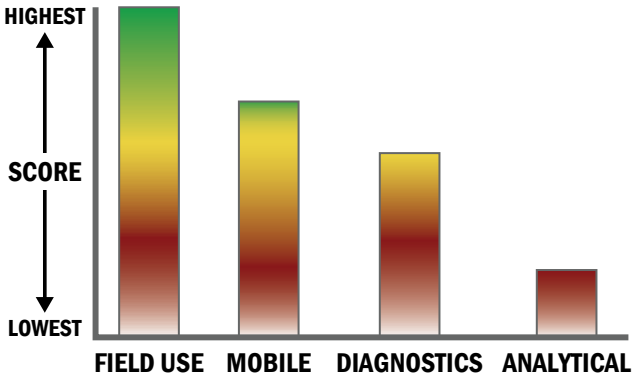
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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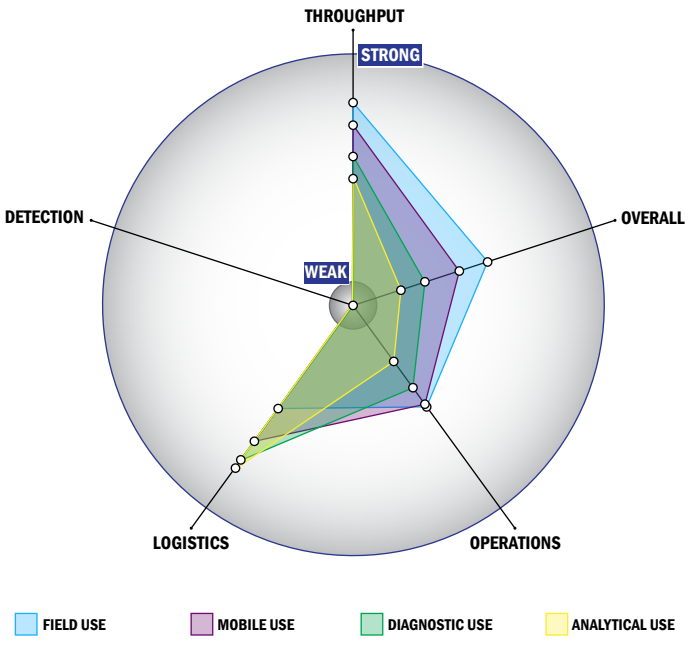


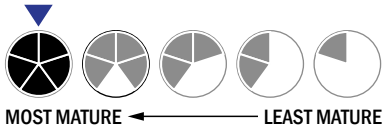
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, single test/sample per run
- Less than 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
- 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
- Between 5 and 25 kg
- This system is not capable of transmitting data
- 1-2 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

No detection information available

Bertin Technologies - Coriolis RECON

GENERAL DESCRIPTION:

Coriolis RECON is a ruggedized bio-aerosol sampler, dedicated to CBRN Recon teams or first responders with quick deployment in case of an event with bio-threat suspicion. This unit is efficient, portable and has been ruggedized for use in an unfamiliar environment



TECHNICAL DESCRIPTION:

Coriolis RECON is based on wet cyclonic technology and has been designed to collect low and high concentrations of airborne biological pathogens (viruses, bacteria, allergens, etc.) in the breathable range of 0.5-10 microns in size. The air flow rate is 600 liters/min. Air is first aspirated into a cone pre-filled with collection fluid in a whirling motion to form a vortex. Particles are pulled against the cone wall due to centrifugal force and separated from the air to be concentrated into the liquid. Sampling time can be set for up to 15 minutes or programmed for a long time collection period of up to 6 hours. After collection, the cone is capped and then sent to the lab for analysis. The collected sample is compatible with any type of molecular downstream application such as PCR, immunoassay, etc.

CONTACT INFORMATION

Bertin Corp
155 Gibbs Street, #533
Rockville, MD 20850
Attn: Antonin Duval
www.bertin-corp.com

COST

- $32,400/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	Fourth Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Notes

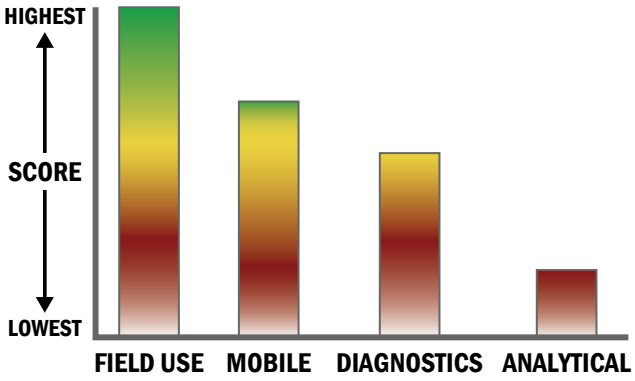
In use with the French military.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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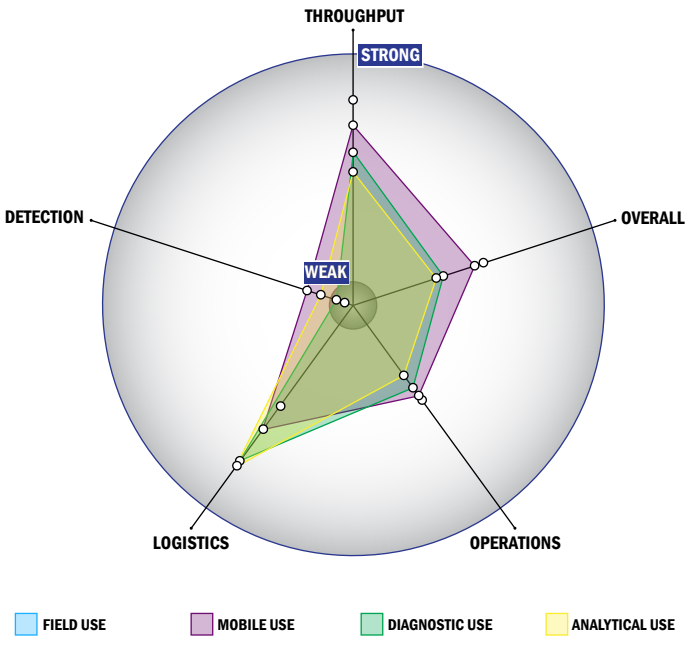


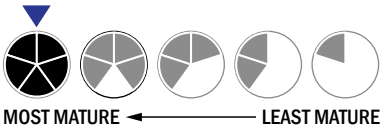
Evaluation Criteria

Throughput:

- Multiple samples, single tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently semi-automated
- 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
- Between 5 and 25 kg
- System or device has 110V electrical requirement
- 1-2 hours battery life



Operations:

- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results cannot be viewed in real-time
- The system could be adapted to a fully autonomous system with some effort

Detection:

- Greater than 250 µL

Bertin Technologies - KIM

GENERAL DESCRIPTION:



Bertin Technologies (France) has developed the system KIM (Kits of Immuno-agglutination on Microbeads) dedicated to the detection of warfare agents. The system is composed of a field analyzer and detection kits. KIM technology enables a rapid homogeneous and sensitive bioanalysis. Within 10 minutes, air samples (e.g. collected with Bertin's Coriolis® air-sampler) could be analyzed without any further preparation. Field-compatible preparation kits have been developed to ensure the compatibility of following samples with the system KIM: powders, surface swab samples, river waters. The KIM system is dedicated to first responders. Procedures have been simplified to be easily performed by users without technical expertise. The analyzer has been conceived for field application in terms of weight, solidity, autonomy, compatibility with standard decontamination procedures.

TECHNICAL DESCRIPTION:

The detection principle consists in accelerating traditional immuno-agglutination on antibody-grafted microbeads by using magnetic Brownian colloids. These microbeads have self-organization properties under a homogenous magnetic field: they self-assemble into linear chains, and the resulting one-dimensional confinement drastically speed-up the recognition rate between the grafted antibodies and the antigen (Baudry et al.. Proc Natl Acad Sci U S A. 2006 Oct 31;103(44):16076-8). The agglutination process can be monitored by the variation of the Optical Density after magnetic field application to the sample: this measurement relies on the fact that a doublet of microbeads scatters more light than two separate beads.

CONTACT INFORMATION

Bertin Technologies - BP284
78053 Saint Quentin en Yvelines Cedex
POC: Antonin DUVAL, Sales Manager
+33 1 39 30 61 69
duval@bertin.fr

COST

- $60,000/system
- $100/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

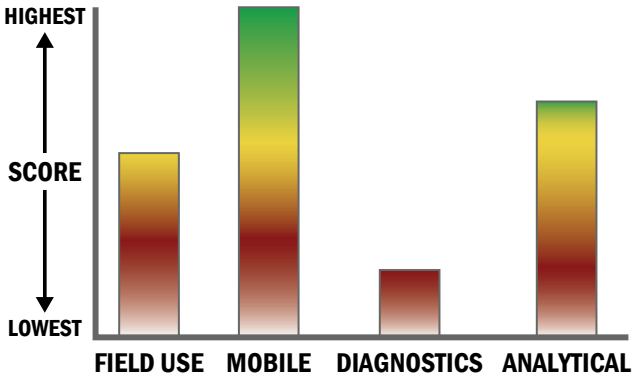
	Biological	Chemical	Radiological
FIELD USE System		N/A	N/A
MOBILE Laboratory		N/A	N/A
DIAGNOSTIC Laboratory		N/A	N/A
ANALYTICAL Laboratory		N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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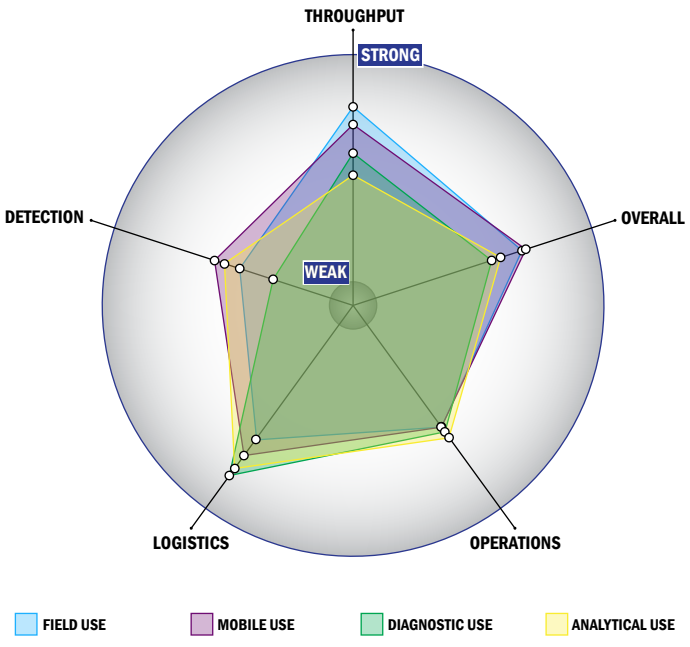


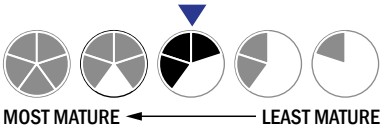
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, single test/sample per run
- System is continuous and provides real time analysis with no defined tests/samples
- Device or system is intended for multiple detection assays
- 2 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
- Between 5 and 25 kg
- Wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 250 µL
- 10,000-100,000 CFU per mL
- 10,000-100,000 PFU per mL
- Less than 1 ng per mL
- Spore lysis not necessary for detection by system
- Spore lysis not necessary for detection by system

Bertin Technologies - Second Sight

GENERAL DESCRIPTION:



Second Sight® MS is a stand-off real time gas cloud detector, designed for chemical area surveillance in open field and harsh conditions. Second Sight® MS automatically detect, identify and monitor all known clouds of dangerous gases (nerve gazes or vesicants) at a distance up to 5 km. In case of detection, it raises an alarm and displays real-time visualization of the scene. This enables efficient management of the chemical event. Its patented infrared process allows a wide field of view with a very high detection probability with night and day surveillance capability,. Second Sight can be used by CBRN team on the field (battery), for base surveillance or mounted on vehicles or ships.

TECHNICAL DESCRIPTION:

Second Sight® MS uses an uncooled IR microbolometer device. Its technology relies on different absorption lines of gases in the IR spectrum. The equipment continuously analyses the absorption of the scene compared with the background. Each gas has its own absorption spectrum and can present typical absorption lines in infra-red bands II (3 to 5 µm MWIR) and bands III (8 to 14 µm LWIR). Second Sight® operates in band III, in order to use the particular lines which enable them to be identified from several gases. The Second Sight® allows real time visualization of gas cloud: the image processing algorithms highlights the presence of a gas cloud on the targeted line. The evaluation of the quantity of gas is carried out by a three differential infra-red imaging process: spatial, spectral, and temporal fields. Spectral differentiation exploits the spectral nature of the gas, which is isolated through the successive utilization of several filters. The comparison of channels enables a value corresponding to the gas cloud concentration. In particular, spatial differentiation enables the luminescence of the gas cloud to be eliminated and to only take its transmission into account. This characteristic enables Second Sight® to detect the gas even when it is at an ambient temperature.

CONTACT INFORMATION

Bertin Technologies
POC: Antonin DUVAL
240-428-1047
duval@bertin-corp.com

COST

- $319,800/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

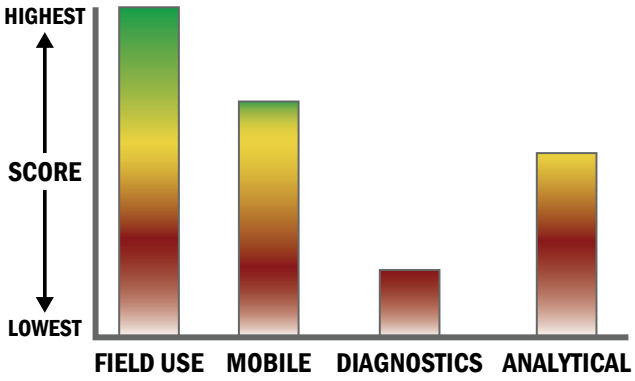
	Biological	Chemical	Radiological
FIELD USE System	N/A	Third Tier	N/A
MOBILE Laboratory	N/A	Bottom Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Bottom Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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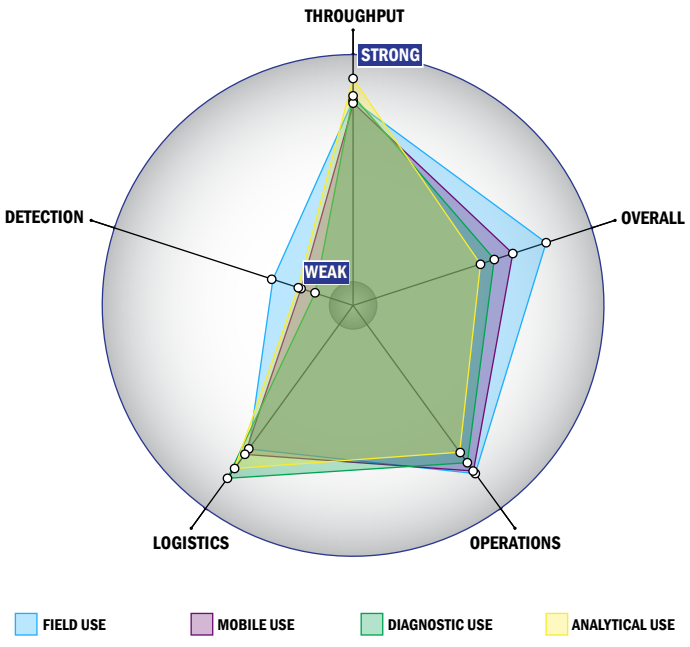


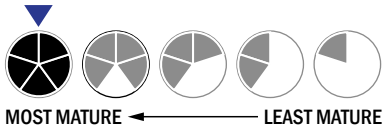
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- 5-10 minutes is required for set-up
- Automatic detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 25 and 50 kg
- Wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- System currently can identify aerosolized chemical agent

BioFire Diagnostics, Inc. - FilmArray Pathogen Detection System

GENERAL DESCRIPTION:



The FilmArray System is a user friendly automated pathogen identification system. The dual use platform with integrated sample preparation is capable of analyzing clinical and environmental samples automatically testing for multiple pathogens simultaneously from a raw sample. The lightweight, small footprint instrument processes a sample, analyzes the data and reports results in one hour. Consumable pouches are freeze dried and room temperature stable. ITI's current test panels are for respiratory disease and biothreat with its development pipeline to include, gastrointestinal disease, sepsis, and sexually transmitted disease panels. The system is intended for clinical diagnostic use and environmental testing. It is simple to use requiring little training and network capable with connectivity to the national health information network and composite health care system available.

TECHNICAL DESCRIPTION:

The FilmArray integrates sample preparation into a highly multiplexed Polymerase Chain Reaction (PCR) system developed for the point-of-care diagnostic market. The single sample instrument uses a consumable pouch that integrates sample preparation and nested multiplex PCR. Integrated sample preparation provides ease-of-use while the highly multiplexed PCR provides both the sensitivity of PCR and the ability to test for up to 30 different organisms simultaneously.

CONTACT INFORMATION

BioFire Diagnostics, Inc.
POC: Matt Scullion
801-736-6354
matt.scullion@idahotech.com
www.biofiredx.com

COST

- $49,500/system
- $129/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	Third Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

Notes

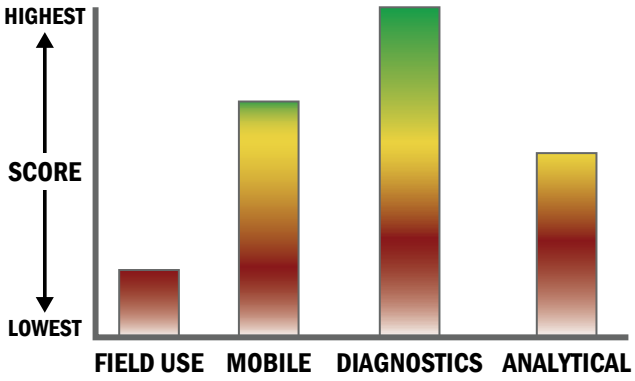
Selected as Next Generation Diagnostics System (NGDS) prototypes.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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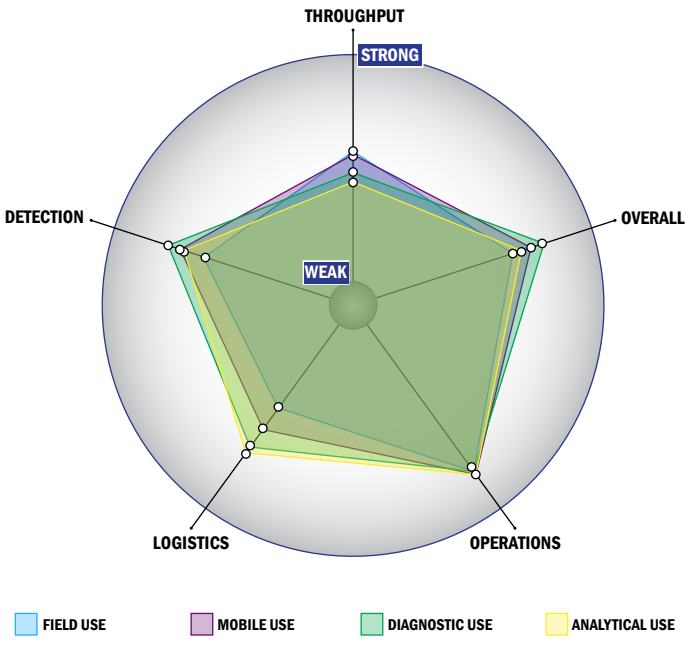


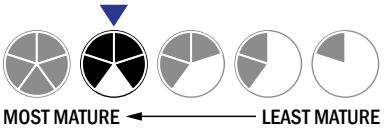
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- 1 sample, >10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 3 components
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- Greater than 10 years expected life
- Results cannot 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 open and available for modification

Detection:

- System currently has 510k clearance
- System currently has FDA approval
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 1,000-10,000 PFU per mL
- Fully automated spore lysis

BioFire Diagnostics, Inc. - JBAIDS (Joint Biological Agent Identification and Diagnostic System)

GENERAL DESCRIPTION:



JBAIDS is the DoD standard platform used to positively identify specific biological warfare agents in a dual-purpose role: for diagnostic applications in a clinical environment and for environmental and food sample confirmatory testing. JBAIDS provides timely, reliable answers to field commanders and medical laboratory officers to support critical decision making and countermeasures and aid in determining appropriate medical intervention. The JBAIDS is an FDA cleared diagnostic system.

TECHNICAL DESCRIPTION:

The JBAIDS instrument is a ruggedized, portable real-time PCR instrument using TaqMan PCR amplification for detection of biological threat agents. The instrument is composed of an air thermocycler that amplifies specific DNA and RNA sequences using PCR and a fluorimeter that measures fluorescence signals associated with production of PCR product (amplicon) during the course of the reaction. Analysis of PCR data is achieved by associated software that automatically makes positive or negative calls for 16 biological threat agents.

CONTACT INFORMATION

BioFire Defense, Inc.
Salt Lake City, UT 84108
POC: Gary Uzzell
801-736-6354
www.biofiredx.com

COST

- $55,000/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	Fourth Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Second Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Notes

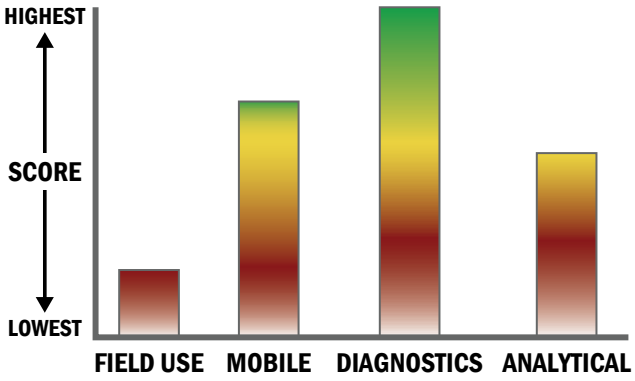
The JBAIDS is a currently fielded DoD system which is scheduled to be replaced with the Next Generation Diagnostic System.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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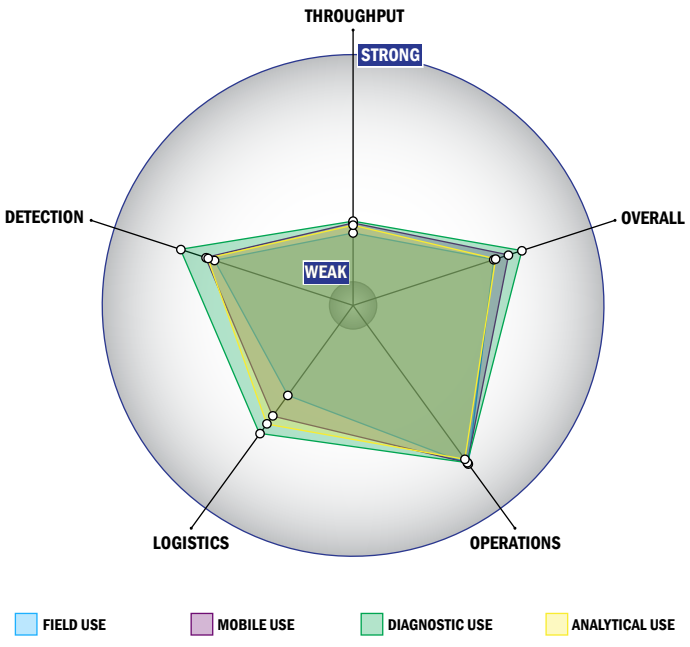


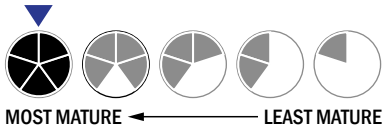
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 4 solutions, buffer, eluents, and/or reagents
- 5 or more components
- Less than 5 minutes is required for set-up
- Greater than 12 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 5 and 25 kg
- This system is not capable of transmitting data
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- System currently has 510k clearance
- System currently has FDA approval
- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 1,000-10,000 PFU per mL
- Manual kit not integrated with the system handles spore lysis

BioFire Diagnostics, Inc. - R.A.P.I.D. BioThreat Detection System

GENERAL DESCRIPTION:



The Ruggedized Advanced Pathogen Identification Device (R.A.P.I.D.) is a portable real-time PCR system designed to identify biological agents. Because of its rugged design, reliability, and sensitivity it has become the standard for the U.S. DoD and other militaries around the world. The R.A.P.I.D. is the ideal choice for mobile analytical labs and field hospitals. The instrument integrates Idaho Technology's LightCycler ® Instrument technology into a portable, impact resistant package. Distinctive software allows simple "push-button" use of the R.A.P.I.D. System by military field personnel with minimal training. R.A.P.I.D.'s open platform supports multiple chemistries and sample matrices including environmental and food samples. Used with Idaho Technology's commercial freeze-dried pathogen test kits or customized reactions, R.A.P.I.D. provides quick, safe, and accurate field identification of pathogens.

TECHNICAL DESCRIPTION:

R.A.P.I.D. employs real-time Polymerase Chain Reaction (PCR).

CONTACT INFORMATION

BioFire Diagnostics, Inc.
390 Wakara Way
Salt Lake City, UT 84108
POC: Lou Banks
801-736-6354
Lou.banks@biofiredx.com
www.biofiredx.com

COST

- $55,000/system
- $24.75/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

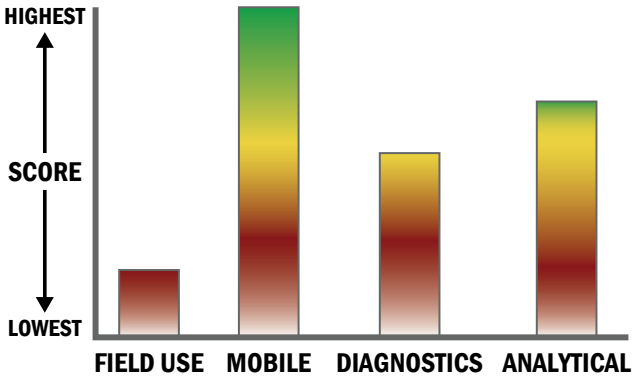
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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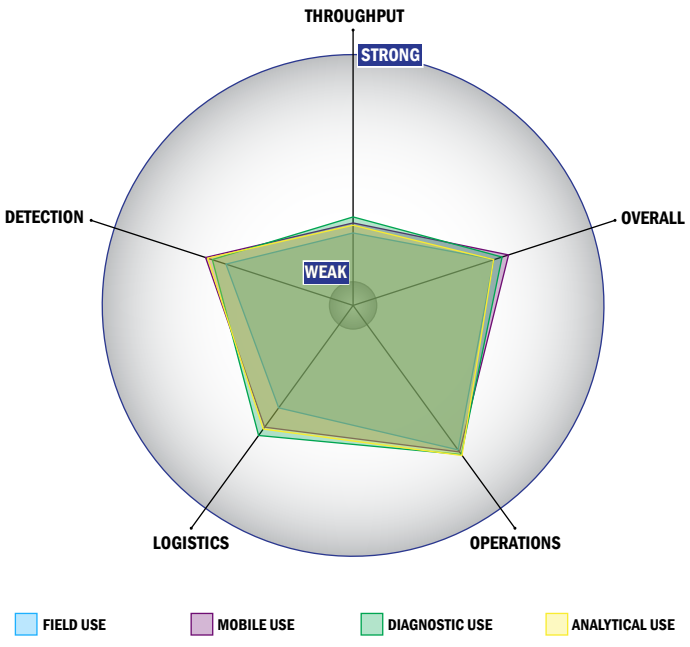


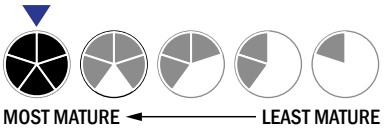
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 4 solutions, buffer, eluents, and/or reagents
- 5 or more components
- Less than 5 minutes is required for set-up
- Greater than 12 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 6 months shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- Possible the system could receive approval, no current efforts at this time
- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 1,000-10,000 PFU per mL
- Manual kit not integrated with the system handles spore lysis

BioFire Diagnostics, Inc. - RAZOR EX BioThreat Detection System

GENERAL DESCRIPTION:



The advanced RAZOR® EX BioThreat Detection System utilizes Real-time PCR technology to deliver the most reliable and sensitive field detection and identification of biological pathogens. Designed specifically for use in the field, the RAZOR EX's compact and lightweight design allows it to be hand carried and minimal sample preparation requirements make it easy to use. Powder, swab, water, dry filter, or culture sample types work ideally with the RAZOR EX. Used with The 10® Target Screen Kit; the RAZOR EX simultaneously tests environmental samples for ten Category A and B BioThreat pathogens with reliable DNA-based results available in less than 30 minutes. Created for first responders and front line military troops, it is easily operated while working in protective equipment under extreme conditions. The stand-alone, battery powered instrument includes Bluetooth® capabilities for wireless data transmission, bar code reader for data input, and a bright, easy-to-read color screen. The RAZOR EX utilizes Idaho Technology's patented reagent pouch system—integrated freeze-dried reagents packaged in durable plastic pouches for incomparable ease of use. A variety of pre-formatted pouch configurations are available for biothreat, food screening, or water testing applications.

TECHNICAL DESCRIPTION:

Real-time Polymerase Chain Reaction (PCR) – a sensitive and specific molecular, enzymatic reaction that in the presence of a targeted pathogen, amplifies the target DNA. Tests are designed to detect novel and highly conserved regions specific to the pathogen of interest, which produce low error rates. The reaction is coupled with fluorescent probes that provide real-time detection.

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

CONTACT INFORMATION

BioFire Diagnostics, Inc.
390 Wakara Way
Salt Lake City, UT 84108
POC: Lou Banks

COST

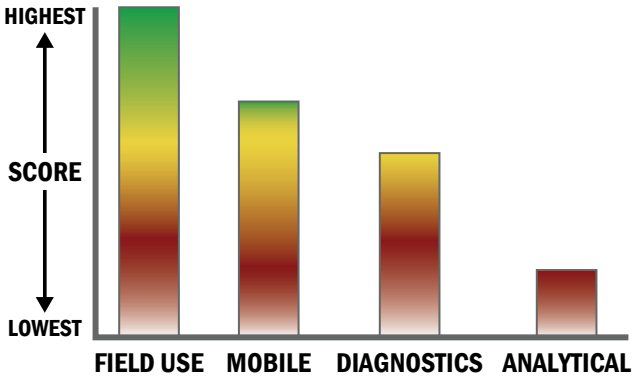
- $38,500/system
- $200/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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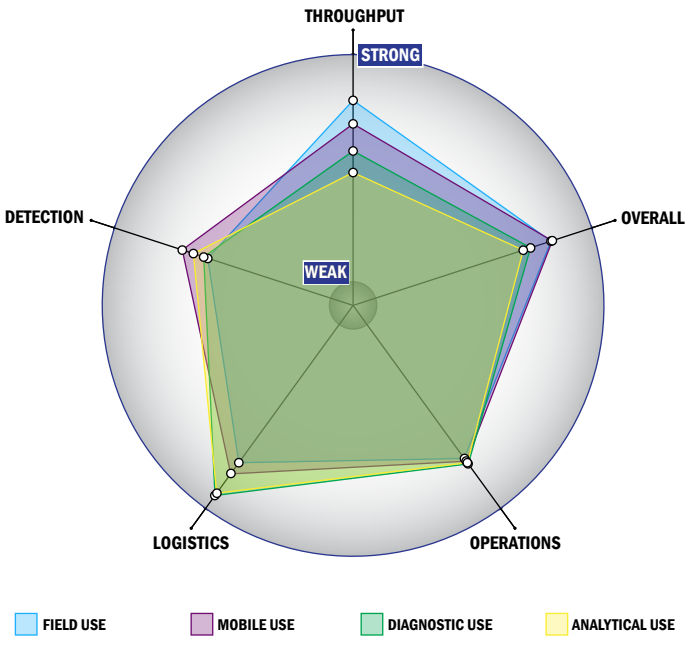


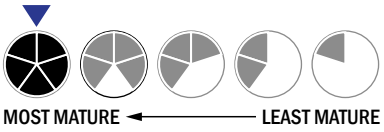
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, >10 tests/sample per run
- Less than 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
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 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:

- 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
- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Greater than 10,000 ng per mL
- Spore lysis not necessary for detection by system

Bioforce Nanosciences, Inc. - ViriChip System

GENERAL DESCRIPTION:



The ViriChip System is a technology platform for direct detection and characterization of viral particles rather than nucleic acid or antigens. The affinity substrate used is termed the 'ViriChip'. The ViriChip contains type-specific antibody or ligand domains capable of capturing intact infectious viruses. The integration of AFM with the ViriChip has resulted in the development of an atomic force microscopy–immunoassay (AFMIA). The AFMIA combines two key features: specificity determined by antibody capture, and a label-free AFM readout that offers the additional benefit of providing topographical/morphological information to corroborate affinity-based virus identification. Principal benefits of AFM readout include size of apparatus (hand held) and multiplexing for multiple viruses on single ViriChips. The ViriChip System is versatile being designed for:

- Use in field operations
- Use in laboratory analysis
- Use in remote testing by UAV or other vehicles
- Use in clinical diagnostic laboratories.

TECHNICAL DESCRIPTION:

The ViriChip System consists of a functionalized chip containing 10 micrometer domains of specific capture ligands (antibodies, aptamers, etc.) arrayed in multiplexed format. The specific ligands are qualified to capture intact virus particles, virus-like particles, or sub-virion structures existing on the outer surface of the virus. The chip, assembled into a microfluidics cartridge, receives and analyzes fluids for virus capture. Processing and readout by atomic force microscopy are automated. Analysis software is coordinated with data collection. Data and analysis transmission is designed for existing communication mechanisms. The System will detect and identify biothreat viral agents collected from water, air, foods, surfaces, and body fluids.

CONTACT INFORMATION

BIOFORCE NANOSCIENCES, INC.
609 E Lincoln Way, Suite 609
Ames, IA 50010
POC: Kerry Frey
515-233-8333
kfrey@bioforcenano.com
www.bioforcenano.com

COST

- $35,000-$50,000/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

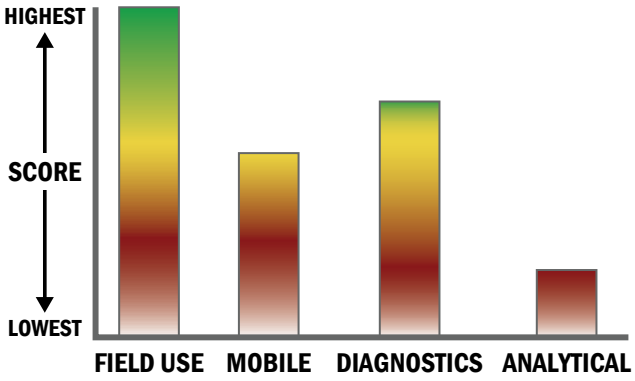
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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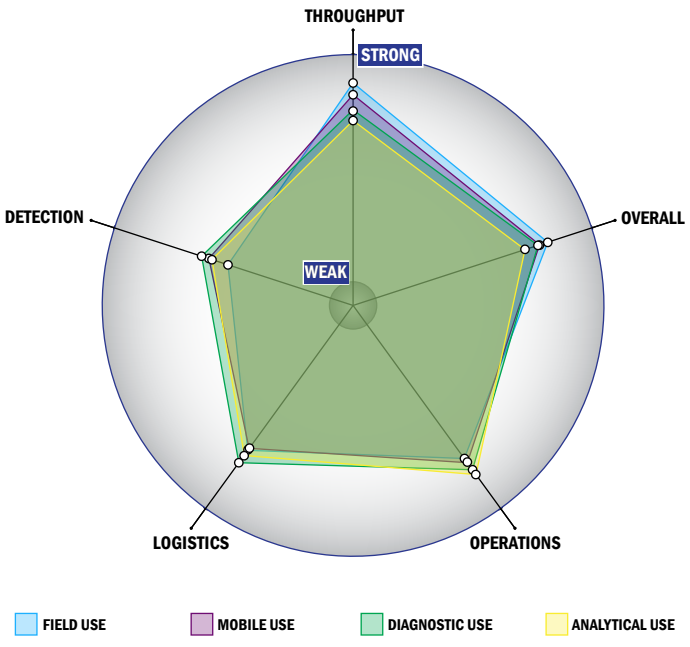


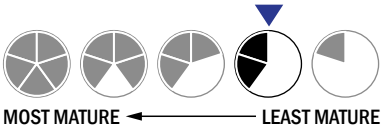
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 samples every 2 hours
- The system could be adapted to a fully automated system with some effort
- 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:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25 kg
- 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
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

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
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 PFU per mL

BioGene Ltd - InSyte

GENERAL DESCRIPTION:

The InSyte is a laboratory based instrument for real-time amplification analysis of nucleic acid samples. It uses independent well control, meaning each vessel is individually monitored and can be controlled as such. The unique ability to perform the PCR process in a sub 15 minute time frame along with laser based optics and photon counting detectors enabling capture of the full plate in under one second. The core technology is applicable to a point of care environment with subsequent further development.



TECHNICAL DESCRIPTION:

The system relies on ultra-rapid thermal cycling and the real-time PCR process in tandem with fast and sensitive laser and photon counting based optics. This allows the real-time detection of multiple nucleic acid target species in a single diagnostic run.

CONTACT INFORMATION

BioGene Ltd
BioGene House 6
The Business Centre Harvard Way
Kimbolton Cambs PE28 0NJ United Kingdom

COST

- £62,200.00/system
- £2/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier
Fourth Tier Bottom Tier

RANKINGS

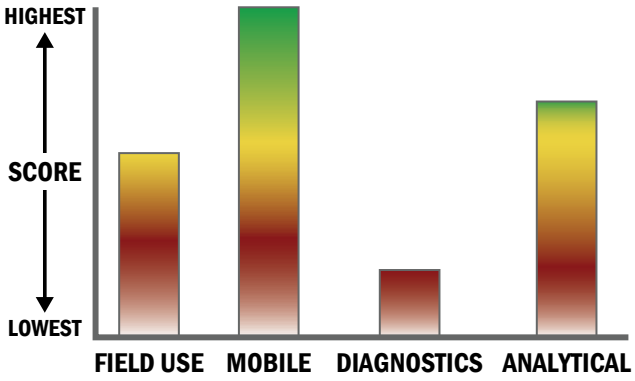
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Fourth Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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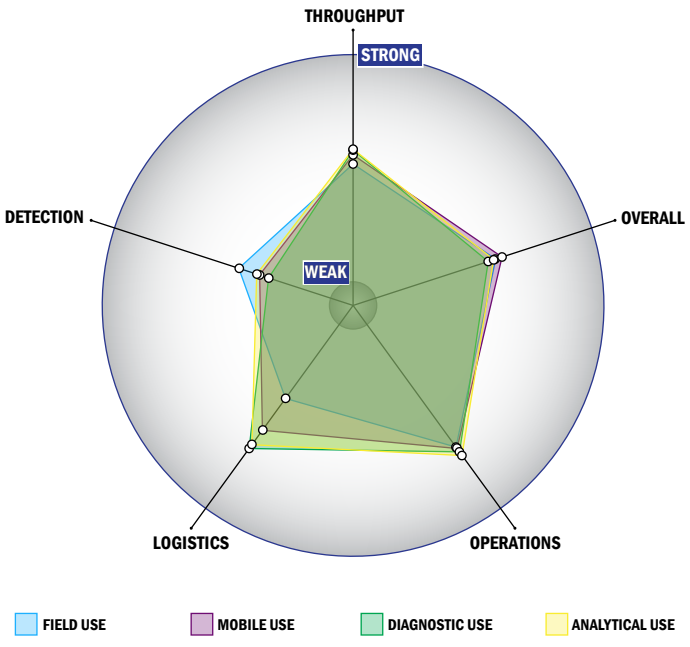


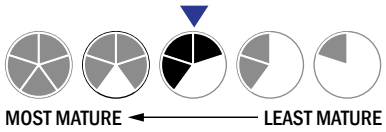
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 samples every 2 hours
- The system could be adapted to a fully automated system with some effort
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 2 components
- 10-20 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a home dishwasher
- Between 25 and 50 kg
- Wireless and wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at 4 °C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 50 µL
- 1-100 CFU per mL
- 1-100 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Biomeme, Inc. - Mobile Real-Time qPCR Platform

GENERAL DESCRIPTION:



Biomeme's platform turns any smartphone or like device (iPod Touch, iPad Mini, etc.) into a mobile lab for performing advanced diagnostics. The system requires no special lab equipment or experience and can be used at the point of need in the field or in a mobile lab. The full system includes a hardware add-on, a mobile device software application, and disposable test kits. The system performs molecular diagnostics and near real-time surveillance of pathogens via real-time quantitative polymerase chain reaction (qPCR). In addition to Biomeme's tests, the platform is open enough for experienced users in analytical and diagnostic laboratories to develop their own tests for use on the system.

TECHNICAL DESCRIPTION:

Real time hydrolysis probe polymerase chain reaction amplification of genetic material on a smartphone or like device (iPod Touch, iPad Mini) hardware add-on thermal cycler.

CONTACT INFORMATION

Biomeme, Inc.
417 N. 8th Street Suite 201
Philadelphia, PA 19123

COST

- ~$1,000/system
- $5-$50/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	Top Tier	N/A	N/A
MOBILE Laboratory	Top Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

Notes

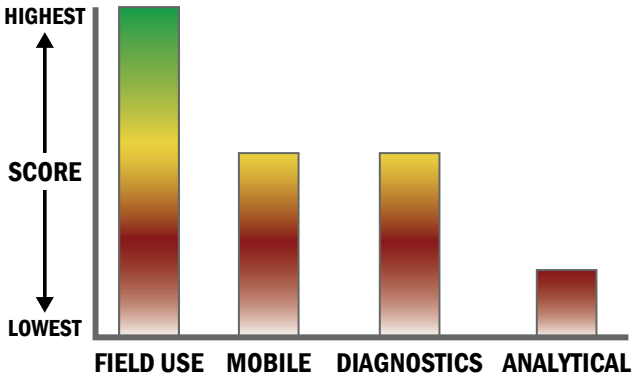
Being tested as part of the DoD's JUPITR ATD.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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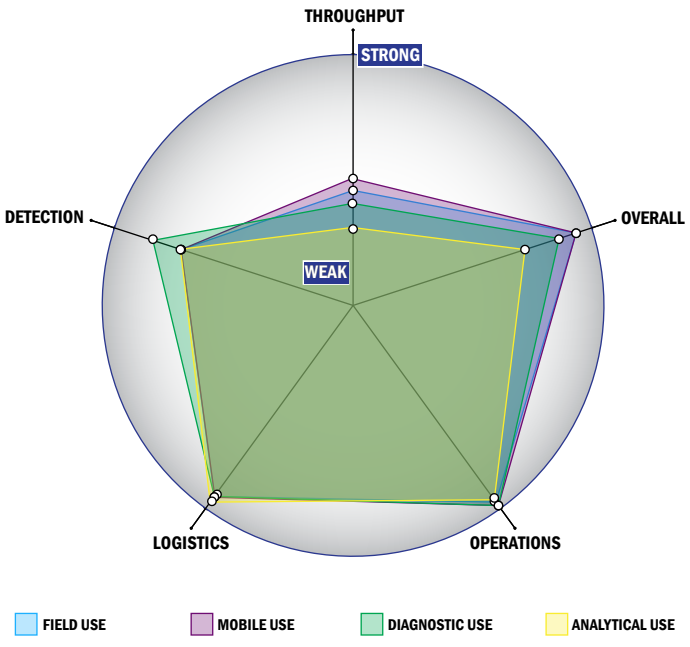


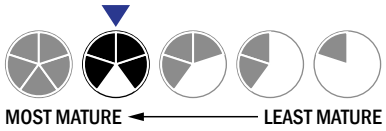
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a fully automated system with some effort
- Device or system is intended for multiple detection assays
- 4 solutions, buffer, eluents, and/or reagents
- 4 components
- No set-up of the system is required
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Satellite, wireless and wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 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 open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Efforts are underway to achieve 510K clearance
- Efforts are underway to achieve FDA approval
- Less than 100 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Manual kit not integrated with the system handles spore lysis

bioMerieux, Inc. - NucliSens easyQ

GENERAL DESCRIPTION:

Amplification and Detection of RNA and DNA using NASBA technology of clinical specimens from body fluids.

TECHNICAL DESCRIPTION:

Not provided.



CONTACT INFORMATION

bioMerieux, Inc.
100 Rodolohe St.
Durham, NC 27712

COST

- $38,000/system
- $30/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

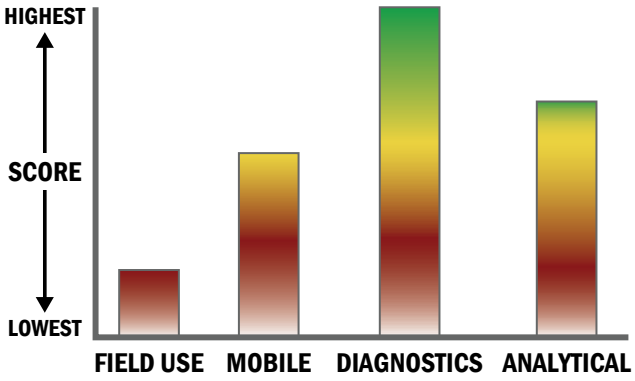
	Biological	Chemical	Radiological
FIELD USE System		N/A	N/A
MOBILE Laboratory		N/A	N/A
DIAGNOSTIC Laboratory		N/A	N/A
ANALYTICAL Laboratory		N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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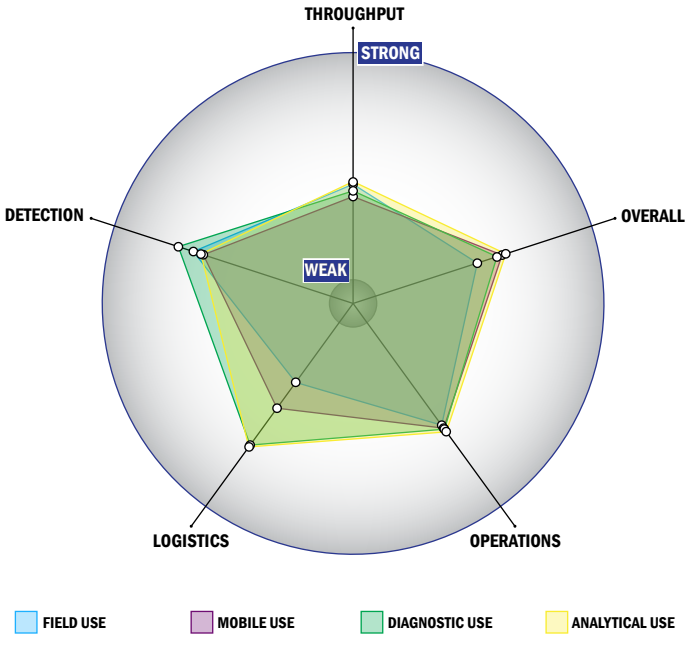


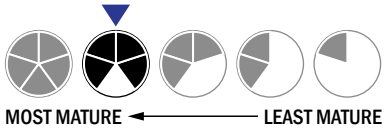
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, single tests/sample per run
- 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
- 3 components
- Greater than 20 minutes is required for set-up
- 6-8 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 5 and 25 kg
- This system is not capable of transmitting data
- System or device has 110V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be stored at 4°C
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- 3-5 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- 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 approval
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- 100-1,000 PFU per mL

Bioneer Corporation - Exicycler 96

GENERAL DESCRIPTION:



The Exicycler 96 is a standard format (96-well), thermal cycler that can be used to perform real-time PCR. The system used a thermal block whose temperature can be controlled, to drive an enzymatic reaction that duplicates DNA. It also contains an optical component that can quantify the amount of DNA in the reaction at a given time. As the amount of DNA increases, the optical sensor can detect this. Software included in the system allow detailed analysis of many kinds of experiments including: Absolute quantitation, Relative quantitation, SNP analysis, plus/minus assays and more.

TECHNICAL DESCRIPTION:

The Exicycler 96 supports two different reaction chemistries: Probe based chemistries and SYBR™ Green I double stranded DNA binding dye chemistry. The Exicycler 96 is a real-time thermal cycler that features a patented system of optics that drives the same amount of light to each well ensuring even fluorescent excitation without the need for a background "reference dye". This technology is called Light Tunnel Technology and exclusive to the Exicycler. The thermal cycler itself is driven by a peltier based 96-well block. The Exicycler 96 is a true 5 color system since there is no need for a reference dye, allowing the use of dyes that are well separated in multiplex experiments. The instrument has an a short arc lamp excitation source, and utilizes a 16-bit 2-D charge coupled device (CCD) camera to enable continuous wavelength detection from 520- 680 nm.

CONTACT INFORMATION

Bioneer Corporation
8-11, Munpyeongseoro
Daedeok-gu, Daejeon 306-220 Korea
POC: Dr. Hanee Park

COST

- $40,000/system
- $0.50/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

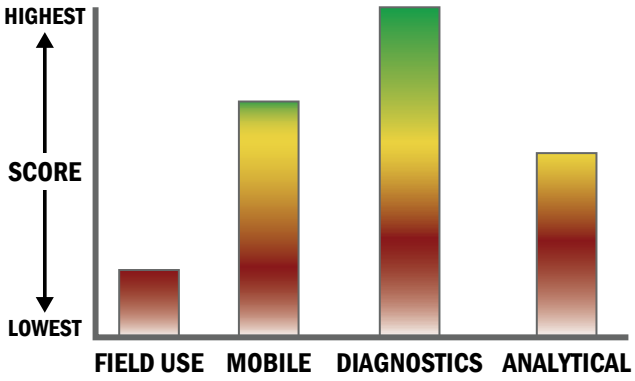
	Biological	Chemical	Radiological
FIELD USE System	Third Tier	N/A	N/A
MOBILE Laboratory	Top Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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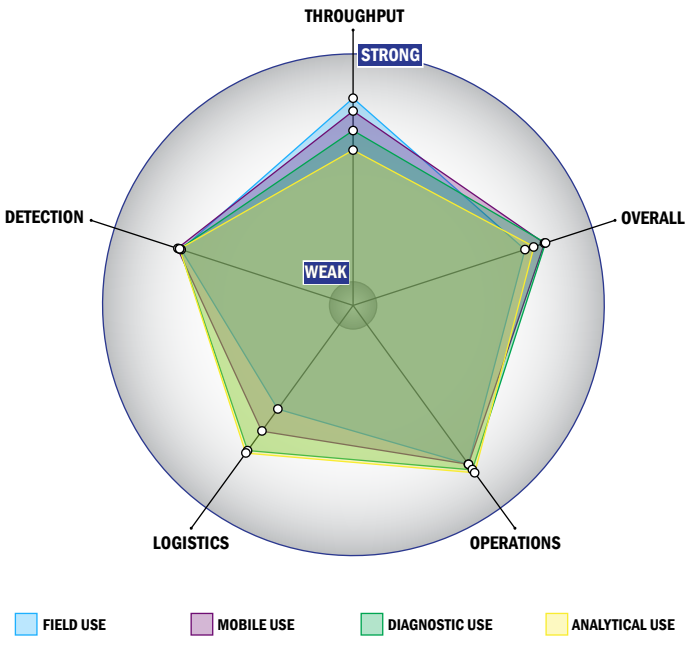


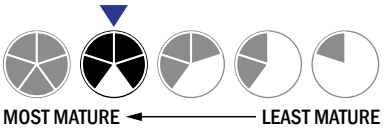
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- 349-96 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
- 2 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a toaster
- Between 25 and 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 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:

- 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
- Less than 50 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Add on capability that is full or semi-automated for spore lysis
- Fully automated spore lysis

Bioneer Corporation - ExiStation Molecular Diagnostic Platform

GENERAL DESCRIPTION:



The ExiStation Molecular Diagnostic Platform is a semi-automated system that provides sample preparation and real-time diagnostics for a variety of clinical sample types and tests. The system allows for simultaneous parallel analysis of up to 6 different samples types and tests in under 4 hours making it the highest throughput system available.

TECHNICAL DESCRIPTION:

The ExiStation consists of 3 x ExiPrep 16 Dx systems, and ExiSpin and an Exicycler 96. The ExiPrep systems are sample prep devices capable of purifying DNA and RNA from a wide range of clinical samples and uses proprietary spherical magnetic nano-particles. Once the sample is purified, the ExiPrep 16 Dx will also set up the diagnostic qPCR reaction which is then taken to the ExiSpin. The ExiSpin is a combination centrifuge/vortexer that is used to mix and spin the reactions in a uniform manner ensuring world class reproducibility of the kits. Finally, after mixing and spinning in the ExiSpin, the samples are placed in the Exicycler 96 Real-Time thermal cycler. The Exicycler uses a peltier based thermal block and has 5-color optics with a 16 bit 2-d CCD camera for detection.

CONTACT INFORMATION

Bioneer Corporation
8-11, Munpyeongseoro
Daedeok-gu, Daejeon 306-220 Korea
POC: Dr. Hanee Park

COST

- $482,000/system
- $30/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

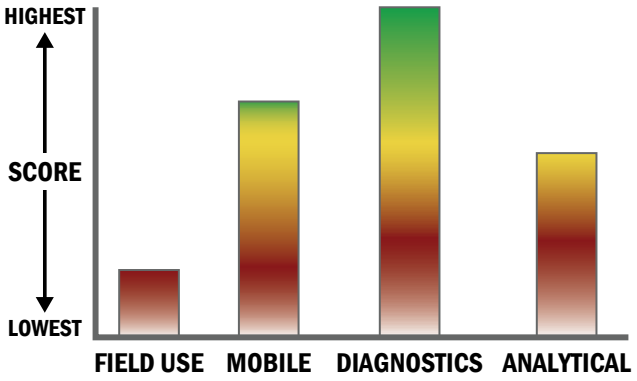
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Second Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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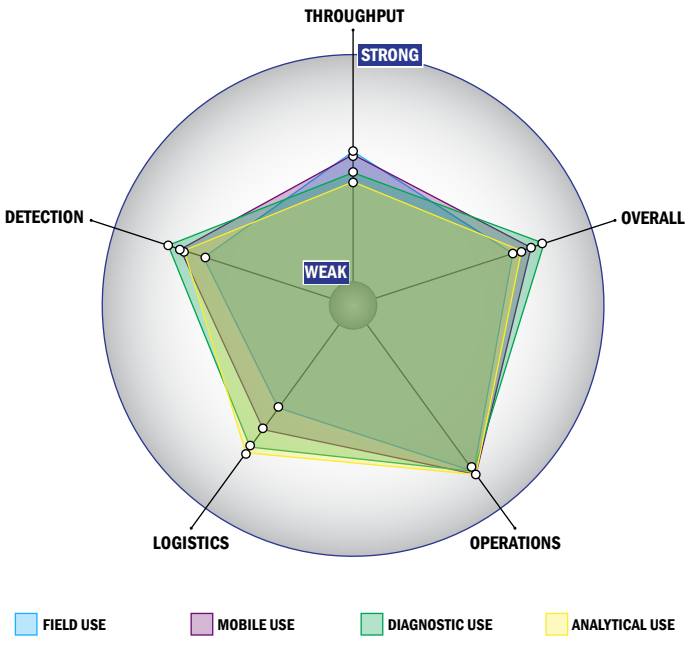


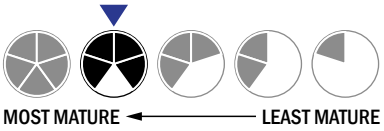
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- 49-96 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 5 or more components
- 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 carry-on luggage suitcase
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- 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
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Fully automated spore lysis

Bio-Rad Laboratories - Bio-Plex 200 Suspension Array System

GENERAL DESCRIPTION:

The Bio-Plex 200 System is a laboratory analysis tool designed for protein detection and analysis using immunoassay xMAP technology.



TECHNICAL DESCRIPTION:

The Bio-Plex 200 system is based on xMAP technology, a proprietary technology that color codes beads which are then used in sandwich immunoassay analysis. These assays are multiplexable.

CONTACT INFORMATION

Bio-Rad Laboratories
2000 Alfred Nobel Drive
Hercules, CA 94547
POC: Michelle Heim, Bio-Plex Business Unit Manager

COST

- $69,000/system
- ~$5.00/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	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Notes

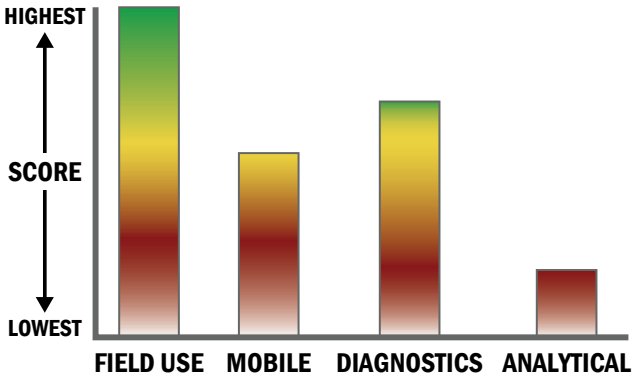
xMap technology also used on Luminex MAGPIX device.

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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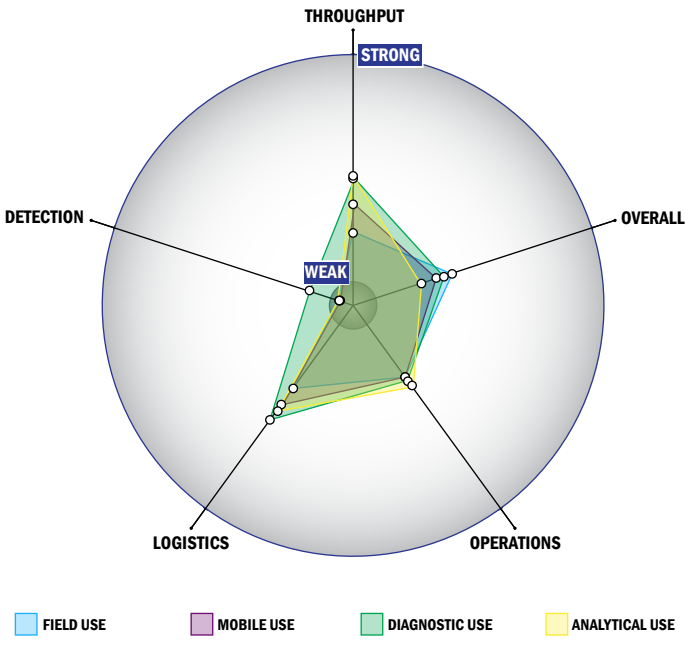


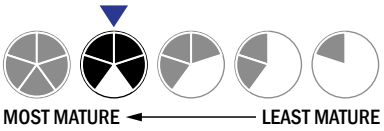
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- 49-96 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more components
- Greater than 20 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- A day of training and technical skills are 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



Operations:

- Can be used from 25 °C to 37 °C
- Components must be stored at 4 °C
- Between 1 to 3 years shelf life
- Greater than 10 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:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- Less than 50 µL

Bio-Rad Laboratories - Bio-Plex 2200

GENERAL DESCRIPTION:

Fully automated, random access multiplex system designed for Autoimmune and Infectious disease testing in human serum or plasma. The system is designed to up to 22 specific analytes per assay panel. The system is utilized in diagnostic testing in hospital laboratories.



TECHNICAL DESCRIPTION:

BioPlex 2200 Immunoassay use heterogeneous sets of 8 micron paramagnetic Beads. The beads are infused with various ratios of fluorescent dyes creating unique bead sets. Beads are coated with recombinant and / or native antibodies, antigens specific to a certain assay. Bead sets are then mixed together into a single reagent pack for testing and the simultaneous detection of multiple analytes from a single sample The system uses a dual laser detection system to process a minimum 150 assay readings per analyte. Detection system is capable of reading 100,000 beads per minute.

CONTACT INFORMATION

Bio-Rad Laboratories
5500 East 2nd St
Benicia CA 94510
POC: David Tomichek Senior Product Manager
510-741-5119
david_tomichek@bio-rad.com
www.bio-rad.com

COST

- $385,000/system
- $1.00-$15.00/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	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Notes

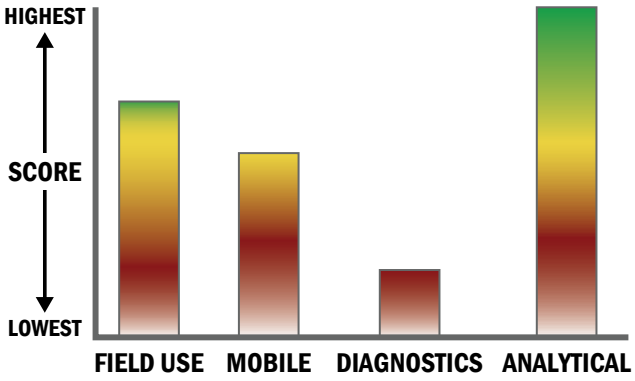
xMap technology also used on Luminex MAGPIX device.

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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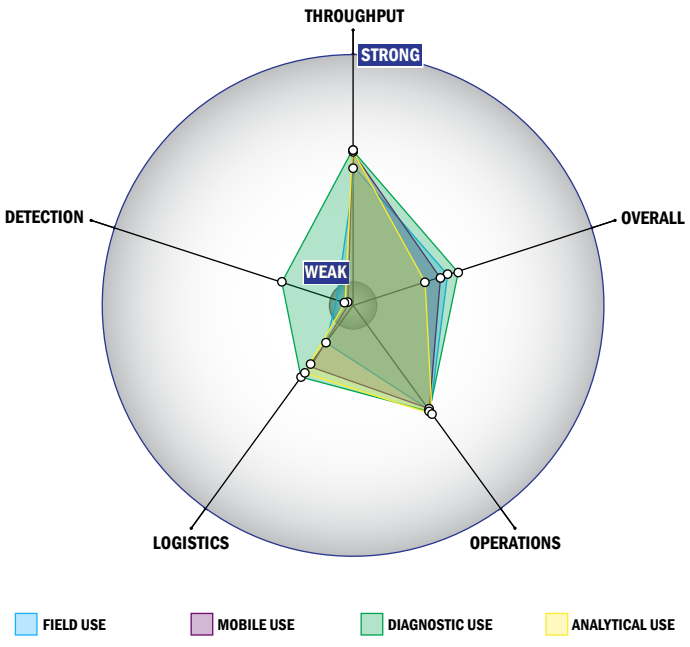


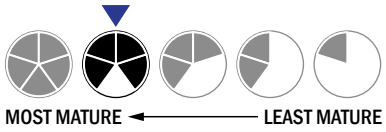
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 2 components
- 5-10 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Device must be used in a temperature stable, dry environment for optimum performance
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- System currently has 510k clearance
- System currently has FDA approval
- Less than 250 µL
- Fair specificity. System has a consistent level of false alarms (5-10%)

Bio-Rad Laboratories - C1000 Thermal Cycler

GENERAL DESCRIPTION:

This product is designed for laboratory analysis. This product amplifies DNA or cDNA extracted from any sample.

TECHNICAL DESCRIPTION:

This is a peltier-based system which amplifies DNA.



CONTACT INFORMATION

Bio-Rad Laboratories
2000 Alfred Nobel Drive
Hercules, CA. 94547
1-800-424-6723

COST

- $8,000-8,700/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	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Notes

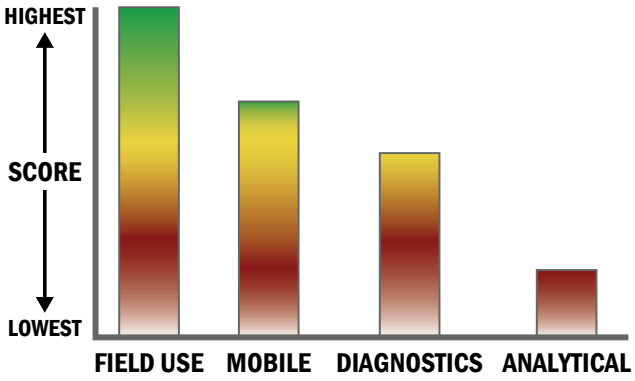
Traditional themocycler not intended for real time analysis.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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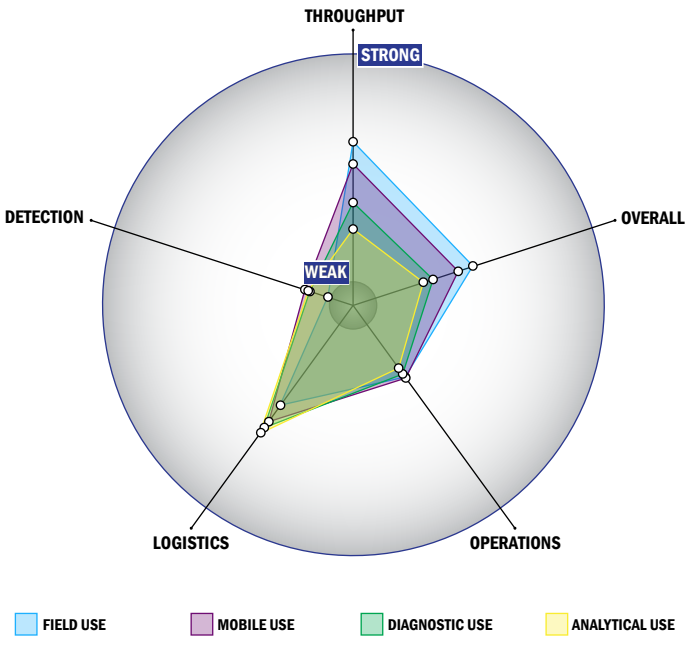


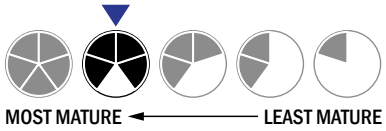
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- 95-32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 2 components
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Device or system has peak performance at normal relative humidity conditions
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- Less than 50 µL
- Manual kit not integrated with the system handles spore lysis

Bio-Rad Laboratories - CFX Real-Time PCR Detection System

GENERAL DESCRIPTION:

Not provided.

TECHNICAL DESCRIPTION:



The CFX Real-Time PCR detection systems are designed for real-time PCR amplification and detection of DNA or cDNA using fluorescence detection to determine target sample presence, absence or quantity. The systems combine a C1000 thermal cycler with interchangeable 96 well or 384 well modules for singleplex and multiplex detection of fluorophores. Purchase of this instrument conveys a limited non-transferable immunity from suit for the purchaser's own internal research and development and for use in human in vitro diagnostics and all other applied fields except veterinary diagnostics. The CFX Automation System enables the automated loading of multiple reaction plates into the CFX system allowing fully automated running sample amplification and detection

CONTACT INFORMATION

Bio-Rad Laboratories
2000 Alfred Nobel Drive
Hercules, CA. 94547
1-800-424-6723

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

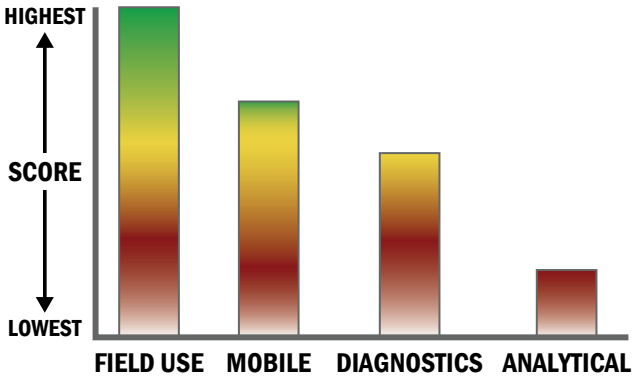
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

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

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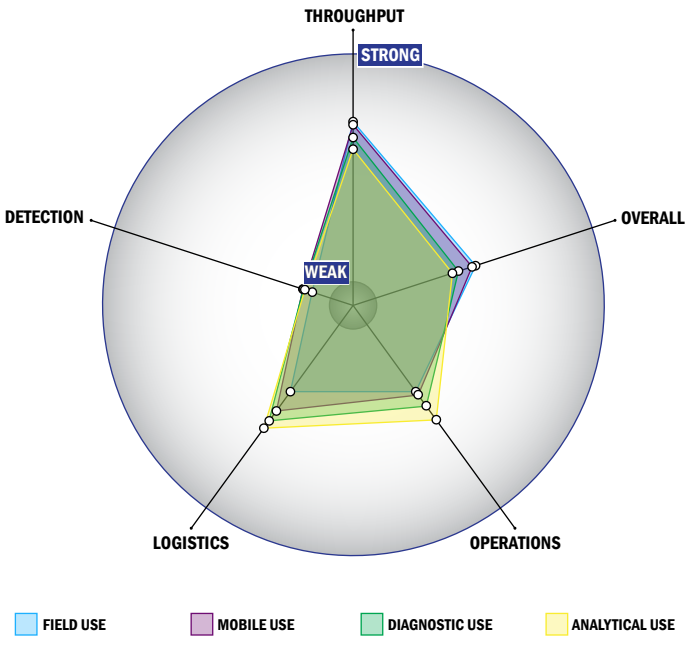


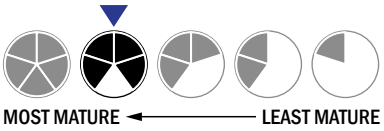
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples every 2 hours
- The system could easily be adapted into a fully automated system
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 2 components
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a toaster
- Between 25 and 50 kg
- Wired connections are available
- System or device has 110V electrical requirement
- Battery life



Operations:

- Can be used from 25°C to 37°C
- Components must be frozen (-20°C)
- Device or system has peak performance at normal relative humidity conditions
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 10 µL
- Manual kit not integrated with the system handles spore lysis

BioSentinel - BoTest Botulinum Neurotoxin Detection Assays

GENERAL DESCRIPTION:



BioSentinel's BoTest™ Botulinum Neurotoxin (BoNT) Detection Assays offer the most sensitive system available for the routine detection of BoNT serotypes A and E (BoTest™ A/E); and serotypes B, D, F, and G (BoTest™ B/D/F/G). Intended uses include high throughput drug discovery; food, environmental, and water testing; and research. The assay detects and quantifies the activity of BoNT. In addition, the BoTest Matrix A assay can be used to detect botulinum activity in complex matrices.

TECHNICAL DESCRIPTION:

The BoTest™ Assays utilize fluorescent reporters that give a ratiometric response when specifically cleaved by BoNT. The assay is run in a mix-and-read, 96 – 1536-well plate format. The reporter uses native BoNT substrates for improved enzyme binding and sensitivity and can be coupled to antibody-conjugated magnetic beads to allow for the detection of BoNT in complex matrices. The assays provide up to a 300-fold increase in sensitivity for BoNT activity compared to other co µL commercially available assays. The assays are provided in kits to ensure reagent consistency and reliability.

CONTACT INFORMATION

BioSentinel
510 Charmany Drive
Madison, WI 53711
POC: Ward Tucker
608-441-8174

COST

- $395/system
- $2/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	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Notes

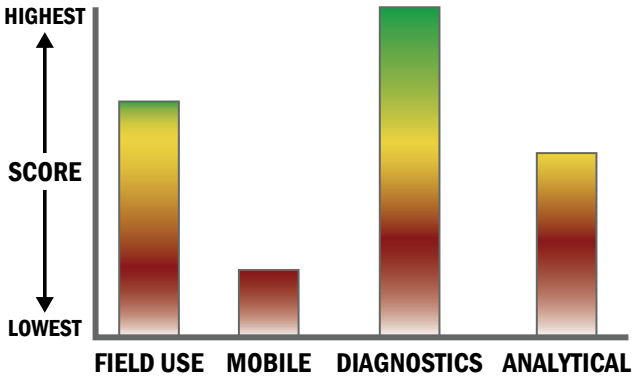
Can determine if toxin is active.

Survey Source

N/A

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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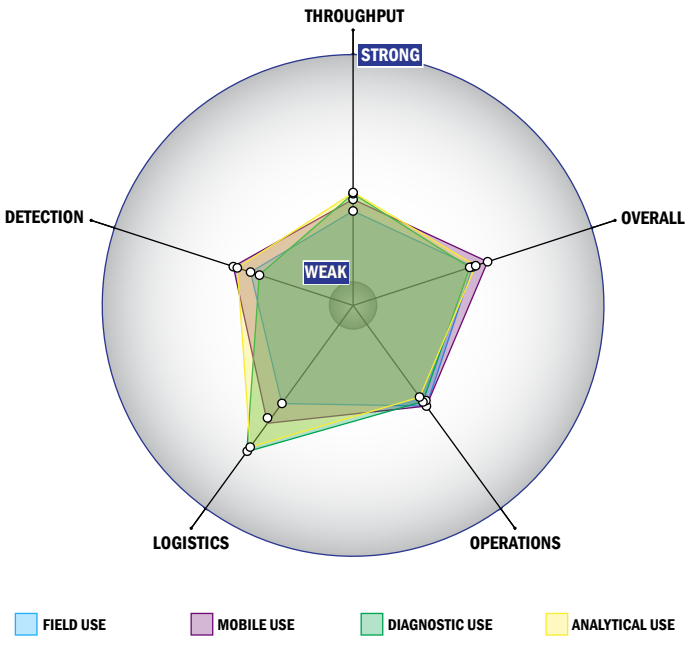


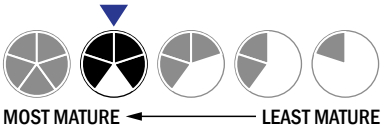
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, single tests/sample per run
- 349-96 samples every 2 hours
- The system could easily be adapted into a fully automated system
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 5 or more components
- Greater than 20 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be frozen (-20°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is open but modification requires licensing
- The system hardware is closed and not available for modification

Detection:

- Not possible for the system to achieve 510K clearance
- Possible the system could receive FDA approval, no current efforts at this time
- Less than 10 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- Less than 1 ng per mL

Biral - VeroTect

GENERAL DESCRIPTION:



The Biral VeroTect real time biodetection instrument is designed to give the earliest possible warning of the potential presence of biological warfare agents in the atmosphere. It is a generic detector that performs all measurements on the particles in airborne suspension. It uses the physical characteristics of particles together with their intrinsic fluorescence to differentiate biological particles that represent a potential threat from the wide range of natural and pollutant particles that are always present in the atmosphere. It requires no reagents or consumables.

The instrument has been designed only for use in military and security environments. It has passed all the required UK MOD rough handling tests and has been environmentally certified for operation between -30°C to +50°C. It can operate entirely autonomously giving visual and/or audible warning or it can be operated remotely from a computer system. In the latter case all indicator lights on the unit may be extinguished. The system is configured so that it can operate on a stand-alone basis as a single point detector or it can be part of an array of networked sensors delivering area detection.

For stand-alone operation it is supplied with intelligent Vero Warn software. If required, this can be used to trigger aerosol collectors, providing samples for identification analysis systems.

TECHNICAL DESCRIPTION:

The Biral VeroTect measures the size and shape of all particles in the sampled aerosol. It also measures the intrinsic fluorescence of a small volume of the aerosol. The particle size and shape are derived from, respectively, the integrated intensity and the spatial distribution of the scattered light pattern. Intrinsic fluorescence is excited by a flash lamp with the output filtered to give a narrow band pulse of UV light centered at a wavelength of 280nm. The fluorescence generated is split into UV and visible bands and the intensity of each is measured.

The data from the aerosol measurements is passed to the VeroWarn software in which a suite of intelligent algorithms assess the probability that a biological challenge has been detected. The analysis algorithms can be adjusted to vary the response of the system for a range of operational requirements. The company always aims to work with the customer to ensure that the analysis system is optimized for their specific requirements.

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

CONTACT INFORMATION

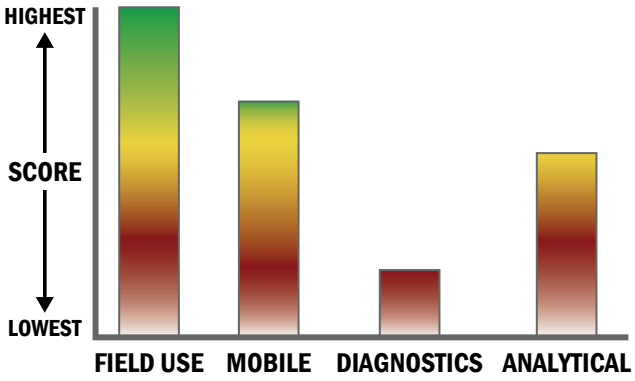
Biral
PO Box2
Portishead, Bristol, BS20 7JB

COST

- $100,000/system
- $0/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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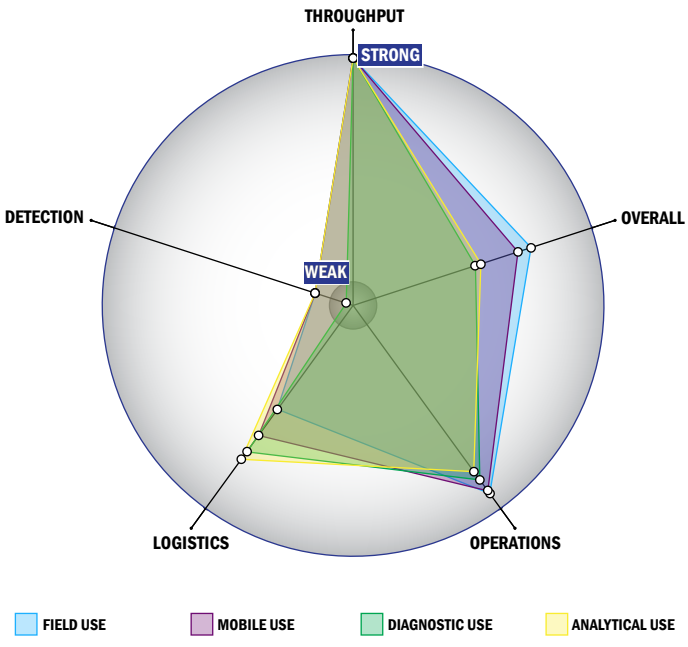


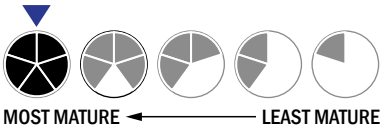
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- 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
- 0 components
- Less than 5 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 25 and 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- This system does not test liquids
- Good specificity. System has a consistently low level of false alarms (2-5%)
- Spore lysis not necessary for detection by system

Block Engineering, LLC - LaserScan Analyzer

GENERAL DESCRIPTION:



The LaserScan Analyzer is a handheld, battery-operated device that is capable of detecting surface contamination, due to the presence of chemical threats, within seconds and in a standoff mode. The system utilizes Quantum Cascade Lasers (QCLs) with the widest tuning range available today, covering the 6-12 microns infrared spectrum, and offers the chemical identification through the use of infrared spectroscopy. The current device, developed under funding from JIEDDO, Army SBIR and Congressional Adds, is capable of detecting trace explosives in the 1-10 micrograms/sq. cm from approximately 6-12 inches standoff distance. Longer distances could also be achieved with properly sized optics. The system has built-in libraries to detect and identify the explosives of interest and has been tested with numerous backgrounds and surfaces. A built-in LCD displays the identified chemical as well as the actual infrared spectrum, if needed. Furthermore, the same device, but with a different software package could be used for the detection of Chemical Warfare Agents (CWAs) and Toxic Industrial Chemicals (TICs) as Low Volatility Contaminants on surfaces. The system is currently at TRL6 or TRL7 levels. Alternative configurations include built-in gas and vapor detection capability, enabling the potential for LaserScan to detect both surface contaminations in standoff, as well as gases and vapors by collecting air samples. Infrared spectroscopy is also capable of detecting pathogens and other biological threats and feasibility has been demonstrated by several groups. LaserScan could potentially be able to identify such threats by developing appropriately prepared samples and software algorithms.

TECHNICAL DESCRIPTION:

The technology behind the operation of the LaserScan Analyzer is laser-based infrared spectroscopy. A Quantum Cascade Laser (QCL) in an External Cavity Configuration is used to tune across the infrared spectrum of 6-12 microns within a few seconds. A built-in infrared detector is used to collect the reflection of the infrared laser light as it bounces off the target and sophisticated, built-in, ultra-fast electronics generate an infrared spectrum of the chemical substance that was found on the target. High-speed, embedded software algorithms compare this spectrum to built-in infrared libraries and provide real-time identification of the chemical.

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

CONTACT INFORMATION

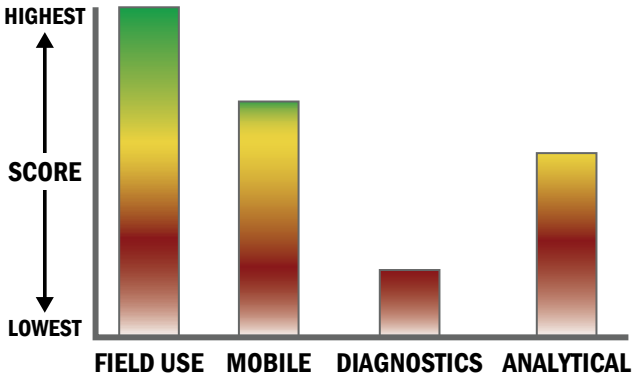
Ward Tucker
Block Engineering, LLC
377 Simarano Drive
Marlborough, MA 01752

COST

- $50,000-$90,000/system
- N/A/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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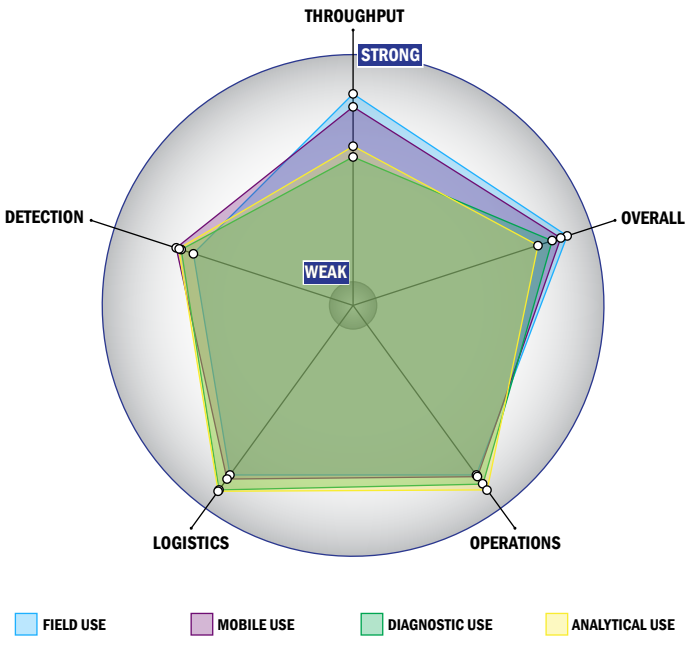


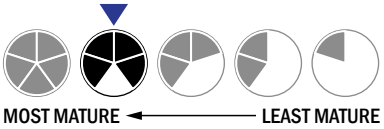
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/sample per run
- 749-350 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
- 0 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- 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 37 °C
- Performance is not influenced by relative humidity
- 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:

- 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
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- $1x10^{-4}$-$1x10^{-3}$ mg/m^3
- 1 ppb-1 ppm
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Bruker Detection Corporation - µRAID Portable Chemical Identifier

GENERAL DESCRIPTION:



Bruker's µRAID Portable Chemical Identifier is the newest IMS based detector on the market today. It has highly advanced capabilities with a combined chemical warfare agent and industrial toxic chemical vapor library and four additional libraries. It also has built in interference rejection for more common harmless chemicals. It is extremely fast to respond with actual agent identification without comprising sensitivity. Its new design makes it half the size and weight of Bruker's established RAID-M with much more library capability. The µRAID Portable Chemical Identifier has flexible battery configurations for either military or commercial battery packs and can detect at altitudes up to 21000 ft. Recent field trials conducted by DHS S&T showed impressive results in which it even beat the ground truth instrument in speed and accuracy.

TECHNICAL DESCRIPTION:

Bruker's µRAID Portable Chemical Identifier employs ion mobility spectrometry suing spectral matching software to locate, classify, and identify chemical warfare agents and toxic industrial chemicals simultaneously. It features a membrane inlet to protect from contamination and environmental effects as well as agent specific automatic back flush to protect from saturation. The µRAID Portable Chemical Identifier also features Bluetooth, USB, and serial interfaces.

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

CONTACT INFORMATION

Bruker Detection Corporation
40 Manning Rd
Billerica, MA 01821

COST

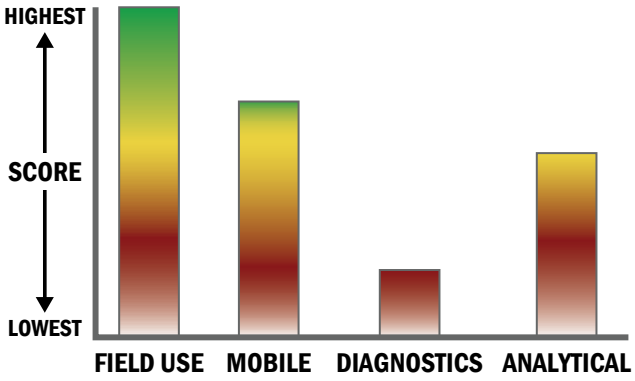
- $10,750/system
- N/A/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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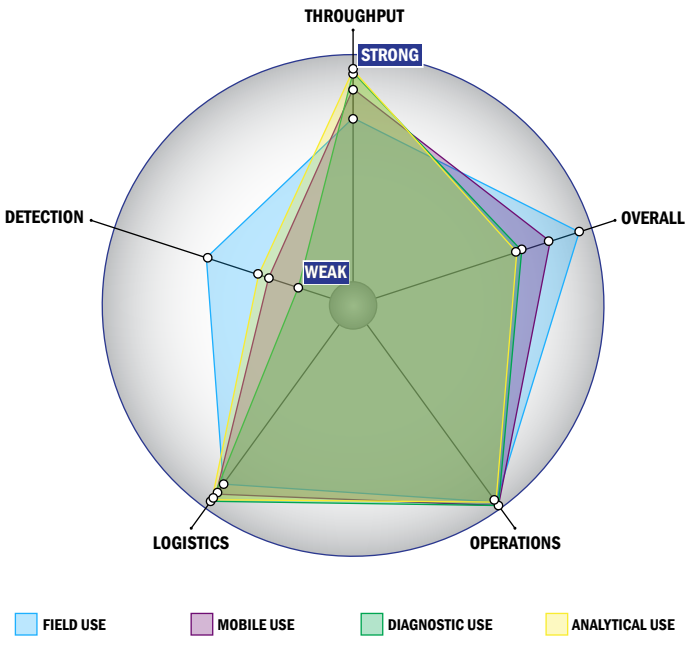


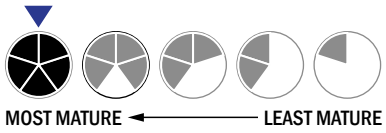
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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 components
- Less than 5 minutes is required for set-up
- No steps for a single detection assay

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- 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
- Is commercially available and meets military specifications



Operations:

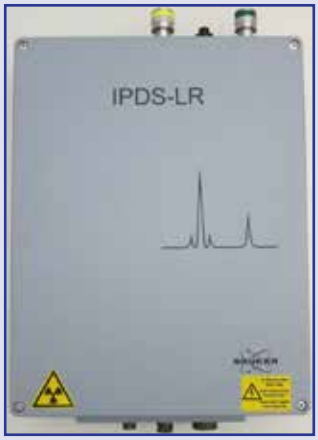
- Can be used from < -21°C to > 42°C (All temperatures)
- This system does not require consumable components
- Performance is not influenced by relative humidity
- Greater than 10 years expected life of system
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not 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
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- <1x10^-6 mg/m^3 chemical agent in air
- System currently can identify aerosolized chemical agent
- Not possible for the system to identify liquid chemical agent

Bruker Detection Corporation - IPDS-LR Shipboard Chemical Detection System

GENERAL DESCRIPTION:



The IPDS-LR Shipboard Chemical Detection System was specifically designed for chemical detection of chemical warfare agent vapors onboard US Navy surface ships. The system comprises two detector units, two sampling systems, a remote display unit, a control display unit, and shock mounts for all units.

TECHNICAL DESCRIPTION:

The IPDS-LR uses ion mobility spectrometry with spectral matching software to locate, classify, and identify chemical warfare agents on board US Navy surface ships. The detector units have special interference rejection built into the detection algorithm and meets specifications for false alarm thresholds with sensitivity requirements. The sampling system includes specially designed sampling lines, filters, and bulkhead adapters to operate in marine environments.

CONTACT INFORMATION

Bruker Detection Corporation
40 Manning Road
Billerica, MA 01821

COST

- $120,000/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

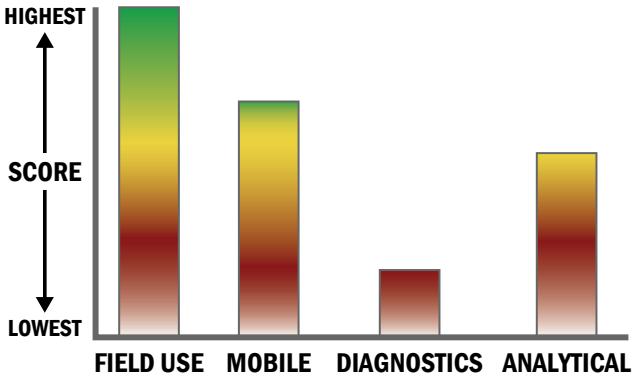
	Biological	Chemical	Radiological
FIELD USE System	N/A	Second Tier	N/A
MOBILE Laboratory	N/A	Second Tier	N/A
DIAGNOSTIC Laboratory	N/A	Fourth Tier	N/A
ANALYTICAL Laboratory	N/A	Third Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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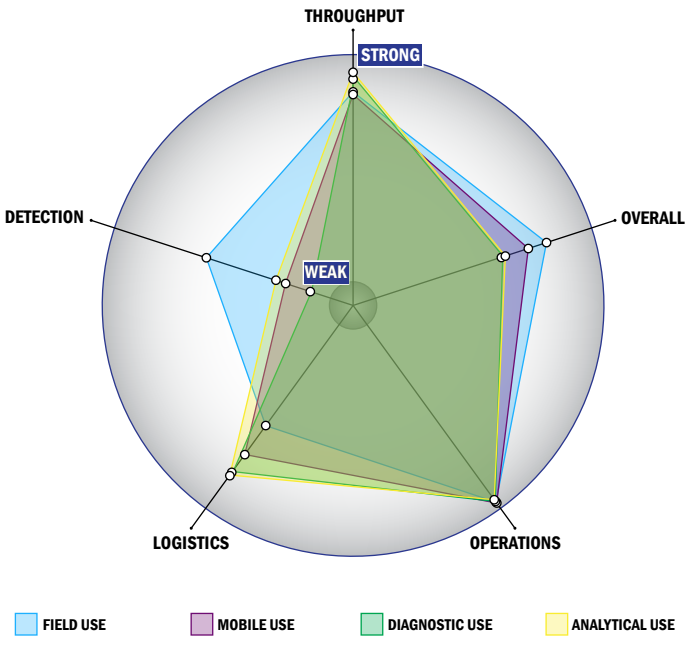


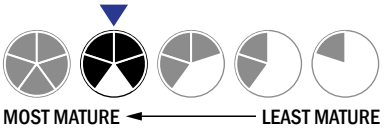
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 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
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- < $1x10^{-6}$ mg/m^3

Bruker Detection Corporation - pTD

GENERAL DESCRIPTION:



The portable Toxin Detector (pTD) allows the rapid, specific and sensitive identification of toxins, which are relevant as biological warfare agents. Application of the ready-to-use pTD Toxin Test Kit BWA I allows the parallel detection of botulinum neurotoxins (BoNT/A, BoNT/B, BoNT/E), staphylococcal enterotoxin B and ricin within less than 25 min in an automated process. A decontamination procedure is integrated in the assay ensuring secure operation of pTD. The system is intended for the on-site analysis of toxins in mobile labs and on-board vehicles. pTD Control is the control and analysis software of the pTD system. The user monitors and controls the startup and shut down of the device as well as the selection and the progress of methods via pTD Control. The results of each analysis are displayed automatically in pTD Control using a traffic light-based color code. Red traffic light is shown together with the warning note that a target was found after identification of a toxin. Data evaluation is realized automatically. Integrated positive and negative control electrodes allow normalization of target electrode signals. This ensures reproducibility of electrochemical toxin detection within different chip batches. The pTD is a platform technology and extendable to address new threats. In addition to toxin detection, first promising results for detection of bacteria and viruses via PCR and nucleic acid hybridization were obtained. Integration of a PCR chamber in pTD will allow nucleic acid amplification and detection of several BWA related microorganisms in parallel.

TECHNICAL DESCRIPTION:

The detection principle is based on an ELISA procedure. Capture antibodies immobilized on gold electrodes facilitate the specific binding of corresponding toxins. Detection of bound toxins is realized by application of a detector-antibody-enzyme conjugate and measurement of the electrical current of an enzymatic redox reaction. The detection event is strongly amplified in this system and allows sensitive toxin identification (low ng/mL-range) in less than 25 minutes. First, the high turnover of enzymatic reaction contributes to the signal amplification and second, a redox recycling procedure built into the experimental procedure, provides a second signal amplification.

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

CONTACT INFORMATION

Bruker Detection Corporation
Division of Bruker Daltonik GmbH
Permosersr. 15
Leipzig, D-04318 Germany

COST

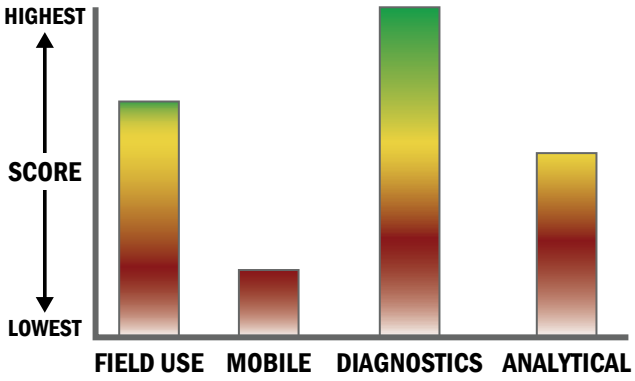
N/A

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

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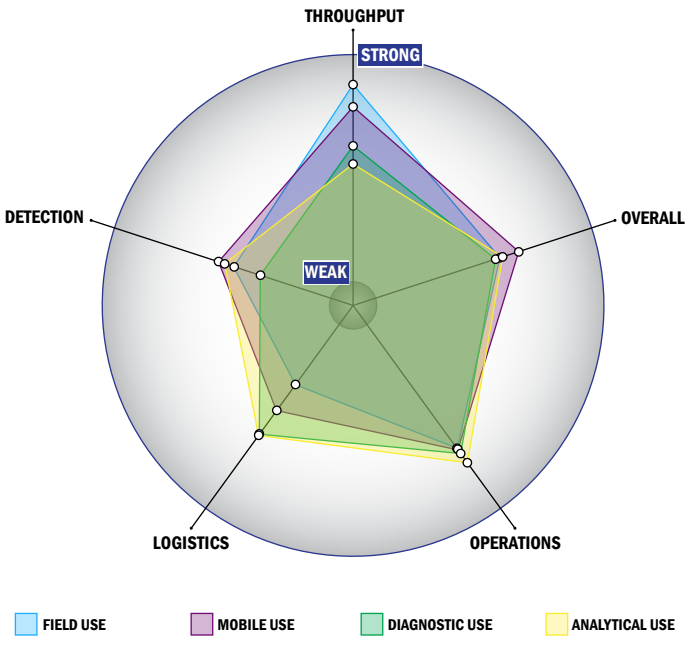


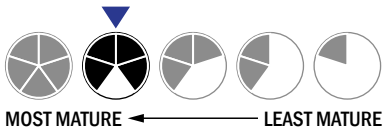
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 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
- No set-up of the system 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
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at 4 °C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Less than 1 ng per mL
- Manual kit not integrated with the system handles spore lysis

Bruker Detection Corporation - Radiation Backpack Sentry

GENERAL DESCRIPTION:



Radiation Backpack Sentry is a self-contained radiological detection and isotope identification instrument. This mobile unit provides the means to screen objects, people, and areas either covertly or visibly. High sensitivity and real time analyses allow an operator to detect and identify low level threats by simply walking through an area. Using the Radiation Backpack Sentry an operator can monitor the surrounding environment by viewing the handheld high resolution TFT LCD monitor or by simply listening to a synthesized voice via a wireless earpiece. Communication between the Radiation Backpack Sentry and user interface handheld is maintained through either wired USB or wireless Bluetooth connection. The instrument can be powered from onboard battery or external source and deployed in either mobile screening and surveillance or stationary local area monitoring roles. The identification algorithms differentiate classes of isotopes to simplify CONOPS. The system identifies the isotope and informs an operator both visually and by voice if the source is from medical treatments, naturally occurring radiation, industrial isotopes, or special nuclear materials.

TECHNICAL DESCRIPTION:

Bruker Radiation Backpack Sentry uses highly sensitive 3" x 3" NaI(Tl) gamma detector. The instrument is automatically self-calibrated and continuously stabilized based on integrated reference source and an array of environmental sensors. Gamma spectra analyses and isotope identification algorithms are based on the template matching technique.

CONTACT INFORMATION

Bruker Detection Corporation
40 Manning Rd
Billerica, MA 01821
POC: Frank Thibodeau
978-663-3660 x1308
fnt@bdal.com
www.bruker.com/detection

COST

- $25,000/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

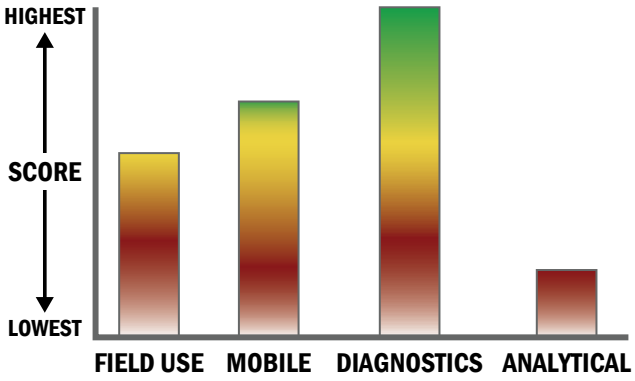
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Top Tier
MOBILE Laboratory	N/A	N/A	Top Tier
DIAGNOSTIC Laboratory	N/A	N/A	Top Tier
ANALYTICAL Laboratory	N/A	N/A	Top Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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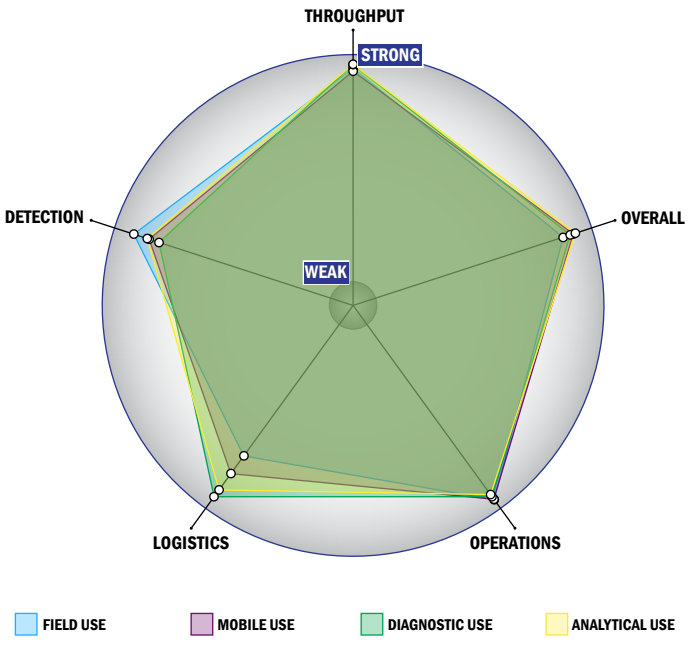


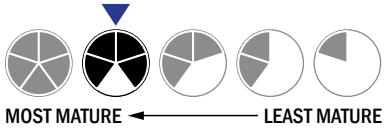
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- Less than 5 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°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose, dose rate and count rate with operator selection to show the display, may differentiate between types of radiation
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

Bruker Detection Corporation - RAID-AFM Autonomous Facility Chemical Monitor

GENERAL DESCRIPTION:

Bruker's RAID-AFM is an autonomous facility monitor for dangerous chemical vapors. It continuously operates 24/7/365 with a combined chemical library of chemical warfare agents and toxic industrial chemicals. Its long lasting consumables are rated at no less than 15,000 operating hours. The RAID-AFM chemical detector and identifier is designed to be installed in critical facilities such as subways, government buildings, and other large venues on a permanent basis. It can be networked, has an optional air sampling unit for extended sampling lines, and webserver software for easy installation and operation.



TECHNICAL DESCRIPTION:

Bruker's RAID-AFM is an ion mobility spectrometer using spectral matching software to locate, classify, and identify chemical warfare agents and toxic industrial chemical vapors simultaneously. It has the capability of loading interferent rejection for common cleaners or solvents unique to the detector's location to reduce false alarms. The membrane inlet and special filters protect the system from environmental effects and lend stability to the analytical process.

CONTACT INFORMATION

Bruker Detection Corporation
40 Manning Rd
Billerica, MA 01821
POC: Frank Thibodeau
978-663-3660 x1308
fnt@bdal.com
www.bruker.com/detection

COST

- $27,500/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

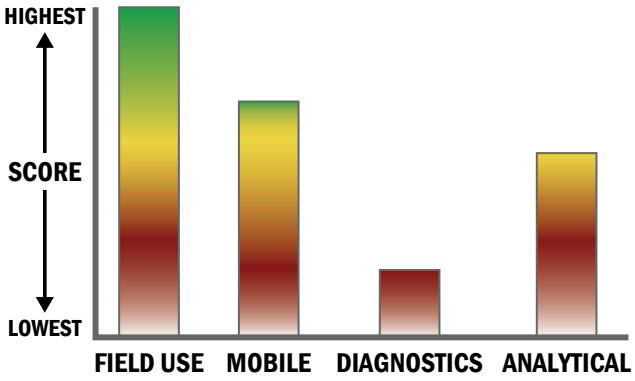
	Biological	Chemical	Radiological
FIELD USE System	N/A	Third Tier	N/A
MOBILE Laboratory	N/A	Second Tier	N/A
DIAGNOSTIC Laboratory	N/A	Third Tier	N/A
ANALYTICAL Laboratory	N/A	Second Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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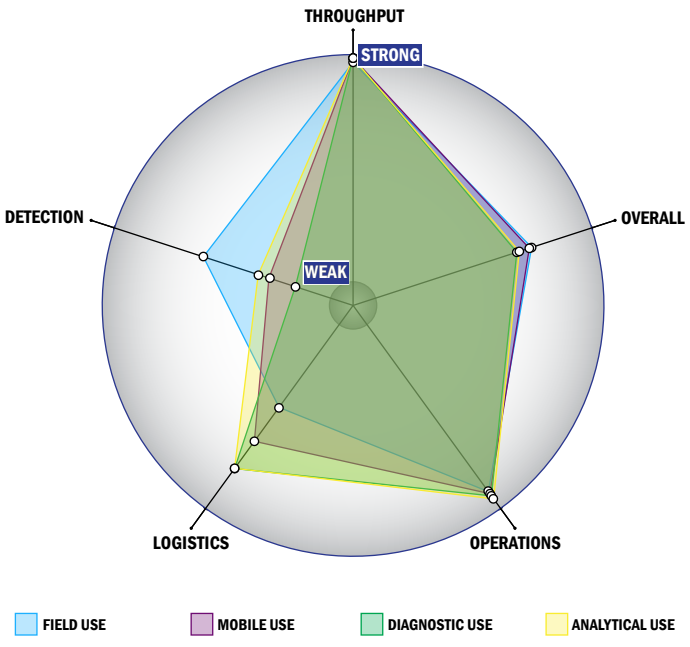


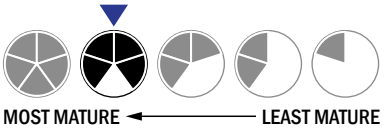
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- Less than 5 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
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Performance is not influenced by relative humidity
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- $<1x10^{-6}$ mg/m^3
- System currently can identify aerosolized chemical agent

Bruker Detection Corporation - Raid-M Handheld Chemical Detector & Identifier

GENERAL DESCRIPTION:



The RAID-M is a complete state-of-the-art instrument for the homeland security and military response team professional to detect and identify dangerous chemical vapors. The RAID-M is an easy to use, rugged, versatile, and certified instrument. It detects and identifies a wide range of chemical vapors including CWA, TIC, riot control, and industrial gases. The RAID-M can be operated while in full personal protective gear, in hazardous areas, and in all kinds of environmental conditions.

The RAID-M alerts the operator to the presence of dangerous chemical warfare agents and certain toxic industrial chemicals by means of an audible alarm, visual alarm, and LED display readings. Agents that are verifiably detectable are GA, GB, GD, GF, VX, HD, HN, L, AC, CG, CL2, TDI, SO2, CY, CN, CS, etc. This list is not exhaustive. Chemicals can be added and deleted from selected libraries easily by trained personnel. Applications include emergency response, chemical survey, decontamination validity, glovebox screening of dangerous chemical vapors, site monitoring, critical event monitoring, leak testing, and laboratory analysis.

TECHNICAL DESCRIPTION:

The RAID-M handheld chemical agent detector is an ion mobility spectrometer that samples the ambient air for chemical agent and toxic industrial chemical vapors. The RAID-M has a membrane inlet, an exempt nickel 63 radioactive source for ionization, ammonia dopant for interference rejection, and automatic back flush for saturation protection. The RAID-M uses spectral matching software to classify and identify CWA's, TICs and other gases.

CONTACT INFORMATION

Bruker Detection Corporation
40 Manning Rd
Billerica, MA 01821
POC: Frank Thibodeau

COST

- $18,975/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

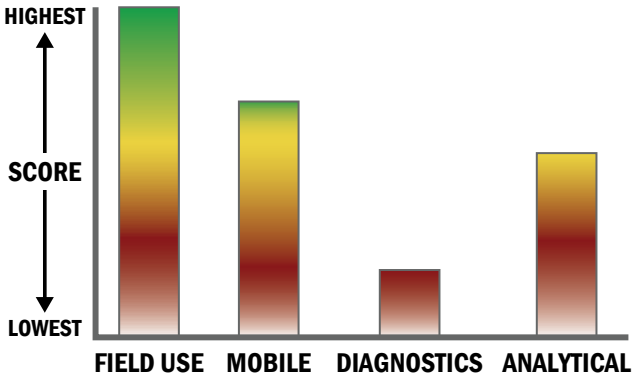
	Biological	Chemical	Radiological
FIELD USE System	N/A		N/A
MOBILE Laboratory	N/A		N/A
DIAGNOSTIC Laboratory	N/A		N/A
ANALYTICAL Laboratory	N/A		N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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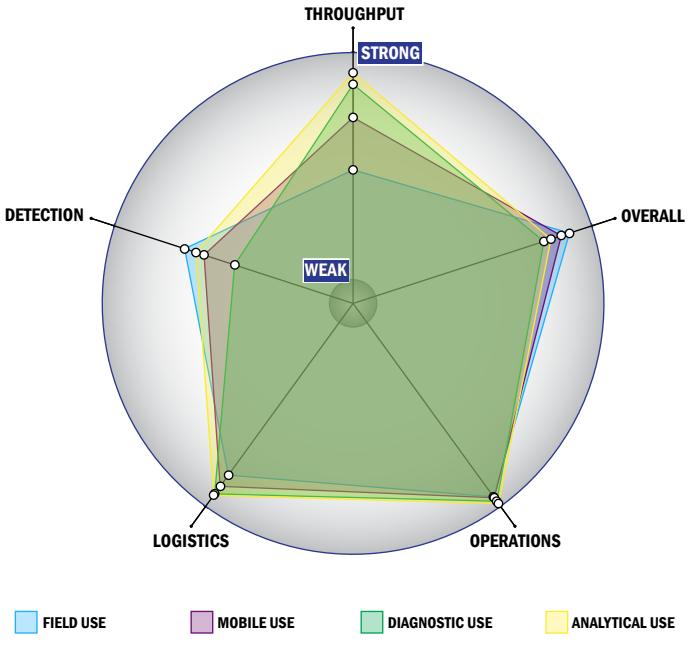


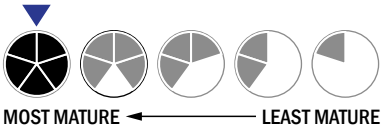
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- 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 < -21°C to > 42°C (All temperatures)
- Device or system has peak performance at normal relative humidity conditions
- 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 but modification requires licensing
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- $1x10^{-6}$ - $3x10^{-5}$ mg/m^3
- 1 ppb – 1 ppm
- System currently can identify aerosolized chemical agent

Bruker Detection Corporation - RAID-XP Combined Chemical & Radiation Detector

GENERAL DESCRIPTION:



The Rapid Alarm and Identification Device-XP (RAID-XP) is an instrument designed for the detection and identification of Chemical Warfare Agents (CWAs) and Toxic Industrial Chemicals (TICs) in the air and has an integrated radiation sensor for dosimetry applications.

The RAID-XP has been designed for detection and monitoring of CWAs and TICs in the air. Detected substances can be identified with their specific substance name and can be quantified by a concentration bar line. To prevent chemical overload, the RAID-XP is equipped with an automatic overload protection system. The radiation sensor is calibrated once before delivery to the customer. After this initial calibration, no further calibration is required.

Chemical detector consumables are rated for 4,000 operating hours.

TECHNICAL DESCRIPTION:

The RAID-XP provides sensors for chemical and radiation detection. The chemical sensor operates on the principle of Ion Mobility Spectrometry (IMS). A state of the art semiconductor technology (pin diodes) based sensor is used for the Gamma radiation detection.

CONTACT INFORMATION

Bruker Detection Corporation
40 Manning Rd
Billerica, MA 01821
POC: Frank Thibodeau
fnt@bdal.com
www.bruker.com/detection

COST

- $26,500/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

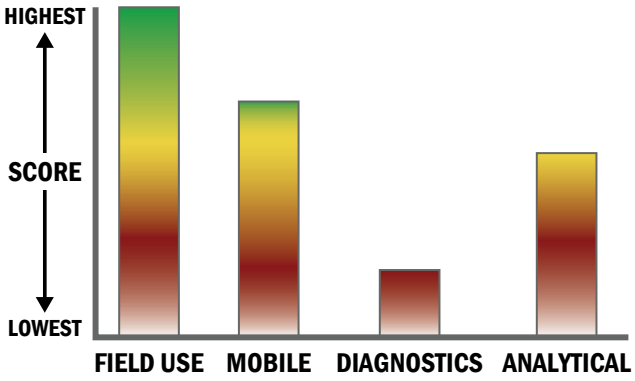
	Biological	Chemical	Radiological
FIELD USE System	N/A	Top Tier	Top Tier
MOBILE Laboratory	N/A	Top Tier	Second Tier
DIAGNOSTIC Laboratory	N/A	Second Tier	Third Tier
ANALYTICAL Laboratory	N/A	Top Tier	Second Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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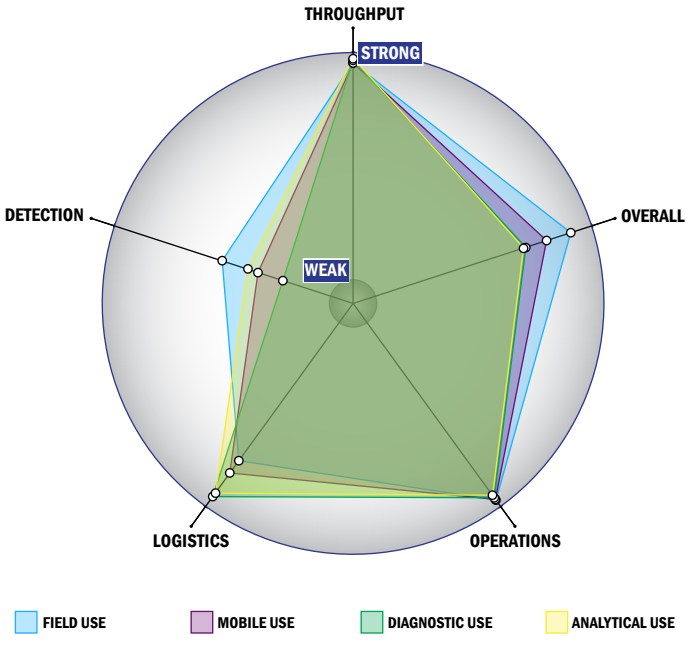


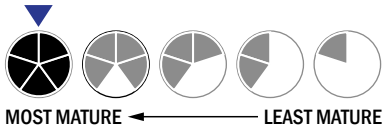
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- Less than 5 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°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- $<1x10^{-6}$ mg/m^3
- 1 ppb – 1 ppm
- System currently can identify aerosolized chemical agent
- Only total dose and dose rate
- Down to background level radiation for dose rate
- System is used for area air sampling

Bruker Detection Corporation - Rapid Plus Standoff Chemical Detector

GENERAL DESCRIPTION:



The RAPID is a highly reliable infrared detector for stand-off detection of chemical agent clouds. All known chemical warfare agents (CWA) and important Toxic Industrial Chemicals (TICs) are automatically monitored. The lightweight system can be mounted on vehicles, ships and helicopters, and performs real-time field screening while underway. Sensor, scanner, electronics and control unit are integrated into one compact housing. The RAPID is based on the proven Bruker RockSolid™ flex-pivot interferometer, and is resistant to mechanical shocks, vibrations, humidity and extreme temperatures. It is hardened for field operations in harsh and rugged environments. All this distinguishes the RAPID as an efficient and reliable chemical agent detector for field screening.

The RAPID features:

- Remote detection of atmospheric pollutants and chemical warfare agents
- Robust and compact design
- Low weight
- Minimal power consumption
- Low detection limits
- Fast measurement and alarm
- Continuous monitoring while in motion
- Chemical cloud tracking and increased situational awareness for critical area or event coverage
- Can detect over 90 chemical compounds up to 5 KMs line of sight

TECHNICAL DESCRIPTION:

IR Spectroscopy is an accepted and widespread analytical procedure which can be applied to many different chemical species. Since different functional groups of chemical compounds absorb light at specific frequencies, this technique has proven to be useful for the broadband passive remote detection of chemical agents in the range of 7 to 14 µm (700-1300 cm-1). This RAPIDplus infrared spectrometer is an FTIR instrument controlled by a integrated processor system and an embedded PC.

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

CONTACT INFORMATION

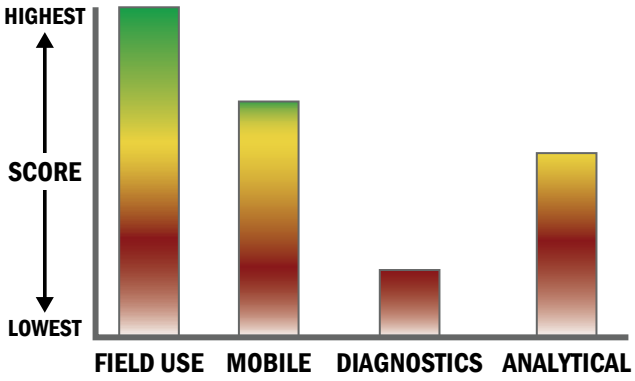
Bruker Detection Corporation
40 Manning Road
Billerica, MA 01821
POC: Frank Thibodeau
978-663-3660 x1308
fnt@bdal.com
www.bruker.com/detection

COST

- $300,000/system
- N/A/analysis

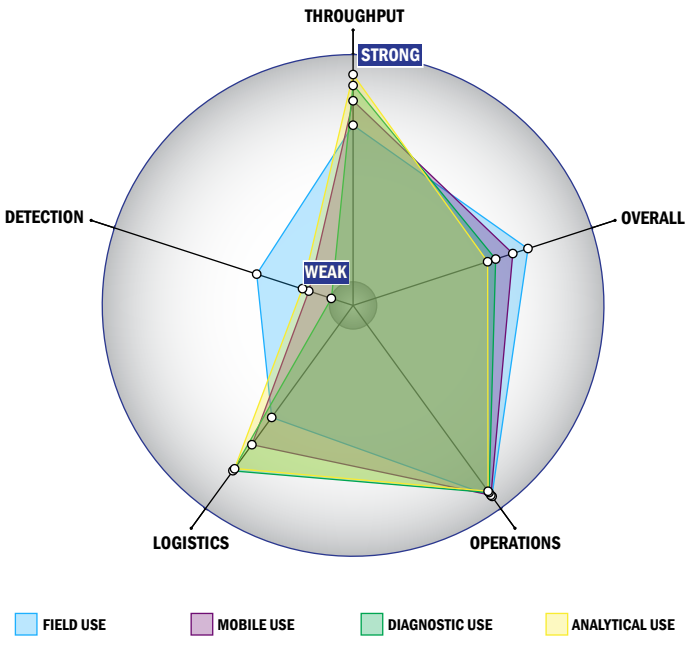
Scoring Analysis

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.



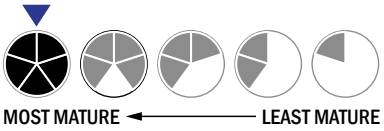
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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 components
- 5-10 minutes is required for set-up
- Automatic 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



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- $1x10^{-4}$-$1x10^{-3}$ mg/m^3

Building Protection Systems, Inc. (BPSI) - METRO SENTRY ONE

GENERAL DESCRIPTION:



The Metro Sentry One (MSO) is a mechanical system installed to monitor areas of terrorist concerns such as an underground Metro Transit Authority station environment. The MSO monitors both directly and remotely, airborne toxins in the fresh air supply, points of ingress and egress and the ambient platform environment. If a toxin is detected, the MSO enacts a sequence of predetermined alerts and mechanical protocols to isolate toxins thus preventing continued distribution to prevent loss of life, preserve assets, and to provide an early warning system for first responders in the event of a targeted terrorist attack using chemical, radiological or biological materials or an accidental release. The MSO is installed as an all-in-one full backbone system and can integrate directly into an existing security command platform or into BPSI's extensive fusion platform. The MSO detects a defined spectrum of chemical contaminants, a wide library of radiological isotopes and select biological agents with sensitivity levels customized for each specific toxin. The MSO has been designed in modular fashion to support continued advances in chemical, radiological and biological sensory technology, with a "Plug and Play" overlay into the Sentry One network. No known similar systems exist. The Metro Sentry One is a fully functioning "Next Generation" detection backbone system that integrates sensory technology into a market ready transit retrofit project. With embedded controls, logic, software, mechanical protocols and remote monitoring coupled with multiple security means, this system is designed to operate 24/7/365 in the absence of false positive readings.

TECHNICAL DESCRIPTION:

BPSI's Metro Sentry One (MSO) is a COTS based system that detects a defined spectrum of toxic compounds, a 120+ library of radiological isotopes and select biological agents in a transit environment on a continuous 24/7/365 basis with virtually zero false positive alarms. Through the integration of programmable logic controllers and sensor arrays, linked to a PC infrastructure with multi-layer communications protocols, the Metro Sentry One solution offers a dynamic set of customized security measures. The MSO's backbone architecture mesh simply and easily with existing systems, in a seamless process that gives the end user virtually unlimited options for protection.

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	Top Tier	Second Tier	Second Tier
MOBILE Laboratory	Third Tier	Second Tier	Top Tier
DIAGNOSTIC Laboratory	Bottom Tier	Third Tier	Top Tier
ANALYTICAL Laboratory	Third Tier	Second Tier	Top Tier

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

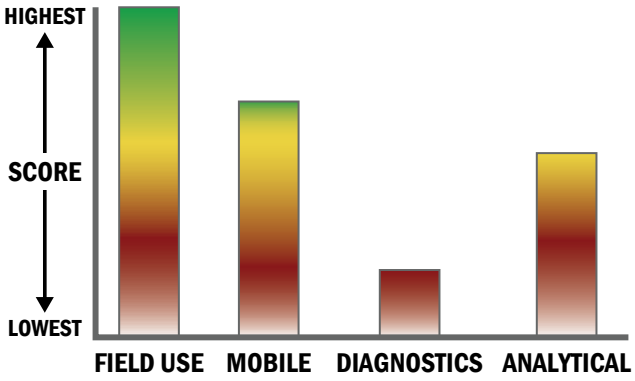
Building Protection Systems, Inc. (BPSI)
150 Post Street, Suite 750
San Francisco, CA 94108
POC: Greg Eiler President
925-933-8600
geiler@bpsiglobal.com
www.bpsiglobal.com

COST

- N/A/system
- $0/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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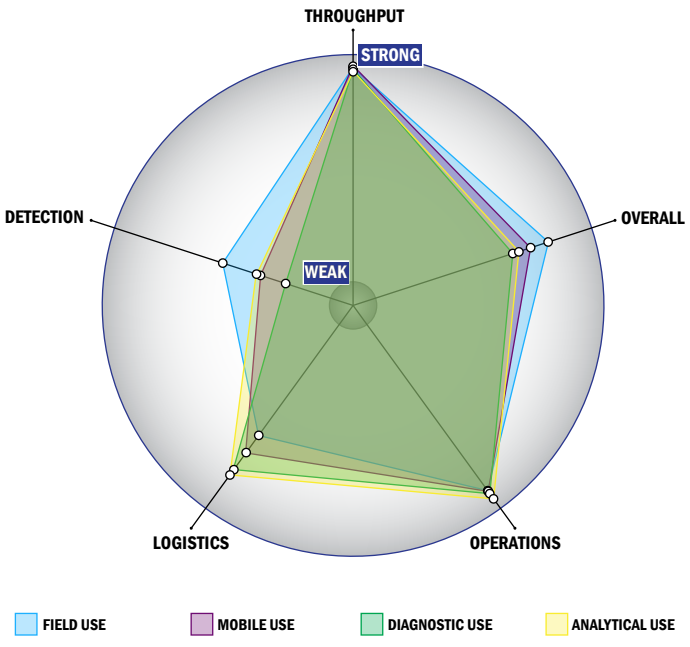


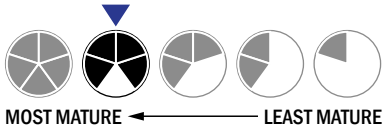
Evaluation Criteria

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 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
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Performance is not influenced by relative humidity
- 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:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Add on capability that is full or semi-automated for spore lysis
- $1x10^{-6}$ - $3x10^{-5}$ mg/m^3
- System currently can identify aerosolized chemical agent
- Total dose, dose rate and count rate with simultaneous display readout
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for area air sampling

Building Protection Systems, Inc. (BPSI) - ALPHA SENTRY ONE

GENERAL DESCRIPTION:



The Alpha Sentry One (ASO) is a U.S. Department of Homeland Security SAFETY Act Designated technology installed to monitor terrorist concerns of smaller venues such as a Commercial Office Building lobbies, perimeter protection and schools. Using the same sensory technology as the larger Building Sentry One, the ASO is limited to (2) or (4) sensors. If a toxin is detected, the ASO enacts a sequence of predetermined alerts and mechanical protocols to isolate toxins thus preventing continued distribution to prevent loss of life, preserve assets, and to provide an early warning system for first responders in the event of a targeted terrorist attack using chemical or radiological materials or an accidental release. The ASO is installed as an all-in-one full backbone system and can integrate directly into an existing Building Management System (BMS) or security command center. The ASO detects a defined spectrum of chemical contaminants and a wide library of radiological isotopes with sensitivity levels customized for each specific toxin. The ASO has been designed in modular fashion for a quick deployment with easy installation. No known similar systems exist. The Alpha Sentry One is a fully functioning "Next Generation" detection system that can integrate sensory technology into just about any market ready project. With embedded controls, logic, software, mechanical protocols and remote monitoring coupled with multiple security means, this system is designed to operate 24/7/365 in the absence of false positive readings.

TECHNICAL DESCRIPTION:

BPSI's Alpha Sentry One (ASO) is a COTS based system that detects a defined spectrum of toxic compounds and a 120+ library of radiological isotopes for smaller applications such as: perimeter protection, schools or building lobbies on a continuous 24/7/365 basis with virtually zero false positive alarms. Through the integration of programmable logic controllers and sensor arrays, linked to a PC infrastructure with multi-layer communications protocols, the Alpha Sentry One solution offers a dynamic set of customized security measures. The ASO's architecture mesh simply and easily with existing systems, in a seamless process that gives the end user superior detection protection.

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	Top Tier	Second Tier	Second Tier
MOBILE Laboratory	Second Tier	Second Tier	Top Tier
DIAGNOSTIC Laboratory	Second Tier	Third Tier	Top Tier
ANALYTICAL Laboratory	Third Tier	Second Tier	Top Tier

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

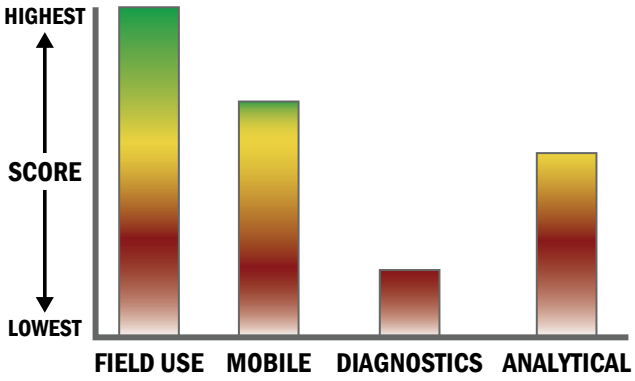
Building Protection Systems, Inc. (BPSI)
150 Post Street, Suite 750
San Francisco, CA 94108
POC: Greg Eiler President
925-933-8600
geiler@bpsiglobal.com
www.bpsiglobal.com

COST

- N/A/system
- $0/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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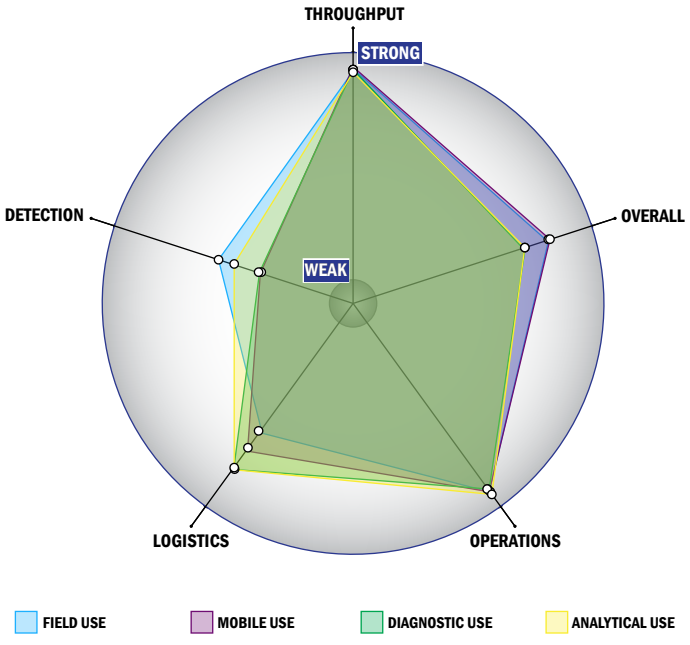


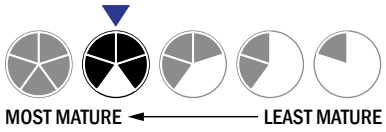
Evaluation Criteria

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 or device is currently fully automated
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- This system does not require consumable components
- Performance is not influenced by relative humidity
- 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Add on capability that is full or semi-automated for spore lysis
- $1x10^{-6}$ - $3x10^{-5}$ mg/m^3
- System currently can identify aerosolized chemical agent
- Not possible to identify liquid chemical agent
- Total dose, dose rate and count rate
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- Area air sampling

Building Protection Systems, Inc. (BPSI) - BUILDING SENTRY ONE

GENERAL DESCRIPTION:



The Building Sentry One (BSO) is U.S. Department of Homeland Security SAFETY Act Designated technology installed to monitor a Commercial Office Building, Campus Complex or Stadium Environment. The BSO monitors both directly and remotely, airborne toxins in the fresh and return air supplies, lobbies and loading dock environments. If a toxin is detected, the BSO enacts a sequence of predetermined alerts and mechanical protocols to isolate toxins and to provide an early warning system for first responders. The BSO is installed as an all-in-one full backbone system and can integrate directly into an existing Building Management System. The BSO detects a defined spectrum of chemical contaminants, a wide library of radiological isotopes and select biological agents with sensitivity levels customized for each specific toxin. The BSO has been designed in modular fashion to support continued advances in chemical, radiological and biological sensory technology, with a "Plug and Play" overlay into the Sentry One network. The BSO is a fully functioning "Next Generation" detection backbone system that integrates sensory technology into just about any market ready project. With embedded controls, logic, software, mechanical protocols and remote monitoring coupled with multiple security means, this system is designed to operate 24/7/365 in the absence of false positive readings.

TECHNICAL DESCRIPTION:

BSO is a COTS based system that detects a defined spectrum of toxic compounds, a 120+ library of radiological isotopes and select biological agents in a building's HVAC system on a continuous 24/7/365 basis with virtually zero false positive alarms. Through the integration of programmable logic controllers and sensor arrays, linked to a PC infrastructure with multi-layer communications protocols, the BSO solution offers a dynamic set of customized security measures. The BSO's backbone architecture mesh simply and easily with existing systems, in a seamless process that gives the end user virtually unlimited options for protection.

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	Second Tier	Third Tier
MOBILE Laboratory	Third Tier	Second Tier	Top Tier
DIAGNOSTIC Laboratory	Bottom Tier	Third Tier	Second Tier
ANALYTICAL Laboratory	Third Tier	Second Tier	Top Tier

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

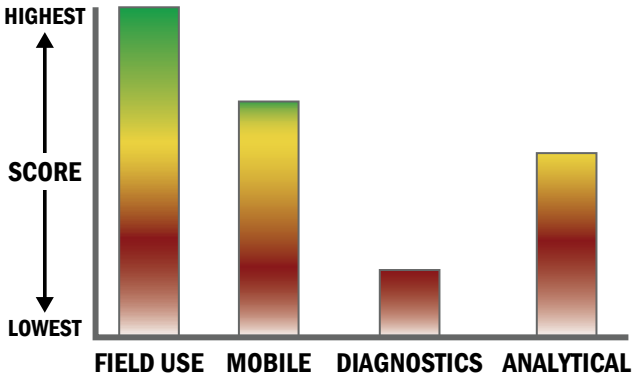
Building Protection Systems, Inc. (BPSI)
150 Post Street, Suite 750
San Francisco, CA 94108
POC: Greg Eiler President
925-933-8600
geiler@bpsiglobal.com
www.bpsiglobal.com

COST

- N/A/system
- $0/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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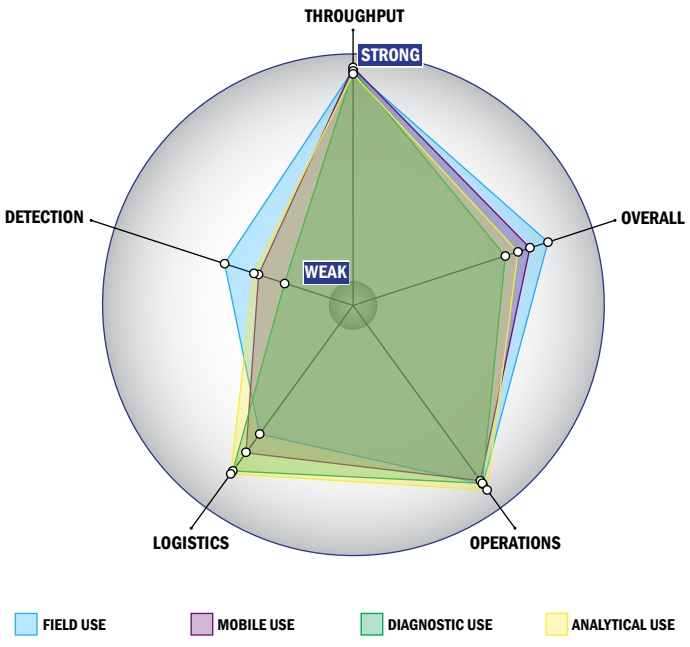


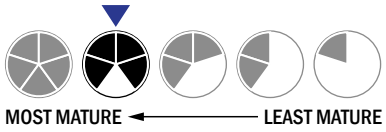
Evaluation Criteria

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 or device is currently fully automated
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Performance is not influenced by relative humidity
- 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Manual kit not integrated with the system handles spore lysis
- $1x10^{-6}$ - $3x10^{-5}$ mg/m^3
- System can currently identify aerosolized chemical agent
- Total dose, dose rate and count rate with simultaneous display readout
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for area air sampling

Caliper Life Sciences - LabChip GXII

GENERAL DESCRIPTION:



The LabChip GXII is a complete solution for consistent and precise analysis of protein, DNA, or RNA samples, and is an ideal instrument for protein research users. Whether it is quantitating monoclonal antibody titers, optimizing protein expression conditions, or rapidly screening IgG N-glycan profiles, the LabChip GXII is the perfect bench top tool to accelerate your research and meet your goals. Leveraging microfluidics technology the LabChip GXII eliminates the need to handle time consuming SDS page gels, and provides superior results for less time and money.

TECHNICAL DESCRIPTION:

Electrophoretic separations of protein, DNA, or RNA utilizing laser-induced fluorescence in a microfluidic channel.

CONTACT INFORMATION

Caliper Life Sciences
68 Elm St
Hopkinton, MA 01748
POC: Richard P. Bunch Senior Product Manager, Microfluidics
508-497-2237

COST

- $52,000-$109,500/system
- $0.35-$1.50/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

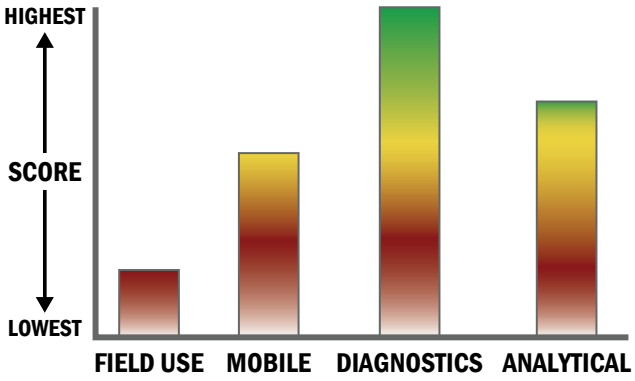
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Fourth Tier	N/A	N/A
DIAGNOSTIC Laboratory	Second Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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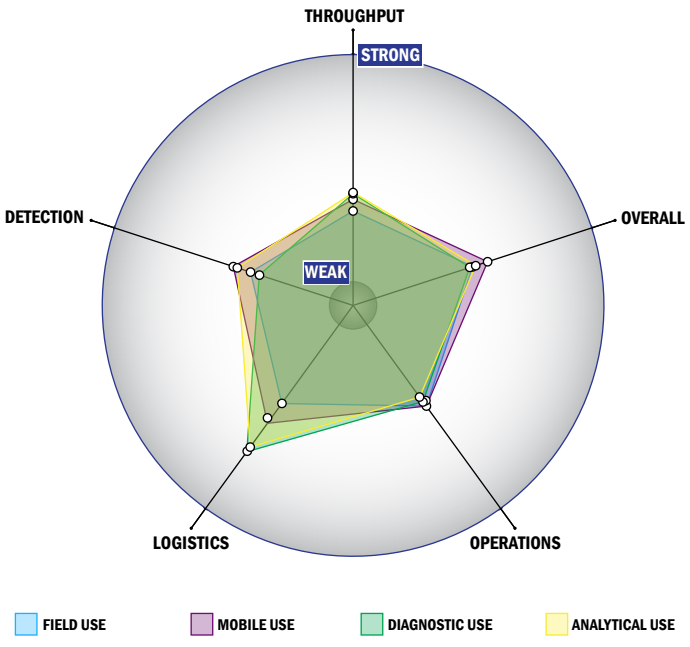


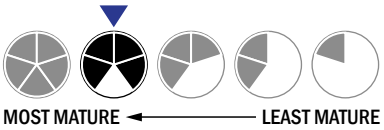
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples every 2 hours
- The system or device is currently fully automated
- 3 solutions, buffer, eluents, and/or reagents
- 3 components
- 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
- Between 25 and 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Components must be frozen (-20 °C)
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 6 months shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- 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
- Possible the system could receive FDA approval, no current efforts at this time
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1,000-10,000 ng per mL
- System does not detect spores

Cellex, Inc. - QFlu Combo Test for POC Flu Diagnosis And Drug Resistance Detection

GENERAL DESCRIPTION:

The QFlu Combo Test is designed for point-of-care use. It can simultaneously detect influenza virus in a sample and determine drug (e.g., Tamiflu) resistance within 15 minutes. The test uses a small, handheld detector that is powered with two AA batteries.



TECHNICAL DESCRIPTION:

The QFlu test detects influenza viral neuraminidase activity using a novel, biochemiluminescent substrate and a luciferin-neuraminic acid conjugate. In the presence of the influenza virus, the substrate is cleaved to release luciferin, which is immediately metabolized by luciferase in the reaction mix to generate detectable light. All reagents are formulated as a master mix. One only needs to add a sample (0.25 mL) into the reagent tube and, after 15 minute incubation, detect the light signal using a handheld luminometer. For detection of drug resistance, an additional reagent tube is used, which contains the drug (Tamiflu or Relenza). The signal difference between reagents with and without the drug is used to indicate drug resistance status. The instrument would be able to interpret the test results.

CONTACT INFORMATION

Cellex, Inc.
9700 Great Seneca Highway
Rockville, MD 20850
POC: X. James Li, Ph.D.
301-905-7269
lix@cellexinc.com
www.cellex.us

COST

- $500/product
- $16.88/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

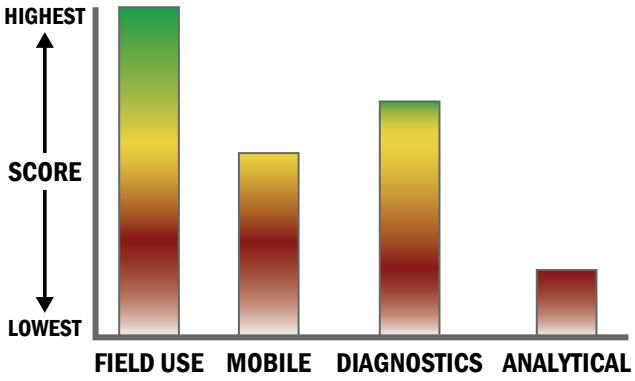
	Biological	Chemical	Radiological
FIELD USE System		N/A	N/A
MOBILE Laboratory		N/A	N/A
DIAGNOSTIC Laboratory		N/A	N/A
ANALYTICAL Laboratory		N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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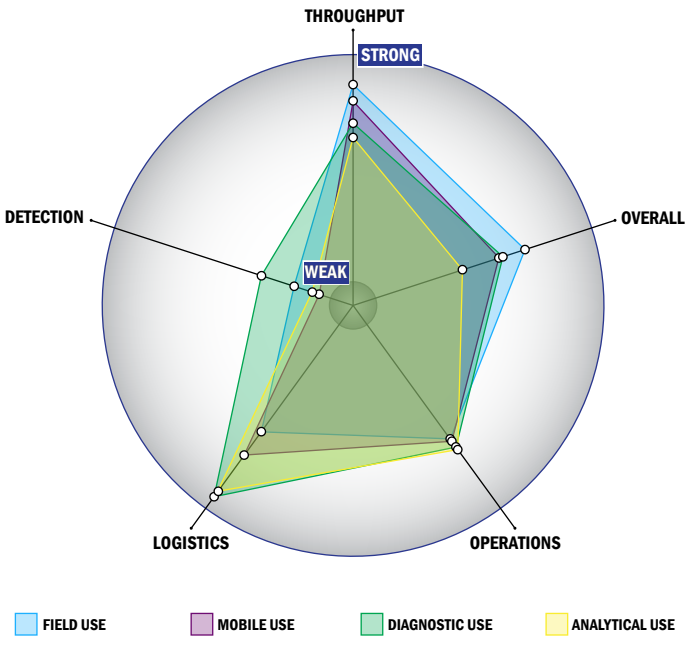


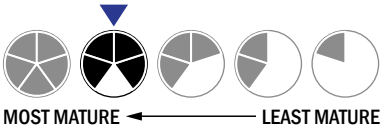
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 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
- No set-up of the system is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Less than 1 kg
- This system is not capable of transmitting data
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 25°C to 37°C
- Components must be stored at 4°C
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 3-5 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- Efforts are underway to achieve 510K clearance
- Efforts are underway to achieve FDA approval
- Less than 250 µL
- Fair specificity. System has a consistent level of false alarms (5-10%)
- 100-1,000 PFU per mL

Cellex, Inc. - QFlu Combo Test for Rapid and Simultaneous Flu Diagnosis and Drug Resistance Detection

GENERAL DESCRIPTION:



The QFlu Combo Test is intended to be used in point-of-care setting (initial response) for simultaneous diagnosis of influenza and drug resistance. There is only one key reagent, the master mix, and a handheld device for detection of the light signal. The assay is essentially a one-step assay (sample addition), which can be completed in 17 minutes with approximately 2 minute manual time. Analytical studies show that the test is at least 100,000 as sensitive as the lateral flow based flu test.

TECHNICAL DESCRIPTION:

The QFlu Combo Test uses a specific substrate for detection of influenza viral neuraminidase activity (hence diagnosis of influenza) and inhibition of this enzyme (hence determination of resistance to Tamiflu and Relenza). The substrate is a conjugate between luciferin and modified neuraminic acid. In the presence of flu virus, the substrate is cleaved to liberate luciferin, which is immediately oxidized by luciferase to generate light signal. The reagents are formulated as a master mix. Sample testing involves sample addition and signal detection using a handheld luminometer.

CONTACT INFORMATION

Cellex, Inc.
104 Alexander Dr. Building 6
PO 12808
Research Triangle Park, NC 27709
POC: X. James Li

COST

- $500/product
- $5/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

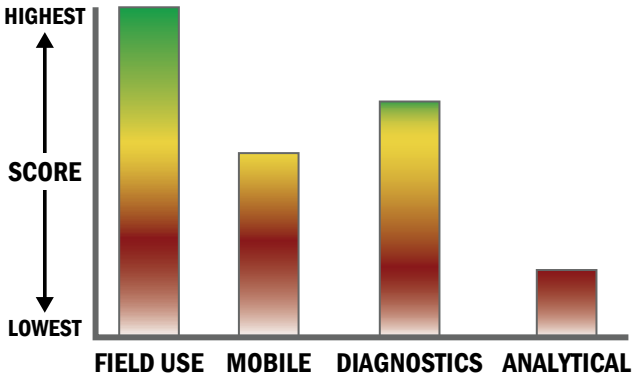
	Biological	Chemical	Radiological
FIELD USE System		N/A	N/A
MOBILE Laboratory		N/A	N/A
DIAGNOSTIC Laboratory		N/A	N/A
ANALYTICAL Laboratory		N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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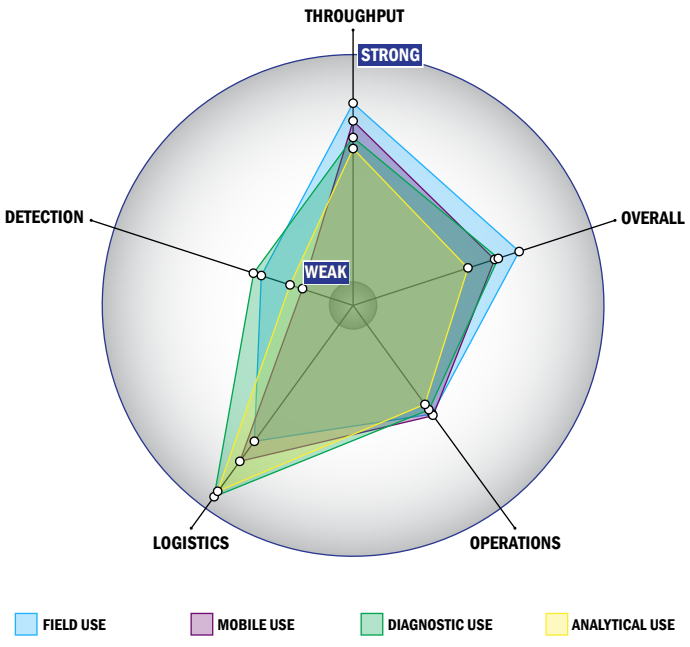


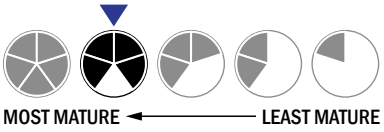
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 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
- No set-up of the system is required for set-up
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Less than 1 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 25°C to 37°C
- Components must be stored at 4°C
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 1-3 years expected life
- Results cannot be viewed in real-time
- The system could be adapted to a fully autonomous system with some effort
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- Efforts are underway to achieve 510K clearance
- Efforts are underway to achieve FDA approval
- Fair specificity. System has a consistent level of false alarms (5-10%)
- 100-1,000 PFU per mL of original sample
- 1-10 ng per mL

Cepheid - GeneXpert System

GENERAL DESCRIPTION:



The GeneXpert System is a closed, self-contained, fully-integrated and automated platform that represents a paradigm shift in the automation of molecular analysis, producing accurate results in a timely manner with minimal risk of contamination. The GeneXpert System is the only system to combine on-board sample preparation with real-time PCR (polymerase chain reaction) amplification and detection functions for fully integrated and automated nucleic acid analysis. The system is designed to purify, concentrate, detect and identify targeted nucleic acid sequences thereby delivering answers directly from unprocessed samples. Modular in design, the GeneXpert System has a variety of configurations to meet the broad range of testing demands of any clinical environment. The Cepheid GeneXpert System makes biothreat agent detection possible in minutes — all from unprepared samples. This easy-to-use, automated and highly accurate real-time PCR instrument combines the ingenuity of more than 30 patents into a sophisticated genetic tool for first responders. A patented, disposable, cartridge test for anthrax is available now, and can be performed on-site — delivering critical answers in critical situations.

TECHNICAL DESCRIPTION:

The GeneXpert System fully integrates and automates the three processes required for real-time PCR-based molecular testing: sample preparation, amplification, and detection, all in one cartridge. On-demand. Just load a biological sample and the system does the rest.

CONTACT INFORMATION

Cepheid
904 Caribbean Drive
Sunnyvale, CA 94089
POC: Chinmay Sheth

COST

- $79,200/system
- $50/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

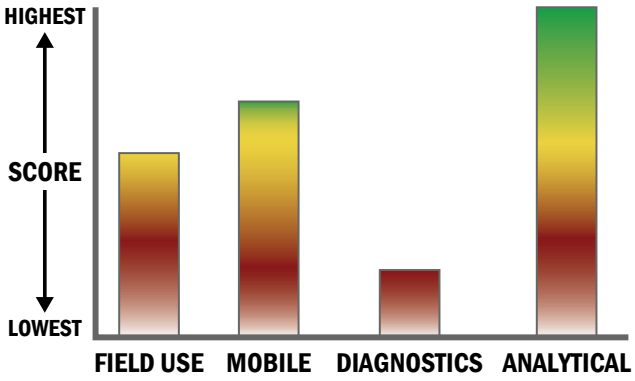
In use by U.S. Postal screening systems

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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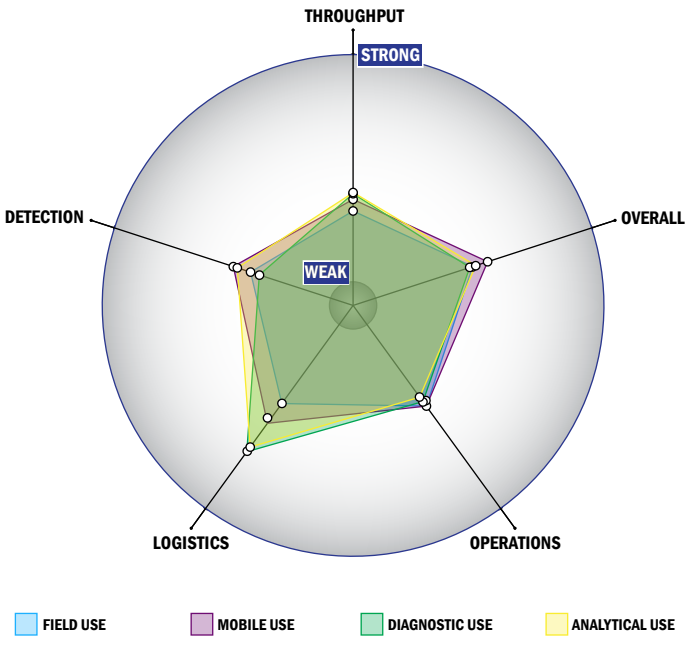


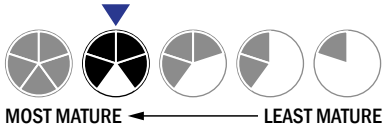
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- 1 sample, <10 tests/sample per run
- 349-96 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- System currently has 510k clearance
- System currently has FDA approval
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Fully automated spore lysis

Cepheid - SmartCycler System

GENERAL DESCRIPTION:



The Cepheid SmartSystem™ is potentially the most sensitive real-time PCR testing platform available on the market. With up to 96 individually programmable reaction sites, it is one of today's most flexible, easy-to-use systems. No other system is designed for complete portability in the field. The SmartCycler System is highly robust and compact, with no moving components—ideally suited for mobile use in field-testing applications. By automating the entire amplification and detection process, the SmartCycler System can deliver highly accurate and consistent test results from prepared biological samples in 20–40 minutes. Flexible and Expandable Cepheid's SmartCycler® instrument is the only random access, modular real-time PCR instrument on the market with up to 96 sites that can each run a different protocol.

Installation of the SmartCycler System is plug-and-play, and system expansion only requires an additional USB connection. Fast With the SmartCycler System, you can optimize PCR denaturation, annealing and extension temperatures and times in a single run. The SmartCycler System can deliver results in less than half the time of a 96-well plate instrument. High Throughput Two SmartCycler instruments can process an equal or greater number of samples than a 96 well instrument in a single day. Assay Optimization Made Easy Increase Flexibility - random access accommodates varied cycling conditions, with variable amplicon lengths, cycling times, and assay design; Increasing Robustness, Decreasing time to results. Mobile Heavy-duty airline-safe transport case and laptop configuration is available for the SmartCycler System, making it ideal for field work.

TECHNICAL DESCRIPTION:

The Cepheid SmartSystem™ is potentially the most sensitive real-time PCR testing platform available on the market. With up to 96 individually programmable reaction sites, it is one of today's most flexible, easy-to-use systems. No other system is designed for complete portability in the field. The SmartCycler System is highly robust and compact, with no moving components—ideally suited for mobile use in field-testing applications. By automating the entire amplification and detection process, the SmartCycler System can deliver highly accurate and consistent test results from prepared biological samples in 20–40 minutes.

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	Third Tier	N/A	N/A
MOBILE Laboratory	Second 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

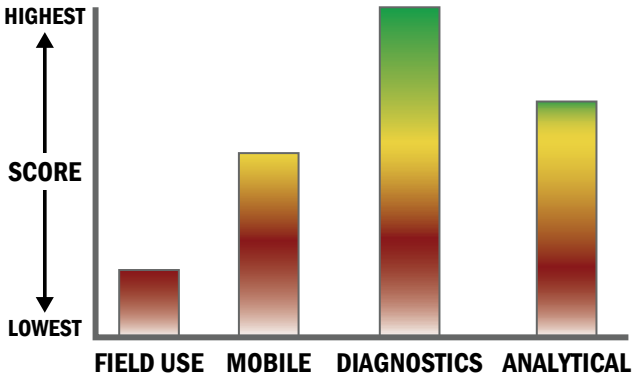
Cepheid
904 Caribbean Drive
Sunnyvale, CA 94089
POC: Chinmay Sheth

COST

- $34,995/system
- $3/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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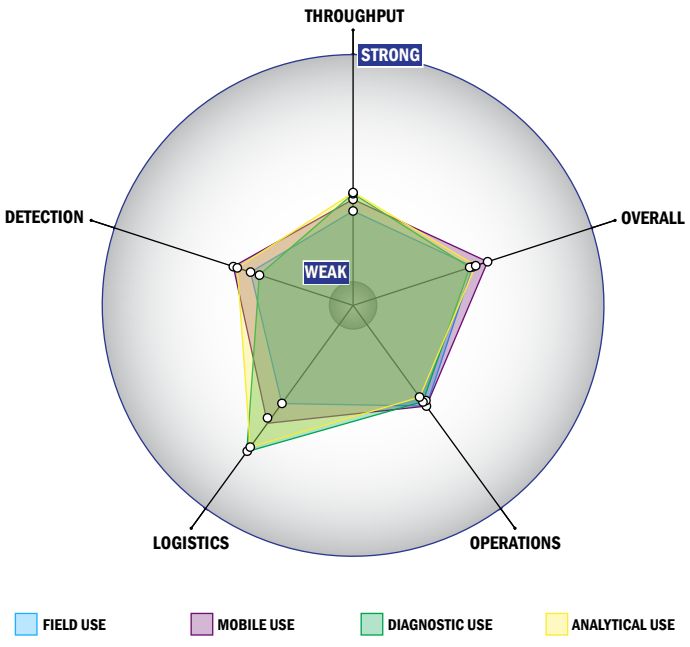


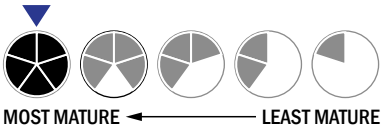
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples every 2 hours
- The system or device is currently fully automated
- Device or system is designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 2 components
- No set-up of the system is required
- 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
- This system is not capable of transmitting data
- System or device has 110V electrical requirement
- <1 Hour battery life



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is closed and not available for modification

Detection:

- System currently has 510k clearance
- System currently has FDA approval
- Less than 100 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- 10-100 ng per mL
- Fully automated spore lysis

ChemImage Corporation - EAGLE

GENERAL DESCRIPTION:



The EAGLE transportable chemical/ biological threat detection system can rapidly identify organic and inorganic industrial chemicals, reveal the presence of chemical or biological weapons of mass destruction, and identify the presence of a hoax material. With this critical material identification information in hand, HAZMAT teams can make informed and accurate decisions with regard to potential evacuations of large numbers of people and for extensive clean-up/decontamination efforts.

TECHNICAL DESCRIPTION:

The EAGLE is a transportable instrument, designed to combine three powerful spectroscopic techniques: microscopic examination, Raman spectroscopy, and fluorescence spectroscopy for rapid identification of chemical and biological threats. The EAGLE combines fluorescence spectroscopy and microscopic imaging analysis to facilitate wide field Chemical Imaging. The EAGLE first uses fluorescence chemical imaging to determine the presence and location of any small fluorescent particles (which could indicate a biological). The EAGLE then uses Raman spectroscopy to identify the targeted material by using the built in spectral library.

CONTACT INFORMATION

ChemImage Corporation
7301 Penn Ave
Pittsburgh, PA 15208
POC: Steven Mitts Director of Business Development
503-332-5452
mittss@chemimage.com
www.chemimage.com

COST

- $199,000/system
- $0.54/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

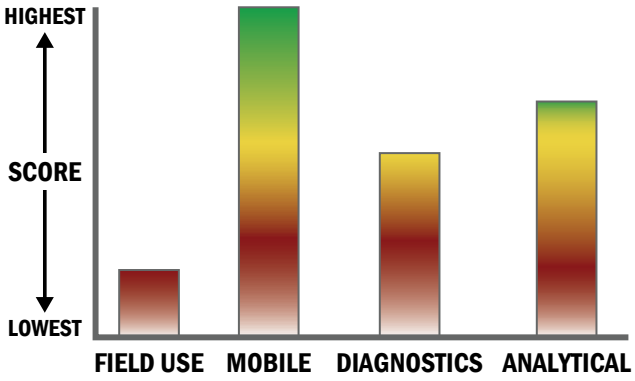
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	Bottom Tier	N/A
MOBILE Laboratory	Third Tier	Fourth Tier	N/A
DIAGNOSTIC Laboratory	Third Tier	Third Tier	N/A
ANALYTICAL Laboratory	Third Tier	Third Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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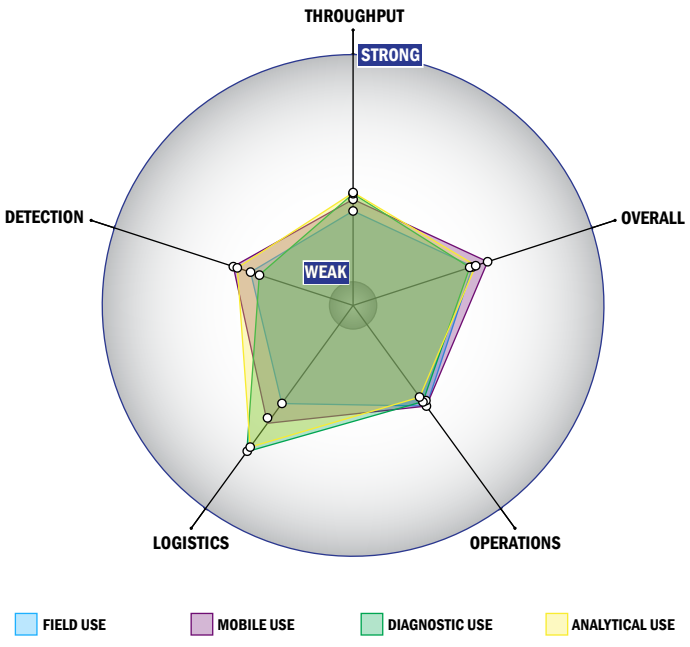


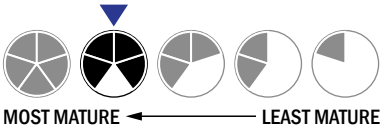
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 2 components
- 10-20 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °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
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- Good specificity. Consistently low level of false alarms (2-5%)
- 1,000-10,000 CFU per mL
- Spore lysis not necessary for detection by system
- > 1 ppt
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

ChemImage Corporation - FALCON II Widefield Raman Chemical Imaging System

GENERAL DESCRIPTION:

The FALCON II Widefield Raman Chemical Imaging System combines the benefits of widefield Chemical Imaging with dispersive Raman spectroscopy. This combination of powerful analytical hardware options and unique, easy-to-use-software makes the FALCON II the most versatile and feature-rich Raman microscope platform available.



Analysis with the FALCON II system requires little or no sample preparation and the Raman spectroscopy/Chemical Imaging measurements are compatible with aqueous systems. Nondestructive sample characterization can be performed through glass containers, thin plastic bags or blister packs. Application areas include drug content uniformity, particle size distribution, polymorph characterization, water quality monitoring, cancer research, polymer characterization, and biological and chemical agent detection and identification.

TECHNICAL DESCRIPTION:

Chemical Imaging combines digital imaging and Raman spectroscopy to provide molecular images that reveal material morphology, composition structure and concentration. The FALCON II system can be configured to operate in visible or Raman modes, as well as optional fluorescence or Near Infrared (NIR) absorbance/reflectance capabilities. The FALCON II system consists of three major subsystems all packaged in one convenient unit. The subsystems include an excitement source to provoke material response, imaging optics to acquire sample response information, and an optical detection system with optical filters and cameras to detect high resolution spatial and spectral information.

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	Fourth Tier	Bottom Tier	N/A
MOBILE Laboratory	Third Tier	Fourth Tier	N/A
DIAGNOSTIC Laboratory	Third Tier	Third Tier	N/A
ANALYTICAL Laboratory	Third Tier	Third Tier	N/A

CONTACT INFORMATION

ChemImage Corporation
7301 Penn Ave
Pittsburgh, PA 15208
POC: Steven Mitts Director of Business Development
503-332-5452
mittss@chemimage.com
www.chemimage.com

COST

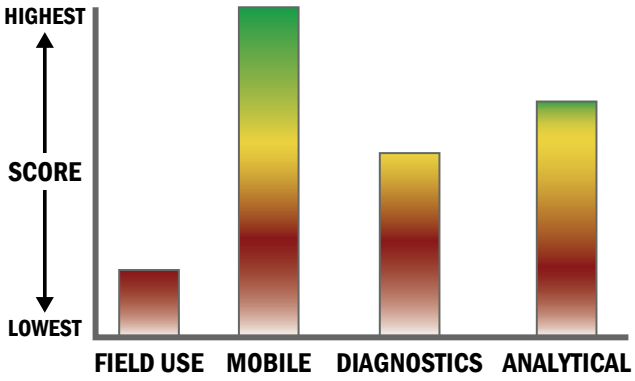
- $300,000/system
- $0.54/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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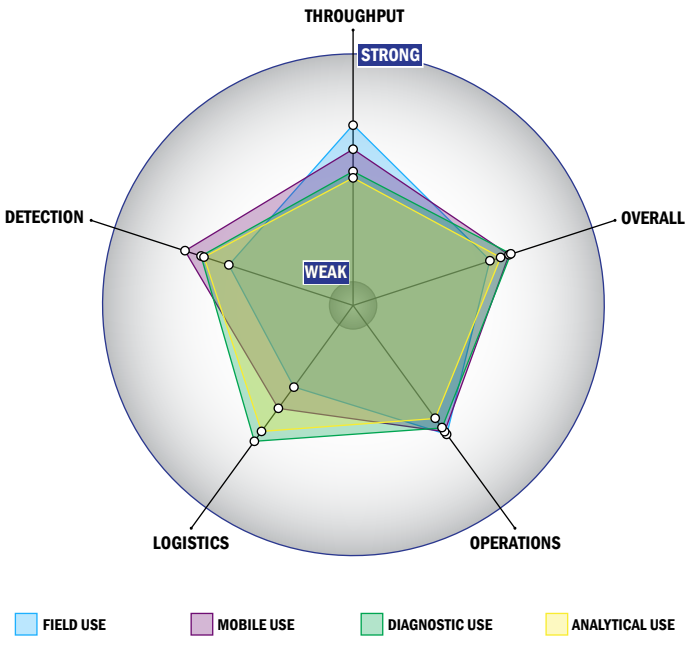


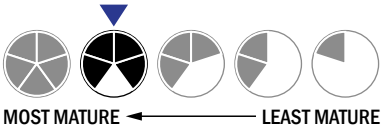
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays.
- 0-1 solutions, buffer, eluents, and/or reagents
- 2 components
- 10-20 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °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
- Greater than 10 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:

- 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
- Less than 10 µL
- Good specificity. Consistently low level of false alarms (2-5%)100-1,000 CFU per mL
- Spore lysis not necessary for detection by system
- > 1 ppt
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

ChemImage Corporation - Falcon II Wide-Field RCI System

GENERAL DESCRIPTION:



FALCON II combines benefits of wide-field Chemical Imaging with dispersive Raman spectroscopy. This combination of powerful analytical multiple hardware options and unique, easy-to-use software makes FALCON II the most versatile and feature-rich Raman microscope platform available. Chemical Imaging combines digital imaging and Raman spectroscopy to provide molecular images that reveal material morphology, composition, structure and concentration. Chemical Imaging takes advantage of the microscope user's natural visual senses and perception to make complex analysis more intuitive and straightforward. FALCON II produces 2-D and 3-D molecular images with unequaled speed and quality. Duet Vision Technology™ delivers real-time simultaneous imaging and spectroscopy, allowing users to quickly and easily identify critical regions of interest. ChemImage proprietary use of a liquid crystal imaging spectrometer provides unparalleled image fidelity, spatial and spectral resolution for high throughput hyperspectral screening of materials. FALCON II also performs dispersive Raman spectroscopy at high spectral resolution for microscopy applications. Limited or no sample preparation required. Raman spectroscopy and Raman Chemical Imaging are compatible with aqueous systems. Non-destructive sample characterization can be performed through glass containers, thin plastic bags, blister packs. Application areas include drug content uniformity, particle size distribution, polymorph characterization, water quality monitoring, cancer research, polymer characterization, biological and chemical agent detection and identification.

TECHNICAL DESCRIPTION:

Chemical Imaging combines digital imaging and Raman spectroscopy to provide molecular images that reveal material morphology, composition structure and concentration. Falcon II can be configured to operate in visible as well as Raman with optional fluorescence or Near Infrared (NIR) absorbance/reflectance capabilities. Falcon II consists of 3 major subsystems all package in one convenient unit. Subsystems are an excitement source to provoke material response, imaging optics to acquire sample response information and an optical detection system with optical filters to detect high resolution spatial and spectral information.

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	Fourth Tier	Bottom Tier	N/A
MOBILE Laboratory	Third Tier	Fourth Tier	N/A
DIAGNOSTIC Laboratory	Third Tier	Fourth Tier	N/A
ANALYTICAL Laboratory	Top Tier	Fourth Tier	N/A

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

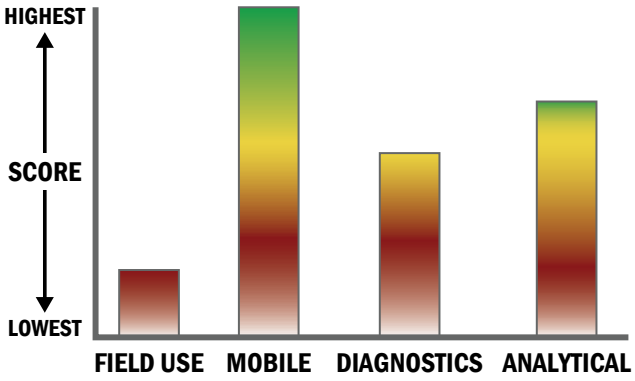
ChemImage Corporation
7301 Penn Ave
Pittsburgh, PA 15208
POC: Steven Mitts Director of Business Development
503-332-5452
mittss@chemimage.com
www.chemimage.com

COST

- N/A/system
- $0.54/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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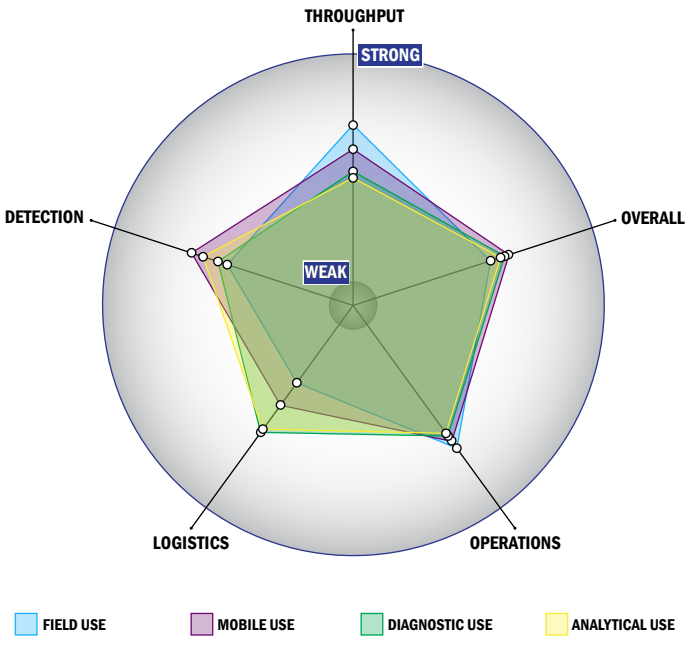


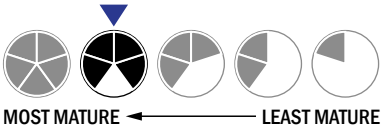
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 2 components
- 10-20 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °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
- Greater than 10 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

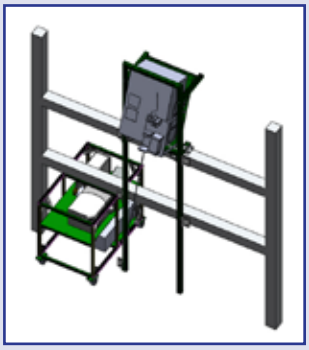
Detection:

- Not possible for the system to achieve 510K clearance
- Possible the system could receive FDA approval, no current efforts at this time
- Less than 10 µL
- Fair specificity. Consistent level of false alarms (5-10%)
- 100-1,000 CFU per mL
- 10,000-100,000 PFU per mL
- 100-1,000 ng per mL
- Spore lysis not necessary for detection by system
- > 1 ppt
- System currently can identify liquid chemical agent

ChemImage Corporation - Standoff UV Raman HSI Chemical Detector

GENERAL DESCRIPTION:

The ChemImage Standoff UV Raman HSI Chemical Detector is designed for the detection of chemical warfare agents. TIC/TIM and other chemical agents of interest on environmental surfaces at a 1 to 3 meter standoff distance.



TECHNICAL DESCRIPTION:

The system provides the detection of chemicals of interest on environmentally-relevant surfaces by the collection of the Raman scattered light excited using an ultraviolet laser beam. The ChemImage System collects the scattered from multiple locations within the excitation beam and performs an analysis and spectral library identification using multi-variate chemometric algorithms. The detected threat material or class of threat material is then transmitted to the operator through the operator display unit.

CONTACT INFORMATION

ChemImage Corporation
7301 Penn Ave
Pittsburgh, PA 15208
POC: Steve Mitts, Threat Detection Business Development Manager
mittss@chemimage.com

COST

- $199,000/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

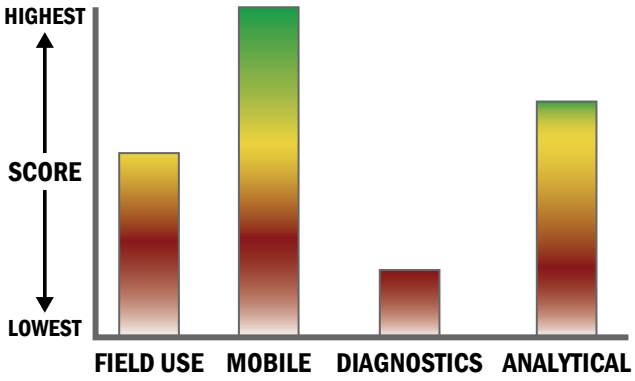
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	N/A	Bottom Tier	N/A
MOBILE Laboratory	N/A	Bottom Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Fourth Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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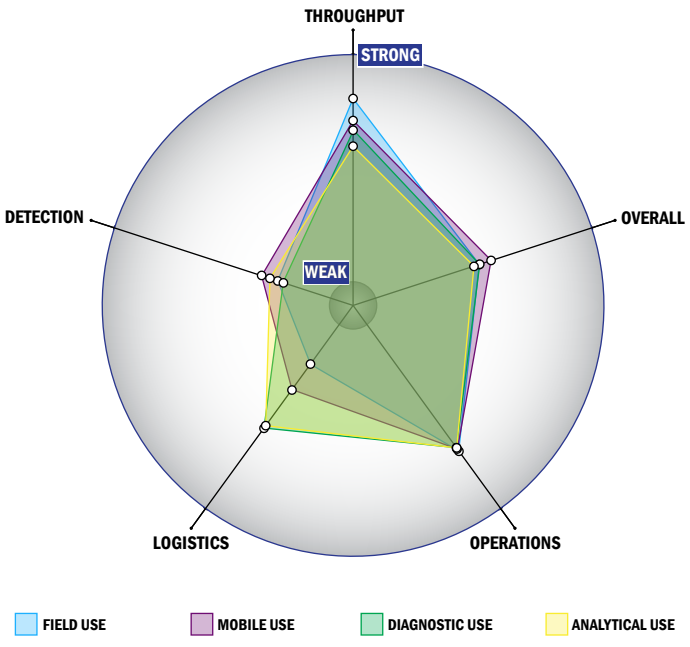


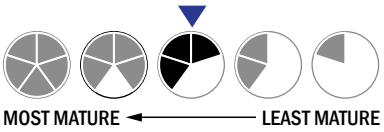
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, >10 tests/sample per run
- 349-96 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
- 5-10 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results cannot 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 open but modification requires licensing

Detection:

- Less than 10 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- > 1 ppt
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Chemring Detection Systems - ATHINA Biological Security System (ABSS)

GENERAL DESCRIPTION:



The ATHINA Biological Security System (ABSS) is an integrated solution for biological security missions requiring detection, collection, sample preparation, and identification of biological threats. The ABSS utilizes CDS's All Threats and Hazards Identification and Notification Architecture (ATHINA) to integrate sensing and support components based on the Common CBRN Sensor Interface (CCSI) Standard. The system is ruggedized and suitable for on scene and site monitoring. The sensing components of ABSS have been partitioned into three physical packages: an intelligent collector module, a manual identification module, and an electronics module. The intelligent collector continuously samples the air, upon detection of a biological event the collector warns and performs an automatic sample collection. Modules can be networked for enhanced performance. The manual identification module provides the sample preparation and identification capabilities needed to identify potential threat material. Identification is achieved by utilizing PCR and immunoassay technologies with options for automated and guided manual sample preparation. The electronics module utilizes CDS's ATHINA to provide power management, operator interface, and networking infrastructure to operate the system.

TECHNICAL DESCRIPTION:

The intelligent collector is triggered by a UV LED Laser Induced Fluorescence (LIF) detector which runs continuously. Sample collection is accomplished with a high efficiency dry sampler developed for the collection of airborne particulates, especially pathogenic bacteria and spores. Liquid samples are extracted from the collector's electrets filter using a manual particle extractor to release the captured aerosols. Identification is accomplished by utilizing PCR and immunoassay technologies with options for automated and guided manual sample preparation. The system can be tailored or configured for mission-specific requirement simply by changing individual sensor modules.

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	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

CONTACT INFORMATION

Chemring Detection Systems
4205 Westinghouse Commons Drive
Charlotte, NC 28273
POC: Doug Woody
980-235-2402
dwoody@chemringds.com
www.chemringds.com

COST

N/A

Notes

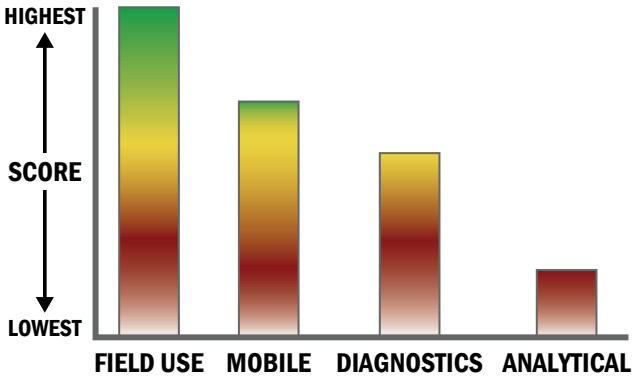
This system can be combined with the Luminex MAGPIX and is being tested as part of the DoD's JUPITR ATD.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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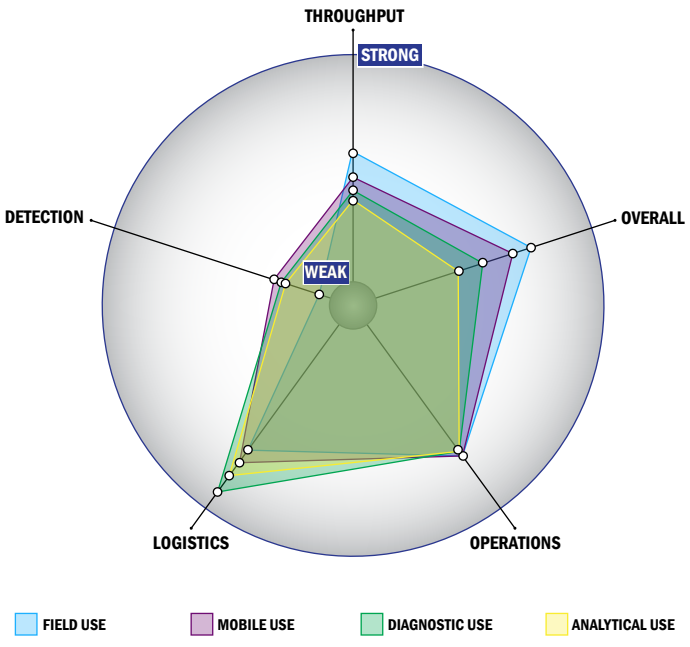


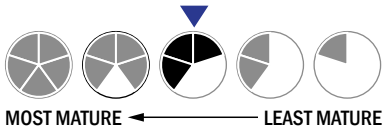
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- 1 sample, >10 tests/sample per run
- Less than 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
- 2 components
- 5-10 minutes is required for setup
- 6-8 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 uses batteries
- 4-8 hours battery life
- A few devices or systems exist (brass board)



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 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 open but modification requires licensing
- The system hardware is open and 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
- Less than 250 µL
- Semi-automated spore lysis

Chemring Detection Systems, Inc. - Juno

GENERAL DESCRIPTION:



JUNO® is a hand-held chemical detector that is capable of detecting, identifying, quantifying and alerting the user to the presence of chemical vapors. JUNO® detects at levels significantly below immediately dangerous to life and health (IDLH) for chemical warfare agents (CWAs) and at the ASTM Acute Exposure Guideline Level 2 (AEGL-2) 30-minute concentrations for toxic industrial chemicals (TICs).

The JUNO® system utilizes a differential mobility spectrometry (DMS) sensor engine with a tunable ion mobility filter. The benefits of this technology are increased selectivity and sensitivity and simultaneous detection of nerve and blister agents.

JUNO® is a small sensor package with a low false alarm rate and high probability of detection that enables users to monitor chemical agent exposure levels and confirm decontamination effectiveness. Interaction with the system is simple. JUNO® has a menu-driven interface that notifies users with audible and visual alarms when a threat is detected. The unit has increased sensitivity, one or two orders of magnitude superior to current handheld detectors.

JUNO® has been extensively tested at GDATP facilities and at various government and independent laboratories, including ECBC, against a wide range of chemicals including CWAs, TICs, and explosives. JUNO® has been validated to detect GA, GB, GD, GF, VX, AC, CK, HD, NH3, and Lewisite. The TICs that have been validated include: chlorine, hydrogen cyanide, cyanogen chloride, hydrochloric acid, hydrogen sulfide, nitric acid, hydrogen fluoride, sulfur dioxide and ammonia. JUNO® is not affected by common interferents such as paint, Windex®, engine exhaust, and DEET.

TECHNICAL DESCRIPTION:

JUNO® is based on differential ion mobility spectrometry (DMS) which uses the nonlinear dependence of ion mobility under high field conditions to separate ions with similar mobility seen in low-fields of IMS. Ions within a DMS flow through an analyzer region where they are subjected to two electrical fields, a high frequency, high potential asymmetric waveform, and a low potential DC field. These two fields create a tunable filter that allows ions to be sorted. This yields improved selectivity and sensitivity over IMS and allows the simultaneous detection of both positive and negative ions.

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	N/A

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

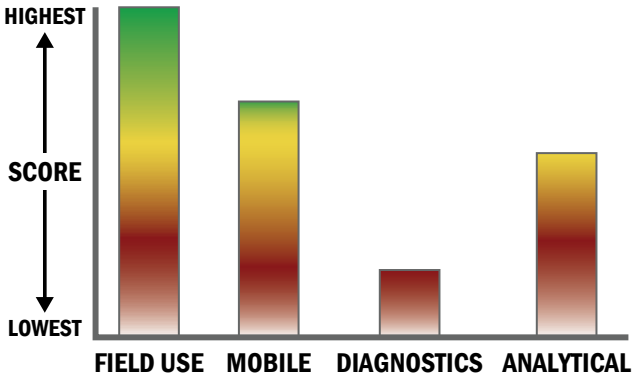
Chemring Detection Systems, Inc.
4205 Westinghouse Commons Drive
Charlotte, NC 28273
POC: Doug Woody
980-235-2402
dwoody@chemringds.com
www.chemringds.com

COST

- N/A/system
- $0/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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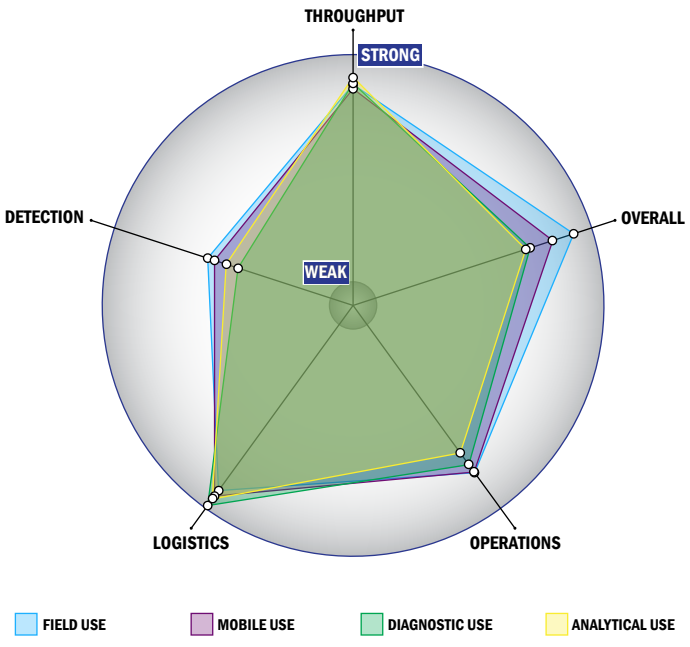


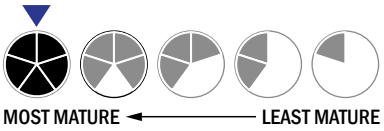
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- 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
- 0 components
- 5-10 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results cannot 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:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- $1x10^{-4}$-$1x10^{-3}$ mg/m^3
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Ciencia, Inc. - FluorSPR

GENERAL DESCRIPTION:



Ciencia's FluorSPR is a dual-mode microarray instrument platform combining a surface plasmon resonance (SPR) analyzer with a surface plasmon coupled emission (SPCE) mode. In its SPR mode it provides capabilities equal to or superior to competing SPR instruments, offering highly multiplexed measurements of high molecular weight analytes in real time. The SPCE mode produces highly directional fluorescence enabling detection in the femptomolar range. The dual-mode instrument is specifically designed to chemically capture (using antibodies, aptamers) and quantify the pattern of cytokines secreted.

TECHNICAL DESCRIPTION:

The instrument combines Grating-coupled Surface Plasmon Resonance and Surface Plasmon Coupled Emission functionality into one instrument. Detection of all analytes present in a single sample occurs simultaneously. The specificity depends on antibody or aptamer selection and binding. Detection depends on the mass of analyte captured or an enhanced fluorescence signal.

CONTACT INFORMATION

Ciencia, Inc.
111 Roberts Street, Suite K
East Hartford, CT 06108
POC: Arturo O. Pilar, President
860-528-9737
apilar@ciencia.com

COST

- $80,000/system
- $150/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

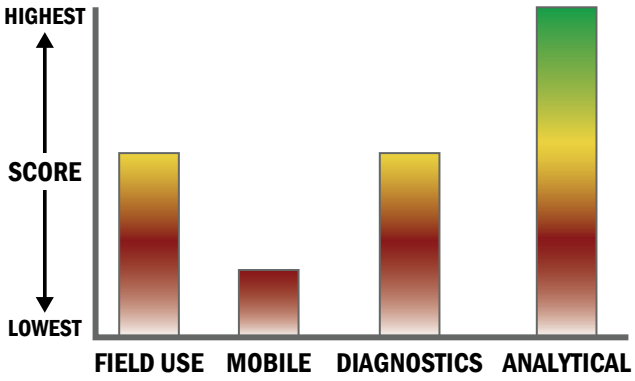
	Biological	Chemical	Radiological
FIELD USE System	Third Tier	Fourth Tier	N/A
MOBILE Laboratory	Second Tier	Fourth Tier	N/A
DIAGNOSTIC Laboratory	Second Tier	Third Tier	N/A
ANALYTICAL Laboratory	Second Tier	Fourth Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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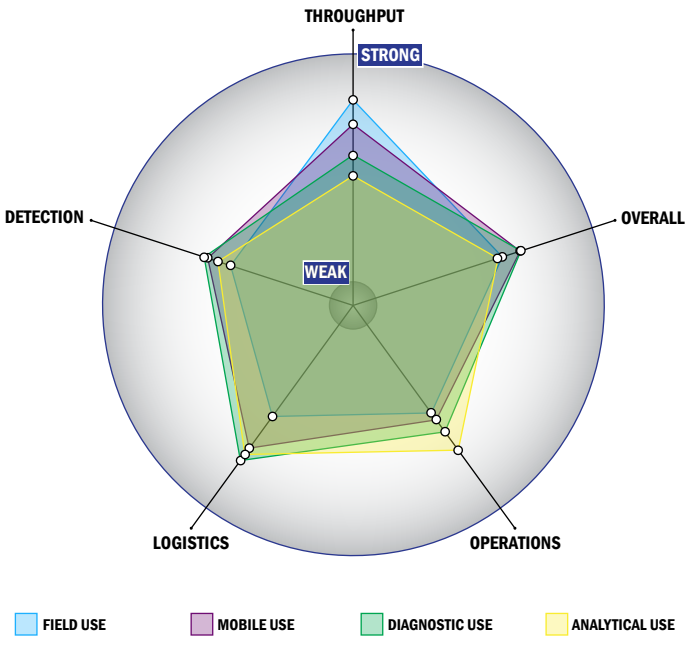


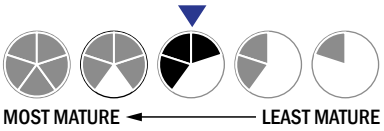
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- 1 sample, >10 tests/sample per run
- Less than 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
- Less than 5 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
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at 4°C
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Less than 100 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 10,000-100,000 CFU per mL
- 10,000-100,000 PFU per mL
- 10-100 ng per mL
- Spore lysis not necessary for detection by system
- Possible system could be adapted to identify aerosolized chemical agent
- System current can identify liquid chemical agent

CMS Field Products - MINICAMS

GENERAL DESCRIPTION:



MINICAMS® is a fully automated, continuous, near-real-time air monitoring system. It was designed primarily for use in the U.S. Army's Chemical Stockpile Disposal Program as an automated chemical-vapor alarm system for monitoring of workplace air and other potentially contaminated in-plant zones, e.g., stack exhausts, ducts, filter banks, etc. It also works well for support of materials-penetration and permeation studies and many other laboratory or on-site test efforts involving a need to detect and quantify chemical vapors automatically and continuously. It provides audible, visible, and electrical alarm responses to toxic military chemical agent vapors, e.g., GB, VX, HD, etc., and to many other substances at any of a variety of regulatory threshold concentrations, e.g., TWA, MDL, PEL, etc. It also provides accurate vapor concentration readings at concentrations in the general vicinity of the preset alarm threshold. It was specifically designed to detect and accurately quantify the chemical agents and other volatile and semi-volatile compounds at far lower concentrations than most other chemical vapor monitors. MINICAMS is a readily transportable system that is designed to be set up and operated at fixed indoor locations or (under mild conditions) at sheltered outdoor monitoring stations, although instances of successful use in vehicles and other mobile platforms have occurred. It requires one or more compressed gases and a source of 117VAC electrical power for its operation.

TECHNICAL DESCRIPTION:

MINICAMS® is based on collection of airborne chemical vapors on a solid sorbent or in a sample loop, thermal desorption or flushing of the collected vapors into a gas chromatographic (GC) column, separation of the sample constituents on the column, and detection by a sensitive GC detector. The available GC detectors include both universal (i.e., nonselective) detector types that respond indiscriminately to virtually all substances, and selective detectors that respond primarily to certain restricted classes of chemicals. The instrument cycles repetitively through a Sample Period, during which an air sample is accumulated, and a subsequent Purge Period, during which the collected sample constituents are separated, detected, and quantified. Total instrument cycle times can range from about 5 min to 20 min or more. When a selective detector is installed, MINICAMS delivers accurate quantification and detection limits in the parts-per-billion and/or parts-per-quadrillion range as a matter of routine, although the system can be reconfigured or "detuned" to cover almost any desired concentration range above these levels.

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	Bottom Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Fourth Tier
ANALYTICAL Laboratory	N/A	N/A	Top Tier

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

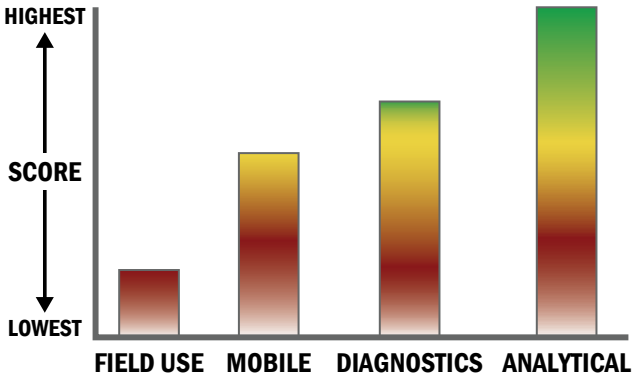
CMS Field Products
2148 Pelham Parkway, Bldg. 400
Pelham, AL 35124
POC: Greg Houston, Sales Manager
205-733-6900, ext. 204
www.oico.com

COST

N/A

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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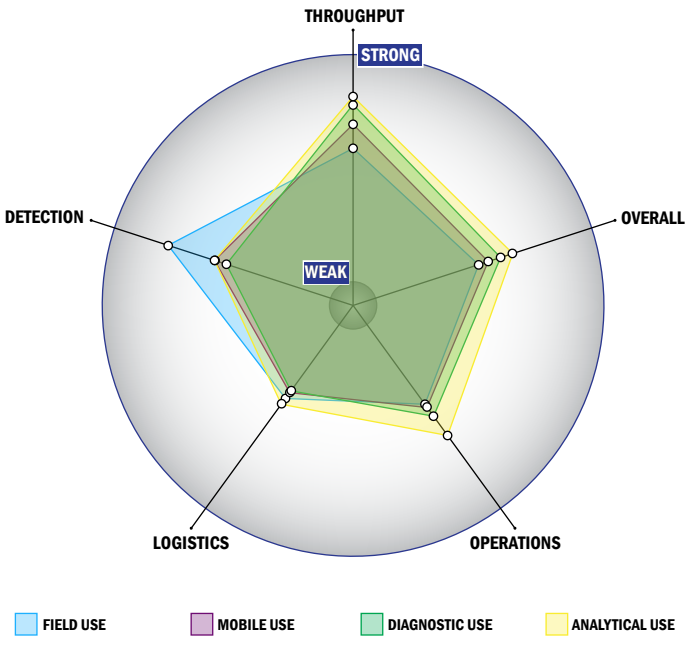


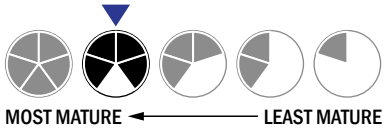
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/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
- Greater than 20 minutes is required for set-up
- Automatic detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Between 6 months and 1 year shelf life
- Greater than 10 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is open and 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%)
- < $1x10^{-6}$ mg/m^3
- Possible system could identify aerosolized chemical agent
- Possible system could identify liquid chemical agent

CustomArray, Inc. - MX300

GENERAL DESCRIPTION:

System for automating hybridization and reading of CustomArray DNA arrays, which can be used to detect organisms and genetic variants in laboratory settings. It is adaptable to any sample that has genetic material in it (either DNA or RNA).



TECHNICAL DESCRIPTION:

Samples must be processed to extract nucleic acid material (using third-party kits), that material is then amplified (using a standard thermocycler), and the amplified material is put into the MX300 for hybridization to a DNA array and reading of results.

CONTACT INFORMATION

CustomArray, Inc.
6500 Harbour Hts Pkway, Suite 202
Mukilteo, WA 98275

COST

- $40,000/system
- $170/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier
Fourth Tier Bottom Tier

RANKINGS

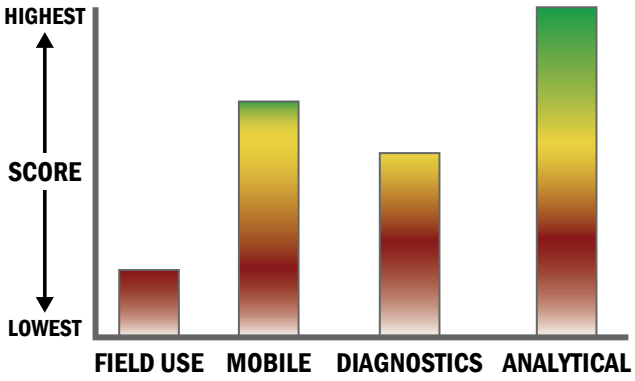
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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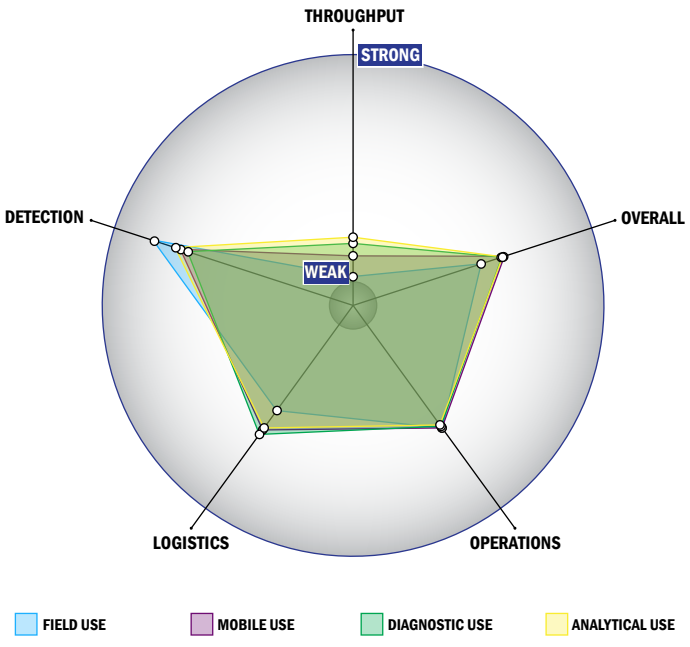


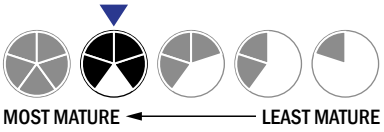
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Between 60 minutes and 8 hours
- Less than 32 samples every 2 hours
- The system could be adapted to a fully automated system with some effort
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- Less than 5 minutes is required for set-up
- Greater than 12 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- Between 25 and 50 kg
- Satellite, wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be frozen (-20°C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 3-5 years expected life
- Results cannot be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL
- Manual kit not integrated with the system handles spore lysis

Defiant Technologies, Inc. - CANARY-3

GENERAL DESCRIPTION:



Defiant Technologies offers the CANARY-3™ Portable Gas Chromatograph (GC) analysis system. MEMS technology allows us to reduce the size of a lab GC to a semi-volatile organic compound (SVOC) analyzer that weighs less than 3 pounds and is battery operated.

The CANARY-3™ can provide lab quality results with ppb detection limits in a 5 minute analysis. The CANARY-3™ can be calibrated for a variety of SVOCs. The instrument display will inform the user which SVOCs are detected and their concentration. An on-board SD card stores all of the data the CANARY-3™ has acquired. The CANARY-3™ is intended to be used in the field to analyze air and liquid samples and provide lab quality results in about 5 minutes of analysis time.

TECHNICAL DESCRIPTION:

The CANARY-3™ is a portable Gas Chromatograph analysis instrument. It is a "systems approach to chemical analysis" constructed using Micro-electromechanical Systems (MEMS) technology components. The key components are a pre-concentrator (PC), a micro gas chromatograph (GC) column (2.5 meters), and a pair of Surface Acoustic Wave (SAW) micro balance detectors.

The CANARY-3™ instrument captures a gas sample in the PC, a chemically-selective porous media, and then thermally desorbs the sample in a sharp, concentrated pulse. A sample enters the GC in a sharp pulse, and then separates into individual constituents as a result of interactions with a coating. The time between sample injection and emergence of the constituents from the column is used to identify the analyte. The measured weight of the sample is related to the concentration of the analyte in the gas sample. The Canary-3 offers "Smart Sampling" which incorporates dual detectors. This allows the instrument to provide a much greater dynamic range of analysis. The instrument includes a display that provides real time information on instrument activities, analyte identification and concentration.

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

CONTACT INFORMATION

Defiant Technologies, Inc.
6814A Academy Parkway West, NE
Albuquerque, NM 87109
POC: John Kiegel
505-999-5880 X 25
jkiegel@defiant-tech.com

COST

- $36,000/system
- $0/analysis

Notes

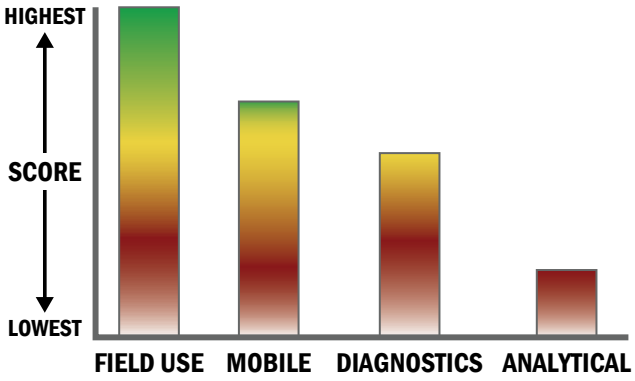
CANARY-3 is not to be confused with the CANARY Technology by Pathsensors Bio-Flash System.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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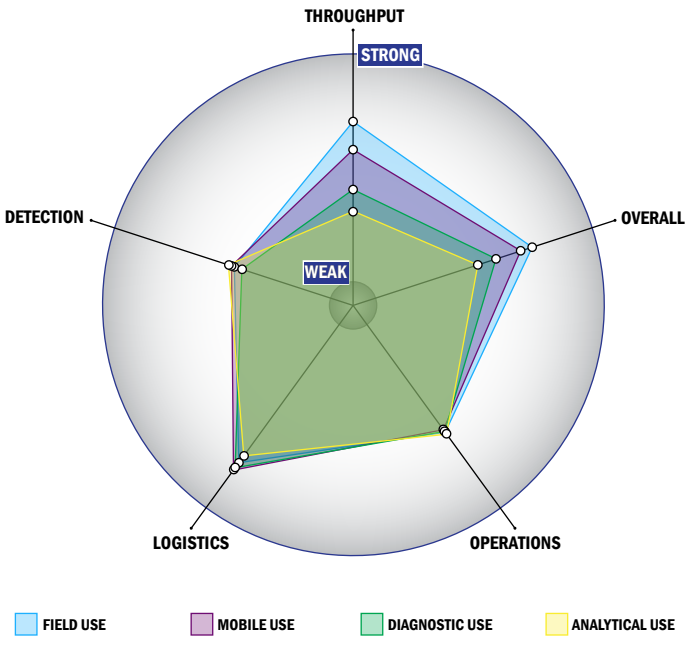


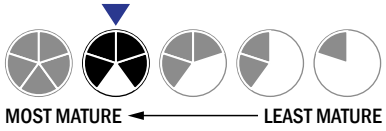
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, single test/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- 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:

- A day of training and technical skills are required
- Approximately the size of a toaster
- Between 1 and 5 kg
- 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
- Performance is not influenced by relative humidity
- 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:

- 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- > 1x10^-3 mg/m^3
- 1 ppb – 1 ppm
- System can currently identify aerosolized chemical agent
- System can currently identify liquid chemical agent

Defiant Technologies, Inc. - FROG-4000

GENERAL DESCRIPTION:



The FROG-4000™ Portable Gas Chromatograph (GC) analysis system. MEMS technology allows us to reduce the size of a lab GC to a volatile organic compound (VOC) analyzer that weighs less than 5 pounds and is battery operated. The FROG-4000™ scrubs the ambient air for its carrier gas. The FROG-4000™ can provide lab quality results with ppb detection limits in a 5 minute analysis.

The FROG-4000™ can be calibrated for a variety of VOCs to include benzene, toluene, TCE, PCE, and many other VOCS. The instrument display will inform the user which VOCs are detected and their concentration. An on-board SD card stores all of the data the FROG-4000™ has acquired and that data can be downloaded to a computer later.

The FROG-4000™ includes a purge and trap collection system for easy analysis VOCs of soil and water. The FROG-4000™ is intended to be used in the field to provide lab quality results in about 5 minutes of analysis time.

TECHNICAL DESCRIPTION:

The FROG-4000™ is a portable Gas Chromatograph analysis instrument. It is a "systems approach to chemical analysis" constructed using Micro-electromechanical Systems (MEMS) technology components. The key components are a pre-concentrator (PC), a micro gas chromatograph (GC) column (4.8 meters), and a Photo-Ionization Detector (PID).

The system employs a built in purge-and-trap collection system to allow rapid sample loading. Ambient air is used as the carrier gas. The air is scrubbed using an activated charcoal filter and pumped through the purge-and-trap collector. This air is then pumped over the PC for about 30 seconds, at which point using proprietary ELLVIN™ software that is included with the instrument. The software allows for real time monitoring of the instrument, and displays the chromatogram as it develops. The software is also used to calibrate the instrument and perform routine maintenance functions.

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

CONTACT INFORMATION

Defiant Technologies, Inc.
6814A Academy Parkway West, NE
Albuquerque, NM 87109
POC: John Kiegel
505-999-5880 X 25
jkiegel@defiant-tech.com

COST

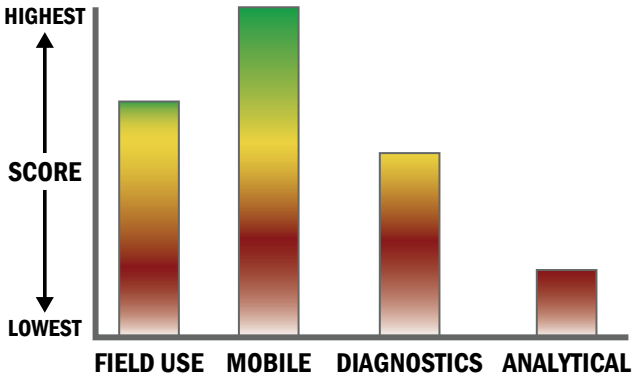
- $21,050/system
- $21,050/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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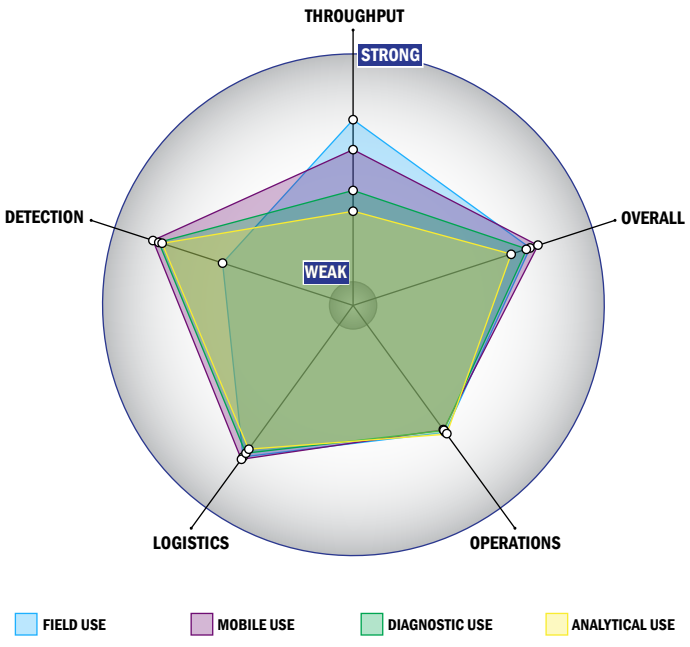


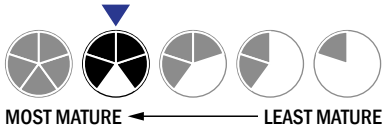
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, single test/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- 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:

- A day of training and technical skills are required
- Approximately the size of a toaster
- Between 1 and 5 kg
- Wired connections are available
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at 4 °C
- Performance is not influenced by relative humidity
- 3-5 years expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is closed and not available for modification
- 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
- Greater than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- > $1x10^{-3}$ mg/m^3
- < 1 ppb
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

DeltaNu - ReporteR

GENERAL DESCRIPTION:

The DeltaNu ReporteR is designed for first-responders in the field, to quickly and easily identify counterfeit drugs and other materials non-destructively. The ReporteR comes with a hazmat material library, consisting of narcotics and explosives. The product can be used independently or with a laptop computer, allowing for convenience in the field and in the lab.



TECHNICAL DESCRIPTION:

The ReporteR utilizes Raman Spectroscopy to quickly and efficiently identify counterfeit drugs. It is the smallest Raman spectrometer available, making portability and convenience easy. Its simple push-button operation runs the DeltaNu software and firmware, making the instrument easy to use, even for non-spectroscopists.

CONTACT INFORMATION

DeltaNu, a business unit of Intevac Photonics, Inc.
5452 Aerospace Drive
Laramie, WY 82070
307-745-9148
www.intevac.com/deltanu

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

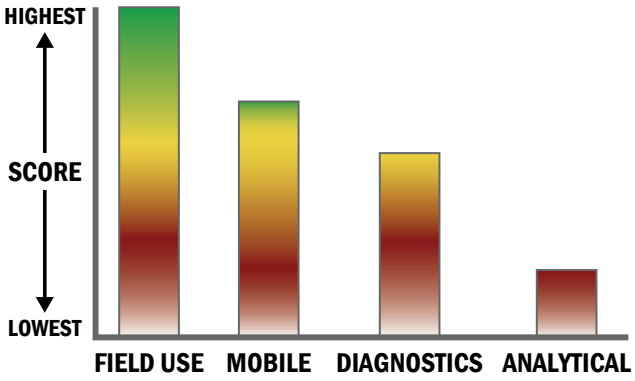
	Biological	Chemical	Radiological
FIELD USE System	N/A		N/A
MOBILE Laboratory	N/A		N/A
DIAGNOSTIC Laboratory	N/A		N/A
ANALYTICAL Laboratory	N/A		N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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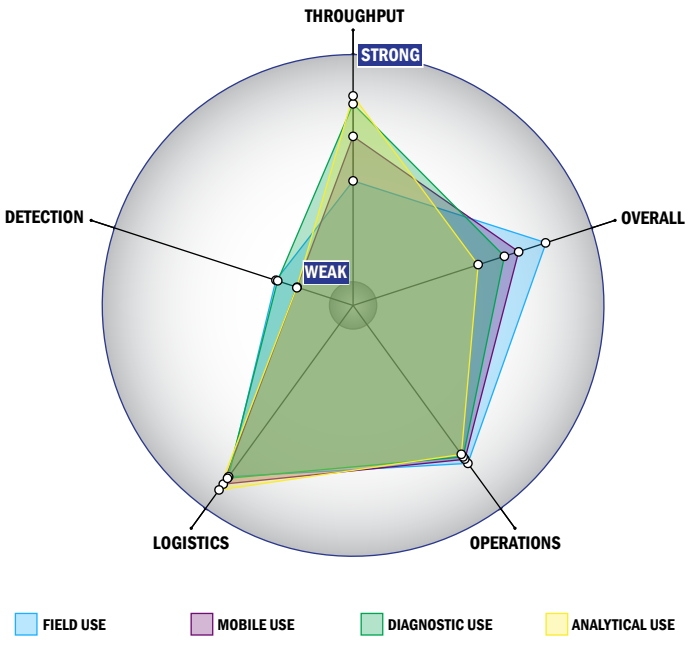


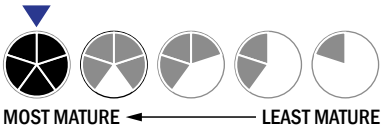
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- Greater than 750 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 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 soda can
- Less than 1 kg
- Wireless and wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from -21°C to 41°C
- Device or system has peak performance at normal relative humidity conditions
- Greater than 3 years shelf life
- Less than 1 year expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system hardware is closed and not available for modification

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- Efforts are underway to achieve FDA approval
- Less than 50 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)

Diagnostic Biosensors, LLC - Field System

GENERAL DESCRIPTION:



The system is designed for use in the field and by consumers. It generates quantitative assay results for samples from a broad range of complex liquid matrixes including blood, urine, and wastewater. Precision electronic detector elements are embedded into a single consumable sample handling cartridge. Customer-supplied capture molecules, and other dried assay reagents, are placed in the cartridge during production. Low cost per assay is achieved through design for manufacturing. Detection elements are commercially available for development of assays and systems. The detector element production process does not harm sensitive biomolecules. Finished detector elements can be machine - assembled into higher level systems without harming onboard biomolecules. The total system is available as a brass board assay development environment. The underlying commercial data acquisition system allows for configurations as a stand-alone custom device or as a user-configurable experimental station. The instrument communicates with a laptop or smart phone via standard USB 2.0 or Bluetooth. Battery power versions are available, standard is 110V AC.

TECHNICAL DESCRIPTION:

The fundamental detection element is a giant magnetoresistive (GMR) sensor array chip that counts the biospecifically bound magnetic labels at its surface. Magnetic labels are available for a wide range of detectable species including antibodies, DNA, RNA, proteins, toxins, bacteria, cells, and chemicals. The tiny plastic sample handling cartridge contains the detector elements and an interface to the handheld instrument. There are peer reviewed accounts of magnetoresistive biosensors detecting many analytes of interest including, Biological Warfare Agents, proteomic breast and colon cancer markers, food pathogens (e-coli, cryptosporidium), immunological lung cancer markers (IL-6), and more.

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
MOBILE Laboratory			N/A
DIAGNOSTIC Laboratory			N/A
ANALYTICAL Laboratory			N/A

CONTACT INFORMATION

Diagnostic Biosensors, LLC
1712 Brook Ave. SE
MPLS, MN 55414-2422
POC: Mark Tondra
612-331-3584
Mark@DiagnosticBiosensors.com
www.DiagnosticBiosensors.com

COST

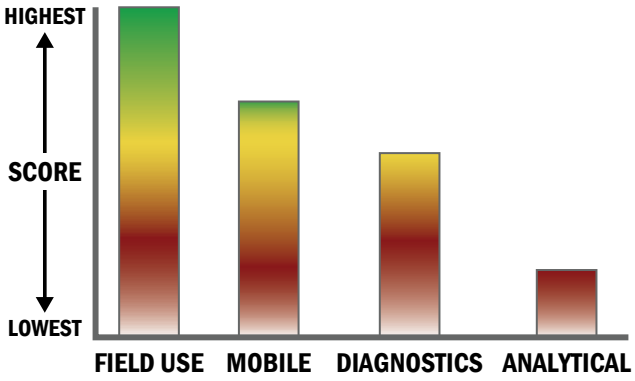
- $5,000/system
- $5/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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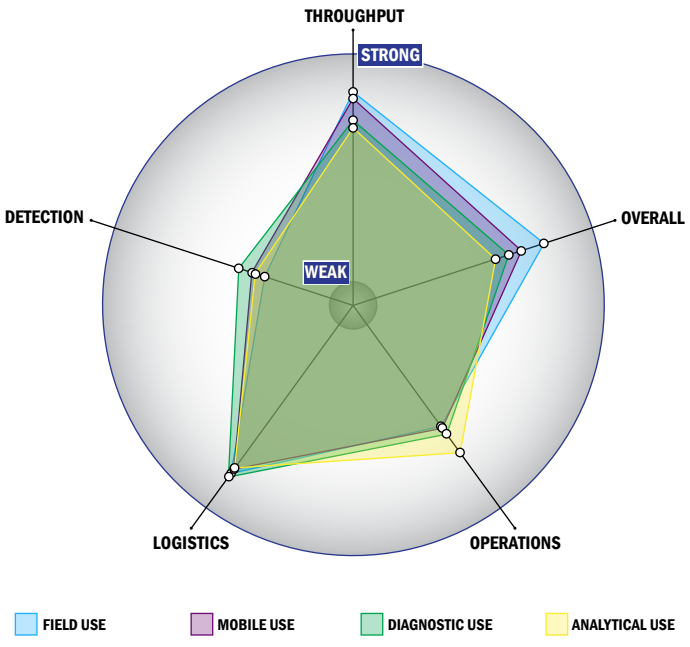


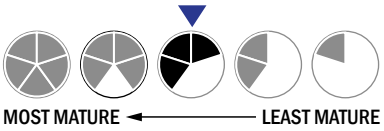
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently semi-automated
- 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:

- An afternoon of training and some technical skills required
- Less than 1 kg
- Satellite, 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 6 months and 1 year shelf life
- 3-5 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 10 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- Greater than 10,000 ng per mL
- 100 ppm-1 ppt
- Possible system could be adapted to identify aerosolized chemical agent
- Possible system could be adapted to identify liquid chemical agent

Dionex Corporation - ICS-5000 Ion Chromatography System

GENERAL DESCRIPTION:



Dionex Corporation develops, manufactures, sells, and services chromatography and extraction systems for separating, isolating, and identifying the components of chemical mixtures. Our continuing leadership in chromatography helps us create powerful solutions to increase productivity for the industries that shape the world. Our solutions are used by the environmental, life sciences, pharmaceutical, food and beverage, chemicals, power generation, and electronics industries.

TECHNICAL DESCRIPTION:

Eluent Regeneration was developed for systems dedicated to high-throughput analyses of samples with low- to moderate-concentration matrices. Reagent-Free IC systems with Eluent Regeneration (RFIC-ER systems) are designed to use carbonate, carbonate/bicarbonate, or MSA eluents for isocratic separations. Eluent Regeneration is available as an optional configuration or upgrade for ICS-1100, -1600, -2100, and -5000 systems.

CONTACT INFORMATION

Dionex Corporation
1228 Titan Way P.O. Box 3603
Sunnyvale, CA 94088-3603
408-737-0700
www.dionex.com

COST

- $35,000-$50,000/system
- $1-$2/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier
Fourth Tier Bottom Tier

RANKINGS

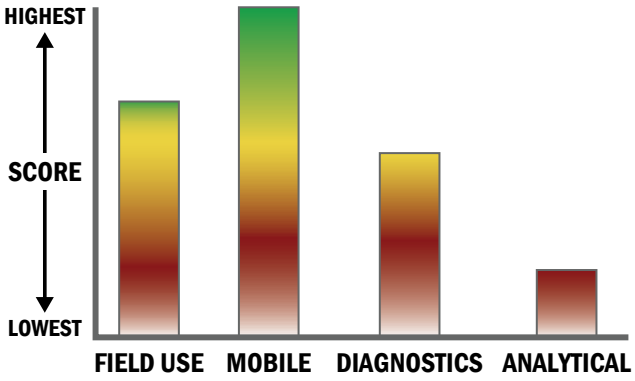
	Biological	Chemical	Radiological
FIELD USE System	●	●	N/A
MOBILE Laboratory	●	●	N/A
DIAGNOSTIC Laboratory	●	◒	N/A
ANALYTICAL Laboratory	●	○	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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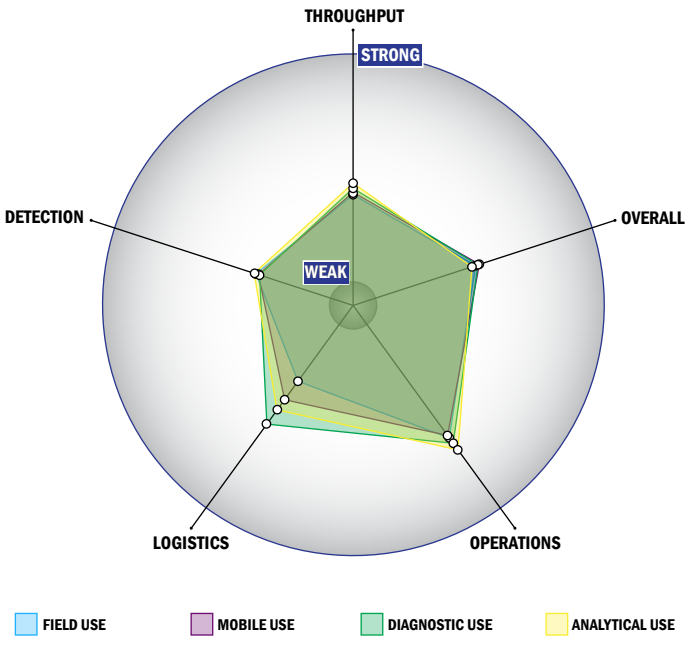


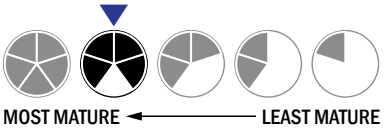
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, single tests/sample per run
- Less than 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
- 5 or more components
- Greater than 20 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Device must be used in a temperature stable, dry environment for optimum performance
- Between 1 to 3 years shelf life
- 5-10 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 open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Possible the system could receive FDA approval, no current efforts at this time
- Less than 250 µL
- Excellent specificity. System has occasional false alarms (<2%)
- 10-100 ng per mL
- System does not detect spores
- $3x10^{-5}$ - $1x10^{-4}$ mg/m^3
- 1 ppb – 1 ppm
- Possible system could identify aerosolized chemical agent
- Possible system could identify liquid chemical agent

Draeger Safety, Inc. - CDS Simultantest Set

GENERAL DESCRIPTION:

The Dräger Civil Defense Set (CDS) utilizes colorimetric Dräger detector tubes and can measure eight chemical substances, and up to five simultaneously, including nerve, blood, lung, nose, and throat irritating agents.



TECHNICAL DESCRIPTION:

When air samples are pumped into the tubes, the chemicals in the sample react with the chemicals in the tubes and change color, alerting the user of the presence of the targeted gases in the air.

CONTACT INFORMATION

Draeger Safety, Inc.
101 Technology Dr.
Pittsburgh, PA 15275

COST

- $500/system
- $65/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

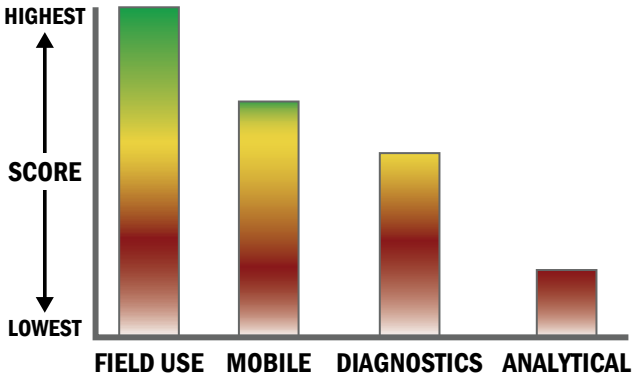
	Biological	Chemical	Radiological
FIELD USE System	N/A	Third Tier	N/A
MOBILE Laboratory	N/A	Third Tier	N/A
DIAGNOSTIC Laboratory	N/A	Fourth Tier	N/A
ANALYTICAL Laboratory	N/A	Fourth Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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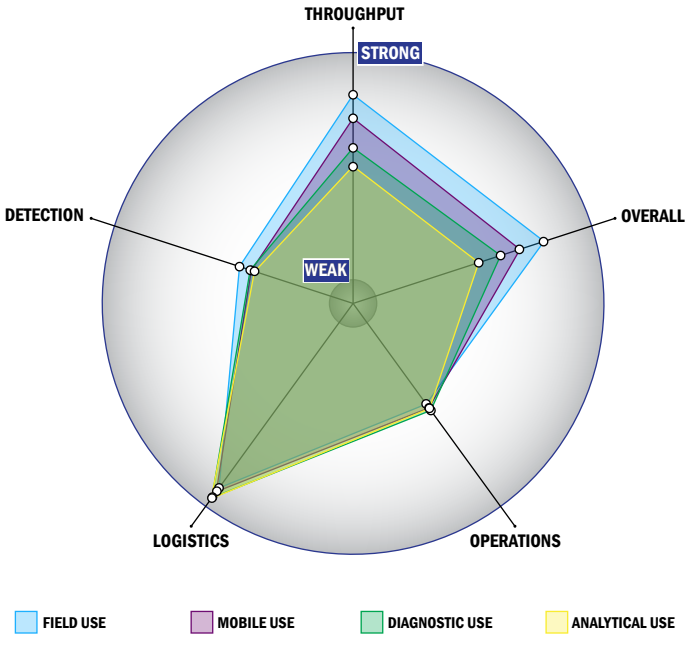


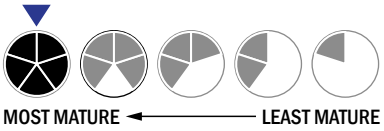
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently semi-automated
- 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 soda can
- Less than 1 kg
- This system is not capable of transmitting data
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at 4 °C
- Device must be used in a temperature stable, dry environment for optimum performance
- Between 1 to 3 years shelf life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system does not employ any software
- 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
- Good specificity. System has a consistently low level of false alarms (2-5%)
- > $1x10^{-3}$ mg/m^3
- System currently can identify aerosolized chemical agent
- Possible system could be adapted to identify liquid chemical agent

D-Tect Systems - Rad-DX

GENERAL DESCRIPTION:



The Rad-DX is a wireless mesh networked radiation detector with a sensitive scintillation detector which allows it to detect discreet sources of radiation in less than one second. Dual versions are available; with and without display. Directionality is also an option to enable the tracking and motion of radiation sources.

The Rad-DX operates on the new and exclusive D-Tect SensorNet - an automatic communication network that allows users to monitor a full network of Rad-DXs as long as they are in range of a single Rad-DX system (up to 1000 meters)! The Rad-DX units will automatically form an intelligent, self-healing mesh network, allowing them to be constantly connected to each other as well as to the user network.

TECHNICAL DESCRIPTION:

The Rad-DX employs a large (6cm) Cesium Iodide scintillation crystal combined with the exclusive SensorNet mesh network technology.

CONTACT INFORMATION

D-Tect Systems c/o Laurus Systems
3460 Ellicott Center Drive
Ellicott City, MD, 21043

COST

- $2,195/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier
Fourth Tier Bottom Tier

RANKINGS

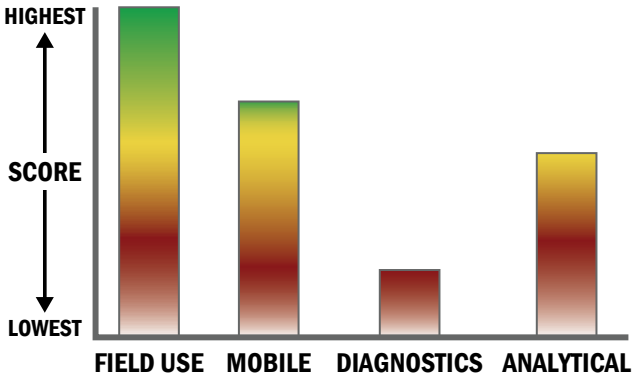
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Third Tier
MOBILE Laboratory	N/A	N/A	Second Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Second Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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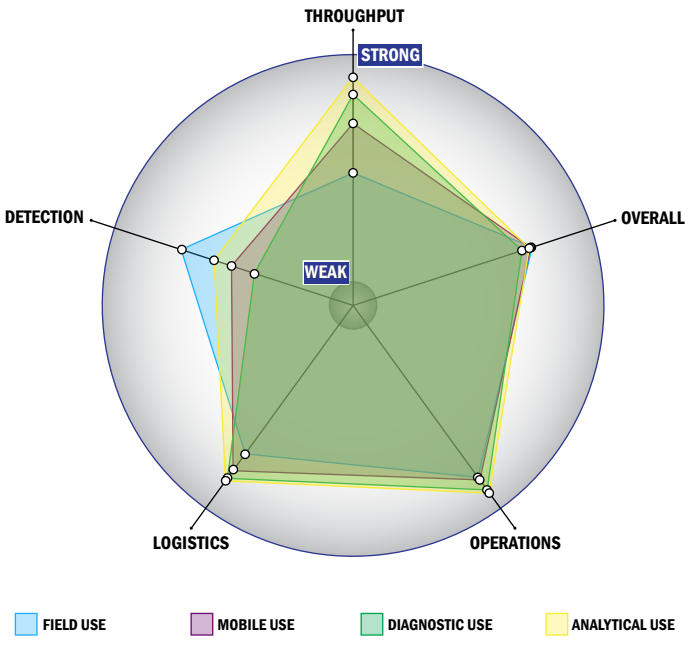


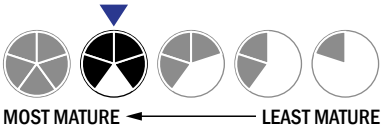
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Device or system has peak performance at normal relative humidity conditions
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Only dose rate
- Down to background level radiation for dose rate
- System is used for surveying

Duvas Technologies Ltd. - D1000

GENERAL DESCRIPTION:



D1000 is a man portable chemical sensor that can be rapidly mounted on to multiple platforms and/or networked. It allows first responders and military users to rapidly survey areas to identify and quantify industrial chemicals, warfare agents and novel threats. It is optimized for use in the field. Unlike chromatography there is no waiting for results as the instrument provides continuous output of concentrations in real time. The system's algorithm utilizes a proven method for analyzing gases called Differential Optical Absorption Spectroscopy (DOAS); It uses established optical technique proven over many years for the measurement of range of gases.

TECHNICAL DESCRIPTION:

The system is a portable, multi-species gaseous detection unit based on differential ultraviolet absorption spectroscopy in combination with an advanced signal processing routine to identify species. The species enter the system through an air inlet in to a cell to allow multiple passes through the air sample. UV light spanning a broad range of wavelengths, traverses a heavily folded optical path (White cell) to allow for a long interaction length in a compact form factor. Gases within the path absorb the UV light; this absorption is registered in real time by the detector. Each constituent gas absorbs a unique fingerprint; the robust algorithm dynamically unmerges overlapping signals from multiple gases, to analyze each component simultaneously. This high throughput is advantageous for analyzing many samples in a short period of time or the ability to sweep vast areas in a short amount of time.

The system features parts per billion simultaneous detection and qualification capability. It measures several gases directly and with much faster time resolution than conventional methods. This enables it to be used whilst on the move on any platform- either on a vehicle, bicycle, on foot or deployed in a fixed position.

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

CONTACT INFORMATION

Duvas Technologies Ltd
Suite 4, 1st Floor, QMB Bioenterprises
Innovation Centre
42 New Road
London E1 2AX
+44(0)207 148 0344
www.duvastechnologies.com

COST

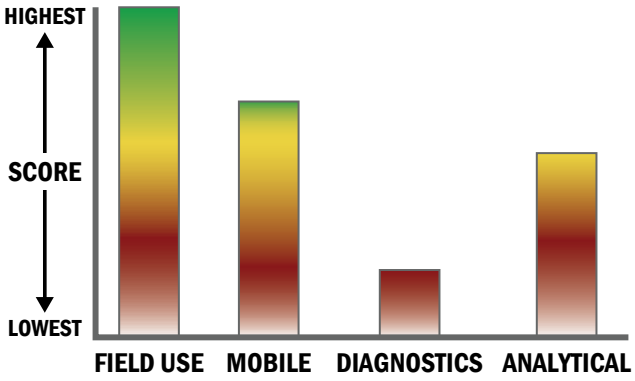
- $50,000/system
- N/A/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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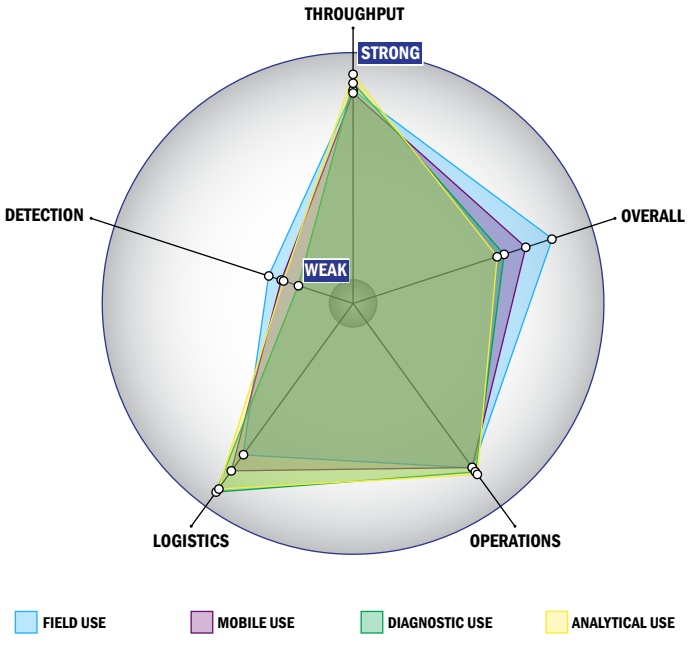


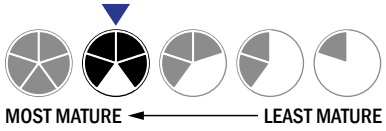
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- 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
- 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 4 °C to 37 °C
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not 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
- $1x10^{-4}$-$1x10^{-3}$ mg/m^3
- Possible system could be adapted to identify aerosolized chemical agent
- Possible system could be adapted to identify liquid chemical agent

Dycor Technologies Ltd. - C-FLAPS Biological Detection System

GENERAL DESCRIPTION:



C-FLAPS is a non-specific bioaerosol detector which was specifically designed for use as a point detector, deployed either on mobile platforms (reconnaissance vehicles, naval ships) or networked in a fixed site (military critical infrastructure, sporting events, mass gatherings, etc.) to assist in surveillance for the presence of anomalous bioaerosols. Operating on the principle of fluorescence of specific enzymes present only in living organisms, the C-FLAPS provides increased confidence in determining live particles as opposed to other aerosolized particles, and when coupled with automated sampling systems, becomes a key tool in enhancing situational awareness for military, civilian security, and public health surveillance capability. C-FLAPS is usually deployed as part of a custom-designed turnkey monitoring, detection, sampling and identification capability within either bio-specific or CBRNE surveillance requirements. C-FLAPS has been extensively and widely deployed, beginning with its role as a major component of the referee system at the US Army West Desert Test Center and DRDC Suffield in Canada, through operational deployments with North American and European defense, security and public health clients. An extensive library of background bioaerosol environments has been compiled, and continues to expand, providing continuous refinement of alarming algorithms for reduction of false alarms.

TECHNICAL DESCRIPTION:

Fluorescence excitation of NADH and Riboflavin, and measurement of their fluorescence emissions along two wavelengths, along with scattered light intensity readings, provides exceptional discrimination and rejection of interferents. Integrated alarming algorithms give the operator the ability to vary parameters based on background conditions, minimize false alarms and differentiate between non-living/harmless interferents and actual biological events.

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

CONTACT INFORMATION

Dycor Technologies Ltd.
1851 - 94 Street NW
Edmonton, Alberta, Canada T6N 1E6
POC: Markus Lemke, VP Business Development
780-930-2387
markus.lemke@dycor.com
www.dycor.com

COST

N/A

Notes

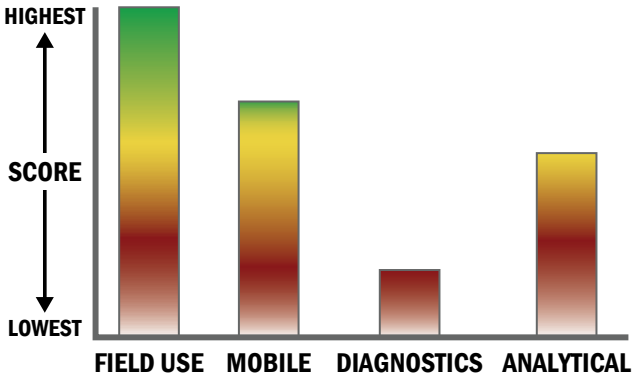
Generic non-specific bioaerosol detector fielded by the Canadian Military.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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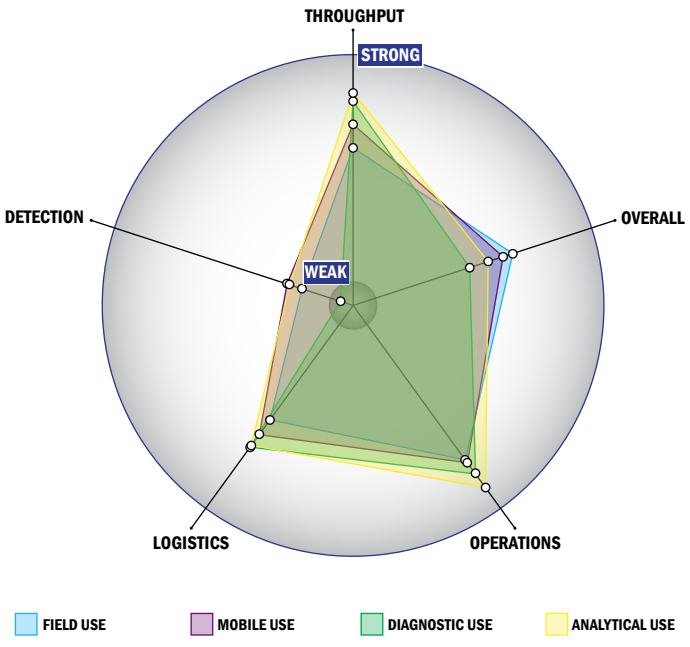


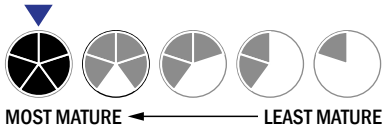
Evaluation Criteria

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 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
- 3-5 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 25 and 50 kg
- Satellite, wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Performance is not influenced by relative humidity
- 5-10 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 open but modification requires licensing

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
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Spore lysis not necessary for detection by system

Electronic Sensor Technology, Inc. - zNose Portable, Explosive, Narcotics and Nerve Agent Detector

GENERAL DESCRIPTION:

The zNose is an Ultra Fast Gas Chromatograph, which uses the unique Surface Acoustic Wave detector (SAW). The instrument was designed as laboratory analysis instrument, and is used for environmental sampling, Food safety, Medical application (Early signs of breast, and lung cancer as well as diabetes) industrial etc.



TECHNICAL DESCRIPTION:

The instrument is based on proprietary Surface Acoustic Wave (SAW) detector system, which enables it to perform chemical detection and diagnostic determination.

CONTACT INFORMATION

Electronic Sensor Technology, Inc.
1125-B, Business Center Circle
Newbury Park, CA 91320
POC: Ifty Talib
italib@estcal.com

COST

- $40,000/system
- <$1.00/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

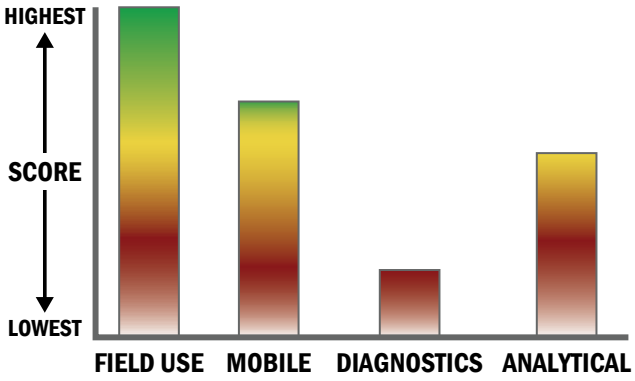
	Biological	Chemical	Radiological
FIELD USE System	N/A	Second Tier	N/A
MOBILE Laboratory	N/A	Top Tier	N/A
DIAGNOSTIC Laboratory	N/A	Top Tier	N/A
ANALYTICAL Laboratory	N/A	Top Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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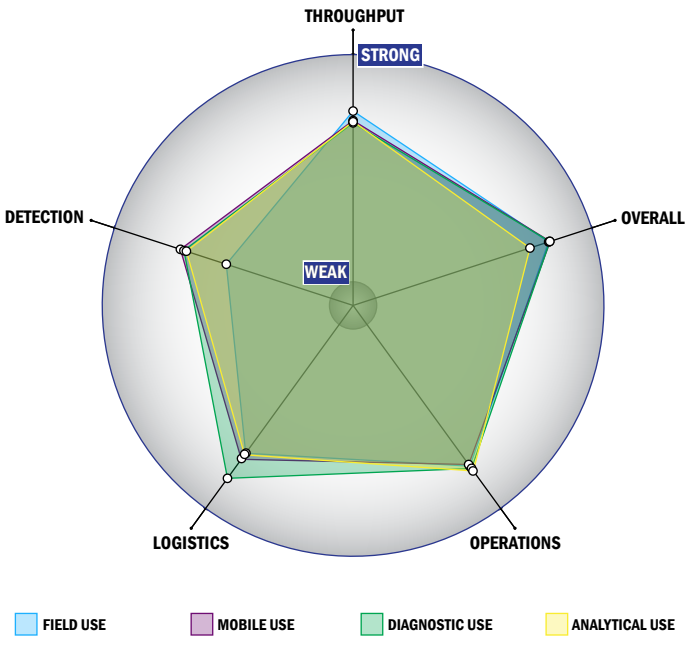


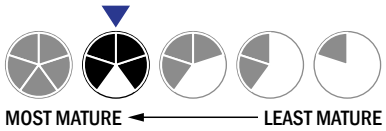
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- 349-96 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
- 5-10 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- 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 4°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
- 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 closed and not available for modification
- The system hardware is open but modification requires licensing

Detection:

- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1 ppb-1 ppm
- System currently can identify liquid chemical agent

Environics - Envi Assay System and ChemPro Reader Module

GENERAL DESCRIPTION:

Envi Assay System is intended for rapid on-site identification of biological material. The system has manual test tickets for Ricin toxin, Botulinum toxin, SEB toxin, Anthrax and Smallpox. The system also contains a reader module that is used to read the test results.



TECHNICAL DESCRIPTION:

The test tickets are based on Immunoassay technology that uses either gold- or fluorescence labelled antibodies. The reader module has a two-wavelength camera that is capable of reading both labels. The Reader module can be connected to a ChemPro100 Chemical Detector or to a PC.

CONTACT INFORMATION

Environics Oy
Graanintie 5 50100
Mikkeli, Finland

COST

- $15,000/system
- $20-$30/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

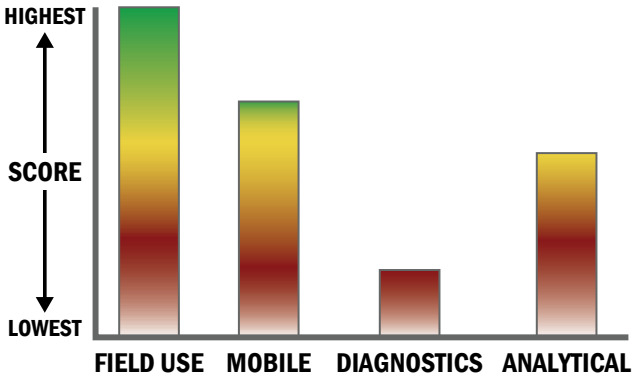
	Biological	Chemical	Radiological
FIELD USE System	Top Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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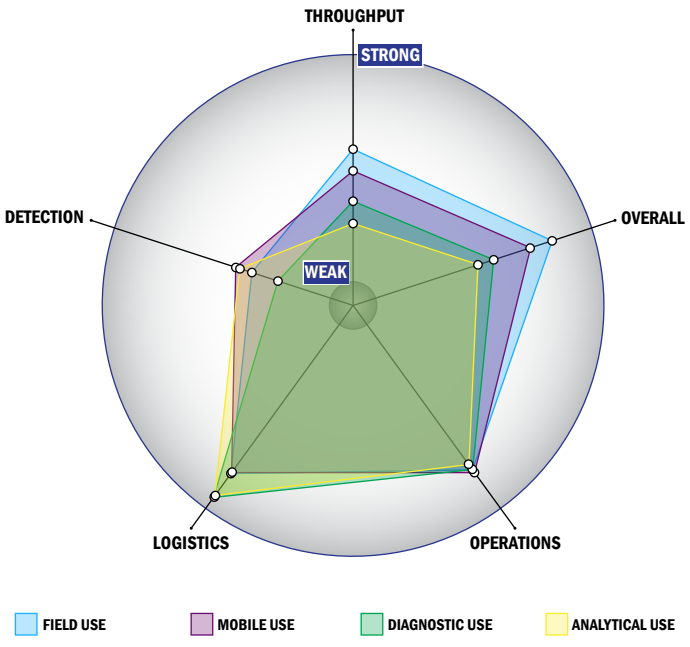


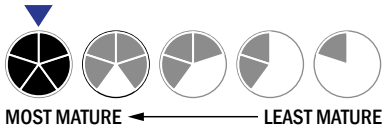
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, single test/sample per run
- 95-32 samples every 2 hours
- The system or approach is not amenable to full or semi-automation
- Device or system is designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 3 components
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- 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 room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- 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
- Less than 10 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- Greater than 100,000 CFU per mL
- Greater than 100,000 PFU per mL
- 10-100 ng per mL
- Spore lysis not necessary for detection by system

Environics - Envi BioScout

GENERAL DESCRIPTION:



ENVI BioScout™ provides a robust and sensitive bioaerosol detection solution that monitors continuously ambient air, triggers early-warning for detected potential airborne biological threats and initiates automatic air sample collection when a biological alarm is issued. The bioaerosol detector is intended to operate as an integral part of fixed and mobile EnviScreen CBRN Monitoring Systems with Operix/ Manifix 2010 software, but it is easy to integrate to 3rd party systems as well. ENVI BioScout™ is compatible with various communication methods and its modular design enables broadening of the device capabilities: an additional sample collector, a remote alarm unit, a BWA identifier or other optional modules can be connected to ENVI BioScout™ through various interface options. The device can be adapted to different outdoor and indoor environments through its adjustable, advanced alarm algorithm. It has been designed to tolerate demanding environmental conditions with continuous use, ease of maintenance and feasible lifecycle costs in mind. ENVI BioScout™ applications include both civilian and military protection in the form of building and area monitoring, mass event and critical infrastructure protection and NBC reconnaissance vehicles etc.

TECHNICAL DESCRIPTION:

Not provided.

CONTACT INFORMATION

Environics Oy
Graanintie 5 50100
Mikkeli Finland
POC: Katja Bengtsson
katja.bengtsson@environics.fi

COST

- $55,000/system
- $25/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier
Fourth Tier Bottom Tier

RANKINGS

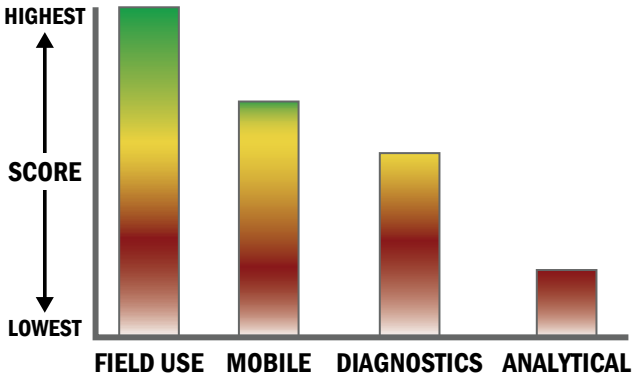
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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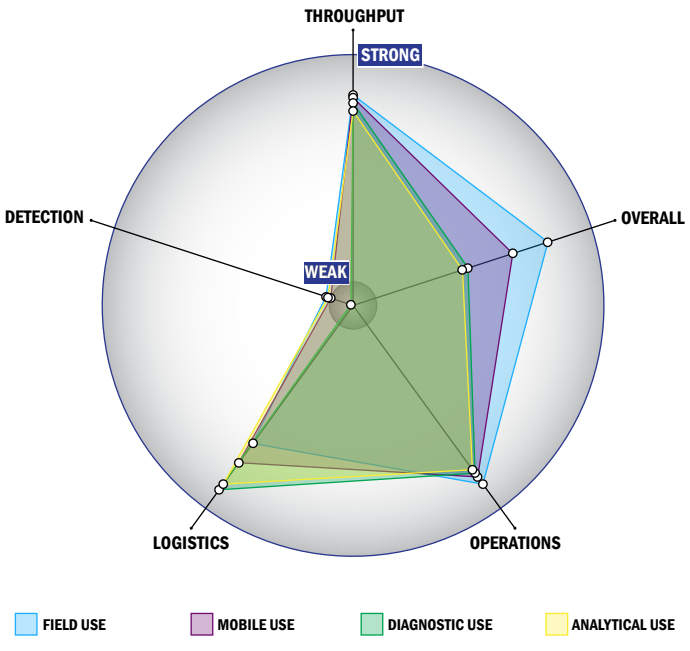


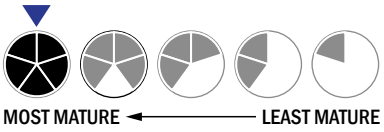
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 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
- 2 components
- 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 carry-on luggage suitcase
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement
- 2-4 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 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:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- This system does not test liquids
- Good specificity. System has a consistently low level of false alarms (2-5%)
- Spore lysis not necessary for detection by system

Environics - RANIDPRO 200 - Portable Radiological and Nuclear Identification, Monitoring and Measuring Unit

GENERAL DESCRIPTION:



RanidPro 200 is a mobile radiation detection, identification, and data collection system. It consists of a rugged laptop computer, a gamma radiation detector and a neutron radiation detector with their associated electronics. Data and analyses may be viewed on-board with the laptop user screen or transmitted digitally/electronically to a remote station. In addition, a mobile telephone or PDA may be used as an additional remote device to control and monitor the system in operation. The RanidPro 200 is designed to be used in the field unnoticeably and it utilizes a conventional rugged laptop computer and smart telephone as easy user interfaces. It may be powered by a variety of AC or DC supplies. The RanidPro 200 system continuously collects, analyzes, and displays radiation information that is acquired by its detectors. All of the collected data is also stored into an on-board database for later review and/or more detailed analyses. The fully integrated system is driven by the RanidPro 200 software which has been specifically developed for ease of use and to provide high quality field spectroscopy, real-time monitoring, and quick efficient data communication with low identification false alarm rates. Although the system is designed to be very easy to use after a short training period by non-technical users it also contains an expert mode including analysis tools for the advanced user. Bluetooth connections between the laptop computer and a smart telephone with graphical interface forms a reliable communication link to, for example, a remote operation center.

TECHNICAL DESCRIPTION:

The RanidPro 200 uses employs quality detectors (Lanthanum Bromide for gamma and Li-6 enriched crystals in a matrix of Zinc Sulfide phosphor for neutrons) to provide high resolution information. These detectors may be exposed to a changing environment during use, which could cause energy calibrations to drift. RanidPro 200 addresses this with continuous internal calibrations. The detector data are analyzed using the software suite specifically developed for the RanidPro 200. The gamma analysis is performed using a hypothesis test, analyzing for specific radionuclides. The device contains an extensive radioisotope energy library and also performs ROI summations and count rate normalization.

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	Bottom Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Third Tier
ANALYTICAL Laboratory	N/A	N/A	Bottom Tier

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

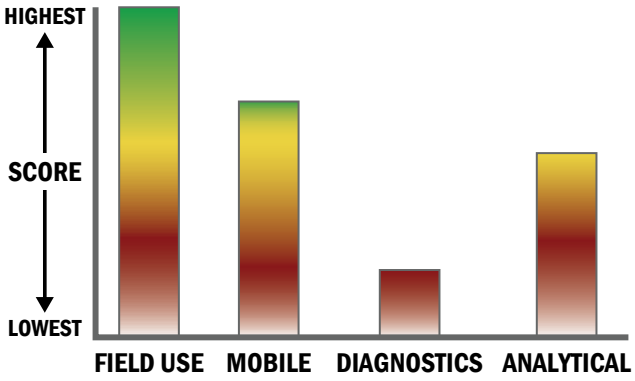
Environics Oy
Graanintie 5, PL 349 50101
Mikkeli Finland

COST

N/A

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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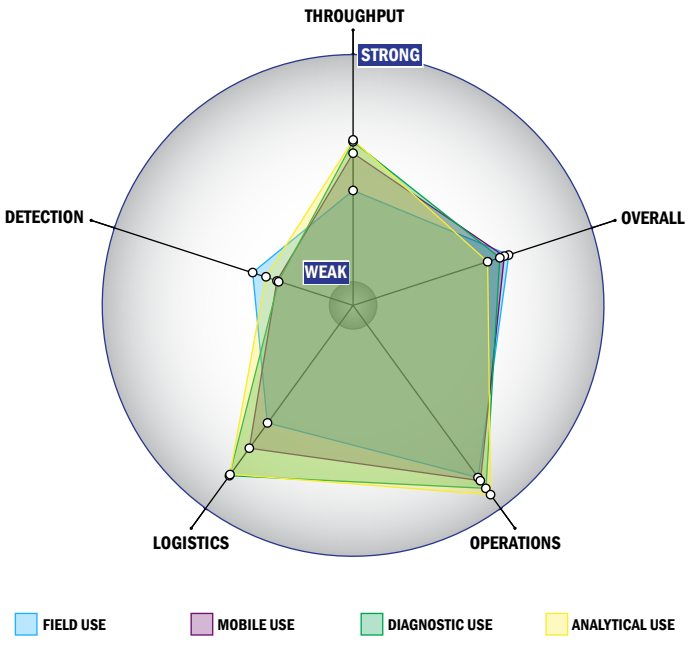


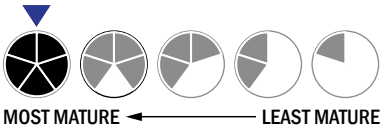
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/sample per run
- System is continuous and provides real time analysis with no defined tests/samples
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 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
- Between 5 and 25 kg
- Satellite, wireless and wired connections are available
- System or device has a greater than 220V electrical requirement
- 2-4 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected
- Down to background level radiation for dose rate
- System is used for surveying

Environics USA - ChemPro 100i

GENERAL DESCRIPTION:

The CP100i is an Ion Mobility Spectrometer capable of classifying gas for the first responder community and war fighter.

TECHNICAL DESCRIPTION:

The CP100i uses Ion Mobility Spectrometer in conjunction with electrochemical cells to classify chemicals.



CONTACT INFORMATION

Environics USA
1308 Continental Drive Suite J
Abingdon, MD 21009

COST

- $14,000/system
- >$.10/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

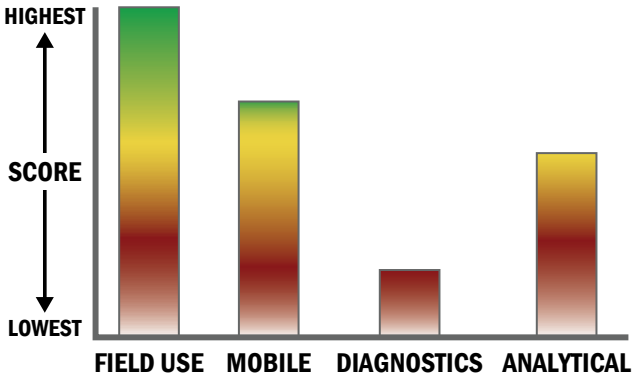
	Biological	Chemical	Radiological
FIELD USE System	N/A	Top Tier	Top Tier
MOBILE Laboratory	N/A	Top Tier	Second Tier
DIAGNOSTIC Laboratory	N/A	Second Tier	Third Tier
ANALYTICAL Laboratory	N/A	Second Tier	Third Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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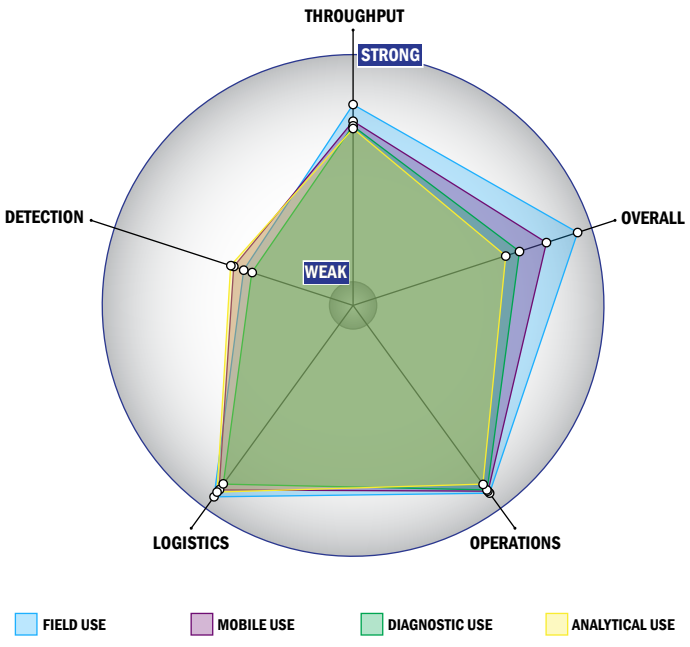


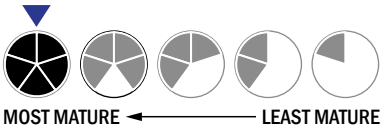
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/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
- 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 soda can
- Between 1 and 5 kg
- Satellite, wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- This system does not require consumable components
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 3-5 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- Less than 10 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- > $1x10^{-3}$ mg/m^3
- 1 ppb – 1 ppm
- Total dose and dose rate
- Down to background level radiation for dose rate
- System is used for personnel detection

Environics USA - ChemPro PD

GENERAL DESCRIPTION:
Rugged TIC/CWA detector for harsh environments.

TECHNICAL DESCRIPTION:
MS and SC cell based technology using spectral matching software to locate, classify and identify TICs and CWAs.



CONTACT INFORMATION
Environics USA
1308 Continental Drive Suite J
Abingdon, MD 21009

COST
- $15,000/system
- <$1/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

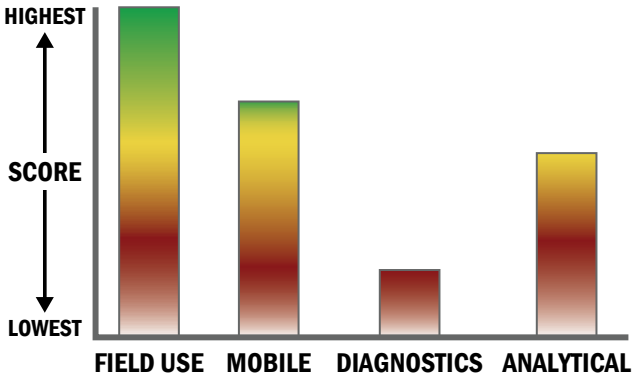
RANKINGS

	Biological	Chemical	Radiological
FIELD USE System	N/A	Top Tier	Top Tier
MOBILE Laboratory	N/A	Second Tier	Second Tier
DIAGNOSTIC Laboratory	N/A	Fourth Tier	Third Tier
ANALYTICAL Laboratory	N/A	Fourth Tier	Third Tier

Survey Source
Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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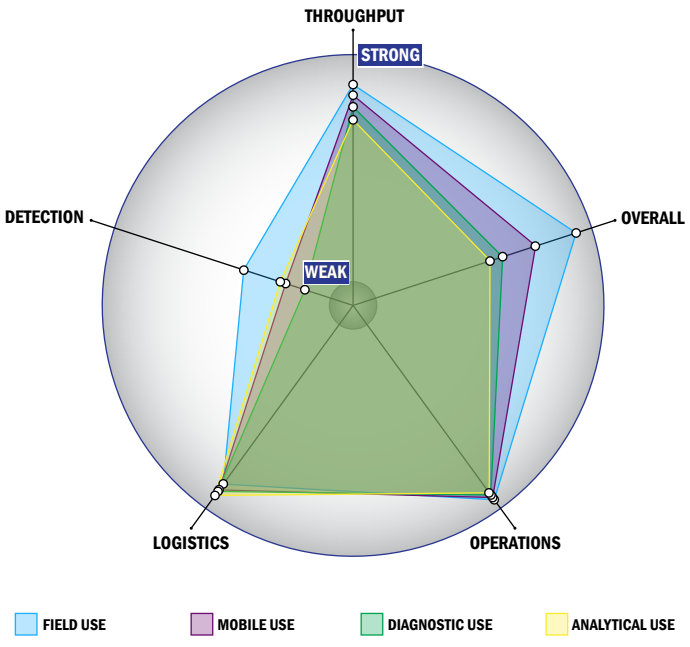


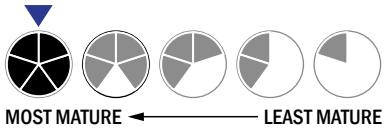
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/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
- 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 soda can
- Less than 1 kg
- Wireless and wired connections are available
- System or device uses batteries
- 4–8 Hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 3-5 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not 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
- Good specificity. System has a consistently low level of false alarms (2-5%)
- $3x10^{-5}$-$1x10^{-4}$ mg/m^3
- Possible the system can identify aerosolized chemical agent
- Total dose and dose rate
- Down to background level radiation for dose rate
- System is used for personnel detection

Environmental Instruments Canada, Inc. - CT007 Personal Radiation Detector

GENERAL DESCRIPTION:



Designed primarily for use by First Responders, the CT007 is a very small, non-intrusive, low-cost personal radiation detector, with no buttons or screens that communicates wirelessly with a smart phone. User interface functions are provided by the phone. When unusual radiation readings are encountered, the phone vibrates/rings to alert the user and the readings are then shown on the phone's display.

Using the phone's networking capabilities, the detector's readings can be monitored from a central location and expert advice can be given. The most important features are:

- **Cost.** By eliminating the user interface and higher level logic from the CT007, the unit cost is less than one third of the radiation detectors currently used by first responders.
- **Space.** There is limited amount of space on the officers' belts. By eliminating the user interface, the CT007 is approximately one third of the volume and less than one third of the weight of the radiation detectors currently used by first responders.
- **Focus.** The officers do not want another gadget that they need to handle and requires their attention. They want something that is in a pouch, on their belt, and they can forget about it, until they need it.
- **Coordinated Response.** The CT007's capability of logging radiation data in real time, so it can be centrally monitored, is a definite advantage over radiation detectors currently used by first responders.

TECHNICAL DESCRIPTION:

Simple Geiger Muller tube based radiation detector. Connects via Bluetooth to a Smart Phone, running an app. Smart Phone provides the user interface, audio and vibrator alarm, as well as networking capabilities.

CONTACT INFORMATION

Environmental Instruments Canada, Inc.
Unit 202 135 Robin Cr.
Saskatoon, Saskatchewan
Canada, S7L 6M3
POC: Kai Kaletsch
406-686-0081
info@gammawatch.com
www.gammawatch.com

COST

- $450/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

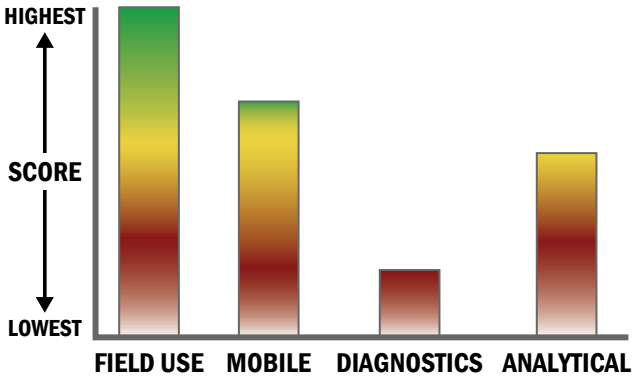
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Top Tier
MOBILE Laboratory	N/A	N/A	Top Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Second Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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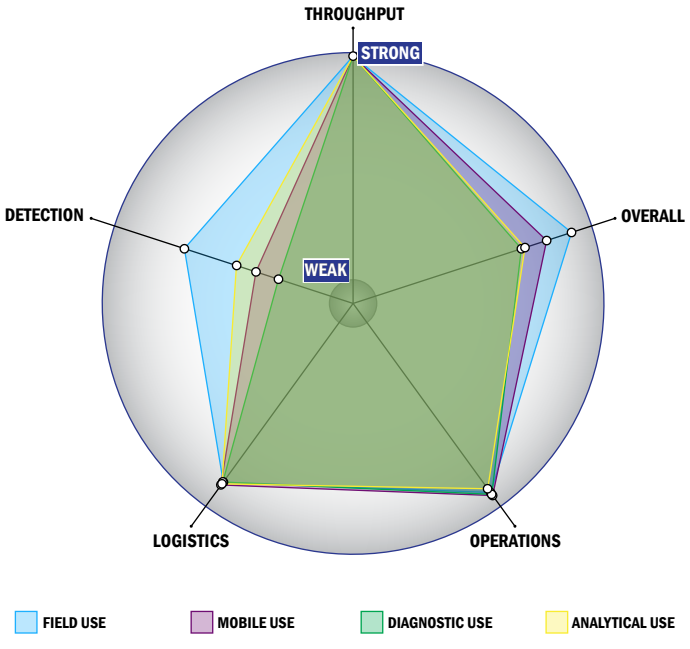


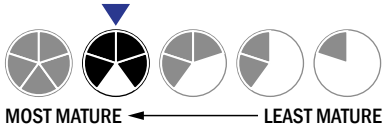
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- No set-up of the system is required
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from -21°C to 41°C
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose and dose rate
- Down to background level radiation for dose rate
- System is used for personnel detection

Epistem - Genedrive

GENERAL DESCRIPTION:

Genedrive™ offers rapid detection of NA targets in a fully integrated, compact (12cm x 17cm x 9cm) and lightweight (550g) unit. It can detect multiple targets simultaneously using room temperature stable reagents. Single button operation allows use by untrained operators.



TECHNICAL DESCRIPTION:

Genedrive™ uses hybrid thermal engine technology which enables rapid thermal cycling within a compact, low power unit.

CONTACT INFORMATION

Epistem
48 Grafton Street
Manchester, M13 9XX, UK
POC: Ben Cobb Director, Diagnostics
07787 565123 or 0161 606 7258
b.cobb@epistem.co.uk
www.epistem.co.uk

COST

- $4,000/system
- $85/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	Second Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

Notes

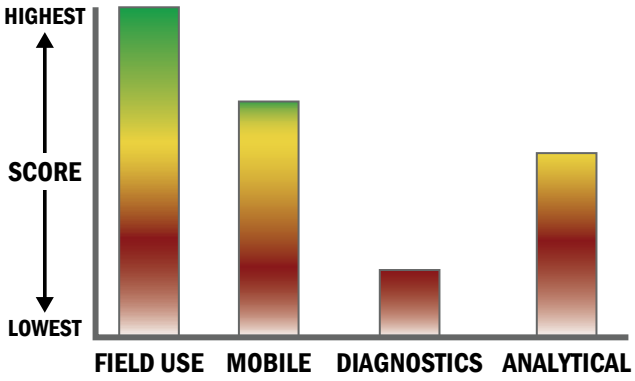
The current version does not integrate sample preparation.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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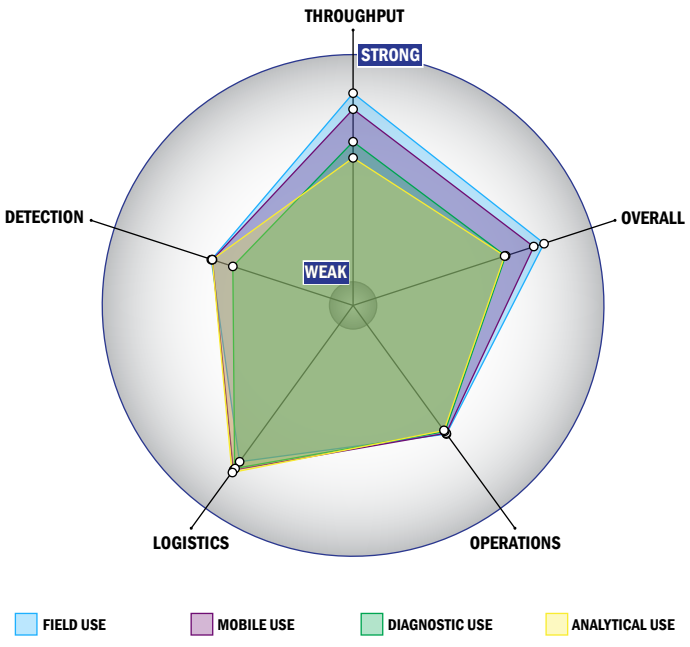


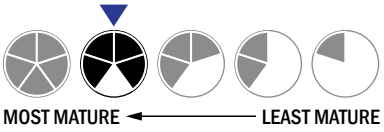
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, >10 tests/sample per run
- Less than 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
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wireless and wired connections are available
- System or device uses batteries
- 1-2 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at room temperature (27°C)
- Between 1 to 3 years shelf life
- 3-5 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Less than 100 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Add on capability that is full or semi-automated for spore lysis

EQM Research, Inc. - Test-mate ChE Cholinesterase Test System

GENERAL DESCRIPTION:

The Test-mate ChE is a complete, self-contained and portable cholinesterase testing system. The system requires only 10µL for each blood test, which may be conveniently obtained from a fingerstick sample. The entire assay may be completed in less than 4 minutes, facilitating the rapid evaluation of poisoning status. The small size (11" x 7" x 10") and weight (10 pounds) allows the unit to be easily transported between test sites.



TECHNICAL DESCRIPTION:

The Test-mate ChE reagents are based on the Ellman method. Acetylthiocholine (AcTC) or butyrylthiocholine (BuTC) is hydrolyzed by AChE or PChE, respectively, producing carboxylic acid and thiocholine which reacts with the Ellman reagent (DTNB, dithionitrobenzoic acid) to form a yellow color which is measured spectrophotometrically at 450nm. The rate of color formation is proportional to the amount of either AChE or PChE.

CONTACT INFORMATION

EQM Research, Inc.
3634 Glenmore Ave.
Cheviot, OH 45211
POC: J. Patrick Eberly, Ph.D.
513-661-0560

COST

- $2,480/system
- $6.00/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

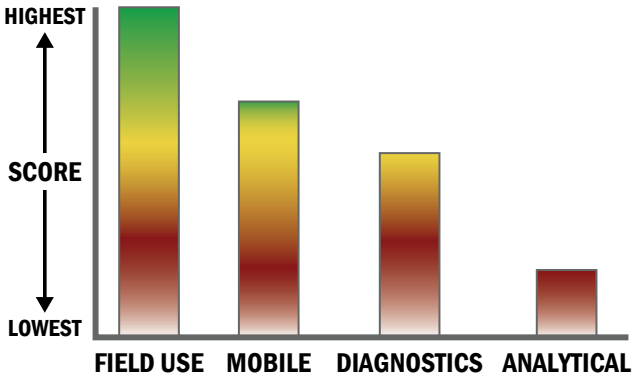
	Biological	Chemical	Radiological
FIELD USE System	N/A	Fourth Tier	N/A
MOBILE Laboratory	N/A	Bottom Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Bottom Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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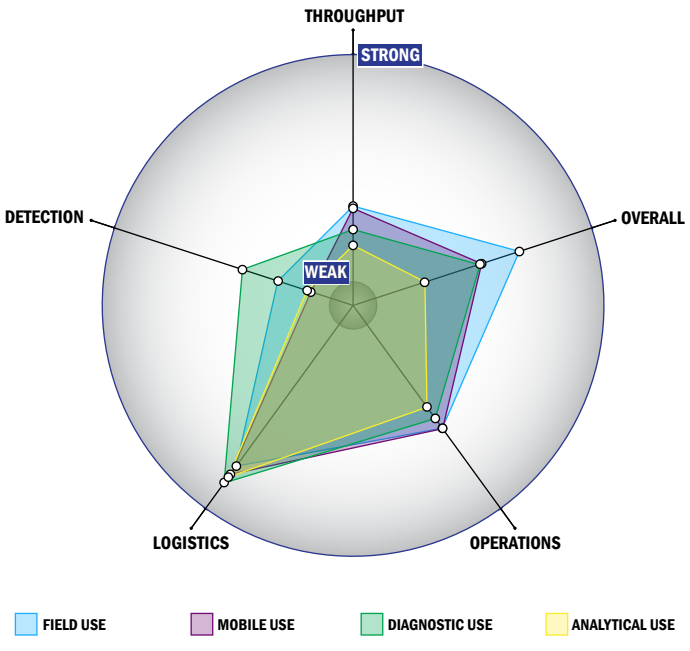


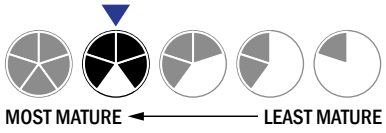
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, single test/sample per run
- Less than 32 samples every 2 hours
- The system or approach is not amenable to full or semi-automation
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 4 components
- Less than 5 minutes is required for set-up
- 9-12 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
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- System currently has 510k clearance
- System currently has FDA approval
- Less than 50 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)

FLIR Systems, Inc. - Agentase CAD-Kit

GENERAL DESCRIPTION:



The Agentase™ CAD-Kit provides first responders with the ability to conduct surface, solid and liquid interrogation of nerve (G&V series), blood (AC) and blister (HD) agents, acids, bases, aldehydes and oxidizers. This kit provides accurate results in field environments, improves detection limits to rival those of expensive handheld electronic testing devices and provides fast signals that are easy to interpret. The simplicity of this kit makes it user friendly for the entire first responder community. Unlike other field detection equipment, the Agentase CAD-Kit has extremely low rates of false positives and negatives. The Agentase CAD-Kit accurately and rapidly characterizes unknown samples in the field. While sensors are used to directly look for low levels of agent contamination on surfaces, the Agentase CAD-Kit also includes a sampling device for unknown solids and liquids. The sampler is used to collect a field sample and dispense a portion of the collected sample to each of the sensors. While the CAD-Kit is fielded an expansion to other targets is under consideration.

TECHNICAL DESCRIPTION:

Agentase CAD-Kit contains 6 sensors for CWA and TIC detection: Nerve, Blood, Blister, Acid/Base, Aldehydes, Oxidizers, a Sampler, and an Instruction Card. Each CAD Kit comes in carry pouch. Sensors are rugged and can withstand transit. The footprint and weight are 2 in x 5 in x 9 in and < 1 lb. respectively. The CAD-Kit is highly resistant to common environmental interferents. No special skills are required to operate. The startup time is 0.5 minutes by 1 person. No electrical power is required. The product has a 2 year shelf life.

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

CONTACT INFORMATION

FLIR Systems, Inc.
CBRNE Detection
2240 William Pitt Way
Pittsburgh, PA 15238, USA
(412) 423-2100

COST

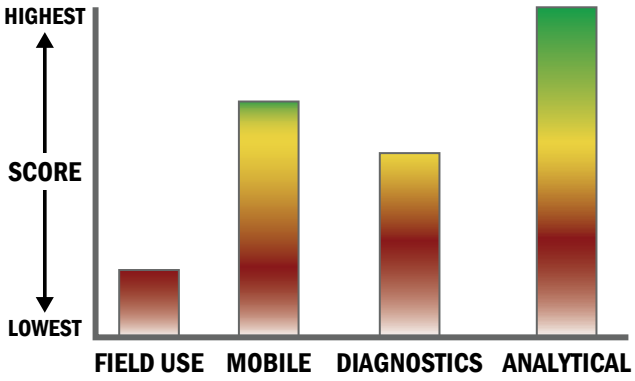
N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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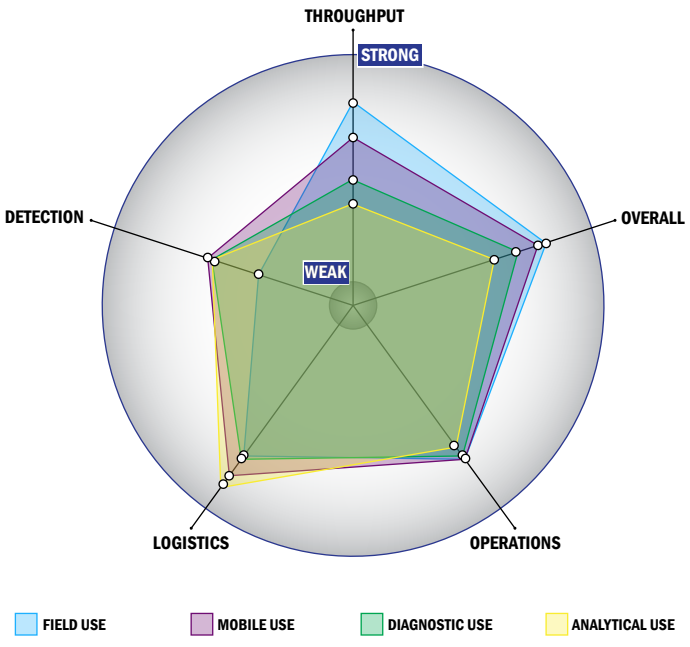


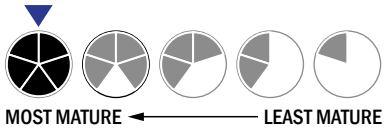
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, single test/sample per run
- 95-32 samples every 2 hours
- The system or approach is not amenable to full or semi-automation
- Device or system is designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- Less than 5 minutes is required for setup
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- This system is not capable of transmitting data
- There is no electrical requirement



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system does not employ any software

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
- Less than 100 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1 ppb–1 ppm
- Not possible for the system to identify aerosolized chemical agent
- System currently can identify liquid chemical agent

FLIR Systems, Inc. - Agentase Disclosure Spray for Blister Agents

GENERAL DESCRIPTION:

Colorimetric Enzyme-Based Spray that detects chemical agents directly on surfaces via a visible color change within 5 minutes. The formulation detects Sulfur Mustard Blister Agent (HD) with microgram sensitivity. The Blister Agent Disclosure Spray is sold in three form factors: a half-liter handheld sprayer capable of covering 5-7 square meters of surface; a man-portable sprayer, the Viper Discovery applicator, which contains approximately 2 gallons of the formulation and covers 75 – 120 square meters of surface area; and the Merlin Discovery cart-based sprayer, which holds 14 gallons and is capable of covering 500-700 square meters.



TECHNICAL DESCRIPTION:

Colorimetric Enzyme-Based Spray that detects chemical agents directly on surfaces via a visible color change within 5 minutes.

CONTACT INFORMATION

FLIR Systems, Inc.
CBRNE Detection
2240 William Pitt Way
Pittsburgh, PA 15238
412-423-2100
www.flir.com

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

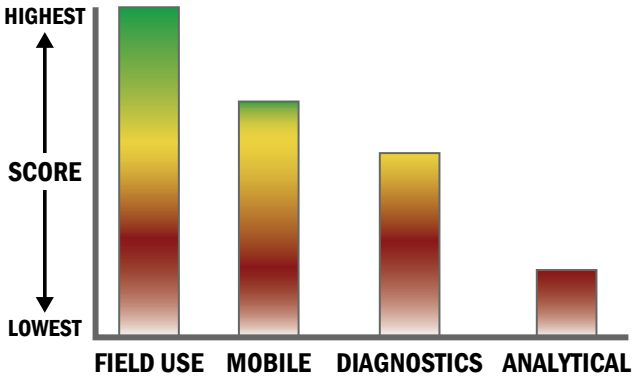
	Biological	Chemical	Radiological
FIELD USE System	N/A	Third Tier	N/A
MOBILE Laboratory	N/A	Fourth Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Bottom Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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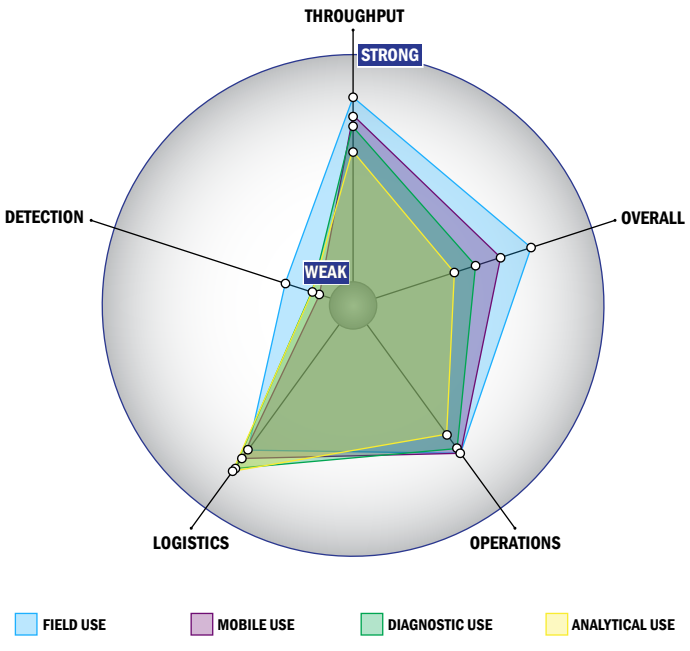


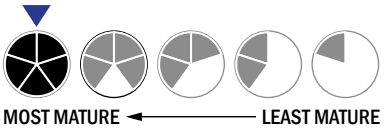
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is designed for a single use
- 2 solutions, buffer, eluents, and/or reagents
- 0 components
- Less than 5 minutes is required for setup
- 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
- This system is not capable of transmitting data
- There is no electrical requirement



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system does not employ any software

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%)

FLIR Systems, Inc. - Agentase Disclosure Spray for Nerve Agents

GENERAL DESCRIPTION:

Colorimetric Enzyme-Based Spray that detects chemical agents directly on surfaces via a visible color change within 5 minutes. The formulation detects both G-series and V-series Nerve Agents with sub-microgram sensitivity. The Nerve Agent Disclosure Spray is sold in three form factors: a half-liter handheld sprayer capable of covering 5-7 square meters of surface; a man-portable sprayer, the Viper Discovery applicator (pictured), which contains approximately 2 gallons of the formulation and covers 75 – 120 square meters of surface area; and the Merlin Discovery cart-based sprayer, which holds 14 gallons and is capable of covering 500-700 square meters.



TECHNICAL DESCRIPTION:

Colorimetric Enzyme-Based Spray that detects chemical agents directly on surfaces via a visible color change within 5 minutes.

CONTACT INFORMATION

FLIR Systems, Inc.
CBRNE Detection
2240 William Pitt Way
Pittsburgh, PA 15238, USA
412-423-2100
www.flir.com

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

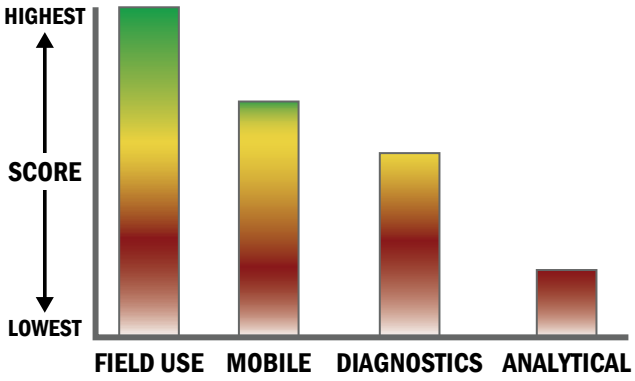
	Biological	Chemical	Radiological
FIELD USE System	N/A	Third Tier	N/A
MOBILE Laboratory	N/A	Bottom Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Bottom Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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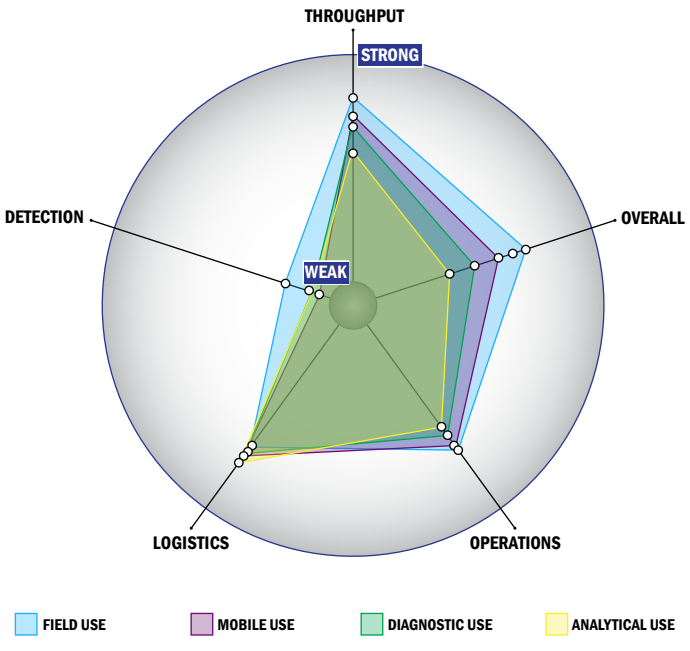


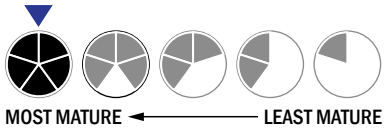
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is designed for a single use
- 2 solutions, buffer, eluents, and/or reagents
- 0 components
- Less than 5 minutes is required for setup
- 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
- This system is not capable of transmitting data
- There is no electrical requirement



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system does not employ any software

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%)

FLIR Systems, Inc. - BioCapture 650

GENERAL DESCRIPTION:



The BioCapture 650 Air Sampler collects aerosolized biological particles in the 1-10 micron diameter range including bacteria, viral particles and toxins and concentrates them into a buffer solution, maximizing the viability of these airborne particles. The sampler uses a disposable collection cartridge that houses the fluidics and sample fluid. Single-button operation, LCD and LEDs allow for ease of use in MOPP-IV personal protection clothing. The unit has flexible sampling times. After collection, sample is automatically deposited in an easily removed sample vial for subsequent analysis by PCR, hand-held assays, and other methods.

TECHNICAL DESCRIPTION:

The BioCapture collects airborne particles utilizing FLIR patented rotating impactor technology. A rotating impactor/impeller captures particles in a water-based collection fluid that circulates through the collection zone. Manifold geometries that allow the air to be exhausted separately from the particle laden liquid have been optimized for minimum evaporation and maximum flow rate. The motor and control systems have been optimized for high impeller revolution rate and low power consumption while maintaining excellent reliability.

CONTACT INFORMATION

FLIR Systems, Inc.
27700 SW Parkway Ave.
Wilsonville, OR 97070

COST

- $10,088/system
- $71/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

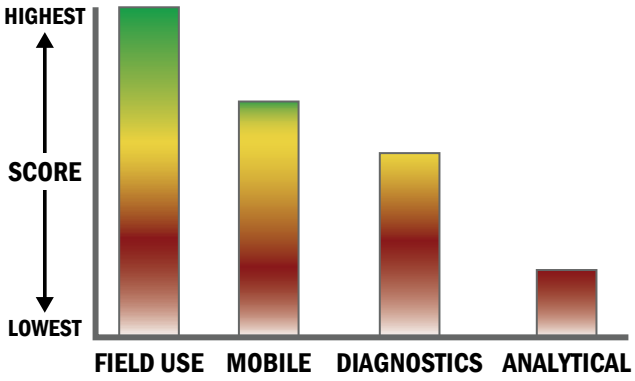
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Fourth Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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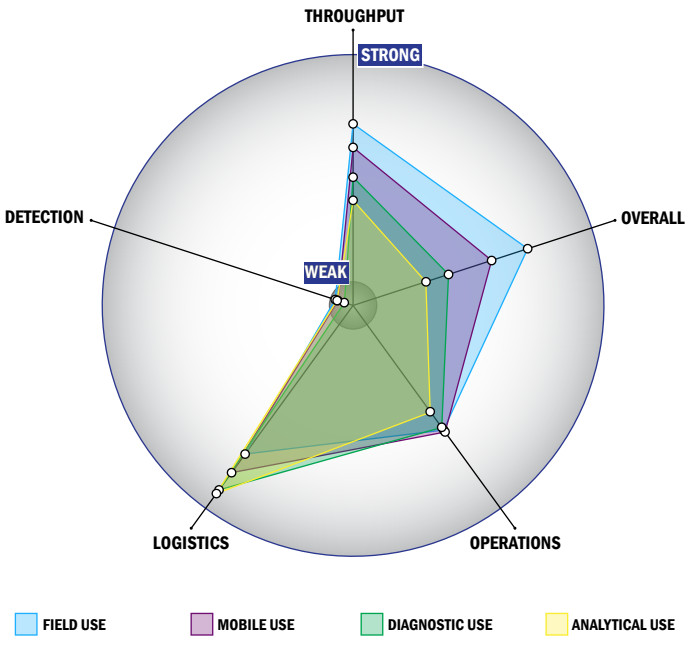


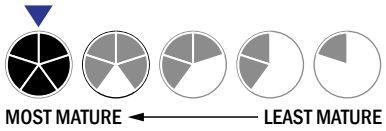
Evaluation Criteria

Throughput:

- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is designed for a single use
- 2 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- This system is not capable of transmitting data
- 1-2 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°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
- The system could be adapted to a fully autonomous system with some effort
- 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
- Less than 10 µL

FLIR Systems, Inc. - CHIRP (Chemical Hazard Indicating and Ranging Pack)

GENERAL DESCRIPTION:



CHIRP can be used for continuous detection of chemical warfare agents (CWAs) in air. The enzymatic detection capabilities are highly sensitive to chemical agents yet extremely resistant to potential environmental and chemical interferents. Currently CHIRP can detect nerve agents (G & V series) at myosis level concentrations in air. Future developments include expanding the capability of the monitor for other CWAs such as blood agents or TICs detection. In future developments the CHIRP will carry GPS and wireless communications and relays data to a central command center software package.

TECHNICAL DESCRIPTION:

A wet chemistry technique formulated to indicate the presence of a CWA by a chemical reaction that causes a color change when agents come in contact with certain solutions or substrates. The color change can be detected either visually or with spectrophotometric devices. The current unit has been proven to detect nerve agents at myosis level concentrations in air in 3rd party conducted live agent studies. The CHIRP is highly selective towards nerve agents and resistant to common environmental interferents.

CONTACT INFORMATION

FLIR Systems, Inc.
CBRNE Detection
2240 William Pitt Way
Pittsburgh, PA 15238
412.423.2100

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

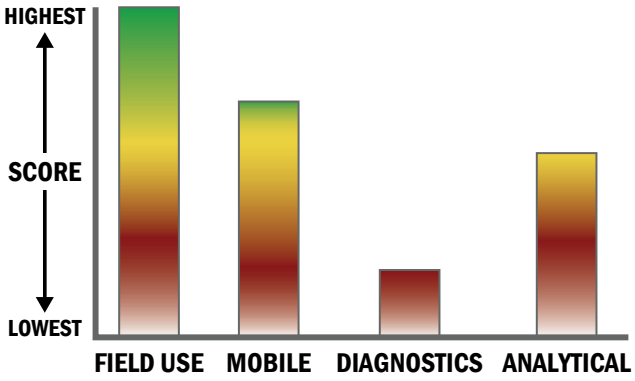
	Biological	Chemical	Radiological
FIELD USE System	N/A	Top Tier	N/A
MOBILE Laboratory	N/A	Second Tier	N/A
DIAGNOSTIC Laboratory	N/A	Third Tier	N/A
ANALYTICAL Laboratory	N/A	Third Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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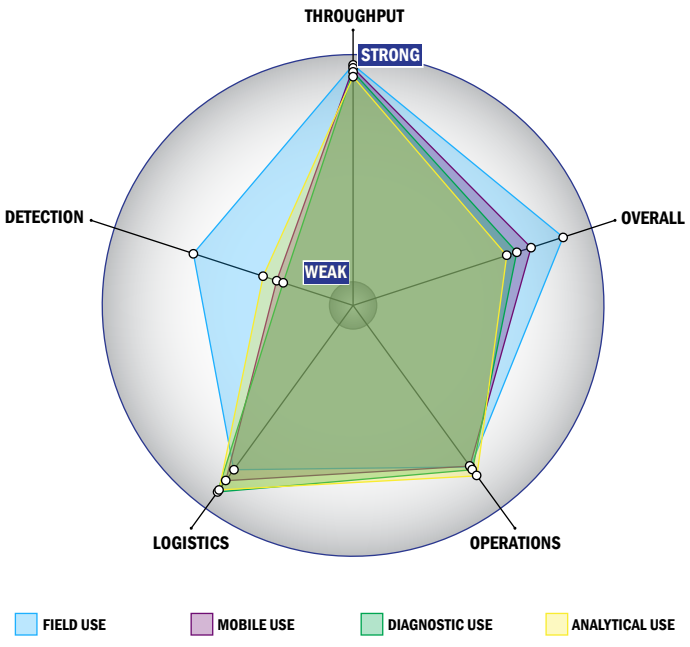


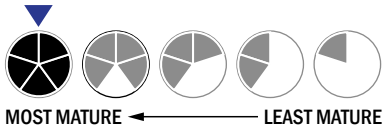
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Continuous operation with no defined runs
- 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
- 0 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a toaster
- 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 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- $<1x10^{-6}$ mg/m^3
- Possible system can be adapted to identify aerosolized chemical agent

FLIR Systems, Inc. - Griffin 460 Gas Chromatograph Mass Spectrometer

GENERAL DESCRIPTION:



The system is a portable, multi-species gaseous detection unit based on differential ultraviolet absorption spectroscopy in combination with an advanced signal processing routine to identify species. The species enter the system through an air inlet in to a cell to allow multiple passes through the air sample. UV light spanning a broad range of wavelengths, traverses a heavily folded optical path (White cell) to allow for a long interaction length in a compact form factor. Gases within the path absorb the UV light; this absorption is registered in real time by the detector. Each constituent gas absorbs a unique fingerprint; the robust algorithm dynamically unmerges overlapping signals from multiple gases, to analyze each component simultaneously. This high throughput is advantageous for analyzing many samples in a short period of time or the ability to sweep vast areas in a short amount of time.

The system features parts per billion simultaneous detection and qualification capability. It measures several gases directly and with much faster time resolution than conventional methods. This enables it to be used whilst on the move on any platform- either on a vehicle, bicycle, on foot or deployed in a fixed position.

TECHNICAL DESCRIPTION:

GC/MS is widely regarded as the “gold standard” technique for chemical analysis. Within one complex sample mixture, multiple chemicals are separated out and identified, even those that are very similar in chemical structure. Once a sample is introduced to the GC/MS, it is automatically transferred into the gas chromatograph. The mixture separates into individual chemical components that travel at different speeds based on their unique properties. Once the mixture is separated into individual chemical components, each chemical molecule is detected by the mass spectrometer where they are blasted with a beam of electrons causing them to break apart. The chemical fragments create a unique chemical fingerprint called a mass spectrum. This mass spectrum is processed by the operating software and is automatically compared to a library of known chemicals. Once the system finds a match, it reports a confirmatory identification of each of the component found in the sample mixture.

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

CONTACT INFORMATION

FLIR Systems, Inc.
Mass Spectrometry
3000 Kent Avenue
West Lafayette, IN 47906 USA
POC: Matt Birnbaum, Director of Sales, Americas
Matt.Birnbaum@flir.com
www.gs.flir.com/griffin-824

COST

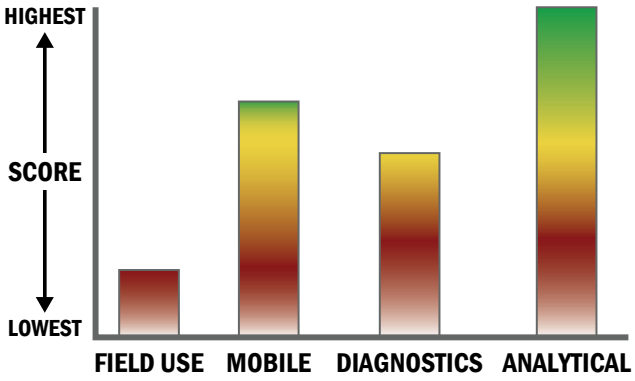
N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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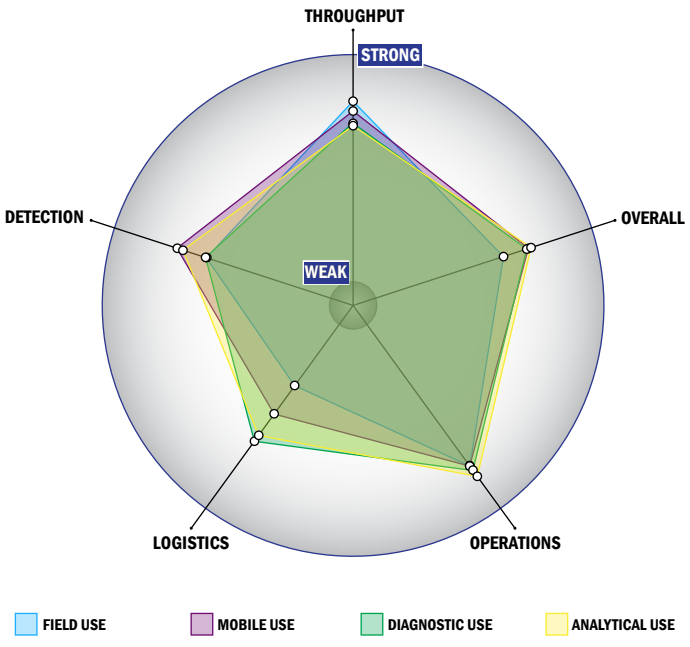


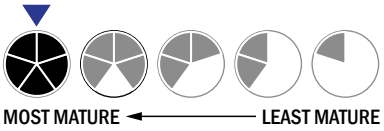
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Continuous operation with no defined runs
- 95-32 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
- 1 component
- 10-20 minutes is required for set-up
- Automatic detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 25 and 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- >1x10^{-3} mg/m^3
- 1 ppm-100 ppm
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

FLIR Systems, Inc. - Griffin 824 Trace Detection Mass Spectrometer

GENERAL DESCRIPTION:



The Griffin™ 824 is the first desktop mass spectrometer designed specifically for explosives and narcotics trace detection. The Griffin 824 mass spectrometer offers ease of adoption across a broad range of existing and emerging trace detection applications. Selectable detection modes allow customers to tailor the system to their operations using explosives only, narcotics only, or explosives/narcotics simultaneous mode. Operators collect trace residue by wiping personal belongings, skin, parcels/cargo, and other surfaces with a sample ticket. The sample ticket is inserted into the Griffin 824 sample inlet where analysis is performed via MS in less than 10 seconds. The Griffin 824 was designed to maximize system operational time by incorporating an open loop that does not recycle air inside the system. No cleaners are required, minimizing consumable costs and allowing rapid clear down after a true alarm.

TECHNICAL DESCRIPTION:

Utilizing lab-caliber mass spectrometry, the Griffin 824 performs rapid analysis and explosives/narcotics threat identification. A mass spectrometer measures a physio-chemical characteristic: the mass-to-charge ratio (m/z) of an ion. Thus, it provides more information about the chemical make-up of a sample than most other sensor technologies can detect. Mass spectrometry is also a very selective technology. Within one complex sample, multiple chemicals can be separated out and identified, even those that are very similar in chemical structure. Mass spectrometers use library matching algorithms to identify the various chemical components within a sample. Griffin 824 is supplied with Griffin-developed spectral libraries that include a broad range of military, commercial, and home-made explosives (includes peroxide-based explosives) that meet current threats and a broad range of commonly abused narcotics and controlled substances.

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	Fourth Tier	N/A
MOBILE Laboratory	N/A	Bottom Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Bottom Tier	N/A

CONTACT INFORMATION

FLIR Systems, Inc.
Mass Spectrometry
3000 Kent Avenue
West Lafayette, IN 47906 USA
POC: Matt Birnbaum, Director of Sales, Americas
Matt.Birnbaum@flir.com
www.gs.flir.com/griffin-824

COST

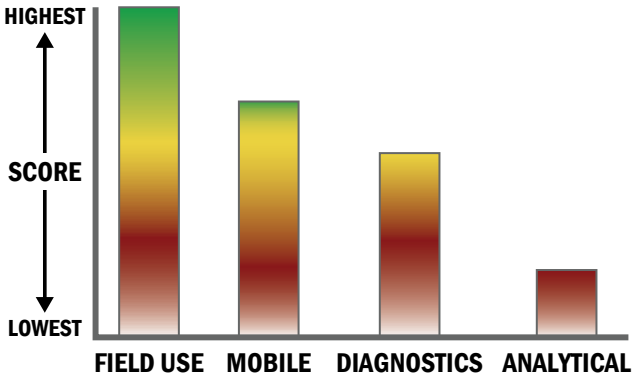
- N/A/system
- <$.05/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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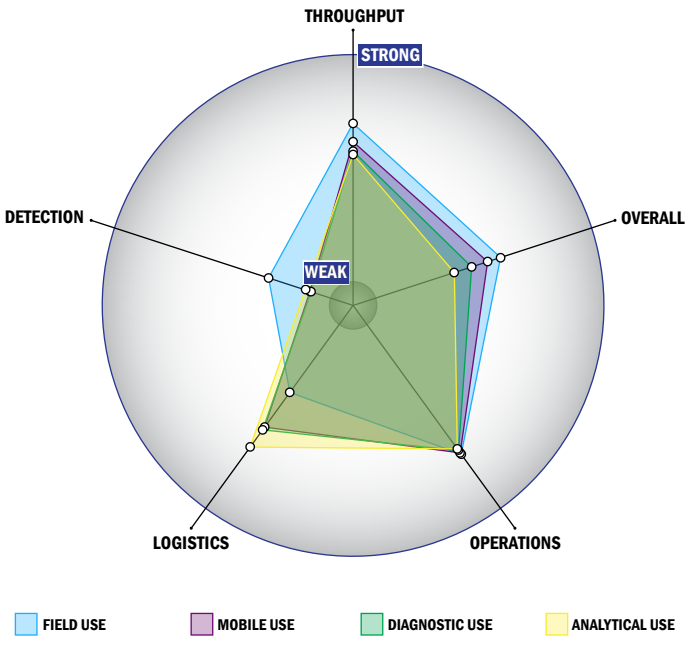


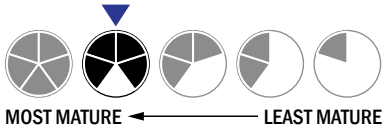
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/sample per run
- 749-350 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
- Greater than 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
- Between 5 and 25 kg
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is open but modification requires licensing
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)

FLIR Systems, Inc. - IBAC Bio-Aerosol Detector and Collector

GENERAL DESCRIPTION:



The IBAC provides real-time biological agent detection, sample collection, and the capability of alerting first responders and emergency personnel. The sensor provides an indoor and outdoor biological agent discrimination capability based on elastic scattering and fluorescence emission of biological particles.

IBAC sensors can operate independently or as part of a network configuration to form the "first tier" of a building air-security system. A battery powered sensor provides a mobile capability for first responders that have the mission of homeland protection in a biologically contaminated environment. Potential applications for the sensor include mass transit facilities, military forward operating bases, national monuments, elements of national infrastructure, and office buildings.

The IBAC has the following functions:

- Continually monitor the ambient air for changes consistent with a high probability of biological warfare agent attack;
- Automatic detection algorithms will respond via alarms once a biological warfare agent is determined to be present;
- Collect, concentrate, and preserve samples for confirmatory and identification analysis;
- Provide transmission of the data collected by the sensor to local and remote command and control centers.

TECHNICAL DESCRIPTION:

Air particles are pulled into the sensor by means of a diaphragm pump at 4 liters/minute. The particles pass through an optical illumination region where they are excited by a continuous-wave laser diode. Light emitted from these particles is scattered elastically (no change in wavelength) and may also emit fluorescence if biological material is present. In the IBAC, the elastically scattered light and the auto-fluorescence produced light are observed simultaneously on independent optical channels.

Once per second, the IBAC measures an environment's particle counts, fluorescence, and particle size information. To trigger an alarm, the real-time detection algorithm analyzes changes in background particle activity. This rolling-average algorithm operates unattended and can trigger an alarm within 30 seconds of detecting a biological agent. Separate algorithm settings have been developed for indoor and outdoor use. All of the processing is performed within the sensor without the need for an attached computer. All acquired data may optionally be stored on an internal flash memory card for retrieval and 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	Top Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Notes

IBAC units are being utilized by the US National Guard.

CONTACT INFORMATION

FLIR Systems, Inc.
CBRNE Detection
6610 Amberton Drive Suite 400
Elkridge, MD 21075
410-540-8660

Survey Source

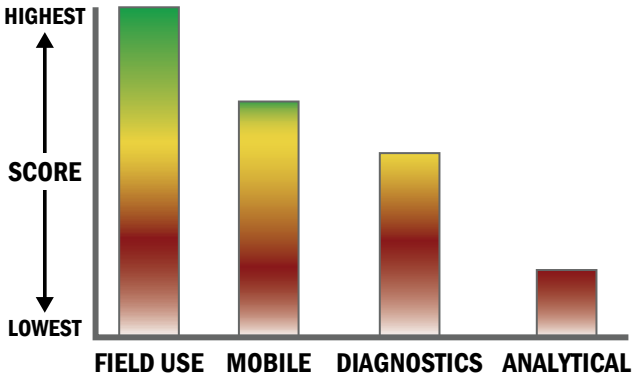
Vendor Supplied Information

COST

- $24,500/system
- <$1/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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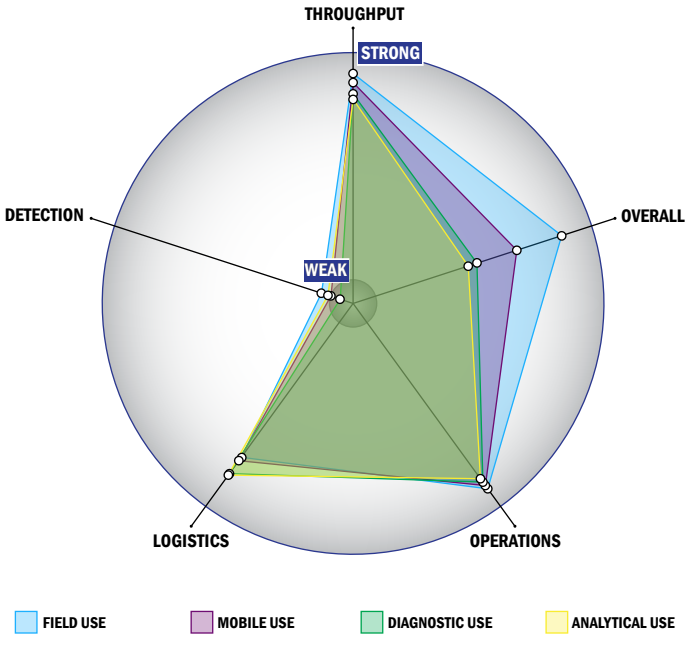


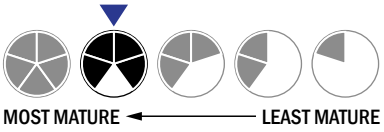
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- 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
- Automatic 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 has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from -21°C to 41°C
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is open but modification requires licensing

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
- Good specificity. System has a consistently low level of false alarms (2-5%)
- Spore lysis not necessary for detection by system

FLIR Systems, Inc. - identiFINDER 2

GENERAL DESCRIPTION:



The identiFINDER is the world's first in a series of handheld instruments capable of detecting the presence of gamma radiation and identifying the radionuclide. Every identiFINDER is able to detect, rapidly locate, accurately measure and precisely identify sources or contaminations from gamma radiation. The ability to detect X-ray sources as well as the presence of neutrons in the radiation field via an optional neutron detector allows a wide application scope. The identiFINDER 2 is a logical extension of the original identiFINDER series of handheld radio- isotope identification detector (RIID) instruments.

TECHNICAL DESCRIPTION:

The identiFINDER includes a NaI or LaBr detector plus a GM tube, for high gamma dose rate measurements is also one of the first handheld instruments to implement Digital Signal Processing (DSP).Three push buttons that align with on-screen menu items are all that is needed to operate this instrument, even with only one gloved hand. The monochrome LCD display has been replaced with a TFT LCD, 64k color, 320 by 240 pixel display that is readable in virtually all light conditions. The spectrum of the ultra-versions is continuously LED peak stabilized to handle a wide range of count rates and conditions with no peak interference in the identification spectrum.

CONTACT INFORMATION

FLIR Systems, Inc.
2800 Crystal Drive, Suite 330
Arlington, VA 22202
410-540-8685
www.flir.com

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

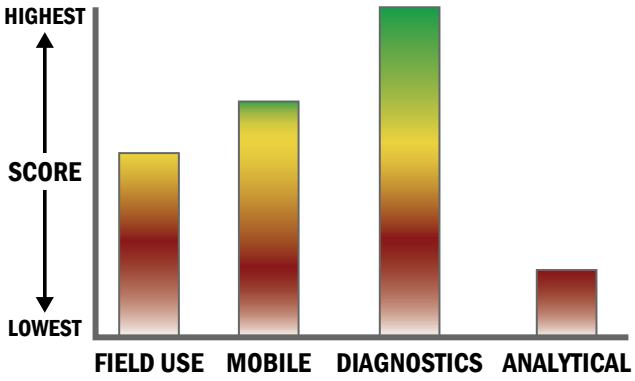
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	
MOBILE Laboratory	N/A	N/A	
DIAGNOSTIC Laboratory	N/A	N/A	
ANALYTICAL Laboratory	N/A	N/A	

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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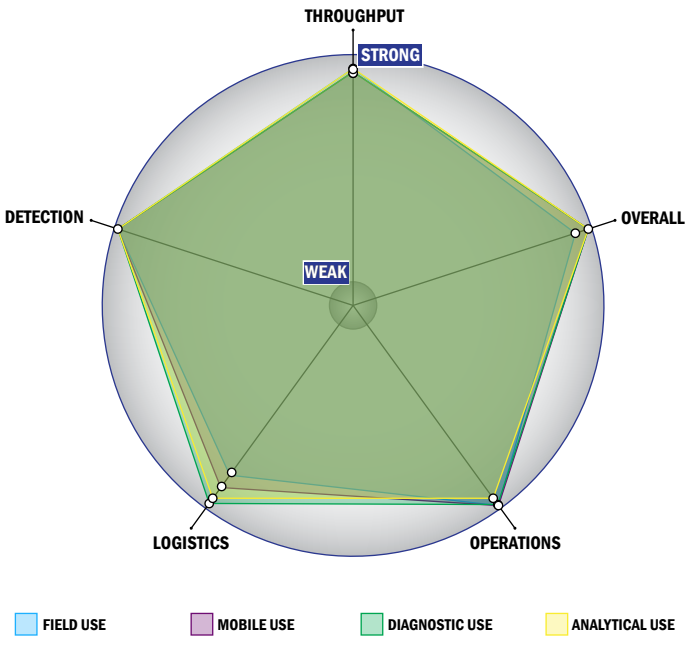


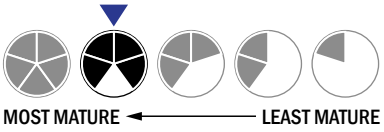
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- Greater than 750 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
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- 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°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose, dose rate and count rate with operator selection to show the display
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for personnel detection

FLIR Systems, Inc. - MailPoint

GENERAL DESCRIPTION:



MailPoint is a mail inspection workstation for biological threat screening of letters and parcels. Designed around a down-draft table, MailPoint pulls air inward and downward, away from the operator's breathing zone through perforated table grates and finally through a high-performance filtration system. MailPoint provides tiered detection and sampling of biological hazards. The collected sample may be used with a presumptive identifier, sold separately, for analysis. The MailPoint system is a containment hood that can be used to safely handle mail or other items that are suspected of containing a biological threat.

TECHNICAL DESCRIPTION:

The system contains FLIR AirSentinel® and BioXC® systems. The BioXC continuously collects some of the particles that are flowing through the MailPoint system. When the AirSentinel OPC detects a potential threat it will alert the user to dispense the fluid sample collected by the BioXC. The sample fluid can then be analyzed by a separate identifier to determine if the particulate is a true biological threat and, if so, the character of the threat.

CONTACT INFORMATION

FLIR Systems, Inc.
27700 SW Parkway Ave.
Wilsonville, OR 97070

COST

- $44,000/system
- ~$35/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

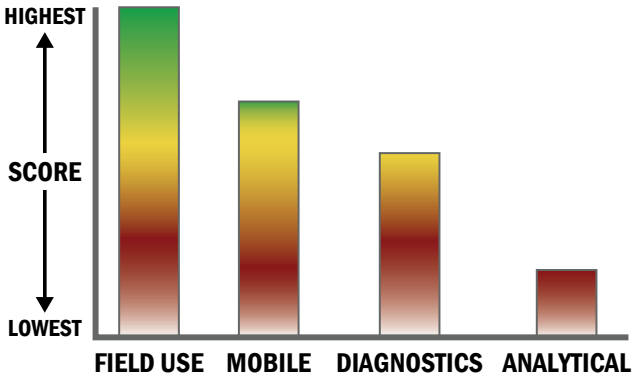
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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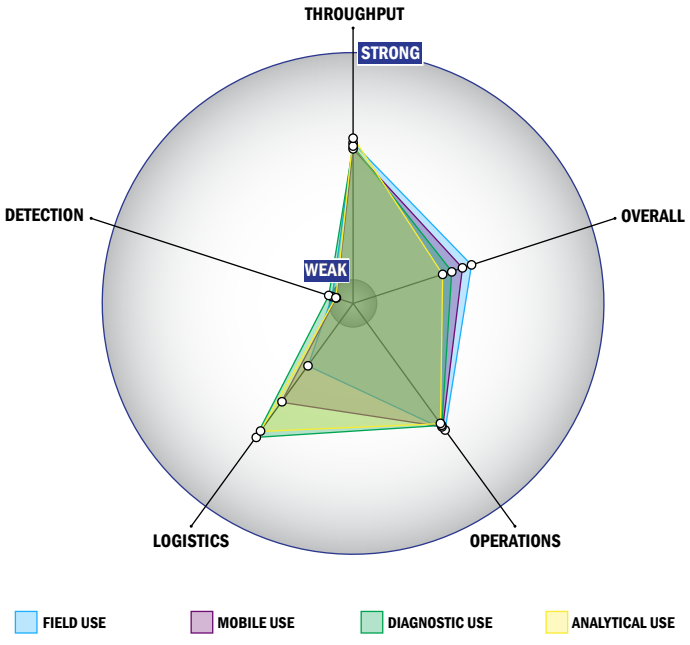


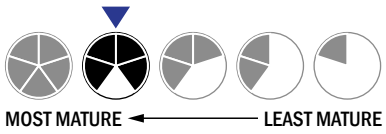
Evaluation Criteria

Throughput:

- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- 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
- 2 components
- 5-10 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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

FLIR Systems, Inc. - nanoRaider

GENERAL DESCRIPTION:



About the same size as a cellphone, the belt wearable nanoRaider provides continuous detection capability with visible, audible and tactile alerts. Once radiation has been detected, the fast identification capability of the instrument provides essential information to the user in the field, enabling them to make a next step determination. The One Touch Reachback™ feature integrated into the nanoRaider allows the user to immediately send a notification to team members, superior officers, situation management personnel, and expert analysts – all with a single push of a button.

TECHNICAL DESCRIPTION:

The nanoRaider uses uniquely constructed Cadmium Zinc Telluride (CZT) detectors that enable exceptional sensitivity and identification capabilities never before seen in a spectroscopic personal radiation detector (SPRD). The characteristic design of FLIR CZT detectors is more rugged than scintillation-based detectors and does not require temperature stabilization. The nanoRaider is also available with an optional neutron detector.

CONTACT INFORMATION

FLIR Systems, Inc.
2800 Crystal Drive, Suite 330
Arlington, VA 22202
410-540-8685
www.flir.com

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

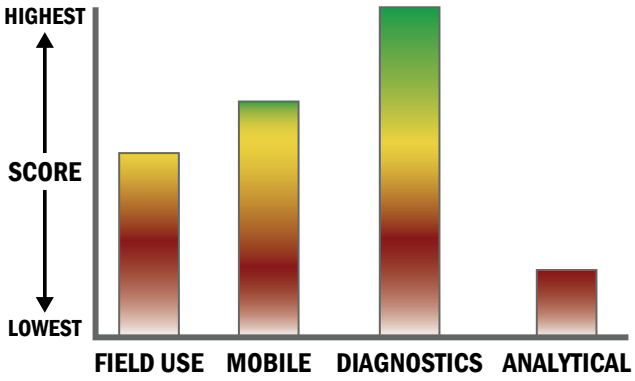
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	
MOBILE Laboratory	N/A	N/A	
DIAGNOSTIC Laboratory	N/A	N/A	
ANALYTICAL Laboratory	N/A	N/A	

Survey Source

Vendor Supplied Information

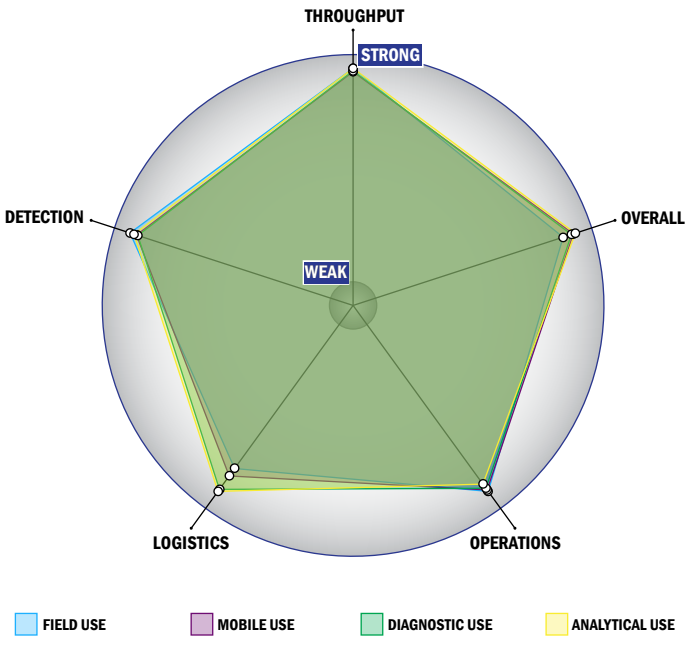
Scoring Analysis

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.



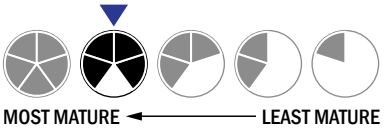
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- Greater than 750 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
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- 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°C to 41°C
- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose, dose rate and count rate with operator selection to show the display, may differentiate between types of radiation
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

FLIR Systems, Inc. - radHUNTER

GENERAL DESCRIPTION:



The radHUNTER is an extremely sensitive and accurate digital hand-held gamma radionuclide identification device (RID). It is the culmination of over eight years of development of micro-miniature, digital signal processing electronics; operating power conservation; and advancements in the scintillation detector, radionuclide template matching identification algorithm. The radHUNTER development was supported in part by the U.S. Government.

TECHNICAL DESCRIPTION:

The radHUNTER is able to quickly detect, rapidly locate, accurately measure and precisely identify sources of contamination from their gamma radiation signature. The radHUNTER uses a 19 mm (0.7") thick by 102 mm (4.0") diameter NaI(Tl) detector or a 38 mm (1.5") thick by 38 mm (1.5") LaBr detector. This large cross section provides an excellent source to background ratio which rapidly locates gamma contamination. It comes with a GM tube for high gamma dose rate measurements and an optional sealed 3He detector with moderator for neutron detection.

CONTACT INFORMATION

FLIR Systems, Inc.
2800 Crystal Drive, Suite 330
Arlington, VA 22202
410-540-8685 or 703-915-9014
www.flir.com

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

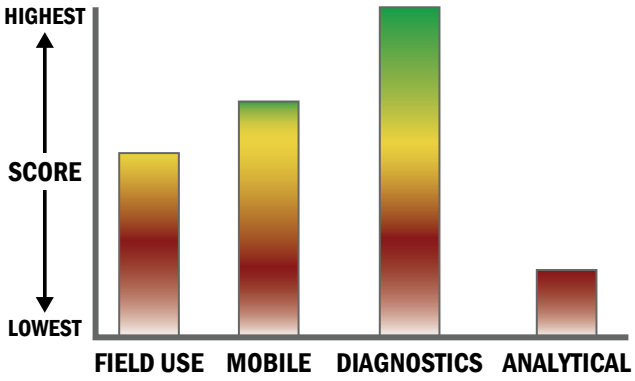
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	
MOBILE Laboratory	N/A	N/A	
DIAGNOSTIC Laboratory	N/A	N/A	
ANALYTICAL Laboratory	N/A	N/A	

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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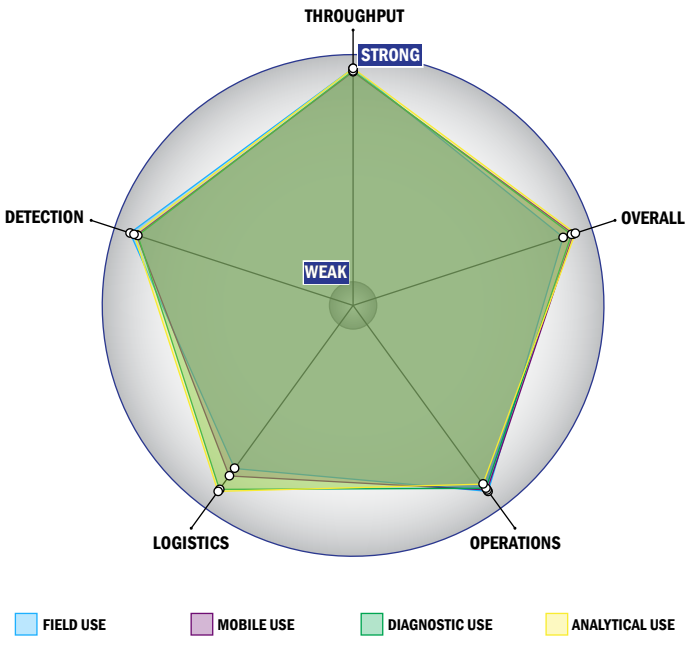


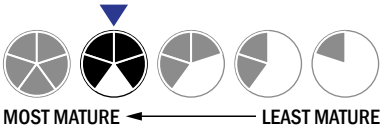
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- Greater than 750 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
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- 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°C to 41°C
- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose, dose rate and count rate with operator selection to show the display, may differentiate between types of radiation
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for personnel detection

FLIR Systems, Inc. - STRIDE systems

GENERAL DESCRIPTION:

STRIDE Detection Systems are available in a wide variety of sizes and features to detect and identify radioactive material. They can be openly or covertly installed in building entrances, at airports, bus or train stations, above or beside luggage or freight conveyer belts, by stadium entrances, ship ports and many more similar locations of potential risk.



TECHNICAL DESCRIPTION:

A typical Detection Unit consists of a NaI scintillation detector for gamma radiation detection; DSP (Digital Signal Processing) based electronics with source or LED stabilization; a multichannel pulse height analyzer; a K40 source in the form of KCl for calibration verification and at times, stabilization; a usage appropriate enclosure; mains, battery or PoE (Power over Ethernet) power; and a data and control communication method.

CONTACT INFORMATION

FLIR Systems, Inc.
2800 Crystal Drive, Suite 330
Arlington, VA 22202
410-540-8685
703-915-9014
www.flir.com

COST

N/A

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

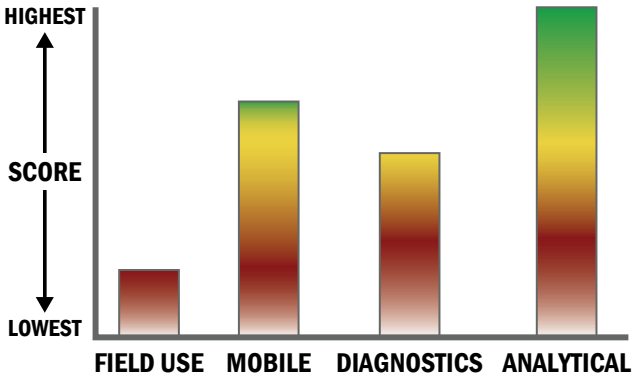
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Third Tier
MOBILE Laboratory	N/A	N/A	Top Tier
DIAGNOSTIC Laboratory	N/A	N/A	Top Tier
ANALYTICAL Laboratory	N/A	N/A	Top Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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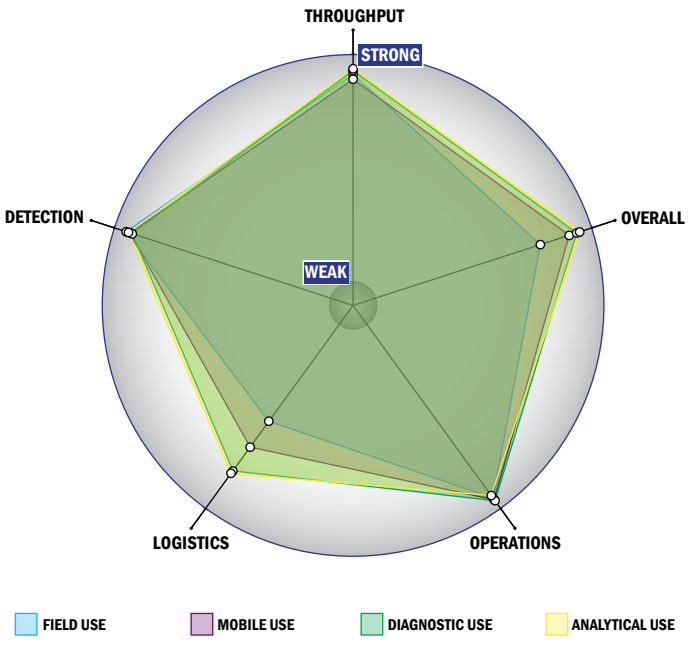


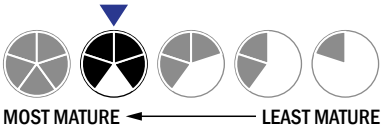
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- 5-10 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 has 110V electrical requirement



Operations:

- Can be used from -21°C to 41°C
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose, dose rate and count rate with operator selection to show the display, may differentiate between types of radiation
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for area air sampling

Fluidigm - The BioMark and BioMark HD System For Real-Time PCR

GENERAL DESCRIPTION:

The BioMark Family of systems are designed for high throughput real-time PCR. The system is designed for research use only.



TECHNICAL DESCRIPTION:

The BioMark Family of Real-Time PCR systems enables high throughput real time PCR with nanoliter sized reaction volumes through the use of microfluidics. The microfluidic architecture does the work of combining samples and assays into 9,216 simultaneous PCR reactions, which is 24-fold more data than that produced by a 384-well plate.

CONTACT INFORMATION

Fluidigm
7000 Shoreline Court, Suite 100
South San Francisco, CA 94080
866-358-4354
650-266-6000
www.fluidigm.com

COST

- $250,000/system
- $15-$18/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

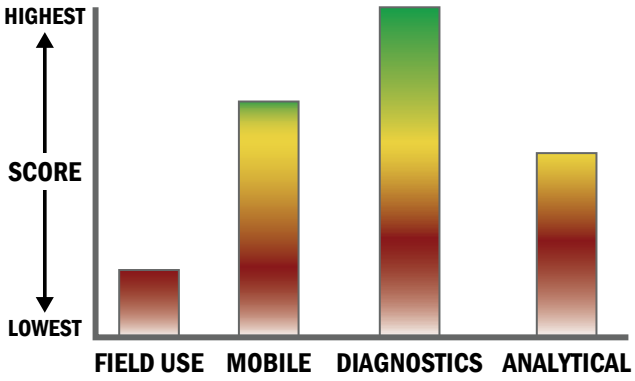
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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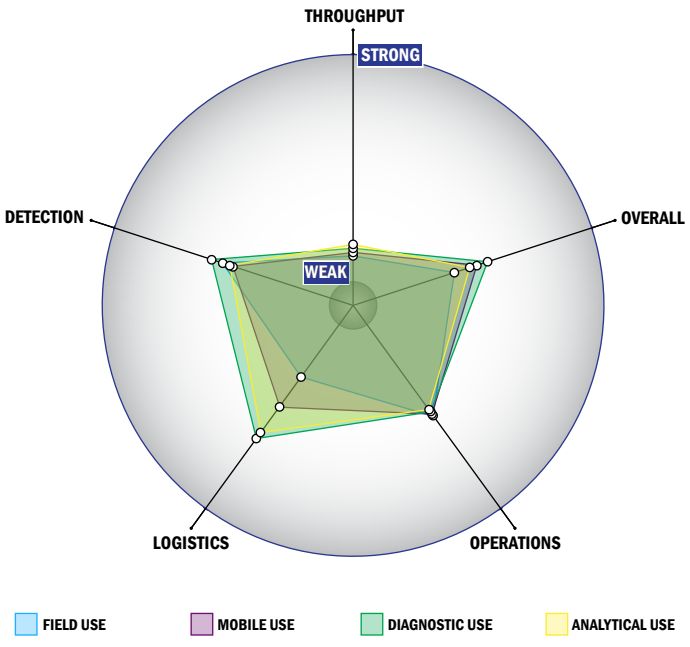


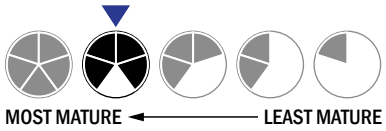
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 3 components
- Greater than 20 minutes is required for set-up
- Greater than 12 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Device or system has peak performance at normal relative humidity conditions
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- 1-100 CFU per mL
- 1-100 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Fluke Biomedical - 451P microR Ion Chamber Survey Meter

GENERAL DESCRIPTION:

The 451P state-of-the-art ion chamber survey meter is a handheld battery operated unit designed for use in both rugged and normal environments. The 451P is a pressurized ion chamber for µR resolution. The 451P has auto-ranging and measure radiation rate and accumulated dose from various radiation sources (x-ray and gamma). The ion chamber detector allows for a fast response time to radiation from leakage, scatter beams, and pinholes. Additionally, the low-noise chamber bias supply provides for fast background-settling time.



TECHNICAL DESCRIPTION:

Pressurized ion chamber technology.

CONTACT INFORMATION

Fluke Biomedical
6920 Seaway Blvd
Everett, Wa. 98203
www.flukebiomedical.com

COST

- $2,700/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

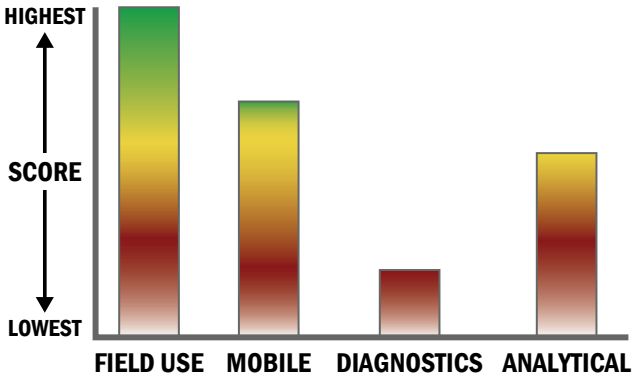
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Fourth Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Bottom Tier
ANALYTICAL Laboratory	N/A	N/A	Bottom Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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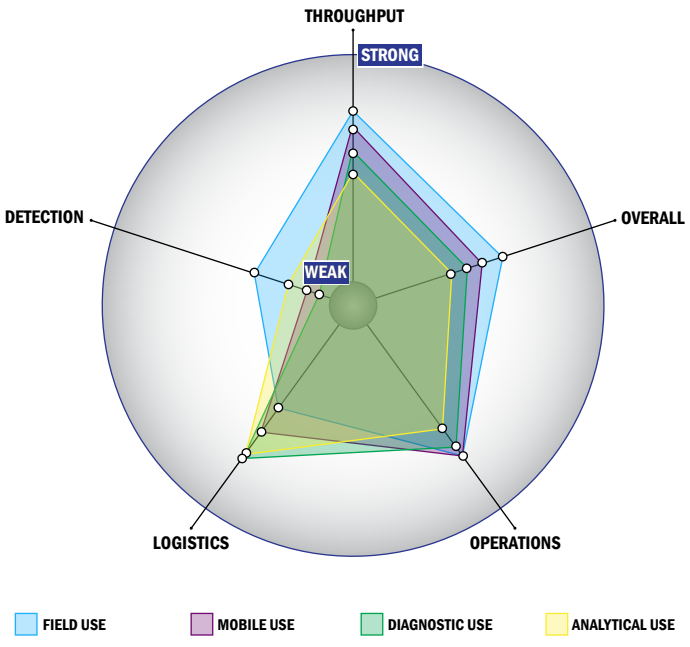


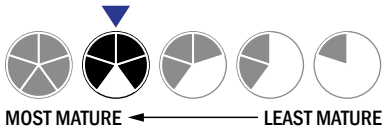
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/sample per run
- System is continuous and provides real time analysis with no defined tests/samples
- The system or approach is not amenable to full or semi-automation
- 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:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- System or device uses batteries
- Is commercially available



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- This system does not require consumable components
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system does not employ any software
- The system is single use or this question does not apply to this device

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 and this question does not apply
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Displays only total dose and dose rate
- Down to background level radiation detection (i.e., gamma 1 uR/hr)
- This system does not measure count rate
- System is used for surveying

Gasmet Technologies, Inc. - DX4000/DX4015

GENERAL DESCRIPTION:



The DX4000 and DX4015 gas analyzers utilize Fourier Transform Infrared Spectroscopy (FTIR) technology for detection of chemical compounds of interest. The DX4000 and DX4015 analyzers provide multiple component gas analysis in a wide variety of matrices.

Intended uses: First Responders, Field Testing and Analysis, Field Portable, Military Field and Lab Testing. The DX4000 and DX4015 are capable of analyzing up to 50 different compounds in a gas stream on a continuous-real time basis and provide analysis in the field or lab for a very wide range of gas matrices and applications. The analyzers are designed for use as field portable, continuous monitoring and testing instruments. DX4000 and DX4015 analyzers are used in laboratory and field settings for industry, DoD, US government and University applications.

The DX4015 provides FTIR based analysis for ambient and/or indoor conditions.

The DX4000 provides FTIR based analysis in hot and wet conditions including temperatures up to 180°C.

TECHNICAL DESCRIPTION:

Air Quality Analytical, Inc. d/b/a Gasmet-USA offers analyzers that can detect low-level chemical warfare agents, toxic industrial chemicals and toxic industrial materials. The instruments we offer for these and other applications are the DX-4015 and DX-4000 analyzers. Both utilize Fourier Transform Infrared Spectroscopy (FTIR) for detection of chemical compounds. The included Calcmet™ software library is used to locate, classify and identify CWAs and/or other agents or chemicals in multiple gas streams and environments.

The Gasmet-based equipment we offer is capable of operating in a mobile environment for sustained periods of at least 72 hours without outside technical support.

The analyzers proposed require only nitrogen or zero grade air for periodic baseline measurements. The analyzers can perform real time measurements of multiple compounds (up to 50 per measurement) with a high degree of accuracy without added expense in a fraction of the time.

CONTACT INFORMATION

Gasmet Technologies, Inc.
P.O. Box 204084
Austin, TX USA 78720-4084
POC: Mark Nelson
512-331-0073

COST

- $57,522-$59,262/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

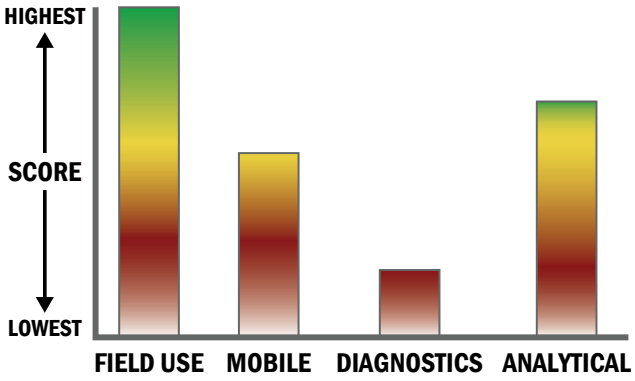
	Biological	Chemical	Radiological
FIELD USE System	N/A	Second Tier	N/A
MOBILE Laboratory	N/A	Top Tier	N/A
DIAGNOSTIC Laboratory	N/A	Top Tier	N/A
ANALYTICAL Laboratory	N/A	Top Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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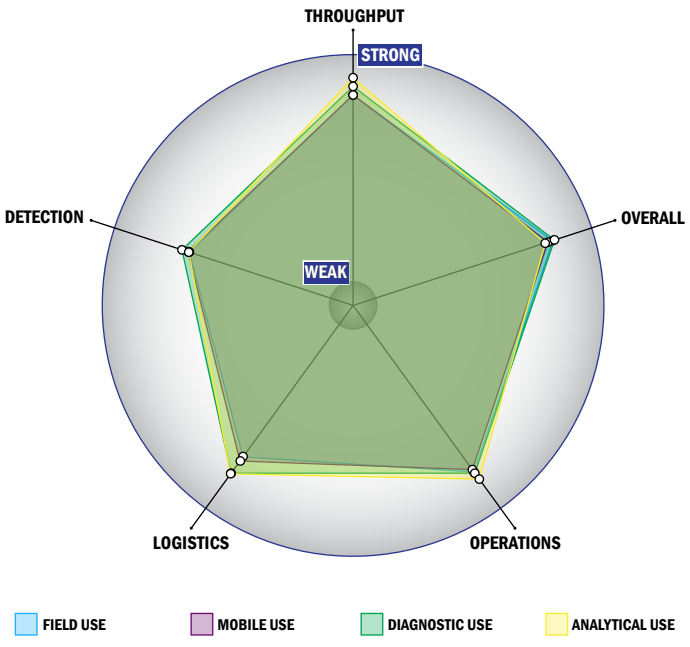


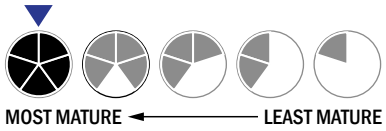
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- 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
- 1 component
- Greater than 20 minutes is required for set-up
- Automatic detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a carry-on luggage suitcase
- Between 5 and 25 kg
- Satellite, wireless and wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open and available for modification
- 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%)
- $1x10^{-4}$-$1x10^{-3}$ mg/m^3
- 1 ppm-100 ppm
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Gasmet Technologies, Inc. - Model DX4040 Portable FTIR Gas Analyzer

GENERAL DESCRIPTION:

The Model DX4040 portable FTIR gas analyzer is a field rugged instrument that can identify "unknown" gases within minutes of arriving at an incident site by searching the NIST/EPA© reference library of over 5,000 gases. Measuring 25 gases simultaneously at sub-ppm levels, the DX4040 can be pre-programmed to measure TIC's, TIM's and CWA gases with updated readings each 60 seconds or less.



TECHNICAL DESCRIPTION:

The Model DX4040 uses FTIR (Fourier Transform Infrared) measurement technology to allow the user to measure up to 25 toxic gases simultaneously.
A unique part of the Model DX4040 is Gasmet Technologies GICCOR (an acronym for 'Genzel interferometer with a cube corner retroflector') interferometer. The interferometer can be thought of as the engine of a FTIR. It is rugged and withstands the demanding environmental conditions of non-laboratory environments.

CONTACT INFORMATION

Gasmet Technologies, Inc.
1410 Taschereau Blvd., B-202
La Prairie, QC J5R 4E8 Canada
866-685.0050
sales@gasmet.com
www.gasmet.com

COST

- $65,000/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

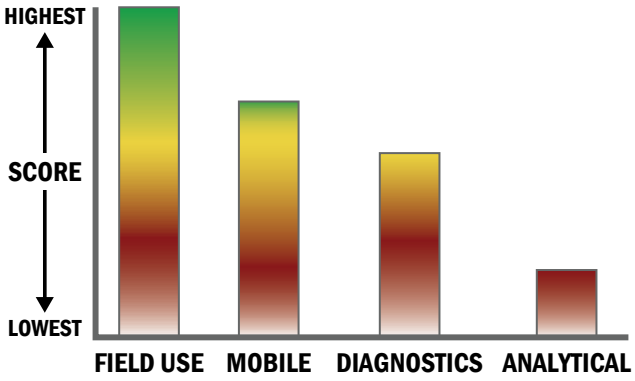
	Biological	Chemical	Radiological
FIELD USE System	N/A	Fourth Tier	N/A
MOBILE Laboratory	N/A	Bottom Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Bottom Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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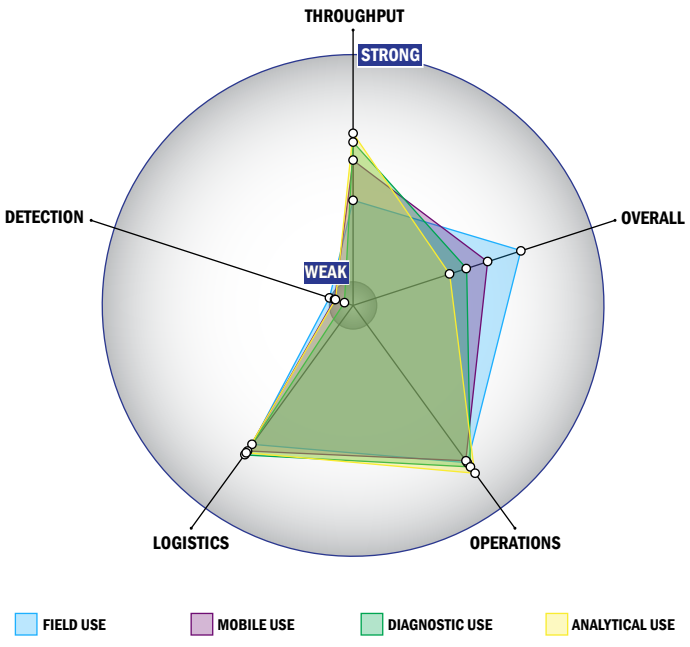


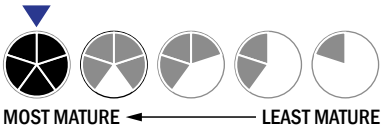
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Continuous operation with no defined runs
- 349-96 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 5-10 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- A day of training and technical skills are required
- 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
- 2-4 hours battery life



Operations:

- Performance is not influenced by relative humidity
- Greater than 10 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 open and available for modification

Detection:

- Excellent specificity. System has occasional false alarms under certain conditions (<2%)

General Dynamics Armament and Technical Products (GDATP) - JSLSCAD

GENERAL DESCRIPTION:



Air Quality Analytical, Inc. d/b/a Gasmet-USA offers analyzers that can detect low-level chemical warfare agents, toxic industrial chemicals and toxic industrial materials. The instruments we offer for these and other applications are the Gasmet™ DX-4015 and Gasmet™ DX-4000 analyzers. Both utilize Fourier Transform Infrared Spectroscopy (FTIR) for detection of the chemical compounds of interest. The included Calcmet™ software library is used to locate, classify and identify CWAs and/or other agents or chemicals in multiple gas streams and environments.

The Gasmet-based equipment we offer is capable of operating in a mobile environment for sustained periods of at least 72 hours without outside technical support for repair or operations. Consumable materials, including gases are fully identified in the technical specifications. Gasmet analyzers can also provide measurement of soil off-gassing and liquid head space vapors.

The analyzers proposed require only nitrogen or zero grade air for periodic baseline measurements. No support gases or other consumables are required. The analyzers can perform real time measurements of multiple compounds (up to 50 per measurement) with a high degree of accuracy without added expense in a fraction of the time. Mean Time Between Failure (MTBF) for the system proposed is nominal five years.

TECHNICAL DESCRIPTION:

The JSLSCAD uses a passive Fourier Transform Infrared (FTIR) technology to allow detection of Chemical Warfare Agents (CWA) and Toxic Industrial Chemicals (TIC) at standoff distances.

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	Second Tier	N/A
MOBILE Laboratory	N/A	Third Tier	N/A
DIAGNOSTIC Laboratory	N/A	Fourth Tier	N/A
ANALYTICAL Laboratory	N/A	Fourth Tier	N/A

CONTACT INFORMATION

General Dynamics Armament and Technical Products (GDATP)
4205 Westinghouse Commons Drive
Charlotte, NC 28273
POC: Boyd Despard
980-235-2348
bdespard@gdatp.com

COST

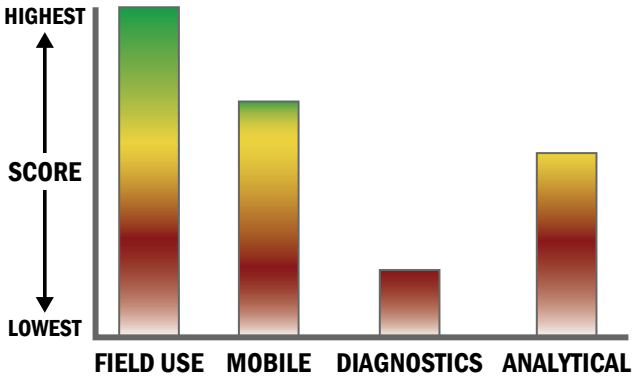
- $29,000-$330,000/system
- $0/analysis

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

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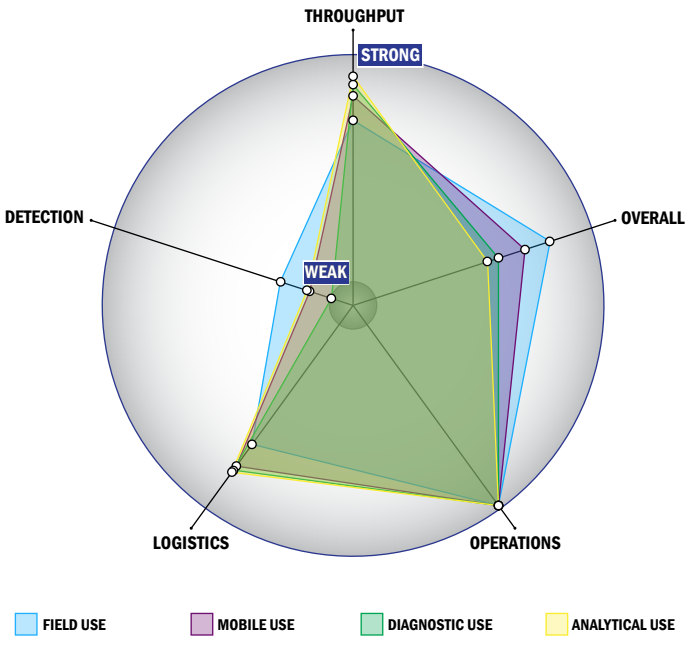


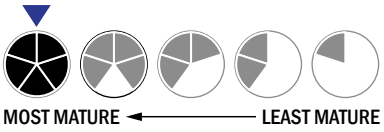
Evaluation Criteria

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 or device is currently fully automated
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 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
- Between 5 and 25 kg
- Satellite, wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- 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 closed and not available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- System currently can identify aerosolized chemical agent

GenPrime, Inc. - Prime Alert Biodetection System

GENERAL DESCRIPTION:



The Prime Alert Biodetection/ Threat Verification System is designed to allow First Responders to perform a rapid, on-site test to determine if a substance is a potential biohazard or merely a hoax. The simple and reliable technology alerts the responder to the presence of suspicious levels of any microbe in one five-minute test. A negative result is quickly followed by tests for ricin and botulinum toxins. In less than 15 minutes reliable information is obtained, allowing the First Response team to make an informed decision regarding incident closure. The Microbe Screen™ is performed using a proven fluorescent-based technology in a hand-held reader and the Toxin Screen™ is carried out using lateral flow antibody tests.

TECHNICAL DESCRIPTION:

The Prime Alert is a broad spectrum point detection device designed for screening unknown substances for the presence of microbes. It employs a fluorescent nucleic acid stain with high affinity binding to DNA/RNA. The amount of fluorescence in a sample is correlative to the CFU's, and is reported digitally on a handheld battery powered fluorometer. This value is used to make a qualitative assessment of the presence or absence of microbes in a sample.

CONTACT INFORMATION

GenPrime, Inc.
157 S. Howard, Ste. 605
Spokane, WA 99201
POC: Buck Somes
Americas

COST

- $10,500/system
- $210/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

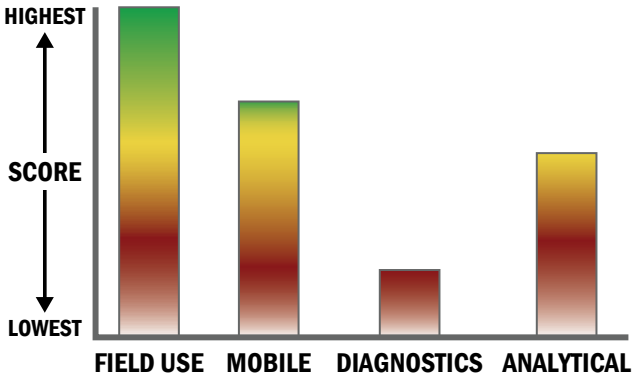
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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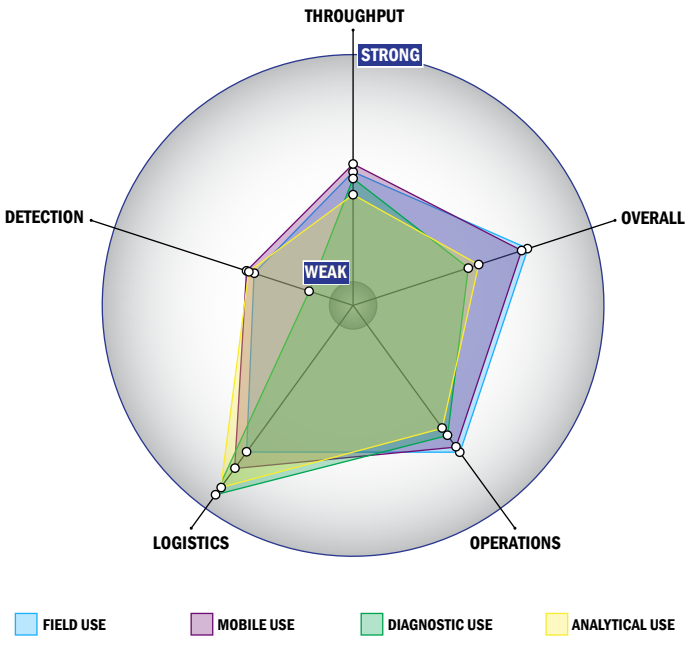


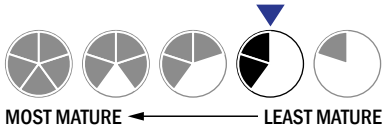
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, <10 tests/sample per run
- 95-32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 3 components
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Between 1 and 5 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Greater than 100,000 CFU per mL
- Greater than 100,000 PFU per mL
- 100-1,000 ng per mL
- Spore lysis not necessary for detection by system

Gentel Biosciences - SilverQuant Pathogen Detection System

GENERAL DESCRIPTION:

The system consists of a low cost scanning system (hardware, software and computer included) that is used to measure antibodies to pathogens (viral or bacterial) in patient (human, monkey, rodent, etc.) blood or sera. Pathogen panels for screening are available off-the-shelf or can be easily customized to meet customer needs.



TECHNICAL DESCRIPTION:

The ultra-senstive detection system (2-10 times > fluorescence is based on gold nano-particles conjugated to species specific antibodies which direct the deposition of silver particles in order to visualize the pathogen spot and identify the infectious organism.

CONTACT INFORMATION

Gentel Biosciences
5500 Nobel Drive Suite #230
Madison, WI 53711

COST

- $8,990/system
- <$16-$30/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

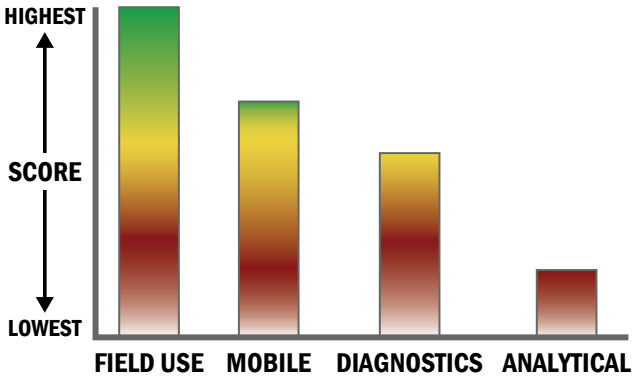
	Biological	Chemical	Radiological
FIELD USE System		N/A	N/A
MOBILE Laboratory		N/A	N/A
DIAGNOSTIC Laboratory		N/A	N/A
ANALYTICAL Laboratory		N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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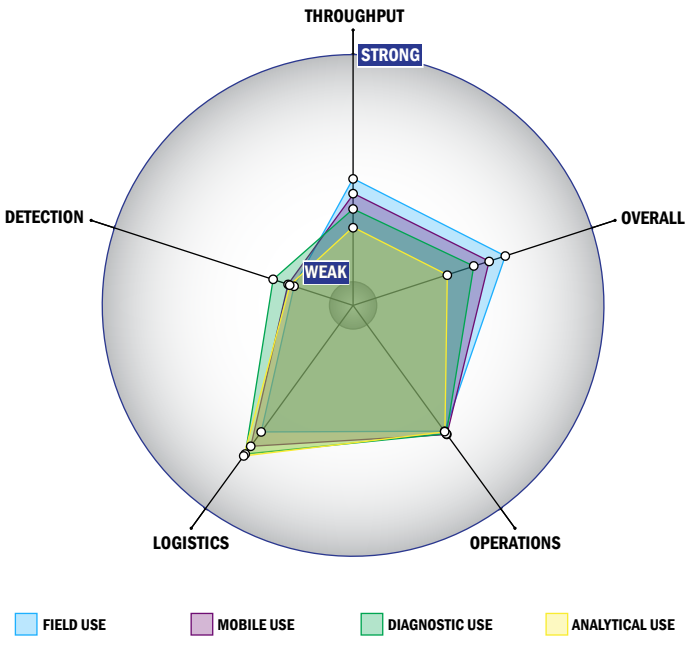


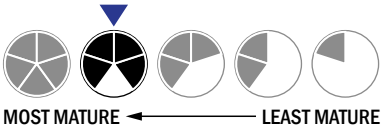
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- 1 sample, >10 tests/sample per run
- 95-32 samples every 2 hours
- The system could be adapted to a fully automated system with some effort
- Device or system is intended for multiple detection assays
- 4 solutions, buffer, eluents, and/or reagents
- 1 component
- Less than 5 minutes is required for set-up
- 9-12 steps are required for 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
- Satellite, wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at 4 °C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is open but modification requires licensing
- The system hardware is open and 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
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)

Hach Company - GuardianBlue Early Warning System

GENERAL DESCRIPTION:



The revolutionary GuardianBlue® Early Warning System is designed for water utilities to provide them with the information they need to ensure their drinking water is safe. Its patented technology lets users detect, alert and classify a wide variety of contaminants. It also will detect, alert, classify, and learn real-world events. GuardianBlue's breakthrough technology will detect and alert on unknown water quality deviations. Key water quality parameters used include pH, turbidity, conductivity, chlorine, and total organic carbon (TOC). Advanced algorithms are used to interpret the sensor data and used to classify potential contamination. The GuardianBlue was the first event detection system for drinking water to receive SAFETY Act certification.

TECHNICAL DESCRIPTION:

The GuardianBlue Early Warning System includes the GuardianBlue Water Panel, TOC analyzer, Event Monitor, and purge gas generator.

The Water Panel, comprised of Hach's leading water quality sensors, continuously monitors for chlorine, conductivity, pH, turbidity, temperature and pressure. The TOC analyzer provides increased sensitivity to organic contaminants and uses a persulfate oxidation with non-dispersive infrared detector (EPA method 415.1). The Event Monitor contains patented water security algorithms and integrates multiple sensor outputs.

Every 60 seconds, signals are processed from a 5-paramater measure into a single scalar trigger signal. A deviation of the signal from the established baseline is derived and a gain matrix is applied that weights the various parameters.

When the signal exceeds the threshold, the deviation vector is compared to agent vectors in the threat Agent Library to see if there is a match within a tolerance. This heuristic system also classifies normal operational events that are named and categorized by the system operator, and stored in the Plant Library. The Purge Gas Generator is a crucial component to maintaining the stability and continual operation of GuardianBlue's TOC Analyzer, by producing ultra-dry, CO2-free air.

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	Third Tier	Fourth Tier	N/A
MOBILE Laboratory	Bottom Tier	Bottom Tier	N/A
DIAGNOSTIC Laboratory	Bottom Tier	Bottom Tier	N/A
ANALYTICAL Laboratory	Bottom Tier	Fourth Tier	N/A

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

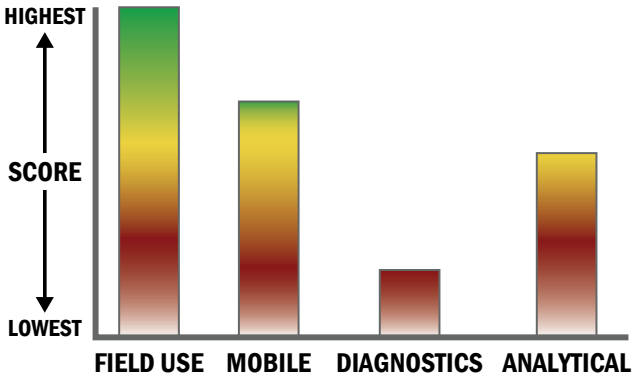
Hach Company
P.O. Box 389 5600 Lindbergh Drive
Loveland, CO 80539
POC: Katy Craig
kcraig@hach.com

COST

- $65,650/system
- $0.0384/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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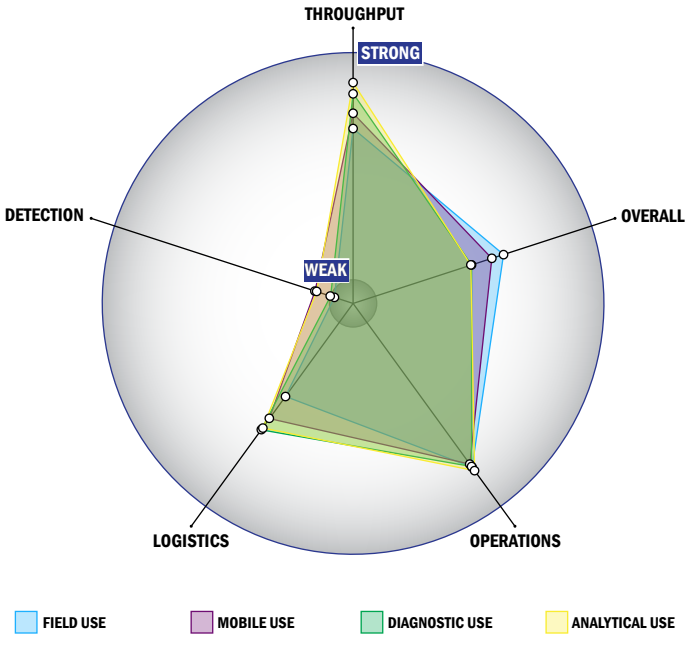


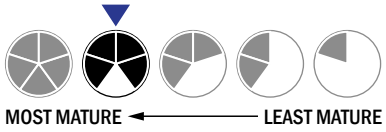
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- 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
- 4 solutions, buffer, eluents, and/or reagents
- 0 components
- Greater than 20 minutes is required for set-up
- Automatic detection

Logistics:

- A day of training and technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °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
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Greater than 250 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- Greater than 10,000 ng per mL
- 1 ppm-100 ppm
- System currently can identify liquid chemical agent

Hamilton Sundstrand Corporation - Chemical Biological Mass Spectrometer/Chemical Biological Detection System (CBMS/CBDS)

GENERAL DESCRIPTION:

The CBMS is a mass spectrometer for the detection of liquid Chemical Warfare Agents (CWAs) on the ground from a moving military reconnaissance vehicle via a ground sampling system. The CBDS version adds an air sampler and pyrolysis module to enable the detection of Biological Warfare Agents (BWAs) via an air intake. In either mode, the system operates continuously and autonomously, reporting alarms both on a display screen and electronically.



TECHNICAL DESCRIPTION:

CWA detection employs direct ion trap mass spectrometric with MS/MS capability for the analysis of the vapor molecules. BWA detection concentrates aerosols during a collection period and pyrolyzes the accumulated material, and then the composite mass spectrum is analyzed for patterns indicating the presence of target BWAs.

CONTACT INFORMATION

Hamilton Sundstrand Corporation
2771 N. Garey Ave
Pomona, CA 91767
POC: Gary R. Stewart
909-593-3581 Ext. 4499

COST

- $160,000-$24,000/system
- $0.1/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

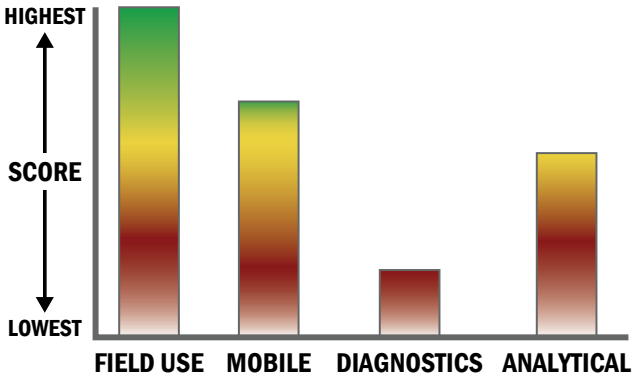
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	Bottom Tier	N/A
MOBILE Laboratory	Bottom Tier	Bottom Tier	N/A
DIAGNOSTIC Laboratory	Fourth Tier	Fourth Tier	N/A
ANALYTICAL Laboratory	Fourth Tier	Fourth Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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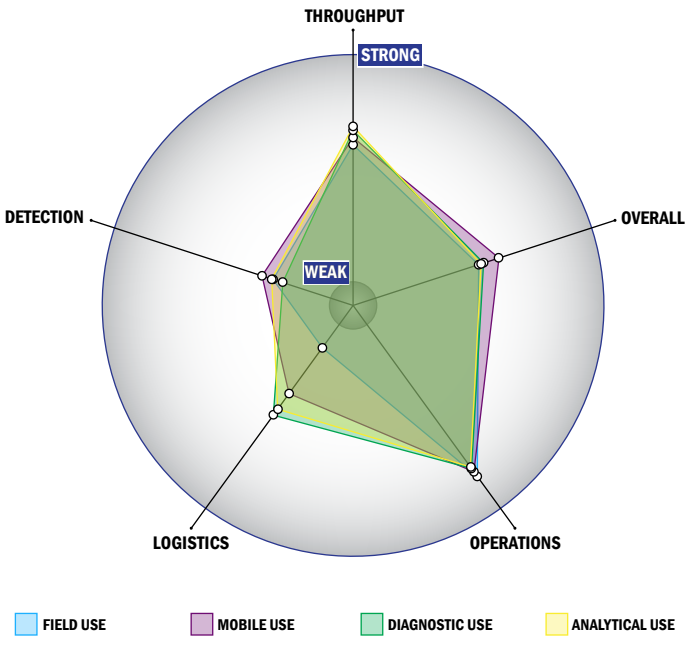


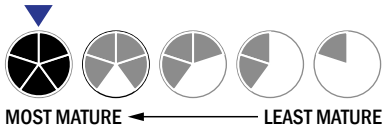
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 1 component
- Greater than 20 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device requires multiple outlets or a dedicated circuit breaker



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 10 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- Spore lysis not necessary for detection by system
- $1x10^{-3}$ mg/m^3
- System could be adapted to identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Hamilton Sundstrand Corporation - ThreatShield-C

GENERAL DESCRIPTION:



The ThreatShield-C™ is an automated chemical vapor detector designed to detect toxic industrial chemicals (TICs) and chemical warfare agents (CWAs) in fixed-site applications. Multiple ThreatShield-C™ detectors provide an integrated chemical warning system. The simple mounting characteristics, continuous operation, low maintenance requirements, and broad detection capabilities make the ThreatShield-C™ ideal for the protection of buildings, public venues and critical transportation hubs from chemical attack. High sensitivity and a low false alarm rate provide reliable Detect-to-Warn capability.

TECHNICAL DESCRIPTION:

The ThreatShield-C™ detects toxic vapors by sampling ambient air through a proprietary inlet system. This inlet system selectively transfers TICs and CWAs into an analyte gas flow that sweeps target vapors through an ionization region and into the Differential Mobility Spectrometer-Ion Mobility Spectrometer (DMS-IMS2) sensor. The DMS acts as a pre-filter for subsequent IMS analysis, greatly reducing chemical background noise and the associated false alarm responses. Two IMS drift tubes allow the simultaneous detection of both positive and negative ions, broadening the types of compounds detected and decreasing the time for alarm response.

CONTACT INFORMATION

Hamilton Sundstrand Corporation
2771 N. Garey Ave.
Pomona, CA 91767
POC: Dr. Andrew Szumlas

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

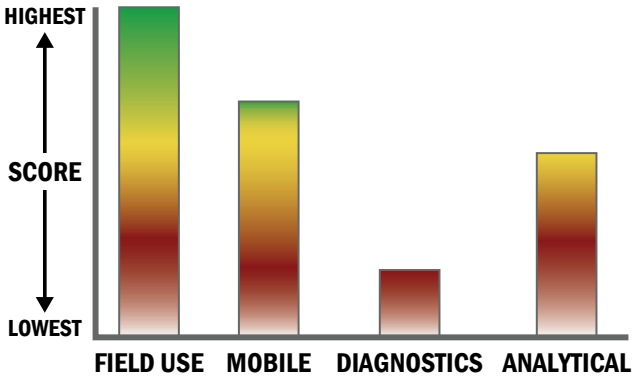
	Biological	Chemical	Radiological
FIELD USE System	N/A		N/A
MOBILE Laboratory	N/A		N/A
DIAGNOSTIC Laboratory	N/A		N/A
ANALYTICAL Laboratory	N/A		N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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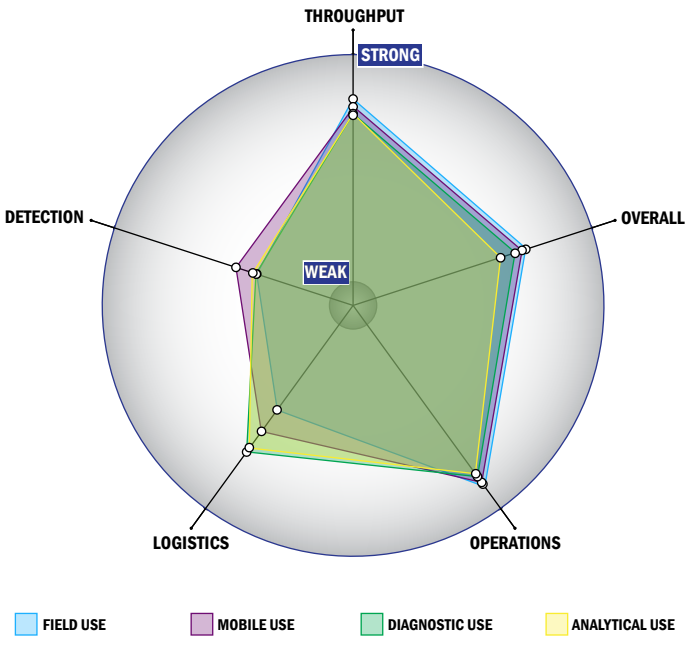


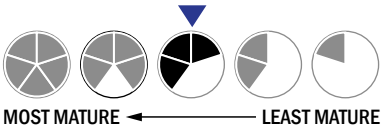
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- 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:

- An afternoon of training and some technical skills required
- Approximately the size of a carry-on luggage suitcase
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Greater than 10 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:

- This system does not test liquids
- > $1x10^{-3}$ mg/m^3
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Holomic, LLC - Rapid Diagnostic Reader

GENERAL DESCRIPTION:



The Holomic Rapid Diagnostic Reader (HRDR) is an economical handheld reader on a smartphone platform, enabling more reliable lateral flow immunoassay tests. HRDR is a portable, handheld, light-weight and universal reader that is optically and mechanically robust as well as highly accurate. Furthermore, the HRDR is integrated into wireless communication networks allowing for the real-time spatiotemporal mapping of warfare threats and other global epidemics that can be diagnosed using state-of-the-art rapid diagnostic tests (RDTs).

The HRDR is also designed for laboratory testing providing quantitative, accurate and fast readouts not subject to human error or lighting conditions. The reader is universal and can read RDTs of varying formats. The reader can be used standalone or connected to cellular or Wi-Fi networks featuring printout of results to a Bluetooth portable printer or Wi-Fi-connected printers.

TECHNICAL DESCRIPTION:

The HRDR digitally images and reads immunochromatographic rapid diagnostics tests (RDTs) for the quantitative interpretation, wireless transmission and digital storage of the test results. This universal reader employs an opto-mechanic attachment to the cell-phone devices that accommodates various RDTs and encloses a custom-designed optical reflection-mode imaging interface. This interface includes multiple narrow-band color LEDs with a lithium-ion battery as well as its recharging USB port which are located on a single PCB (printed circuit board). In order to wirelessly communicate between the cell-phone and the reader attachment, this PCB board also utilizes a photo-sensor as a switch to control the illumination LEDs by generating light pulses using the cell-phone camera flash.

The hardware attachment is complimented by the cell-phone reader application to acquire, analyze and digitally transfer the test results to the cloud. Running custom-developed image processing algorithms, this application provides a user-friendly interface to interpret various RDTs.

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

CONTACT INFORMATION

Holomic, LLC
10966 Le Conte Ave., Suite 17
Los Angeles, CA 90024-2813
POC: Ketaki Sood, Director of Product Marketing
310-443-2070
ketaki@holomic.com

COST

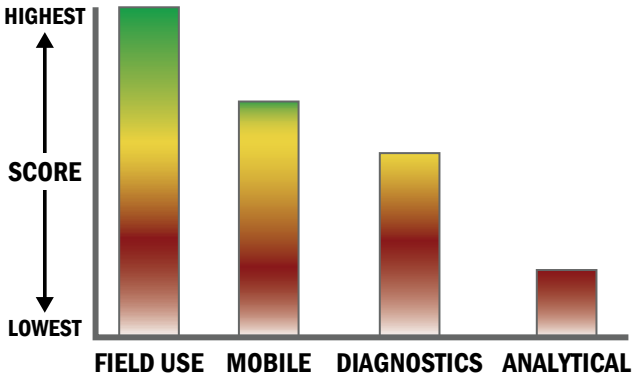
- $1,400/system
- $3.00-$30.00/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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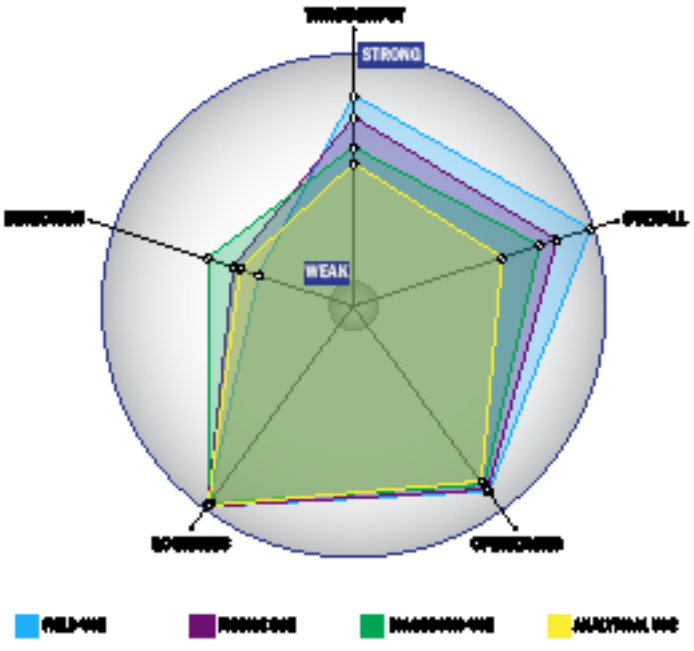


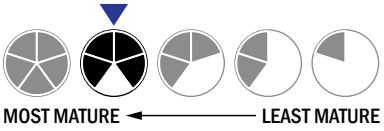
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/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:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Satellite, wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Spore lysis not necessary for detection by system

ICx Biosystems - RapidPlex

GENERAL DESCRIPTION:



RapidPlex is a fully automated system for environmental monitoring of bacteria, viruses, and toxins. This advanced system has automated sample preparation, detects with high sensitivity, and identifies with high accuracy up to 20 different pathogens at once. Detected threats include toxins, DNA viruses, RNA viruses, bacteria, and bacterial spores. The RapidPlex identifier is capable of detecting at least 10-20 threat targets in a single test and utilizes multiple (2-3) independent biomarkers per threat target to ensure high levels of detection confidence and to minimize false positives, especially from non-pathogenic near-neighbors that are often present in the environment. The analyzer's total analysis time is configurable dependent on sensitivity requirements, but in its most sensitive mode, provides sample-to-answer times of less than 30 minutes. RapidPlex was developed initially for unattended environmental monitoring, but is adaptable to other biodetection applications such as clinical diagnostics and food/water testing.

TECHNICAL DESCRIPTION:

RapidPlex employs fast multiplex PCR to amplify DNA and RNA target sequences and a rapid multiplexed antibody sandwich assay for detection of toxins and surface proteins on viruses and bacteria. DNA amplicons and protein targets are detected by capturing them with specific capture probes on tens of thousands of microbeads. Each microbead is color coded to identify which threat hypothesis is being tested. This fluorescent imaging readout of thousands of assay microbeads enables coverage of a long threat list without the loss of sensitivity associated with sample splitting. The analyzer uses multiple molecular markers per threat to reduce false positives.

CONTACT INFORMATION

ICx Biosystems
505 Coast Boulevard South, Suite 309
La Jolla, CA 92037
POC: Michael Meyer
858-551-8827, x102
michael.meyer@icxt.com

COST

- $45,000/system
- <$70/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

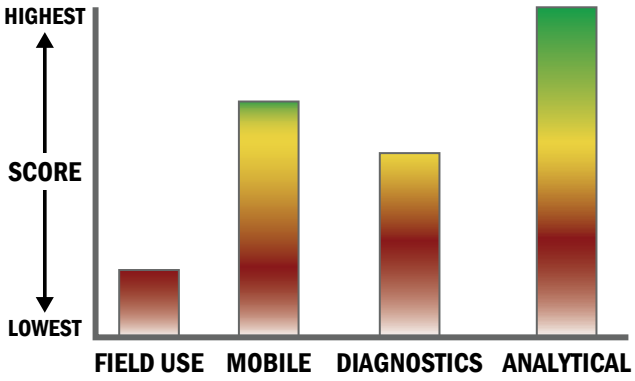
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

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

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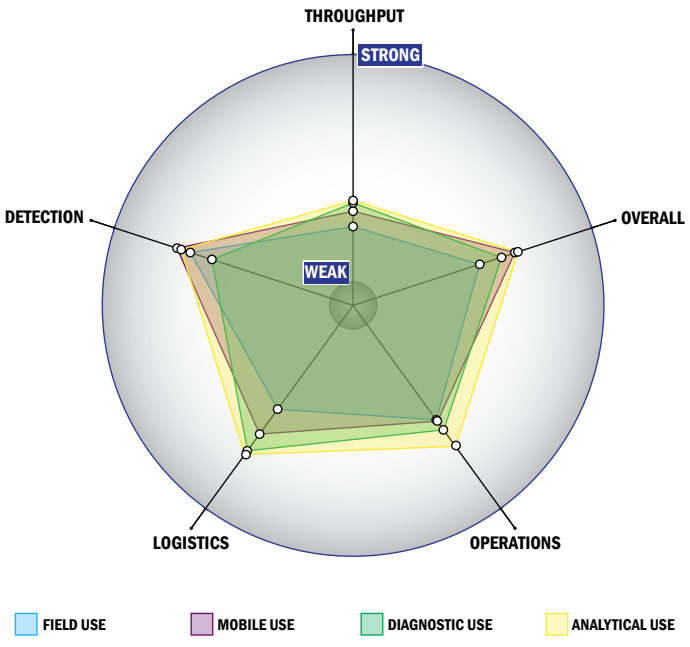


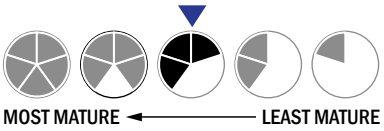
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, single test/sample per run
- 349-96 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 3 components
- 5-10 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
- Between 25 and 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Between 6 months and 1 year shelf life
- Results cannot 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:

- Less than 100 µL
- 100-1,000 CFU per mL
- 1,000-10,000 PFU per mL
- 1-10 ng per mL
- Fully automated spore lysis

Illumina, Inc. - BeadXpress Reader

GENERAL DESCRIPTION:



The BeadXpress Reader is the optimal solution for both small and high-throughput laboratories conducting molecular testing that benefit from robust, multiplexed-based assays. It employs a dual-color laser detection system that identifies the unique holographic codes embedded in VeraCode microbeads, and detects the signal intensity associated with each bead. This system supports the development of both single- and two-color assays, across genotyping, methylation, and protein-based assays. The BeadXpress System comes with VeraScan software, which provides a user-friendly graphical interface to control the BeadXpress Reader, enabling users to load assays, perform real-time scans, and view scan data for up to 96 samples per run. The software features administrator control of setting user specific accounts and rights, configuration of default file locations, and security options, including alerts via email. It also offers customization of scanning protocols, enables acquisition and viewing of intensity data, and report generation.

TECHNICAL DESCRIPTION:

VeraCode glass microbeads provide an ideal surface for numerous bioassays including genotyping, gene expression, and protein-based assays. Illumina's proprietary technology precisely embeds digital holographic elements within glass microbeads to create unique bead types. Each microbead can easily carry high-density codes (24-bit), for virtually unlimited development of bead types. When excited by a laser, each VeraCode bead emits a unique code image, allowing for quick and specific detection by Illumina's BeadXpress Reader System.

CONTACT INFORMATION

Illumina, Inc.
9885 Towne Centre Drive
San Diego, CA 92121
POC: Dawn Barry
dbarry@illumina.com

COST

- $98.500/system
- $10.50/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

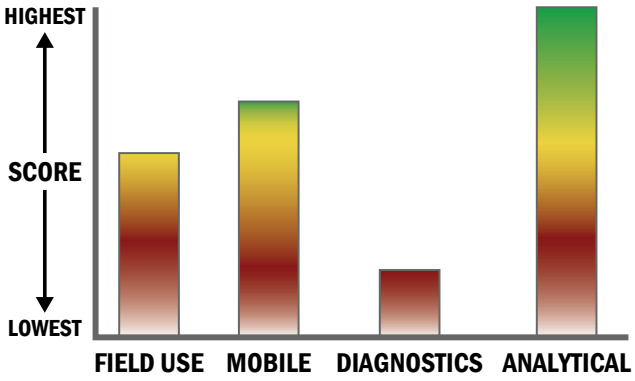
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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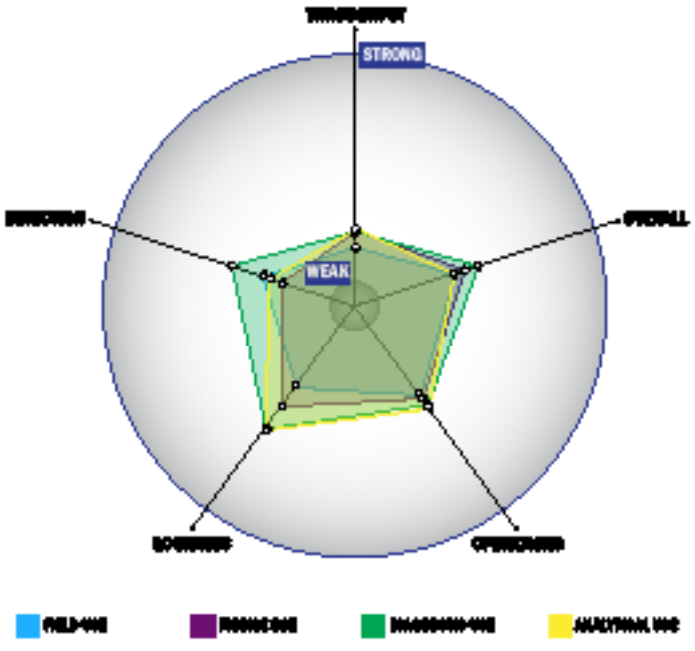


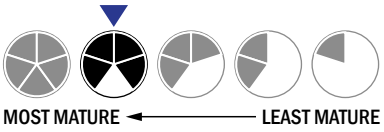
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a fully automated system with some effort
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 5 or more components
- Less than 5 minutes is required for set-up
- Greater than 12 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be stored at 4°C
- Performance is not influenced by relative humidity
- Between 1 to 6 months shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- System currently has 510k clearance
- System currently has FDA approval
- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Less than 1 ng per mL
- Manual kit not integrated with the system handles spore lysis.

Illumina, Inc. - Eco Real-Time PCR System

GENERAL DESCRIPTION:



The instrument is an integrated system designed to perform real-time PCR. The instrument utilizes a custom plate allowing the researcher to analyze up to 48 samples simultaneously. An intuitive software interface supports all chemistries and real-time PCR applications, including absolute quantification by standard curve, relative quantification with support for multiple reference gene normalization, allelic discrimination by end-point fluorescence and genotyping by High Resolution Melt (HRM) curve analysis.

TECHNICAL DESCRIPTION:

The instrument utilizes an advanced thermal design which incorporates a precisely electroformed hollow silver block that is heated and cooled by a single peltier device. The hermetically sealed hollow block contains a conductive fluid and two opposing agitators driven by electromagnetic motors. During PCR cycling these agitators rapidly circulate the fluid, transferring heat from the peltier quickly and evenly throughout the hollow block. The optical system consists of two panels of 48 fixed LEDs, four emission filters in a linear filter slide, and a high performance CCD camera which detects the fluorescence for each well at each cycle.

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	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

CONTACT INFORMATION

Illumina, Inc.
9885 Towne Centre Drive
San Diego, CA 92121
POC: Dawn Barry
1-800-809-4566
dbarry@illumina.com
www.illumina.com

COST

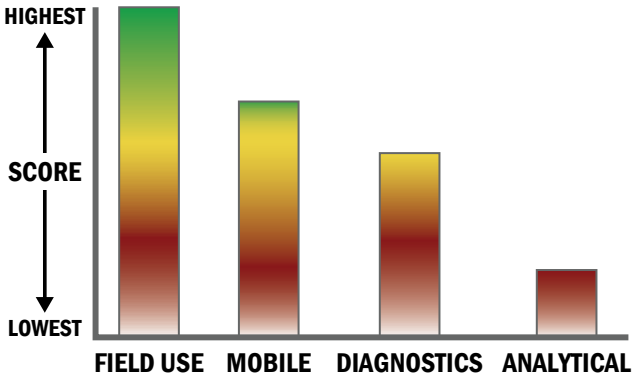
- $13,900/system
- $1.07/analysis

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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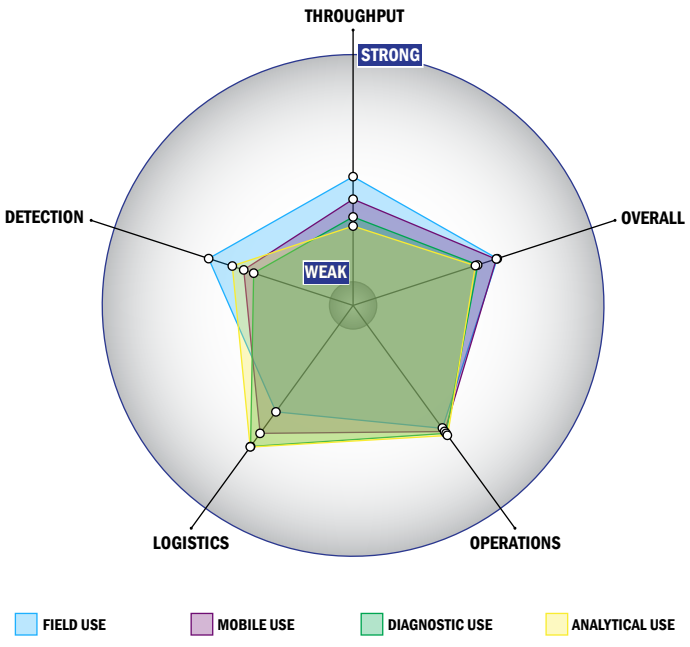


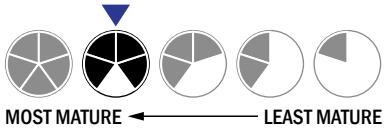
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 2 components
- 10-20 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a toaster
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be frozen (-20 °C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- Not possible for the system to achieve FDA approval
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Illumina, Inc. - Genome Analyzer IIx

GENERAL DESCRIPTION:

The Genome Analyzer IIx offers a powerful combination of 2 x 150 bp read lengths and up to 640 million paired-end reads per flow cell, enabling a broad range of high-throughput sequencing applications. Evidenced by a vast number of peer-reviewed publications in an ever-broadening range of applications, Illumina sequencing technology with the Genome Analyzer IIx is a proven platform for genomic discovery and validation.



TECHNICAL DESCRIPTION:

Illumina sequencing technology leverages clonal array formation and proprietary reversible terminator technology for rapid and accurate large-scale sequencing. The innovative and flexible sequencing system enables a broad array of applications in genomics, transcriptomics, and epigenomics.

CONTACT INFORMATION

Illumina, Inc.
9885 Towne Centre Drive
San Diego, CA 92121
POC: Dawn Barry
800-809-4566
dbarry@illumina.com
www.illumina.com

COST

- $250,000/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

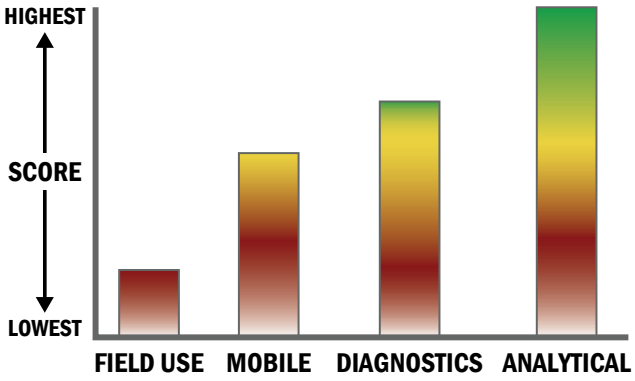
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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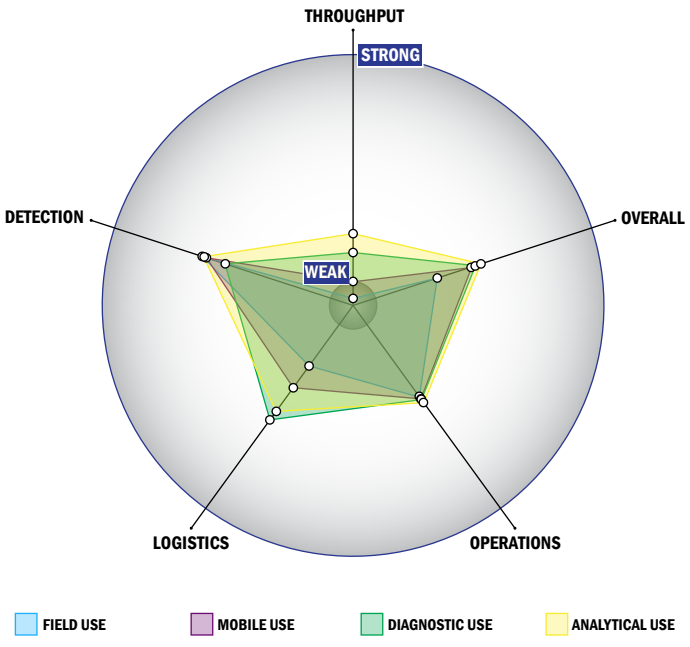


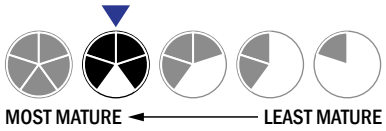
Evaluation Criteria

Throughput:

- Greater than 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 5 or more components
- Greater than 20 minutes is required for set-up
- Greater than 12 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be frozen (-20°C)
- Device or system has peak performance at normal relative humidity conditions
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Illumina, Inc. - HiScanSQ Systems

GENERAL DESCRIPTION:



The HiScanSQ system integrates the power and resolution of next-generation sequencing with the high-throughput capacity of genotyping and gene expression arrays, delivering unprecedented flexibility for experimental design. The instrument features two distinct components, the HiScan Reader and the SQ Module.

The HiScan Reader functions as a high-speed, precision imaging scanner for Illumina sequencing and microarray-based analyses. The SQ Module is reagent handling fluidics device needed to perform Illumina next-generation sequencing. Other components include the cBot Cluster Generation System, a suite of data collection and analysis software, and dedicated consumables. cBot provides automated clonal amplification of single molecules randomly distributed on a glass surface.

TECHNICAL DESCRIPTION:

The HiScan Reader is a high-speed, precision imaging scanner for Illumina sequencing and microarray-based analyses. The SQ Module is an add-on reagent handling fluidics device needed to perform Illumina next-generation sequencing on the HiScan reader. BeadArray technology is utilized in Illumina's HiScanSQ System for a broad range of DNA and RNA analysis applications. Illumina's BeadArray Technology is based on sub-micron silica beads that self-assemble in microwells on planar silica slides. Each bead is covered with hundreds of thousands of copies of a specific oligonucleotide that act as the capture sequences in one of Illumina's assays. Illumina sequencing technology leverages clonal array formation and proprietary reversible terminator technology for rapid and accurate large-scale sequencing. The innovative and flexible sequencing system enables a broad array of applications in genomics, transcriptomics, and epigenomics.

CONTACT INFORMATION

Illumina, Inc.
9885 Towne Centre Drive
San Diego, CA 92121
POC: Dawn Barry
dbarry@illumina.com
203-296-0536
www.illumina.com

COST

- $405,000/system
- $6.00-$5,000/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

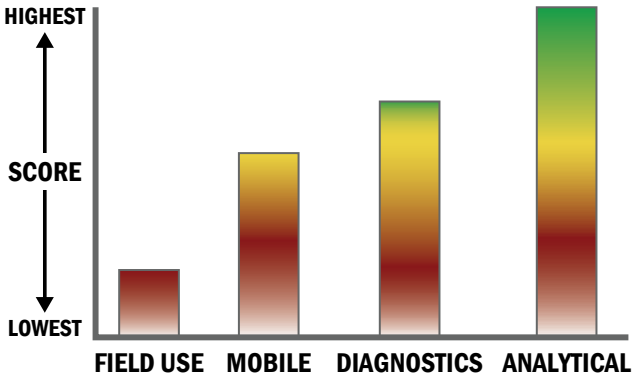
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

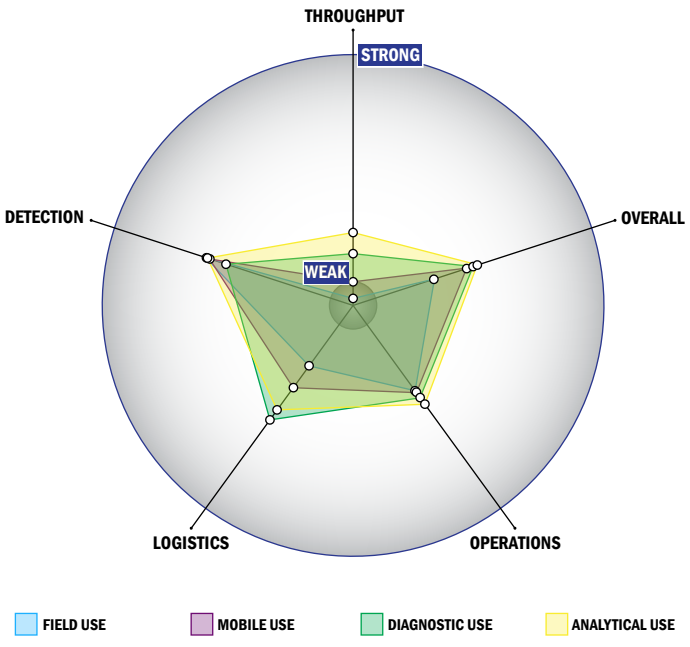
Scoring Analysis

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.



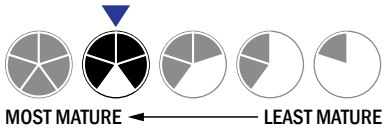
Evaluation Criteria

Throughput:

- Greater than 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 5 or more components
- Greater than 12 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be frozen (-20°C)
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 6 months shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- 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
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Illumina, Inc. - HiSeq 1000 Sequencing System

GENERAL DESCRIPTION:



The Illumina HiSeq 1000 Sequencing System is an integrated platform that uses massively parallel sequencing technology for genetic analysis and functional genomics. It consists of the HiSeq 1000 sequencer, which uses TDI line scanning and dual surface imaging to generate up to 300 gigabases (Gb) per run and up to 30 Gb per day. Other components include the cBot Cluster Generation System, a suite of data collection and analysis software, and dedicated consumables. cBot provides automated clonal amplification of single molecules randomly distributed on a glass surface. Resulting DNA clusters are sequenced on the HiSeq 2000 using sequencing by synthesis method with patented reversible terminator chemistry.

TECHNICAL DESCRIPTION:

Illumina sequencing technology leverages clonal array formation and proprietary reversible terminator technology for rapid and accurate large-scale sequencing. The innovative and flexible sequencing system enables a broad array of applications in genomics, transcriptomics, and epigenomics.

CONTACT INFORMATION

Illumina, Inc.
9885 Towne Centre Drive
San Diego, CA 92121
POC: Dawn Barry
dbarry@illumina.com

COST

- $560,000/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

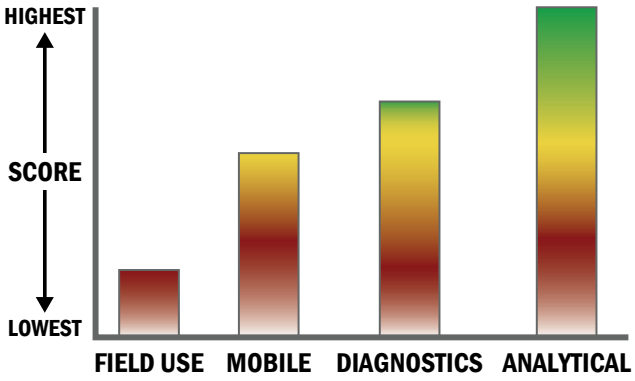
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

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

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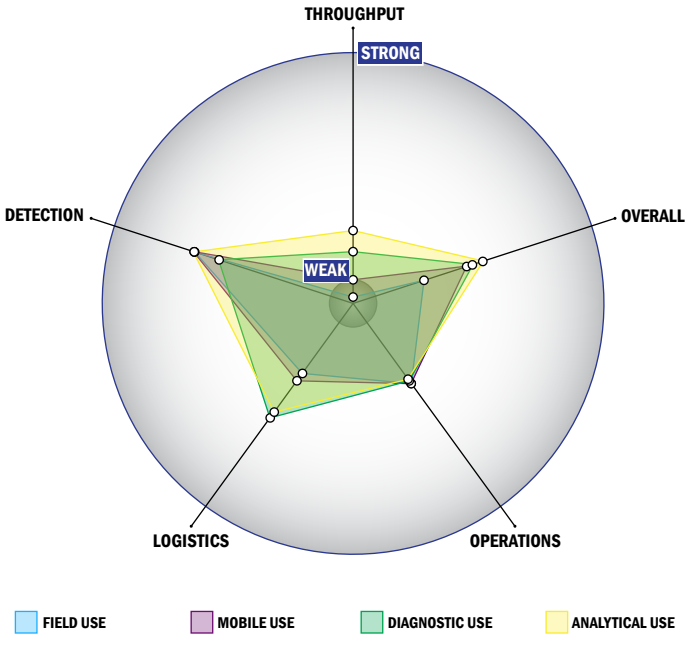


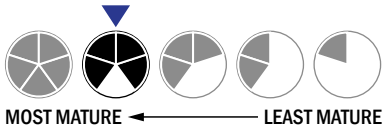
Evaluation Criteria

Throughput:

- Greater than 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 5 or more components
- Greater than 20 minutes is required for set-up
- Greater than 12 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be frozen (-20°C)
- Device or system has peak performance at normal relative humidity conditions
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Illumina, Inc. - HiSeq 2000 Sequencing System

GENERAL DESCRIPTION:



The Illumina HiSeq 2000 Sequencing System is an integrated platform that uses massively parallel sequencing technology for genetic analysis and functional genomics. It consists of the HiSeq 2000 sequencer, which uses TDI line scanning and dual surface imaging to generate up to 600 gigabases (Gb) per run and up to 60 Gb per day. Other components include the cBot Cluster Generation System, a suite of data collection and analysis software, and dedicated consumables. cBot provides automated clonal amplification of single molecules randomly distributed on a glass surface. Resulting DNA clusters are sequenced on the HiSeq 2000 using sequencing by synthesis method with patented reversible terminator chemistry.

TECHNICAL DESCRIPTION:

Illumina sequencing technology leverages clonal array formation and proprietary reversible terminator technology for rapid and accurate large-scale sequencing. The innovative and flexible sequencing system enables a broad array of applications in genomics, transcriptomics, and epigenomics.

CONTACT INFORMATION

Illumina, Inc.
9885 Towne Centre Drive
San Diego, CA 92121
POC: Dawn Barry
dbarry@illumina.com

COST

- $690,000/system
- $5,000/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

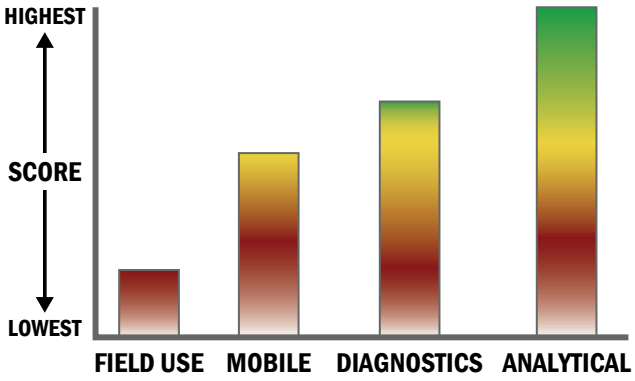
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

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

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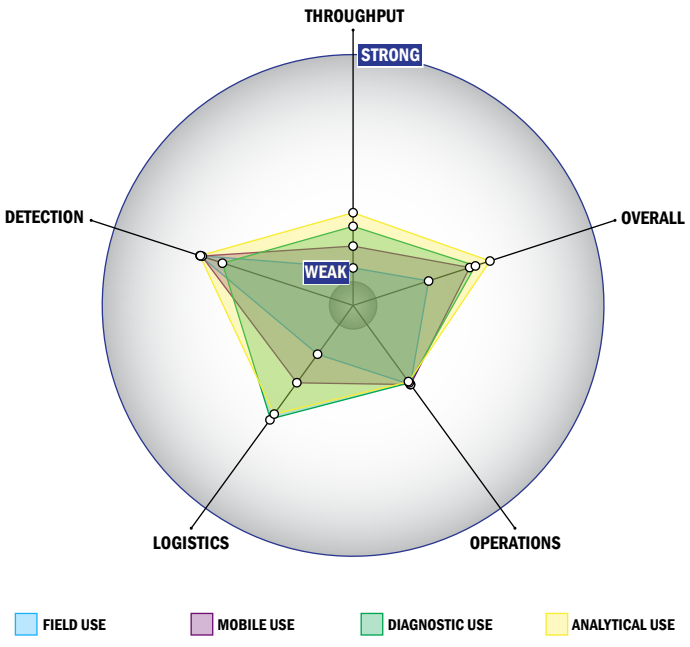


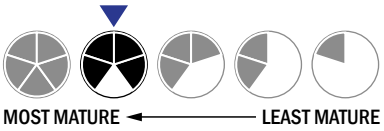
Evaluation Criteria

Throughput:

- Greater than 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 5 or more components
- Less than 5 minutes is required for set-up
- Greater than 12 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be frozen (-20°C)
- Device or system has peak performance at normal relative humidity conditions
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Illumina, Inc. - iScan System

GENERAL DESCRIPTION:



The iScan System is a cutting-edge, dedicated array scanner that supports rapid, sensitive, and accurate imaging of Illumina's array-based genetic analysis products. The system features a high signal-to-noise ratio, high sensitivity, an excellent limit of detection, and a broad dynamic range leading to exceptionally high data quality. The iScan System supports Infinium, GoldenGate, DASL, Gene Expression (Direct Hybridization), and Methylation assays along with different multi-sample BeadChip formats.

TECHNICAL DESCRIPTION:

At the System's core is the iScan Reader, which incorporates high-performance lasers, optics, and detection systems. The iScan Reader offers sub-micron resolution and unmatched throughput rates. Even the highest density BeadChips can be scanned in just minutes, allowing processing of up to 96 multi-sample BeadChips per day. These imaging features are especially beneficial for high-density genotyping, CNV analysis, DNA methylation, and gene expression profiling.

CONTACT INFORMATION

Illumina, Inc.
9885 Towne Centre Drive
San Diego, CA 92121
POC: Dawn Barry
dbarry@illumina.com 203-296-0536

COST

- $230,000/system
- $6.00-$600/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

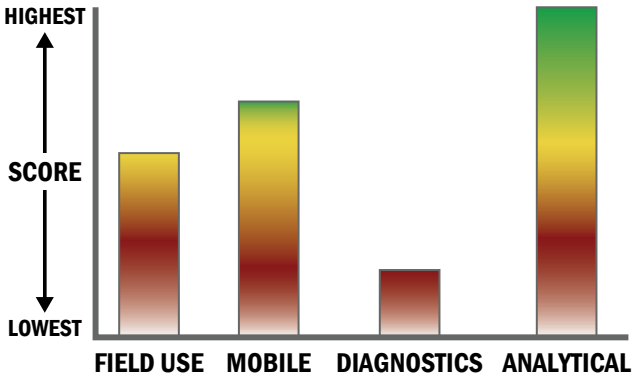
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

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

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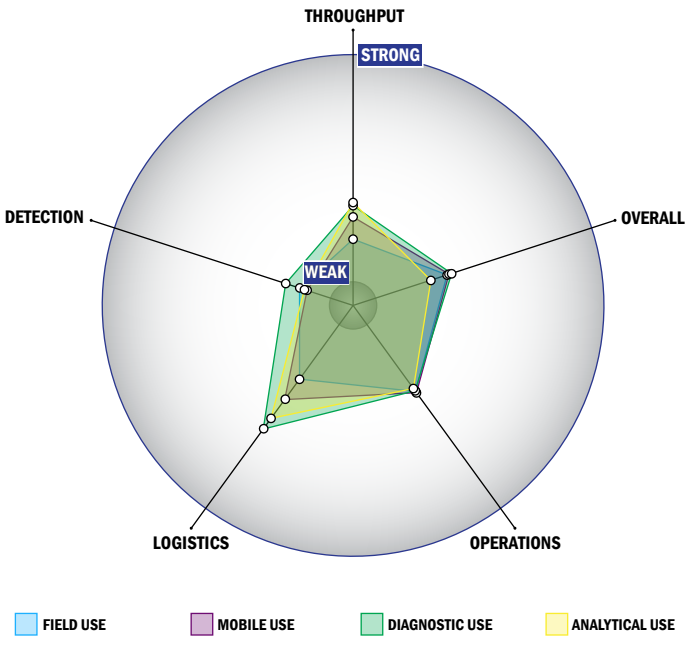


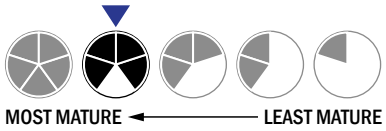
Evaluation Criteria

Throughput:

- Greater than 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 5 or more components
- Less than 5 minutes is required for set-up
- Greater than 12 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- System or device has 110V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be frozen (-20°C)
- Performance is not influenced by relative humidity
- Between 1 to 6 months shelf life
- Greater than 10 years expected life
- Results cannot 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:

- 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%)
- Manual kit not integrated with the system handles spore lysis

Illumina, Inc. - MiSeq System

GENERAL DESCRIPTION:

MiSeq is a next generation sequencer design for individual research labs. Key characteristics include rapid turnaround times, a simple workflow from sample prep to data analysis, high accuracy and output in excess of 1Gb.



TECHNICAL DESCRIPTION:

MiSeq leverages standard molecular biology techniques to yield adapter ligated products that are then loaded onto the MiSeq system. There, the fragments are clonally amplified by bridge amplification and then sequenced using a sequencing by synthesis reversible terminator chemistry. Each based is imaged, processed and reported out as a variant call all on the same instrument.

CONTACT INFORMATION

Illumina, Inc.
9885 Towne Centre Drive
San Diego, CA 92121
POC: Dawn Barry
dbarry@illumina.com
800-809-4566
www.illumina.com

COST

- $125,000/system
- $525/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	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Notes

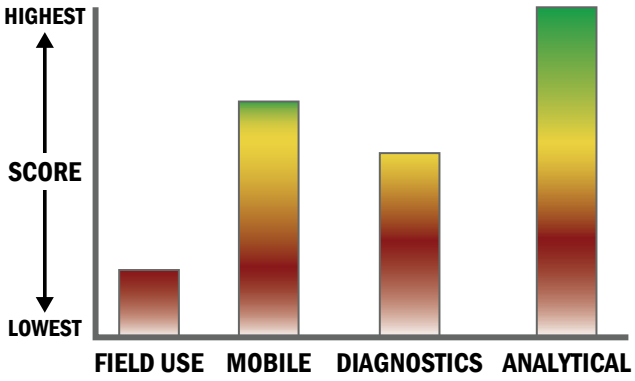
In use at DoD regional laboratories under the Global Biosurveillance Technologies Initiative (GBTI).

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

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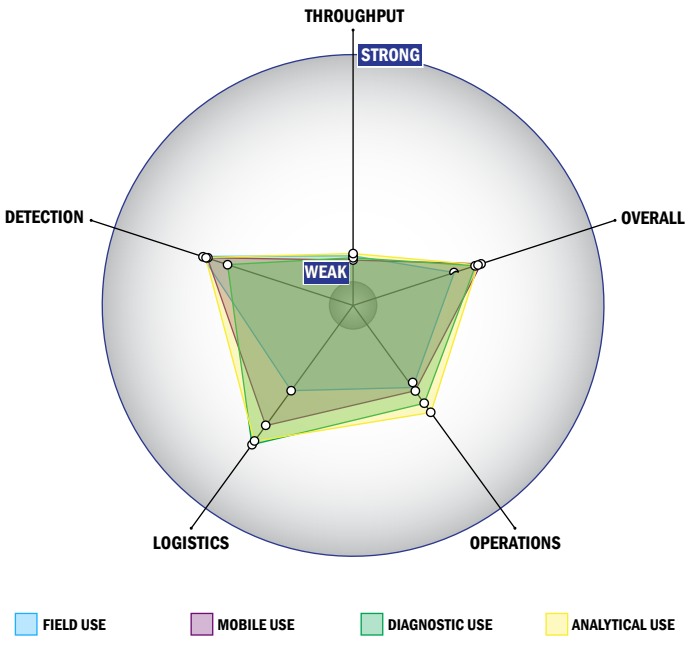


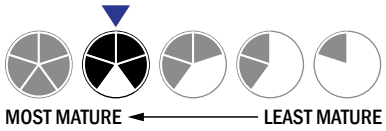
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 5 or more components
- 9-12 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a carry-on luggage suitcase
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be frozen (-20°C)
- Between 6 months and 1 year shelf life
- 3-5 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Inficon - HAPSITE ER Chemical Identification System

GENERAL DESCRIPTION:

The HAPSITE ER was designed for portable use with positive identification of VOC's, SVOC's, including TIC's, TIM's, and CWA at very low concentrations in minutes. Uses include emergency response, environmental characterization, monitoring and cleanup, industrial hygiene, vapor intrusion, and other applications requiring low concentrations identification and detection of VOC's and SVOC's.



TECHNICAL DESCRIPTION:

The HAPSITE ER uses Gas Chromatography and quadrupole Mass Spectrometer (GC/MS) technology to provide qualitative and quantitative laboratory quality results in the field in less than 10 minutes. The system is capable of testing liquid, solid, or gas phase samples using a variety of accessories: hand held Sample Probe, Headspace Sampling System, Thermal Desorption Sampling System, Solid Phase Micro Extraction, or SituProbe (for analysis of drinking water).

CONTACT INFORMATION

Inficon
POC: Rebecca Roberston DOD/DHS Account Manager
Rebecca.Robertson@inficon.com
410-459-1876
James Amyot DOD Account Manager
jim.amyot@inficon.com
410-864-8202

COST

- $123,485/system
- $2.83/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	Second Tier	N/A
MOBILE Laboratory	N/A	Top Tier	N/A
DIAGNOSTIC Laboratory	N/A	Top Tier	N/A
ANALYTICAL Laboratory	N/A	Top Tier	N/A

Notes

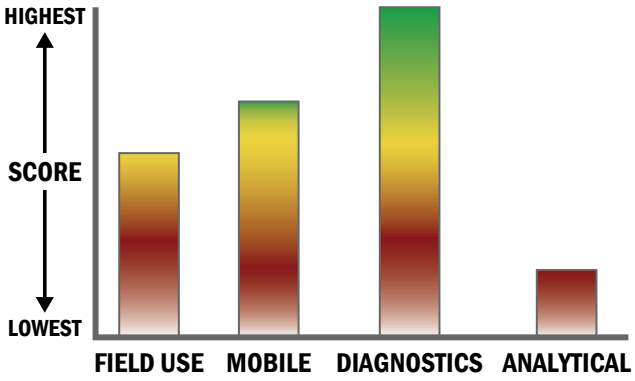
In wide use with U.S. first responders.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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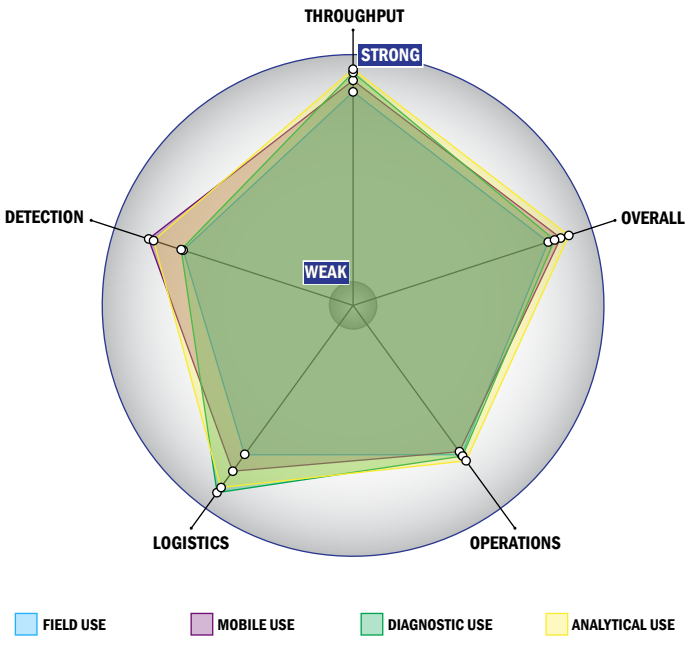


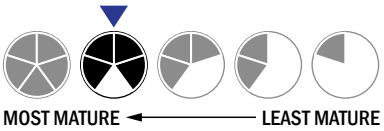
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 2 components
- 5-10 minutes is required for set-up
- Automatic detection

Logistics:

- An afternoon of training and some technical skills required
- 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
- 2-4 hours battery life



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- $1x10^{-4}$ – $1x10^{-3}$ mg/m^3
- <1 ppb
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

IntegenX, Inc. - RapidHIT 200 Rapid DNA Profiling System

GENERAL DESCRIPTION:



IntegenX™ created the RapidHIT™ 200 Human DNA Identification System. RapidHIT is the first fully automated sample-to-answer system for STR-based Human Identification (HID). The system is based on the integration of IntegenX's proprietary, patented and licensed microfluidic technologies and STR-based chemistry. Reagents are provided in single use disposable cartridges are loaded on the system with up to eight buccal swab samples and sample processing is initiated with no further user interaction. The system extracts DNA from the samples and performs STR amplification, electrophoretic separation and software analysis to generate full DNA profiles in about 90 minutes. For the U.S. market, the results data are saved in CODIS-compatible format within the embedded GeneMarker HID® software (SoftGenetics®, LLC). Other data formats will be available as needed.

TECHNICAL DESCRIPTION:

The core IntegenX technologies include the development, fabrication and programmability of low-cost, microfluidic devices. The key IntegenX technology is the Microscale On-chip Valve (MOVe™). MOVe valves are externally actuated pneumatically-driven miniaturized on-chip valves. MOVe valves can be opened or closed by applying a vacuum or pressure to an air chamber formed by a flexible membrane layer. By combining three or more valves, on-chip MOVe diaphragm micropumps can be formed to transport and process samples. These micropumps control fluidic flow, can readily manipulate volumes from 20 nL to 100 µL, and are excellent in handling paramagnetic beads. MOVe routers can be made from four or more valves to rapidly and effectively mix two nanofluidic streams in seconds, a feature that has been elusive in microfluidics. The second key IntegenX technological breakthrough has been the adaptation of paramagnetic bead technology to work with large volume, "real world" samples, and collapse the targeted contents to a scale suitable for integration with downstream microfluidic devices. A novel feature of the MOVe pumps is their ability to move and capture beads which is not straightforward in other microfluidics devices. The third key IntegenX technology is DevLink™ software. DevLink is a robust, industrial-strength, distributed instrumentation control platform with an object-oriented application architecture implemented in C# using Microsoft's .NET Framework. DevLink defines a set of communication and command protocols within a standardized automation architecture. As a result, DevLink forms the basis for both internal breadboard-system development as well as commercial product releases at IntegenX.

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

CONTACT INFORMATION

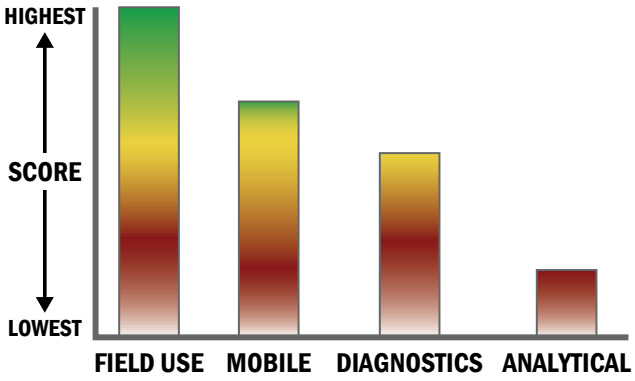
IntegenX, Inc. Worldwide Headquarters
5720 Stoneridge Drive, Suite 300
Pleasanton, CA 94588
POC: Howard D Goldstein
howardg@integenx.com

COST

- $245,000/system
- $350/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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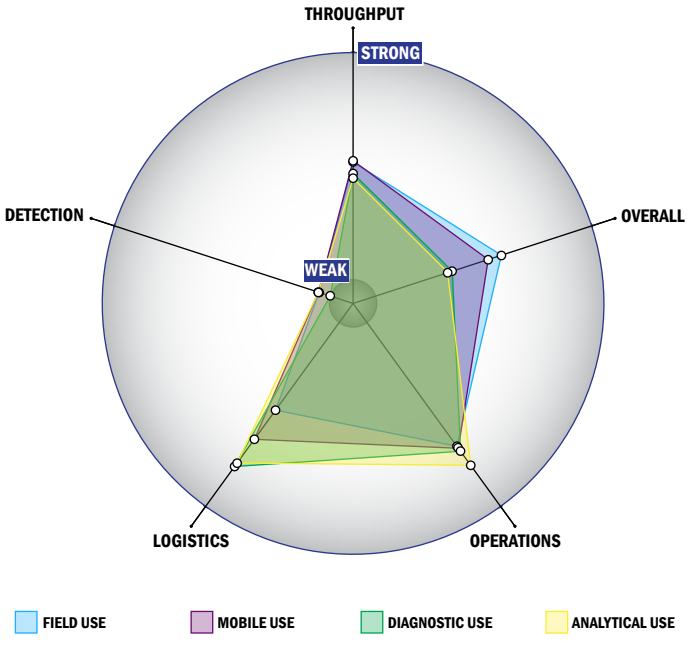


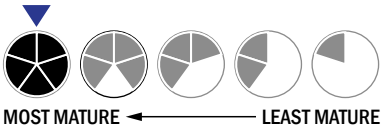
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, single tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is designed for a single use
- 5 or more solutions, buffer, eluents, and/or reagents
- 0 components
- Less than 5 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
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 1-2 hours battery life



Operations:

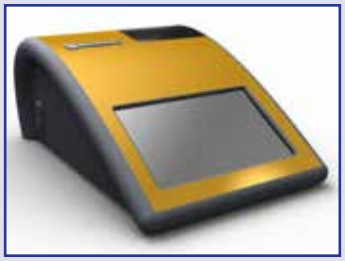
- Can be used from 4 °C to 37 °C
- Components must be stored at 4 °C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with some effort
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- 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
- Less than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)

Integrated Nano-Technologies, LLC - Palladium

GENERAL DESCRIPTION:



INT's Palladium System is an automated field deployable DNA based diagnostic and biological identification system. The unit can be used by first responders or as a point of care diagnostic system. The system utilizes a novel electronic array which allows for identification of multiple nucleic acid sequences within a sample. The current system incorporates sample preparation. It uses PCR to amplify target sequences which provides a high degree of sensitivity and specificity. The system is designed for field use. It is less than nine pounds and is battery powered. Reagents do not need refrigeration. The sample preparation process is versatile and has been used to prepare target material from biological samples, such as blood, tissue, and whole insects, or environmental samples such as air filter washes or soil. Target materials evaluated on the system include DNA and RNA targets from bacteria and viruses. The system integrates all steps from sample preparation to result into a single disposable cartridge which includes all reagents. The unit has GPS and communications capability in order to record time, and location and report results.

TECHNICAL DESCRIPTION:

INT's Palladium System utilizes a novel electronic nucleic acid sensor. Target nucleic acids bind to sensors forming a bridge between electrodes. The presence of a target is determined electrically. This approach allows for a multiplexed array of sensors, for simultaneous testing for a number of targets. The system also incorporates a sample preparation process which uses nano- magnetic particles to separate and concentrate target molecules. The sample preparation process works with a wide variety of sample matrixes and with high yields using nucleic acid concentrations from femto-moles to milli-moles. Finally, the system uses a unique revolver disposable cartridge which is low cost and easy to manufacture. The revolver design allows for valving of multiple reagents with only one valve. The design of the cartridge provides flexibility to modify processing steps without the need to rework the cartridge.

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

CONTACT INFORMATION

Integrated Nano-Technologies, LLC
999 Lehigh Station Road
Henrietta, New York 14467
POC: Michael Connolly
585-350-6991
mconnolly@integratednano.com

COST

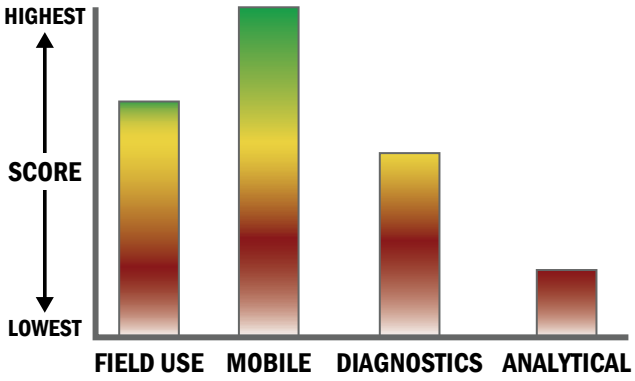
- $10,000-$35,000/system
- $15/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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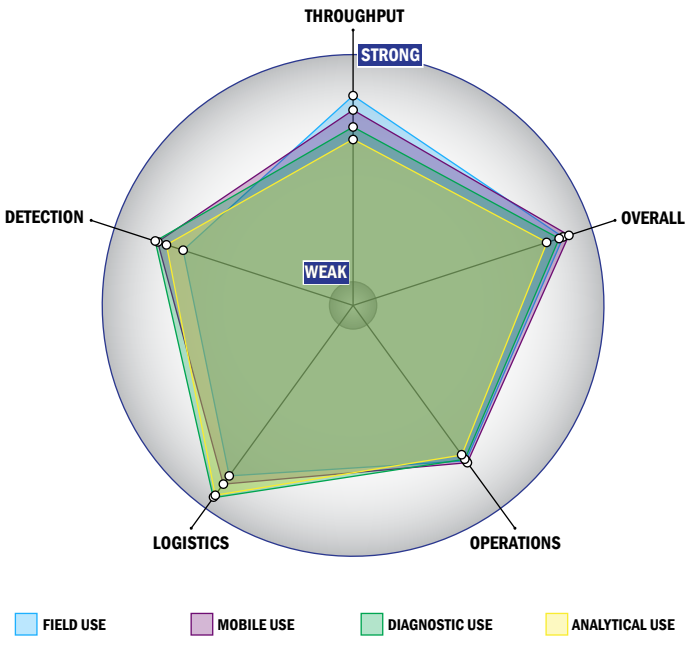


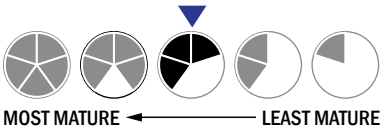
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 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
- 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 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 room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system could be adapted to a fully autonomous system with some effort
- The system software is open and 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 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Fully automated spore lysis

Ion Torrent Systems, Inc. - Personal Genome Machine

GENERAL DESCRIPTION:



The Ion Personal Genome Machine (PGM™) sequencer can do runs in about 2 hours, offers semiconductor scalability and is one tenth the price of other sequencers to buy and to run. A touch screen guides the user through every step of the run, making it simple to use. The PGM weighs less than 50 pounds and has a foot print that's no bigger than a desktop printer, so it can fit in any lab. The Ion Torrent Personal Genome Machine (PGM™) is simpler, more cost effective, and more scalable than any other sequencing technology. The PGM™ sequencer is a bench top system utilizing ground breaking and disruptive semiconductor technology that enables rapid and scalable sequencing experiments. Ion Torrent technology uses a massively parallel array of proprietary semiconductor sensors to perform direct real time measurement of the hydrogen ions produced during DNA replication. A high-density array of wells on the ion semiconductor chips provide millions of individual reactors while integrated fluidics allows reagents to flow over the sensor array. This unique combination of fluidics, micromachining, and semiconductor technology enable the direct translation of genetic information (DNA) to digital information (DNA sequence) rapidly generating large quantities of high quality data. The Personal Genome Machine along with Ion Torrent semiconductor chips, Ion Torrent reagent kits, and the Torrent Server /Torrent Suite software allow Ion Torrent to deliver a cutting edge sequencing solution.

TECHNICAL DESCRIPTION:

Ion Torrent combines semiconductor sequencing technology with natural biochemistry. Ion Torrent produces proprietary semiconductor chips in standard CMOS factories. Ion leverages the $1 trillion investment that has been made in the semiconductor industry. Ion Torrent uniquely and directly benefits from four decades of exponential improvement in semiconductor technology, expressed as Moore's Law. Ion Torrent uses the simplest sequencing chemistry including natural nucleotides, no enzymatic cascade, no fluorescence, no chemiluminescence, no optics, no light, The Chip is the Machine. The Ion Chip directly detects, real-time, the natural release of the hydrogen ion as a nucleotide is incorporated into a DNA strand.

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	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

CONTACT INFORMATION

Ion Torrent Systems, Inc.
A Division of Life Technologies
7000 Shoreline Court, Suite 201
South San Francisco, CA 94080

COST

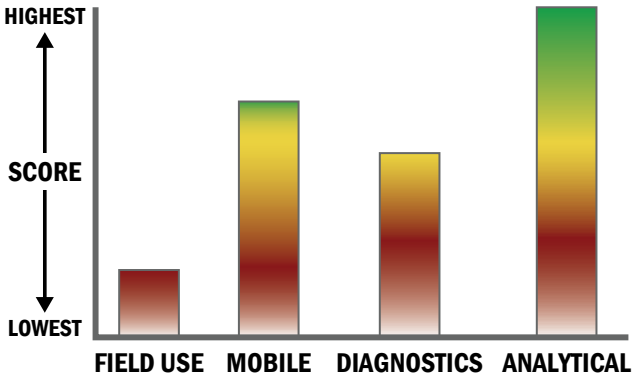
- $66,000/system
- $500/analysis

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

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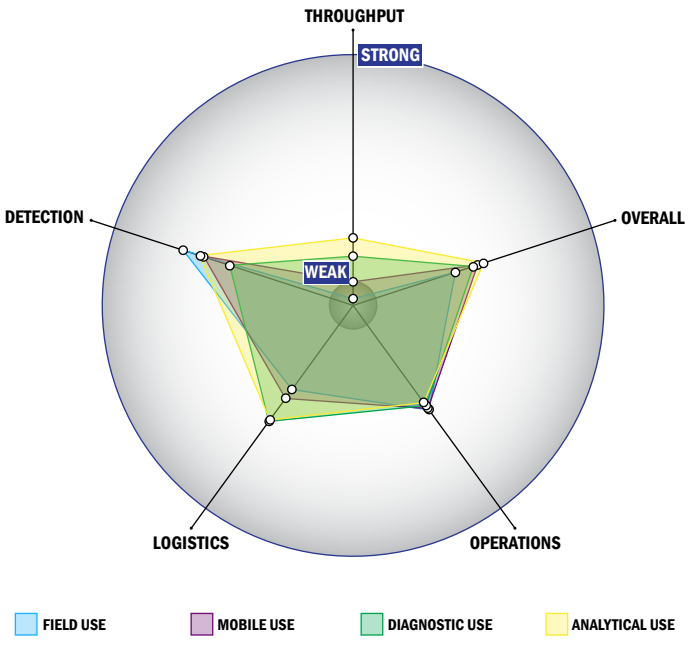


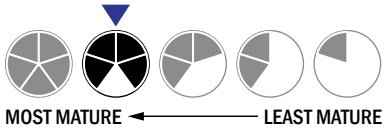
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 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
- 5 or more solutions, buffer, eluents, and/or reagents
- 5 or more components
- Greater than 20 minutes is required for set-up
- Greater than 12 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a home dishwasher
- Between 25 and 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at 4 °C
- Device or system has peak performance at normal relative humidity conditions
- Between 6 months and 1 year shelf life
- 3-5 years expected life
- Results cannot be viewed in real-time
- The system could be adapted to a fully autonomous system with some effort
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Manual kit not integrated with the system handles spore lysis

ITT Corporation - LISA Manportable Standoff Chemical Detection System

GENERAL DESCRIPTION:



The LISA® Manportable system has been developed as part of the DHS S&T Low Vapor Pressure Chemical Detection Systems (LVPCDS) program. The system provides a capability to perform real-time sensitive site assessment (e.g., inspect buildings, roadside formations, equipment, vehicles, aircraft, and other manmade or natural surfaces) for the presence of low vapor pressure chemicals, other persistent chemical agents, and TICs, with the expanded capability to include explosives, homemade explosives and their precursors.

TECHNICAL DESCRIPTION:

Not provided.

CONTACT INFORMATION

ITT Corporation
5901 Indian School Rd
Albuquerque, NM 87110
POC: Howard LaValley
505-889-7002

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

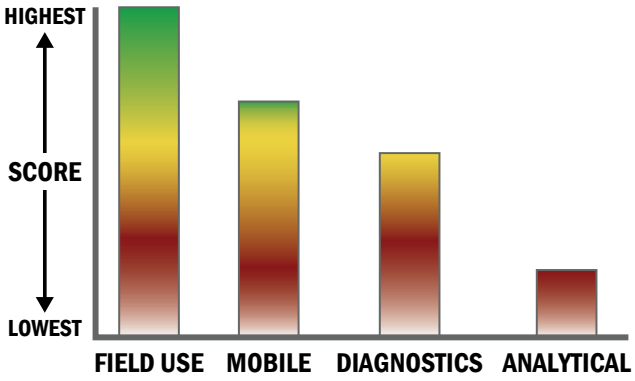
	Biological	Chemical	Radiological
FIELD USE System	N/A	●	N/A
MOBILE Laboratory	N/A	●	N/A
DIAGNOSTIC Laboratory	N/A	●	N/A
ANALYTICAL Laboratory	N/A	●	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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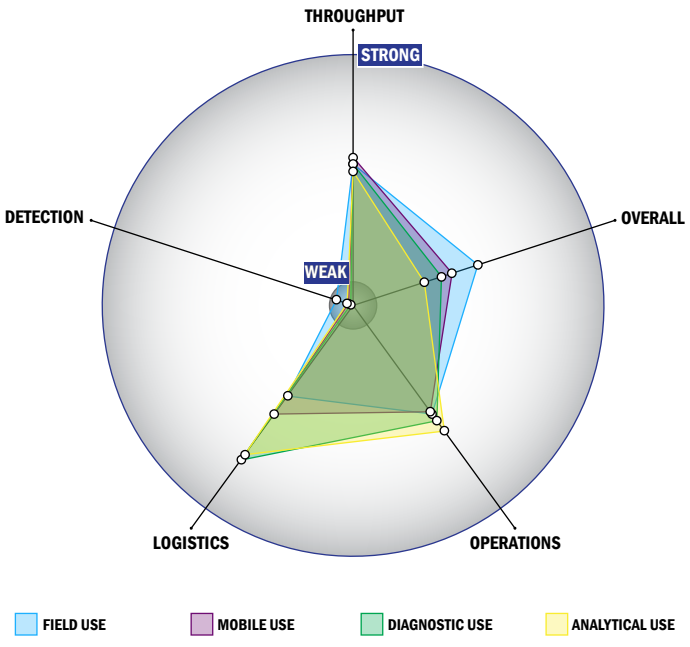


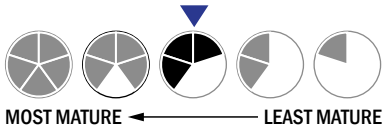
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- 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:

- An afternoon of training and some technical skills required
- Approximately the size of a home dishwasher
- More than 50 kg
- System or device has 110V electrical requirement
- 2-4 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system

Detection:

- Not possible for the system to achieve clearance
- Not possible for the system to achieve approval
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)

ITT Corporation - Raman Shifted Eyesafe Aerosol Lidar (REAL)

GENERAL DESCRIPTION:

REAL is an eyesafe lidar system capable of detecting and tracking bio- and nonbio-aerosols and clouds at distances of several km with resolution of a few meters. It does not distinguish bio- from nonbio- aerosols. It is currently deployed as part of Pentagon Shield.



TECHNICAL DESCRIPTION:

REAL is an elastic backscatter lidar operating at an eyesafe wavelength of 1.54 microns.

CONTACT INFORMATION

ITT Corporation
5901 Indian School Rd NE
Albuquerque, NM 87110
POC: Patrick Ponsardin
505-889-7000
patrick.ponsardin@itt.com

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

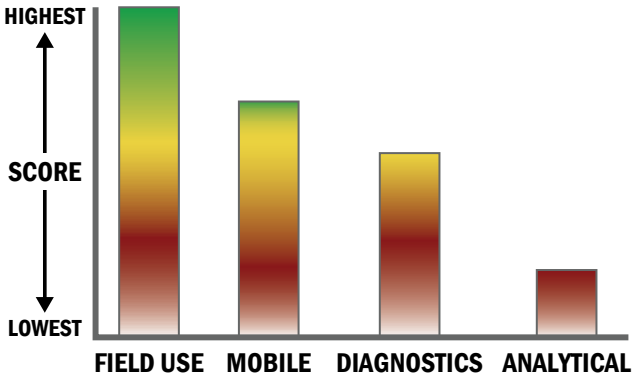
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	Bottom Tier	N/A
MOBILE Laboratory	Bottom Tier	Bottom Tier	N/A
DIAGNOSTIC Laboratory	Bottom Tier	Bottom Tier	N/A
ANALYTICAL Laboratory	Bottom Tier	Bottom Tier	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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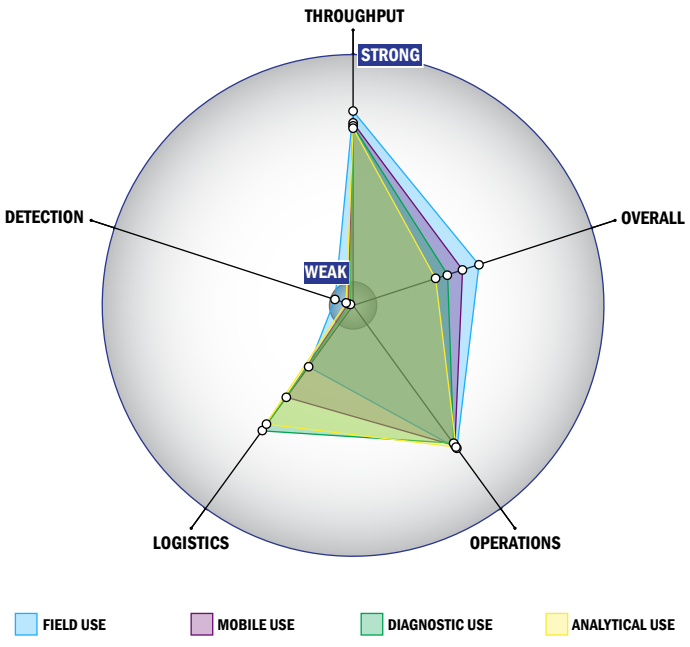


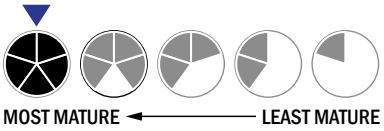
Evaluation Criteria

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
- Greater than 20 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Device or system has peak performance at normal relative humidity conditions
- Greater than 3 years 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:

- This system does not test liquids

ITT Corporation - UGV-Based Mountable and Dismountable Standoff Chemical Sensor

GENERAL DESCRIPTION:

This is an ITT LISA Manportable sensor mounted on a Qinetiq Talon robot. It provides rapid scanning and short range standoff (0.5 m to 3 m) detection and identification of chemicals, agents, advanced threats and explosive materials. The user remotely controls the robot, views the interrogated spot and is provided detection and ID results in real time.



TECHNICAL DESCRIPTION:

The sensor is based upon 10 years of UV Raman standoff spectroscopic sensor development by ITT. It is a robot compatible version of the ITT LISA Manportable sensor.

CONTACT INFORMATION

ITT Corporation
5901 Indian School Rd NE
Albuquerque, NM 87110
POC: Ted Lobb
505-889-7038
ted.lobb@itt.com

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

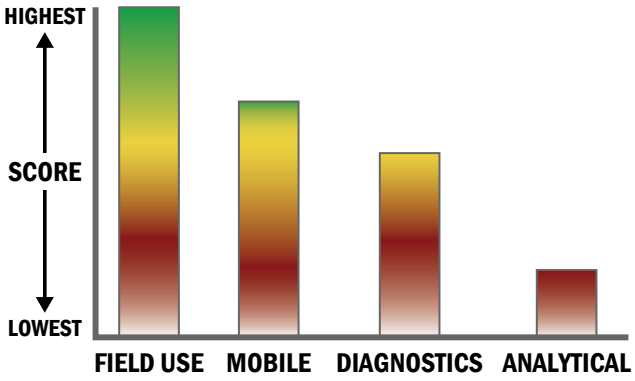
	Biological	Chemical	Radiological
FIELD USE System	N/A	Fourth Tier	N/A
MOBILE Laboratory	N/A	Fourth Tier	N/A
DIAGNOSTIC Laboratory	N/A	Fourth Tier	N/A
ANALYTICAL Laboratory	N/A	Fourth Tier	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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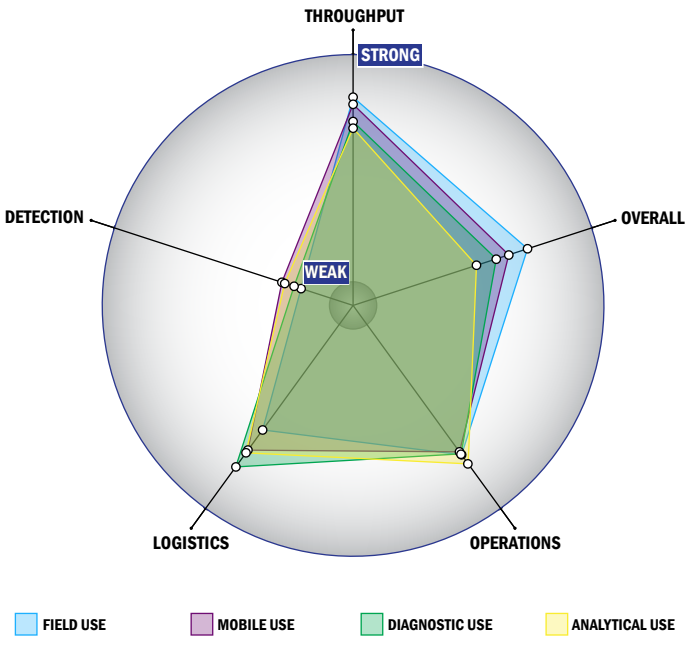


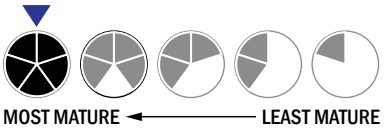
Evaluation Criteria

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
- 5-10 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4 °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
- 5-10 years expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

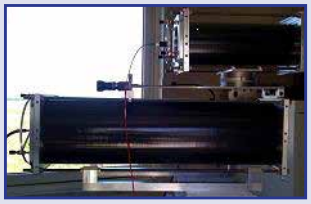
Detection:

- Less than 10 µL
- >1 ppt
- System currently can identify liquid chemical agent

ITT Information Systems - Scanning Aerosol Micropulse LIDAR - Eyesafe (SAMPLE)

GENERAL DESCRIPTION:

The Scanning Aerosol Micropulse LIDAR -Eyesafe (SAMPLE) is an eyesafe 1.5 micron aerosol backscatter lidar, capable of detecting monitoring and warning of CB aerosols up to a standoff range of 10km. It provides 3D maps of atmospheric particulates using cloud detection and aggregation algorithms.



TECHNICAL DESCRIPTION:

SAMPLE is highly robust due to its all fiber coupled design and leveraging of telecom fiber technologies. It uses digital detection via photon counting mode for exceedingly high sensitivity. It has very low SWaP.

CONTACT INFORMATION

ITT Information Systems
127 Berry St Suite 400
Ft. Wayne, IN
POC: Jeff Pruitt
260-451-1374
jeff.pruitt@itt.com

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

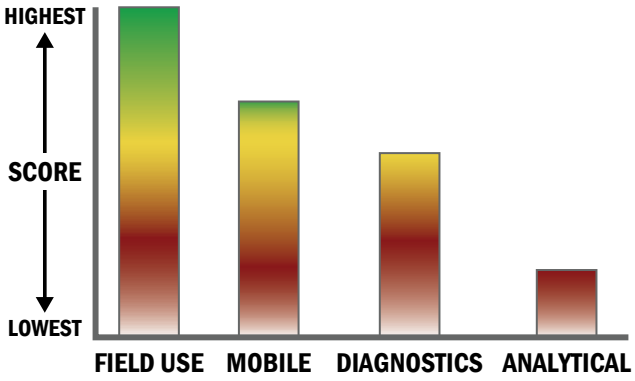
	Biological	Chemical	Radiological
FIELD USE System	N/A	Bottom Tier	N/A
MOBILE Laboratory	N/A	Bottom Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Bottom Tier	N/A

Survey Source

Vendor and Internet Supplied Information

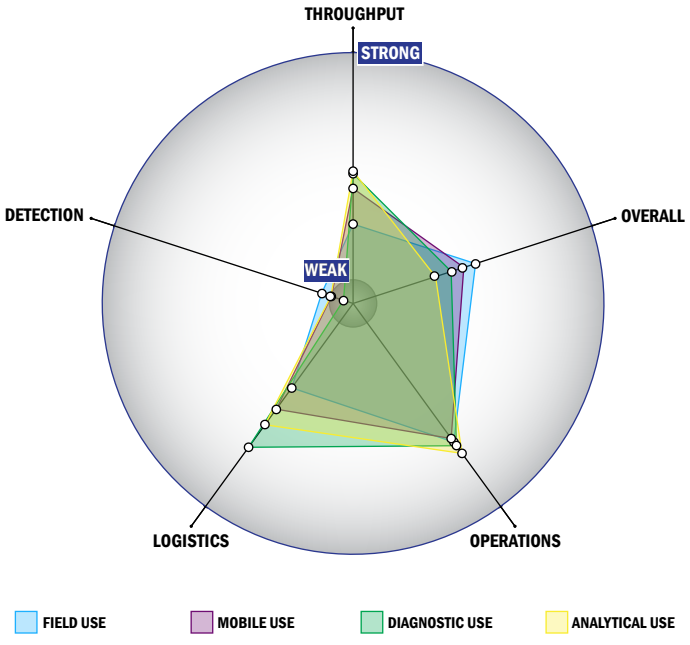
Scoring Analysis

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.



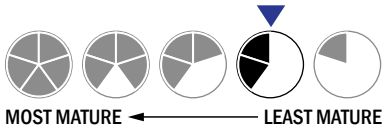
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system could be adapted to a fully automated system with some effort
- Device or system is intended for multiple detection assays
- Greater than 20 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be stored at room temperature (27°C)
- Device or system has peak performance at normal relative humidity conditions
- Greater than 3 years shelf life
- 5-10 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 open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- This system does not test liquids
- System currently can identify aerosolized chemical agent

Izon Science USA - qNano

GENERAL DESCRIPTION:

Particle analyzer capable of characterizing pathogens such as bacteria and virus particles

TECHNICAL DESCRIPTION:

System uses adjustable nanopore to characterize single particles as they flow along an electric and pressure gradient.



CONTACT INFORMATION

Izon Science USA
4841 International Blvd. Suite 105
Frederick, MD 21703

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

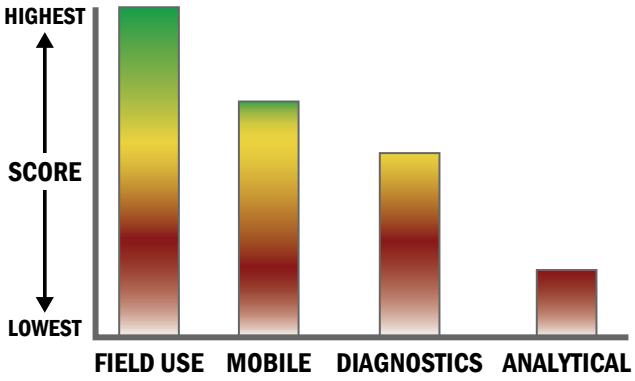
	Biological	Chemical	Radiological
FIELD USE System	Third Tier	N/A	N/A
MOBILE Laboratory	Fourth Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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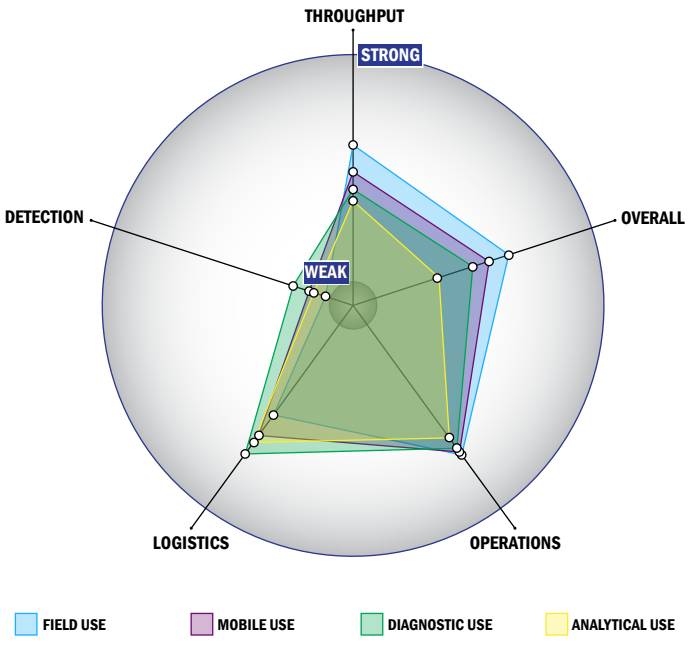


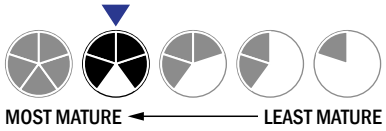
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, single tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a fully automated system with some effort
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- 5-10 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a toaster
- Between 5 and 25 kg
- This system is not capable of transmitting data
- System or device has 110V electrical requirement



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at 4°C
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- Less than 50 µL

JMAR Technologies, Inc. - BioSentryPlus

GENERAL DESCRIPTION:

Product provides continuous monitoring of water for Biological and Chemical contamination events. Online, real time monitor for bacteria, spores, or cysts along with chemical sensors to provide a minute by minute measurement of the safety of water. The system can be operated autonomously and reports automatically when it detects an "out of normal" condition. No analysis consumables required.



TECHNICAL DESCRIPTION:

The biological sensor uses MIE light scattering detection and the chemical sensors include temperature, pH, conductivity, and Oxidation Reduction Potential (ORP). Additionally the system calculates a free chlorine reading.

CONTACT INFORMATION

JMAR Technologies, Inc.
10905 Technology Place
San Diego, CA 92127
POC: Liz Wessing
858-312-7769 ext 6837
lwessing@jmar.com

COST

- $24,900-$29,990/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier
Fourth Tier Bottom Tier

RANKINGS

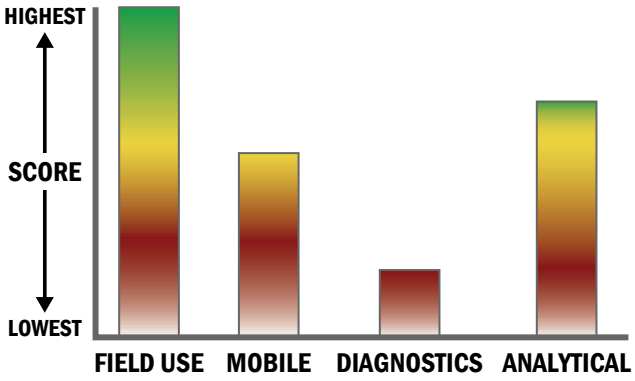
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Fourth Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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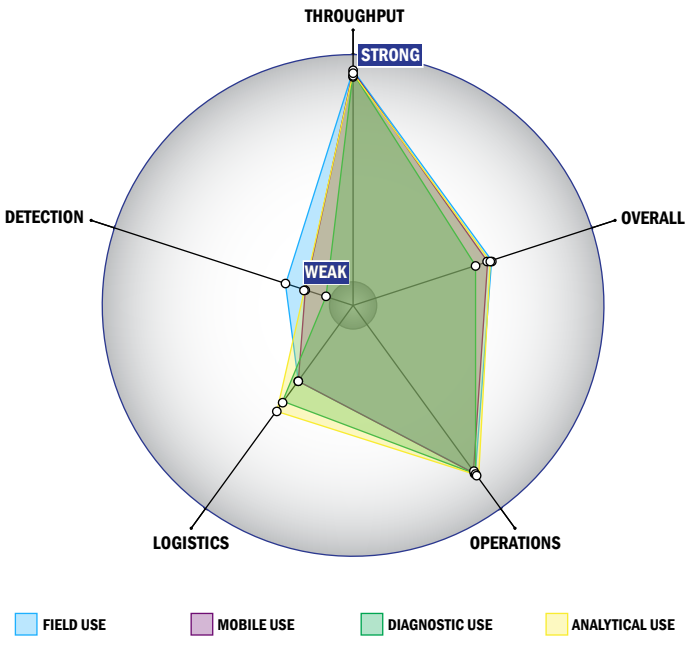


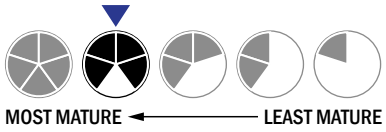
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple 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
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

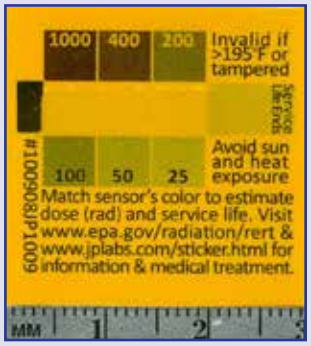
- Can be used from 4 °C to 37 °C
- This system does not require consumable components
- Device or system has peak performance at normal relative humidity conditions
- Greater than 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

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
- Greater than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100-1,000 CFU per mL
- Spore lysis not necessary for detection by system.

JP Laboratories, Inc. - RADSticker

GENERAL DESCRIPTION:



RADSticker is a peel-&-stick postage stamp sized (3cm x 3cm x 0.2mm, weight: 0.2g), instantly color developing, casualty dosimeter, can be carried 24/7 and always ready. Needs no power, has no electronics or moving parts, reliable, robust, rugged and useful for triaging radiation exposure information and medical treatment in a major radiological incident, such as a nuclear or dirty bomb explosion, nuclear power plant accident or mishandling of radiation sources. It can be applied on many objects and carried for a few years.

RADSticker monitors 50–10,000 mSv. When exposed to ionizing radiation, the sensor of the dosimeter develops blue color instantly and the color intensifies as the dose increases. Radiation exposure can be estimated simply by matching the colors of the sensor with the adjacent color reference bars. If used as per instruction, RADSticker will not give false signals. The operating temperature range is from -30oC to 90oC. All essential information is printed on the front and back of the dosimeter. Additional information is provided in one page manual.

The first generation of the dosimeter was field tested by DHS with 800 first responders for one year (http://www.tswg.gov/subgroups/cbrnc/detection/EML627SiradReport.pdf).

It can be used by first responders (police, firefighters and emergency responders), military, hospital radiation workers, occupational and contract workers at nuclear power plants and the general public, especially in an event of a radiological incident.

TECHNICAL DESCRIPTION:

The materials used for monitoring radiation are fine particles of colorless solid diacetylenes dispersed in a polymeric binder. Upon exposure to ionizing radiation, diacetylenes polymerize to blue colored polymers. The reaction is irreversible. As radiation dose increases more monomeric diacetylene molecules polymerize and color of the sensor intensifies.

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

CONTACT INFORMATION

JP Laboratories, Inc.
120 Wood Avenue
Middlesex, NJ 08846
POC: Dr. Gordhan Patel
732-469-6670
gnpatel@jplabs.com
www.jplabs.com

COST

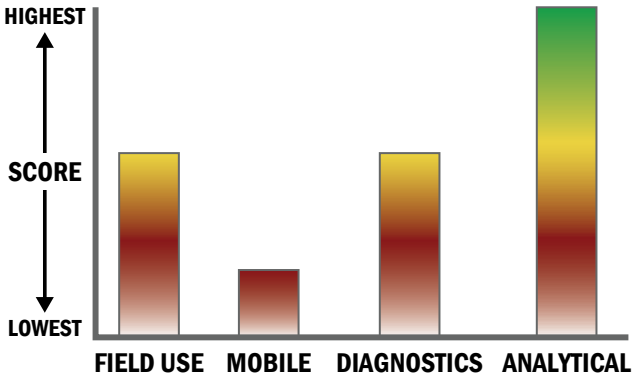
- $5/system
- N/A/analysis

Survey Source

Vendor Supplied Information

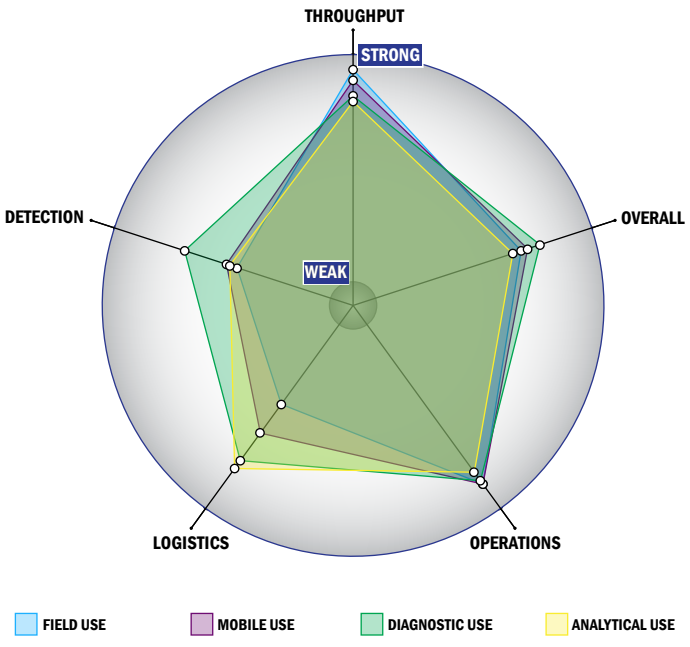
Scoring Analysis

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.



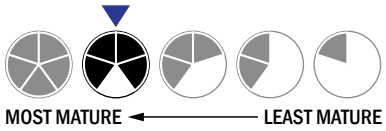
Evaluation Criteria

Throughput:

- Detection is instantaneous
- 1 sample, single test/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 designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- No set-up of the system is required
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Less than 1 kg
- This system is not capable of transmitting data
- There is no electrical requirement



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Results can be viewed in real-time
- The system or device is currently fully autonomous

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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Only total dose and dose rate
- System is used for personnel detection

JP Laboratories, Inc. - RADTriage

GENERAL DESCRIPTION:



RADTriage radiation dosimeter is a credit card sized, self-indicating, user friendly, practically non-destructible, casualty personal dosimeter that reliably monitors harmful high dose (10–10,000 mSv) in an event of a radiological incident. It is a color developing, disposable, pre-calibrated and affordable (under $15) radiation dosimeter. It has no moving or electronic parts, needs no battery and is always ready.

When exposed to ionizing radiation, the sensor of the dosimeter develops blue color instantly and the color intensifies as the dose increases. Radiation exposure can be estimated simply by matching the colors of the sensor with the adjacent color reference bars. Thus it provides the wearer and first responder instantaneous information on cumulative radiation exposure of the victim to prioritize and guide medical treatment, if required. The operating temperature range is from -30oC to 90oC. All essential information is printed on the front and back of the dosimeter. Additional information is provided in one page manual.

RADTriage can minimize the panic, worry and triages exposure information in an event of a radiological incident. The first generation of the dosimeter was field tested by DHS with 800 first responders for one year (http://www.tswg.gov/subgroups/cbrnc/detection/EML627SiradReport.pdf).

It can be used by first responders (police, firefighters and emergency responders), military, hospital radiation workers, occupational and contract workers at nuclear power plants and the general public, especially in an event of a radiological incident.

TECHNICAL DESCRIPTION:

The materials used for monitoring radiation are fine particles of colorless solid diacetylenes dispersed in a polymeric binder. Upon exposure to ionizing radiation, diacetylenes polymerize to blue colored polymers. The reaction is irreversible. As radiation dose increases more monomeric diacetylene molecules polymerize and color of the sensor intensifies.

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

CONTACT INFORMATION

JP Laboratories, Inc.
120 Wood Avenue
Middlesex, NJ 08846
POC: Dr. Gordhan Patel
732-469-6670
gnpatel@jplabs.com
www.jplabs.com

COST

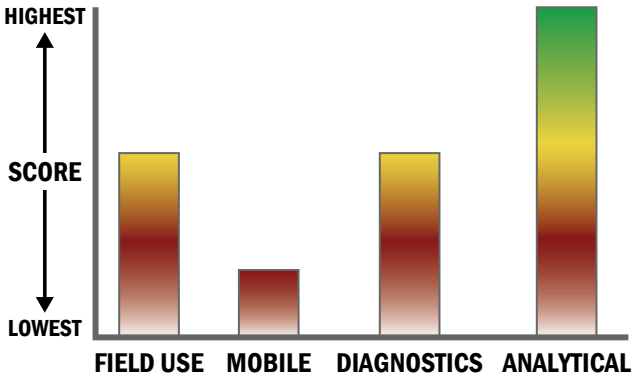
- $15/system
- N/A/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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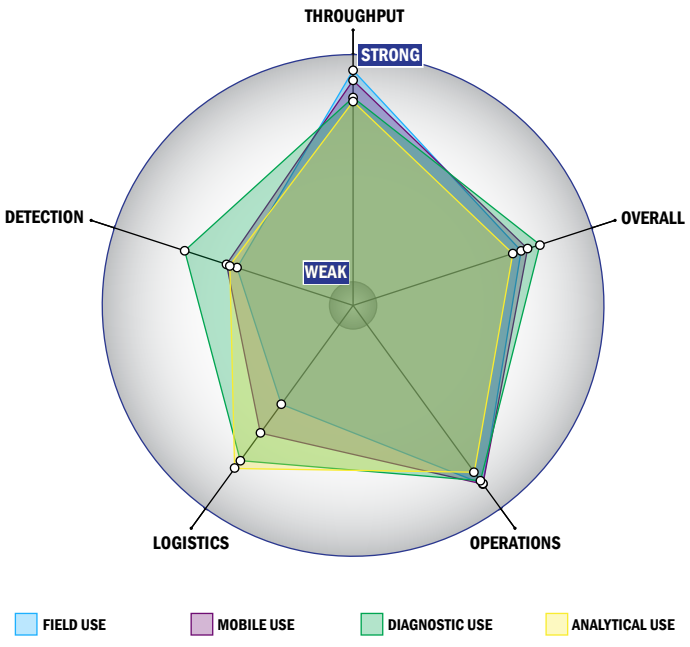


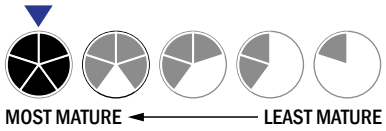
Evaluation Criteria

Throughput:

- Detection is instantaneous
- 1 sample, single test/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 designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- No set-up of the system is required
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Less than 1 kg
- There is no electrical requirement



Operations:

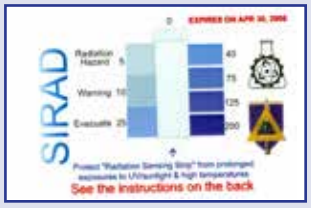
- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Results can be viewed in real-time
- The system or device is currently fully autonomous

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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Only total dose and dose rate
- System is used for personnel detection

JP Laboratories, Inc. - SIRAD-TLD

GENERAL DESCRIPTION:



This is dual sensor dosimeter. SIRAD-TLD dosimeter offers the most desired properties SIRAD (instantly seeing the dose above 10 mSv) and TLD-dosimeter (measuring very low dose accurately). TLD - Thermo Luminescence Detector. SIRAD can monitor above ~10 mSv (+20%) visually and instantly. The TLD-dosimeter can monitor dose as low as 0.01 mSv (+7%) with a TLD reader. Both sensors (SIRAD/diacetylene and TLD/lithium fluoride chip) are tissue equivalent, light, rugged, can be carried 24/7, affordable and do not need a power source. The TLD-dosimeter can be reused many times and can be assigned to the user for a life time.

Highly sensitive lithium fluoride (LiF) TLD sensors (LiF:Cu,Mg,P or LiF:Cu,Na,Si) are used for SIRAD-TLD as they do not require metal filters for energy corrections. The TLD materials have a negligible effect of ambient conditions and an almost linear response with energy & dose. The TLD-sensor is very sensitive (LLD = 10 micro Sievert/0.01 mSv), the most widely used worldwide and a field proven technology over several decades. TLD readers and certified facilities to the dose are available worldwide for reading the dose.

The SIRAD and TLD sensors are small, pre-calibrated, rugged, sealed against moisture and contamination and further protected from ambient conditions in the pocket of the card. Each TLD-dosimeter and the RADTriage card have their own barcodes.

TECHNICAL DESCRIPTION:

The second sensor is TLD, Thermo Luminescence detector. Radiated TLD emits light proportional to dose. A reader is required to read the dose. Highly sensitive lithium fluoride (LiF) TLD sensors (LiF:Cu,Mg,P or LiF:Cu,Na,Si) are used for SIRAD-TLD as they do not require metal filters for energy corrections. The TLD materials have a negligible effect of ambient conditions and an almost linear response with energy & dose. The TLD-sensor is very sensitive (LLD = 10 micro Sievert/0.01 mSv), the most widely used worldwide and a field proven technology over several decades. TLD readers and certified facilities to the dose are available worldwide for reading the dose.

CONTACT INFORMATION

JP Laboratories, Inc.
120 Wood Avenue
Middlesex, NJ 08846
POC: Dr. Gordhan Patel
732-469 6670
gnpatel@jplabs.com
www.jplabs.com

COST

- $25/system
- $10/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

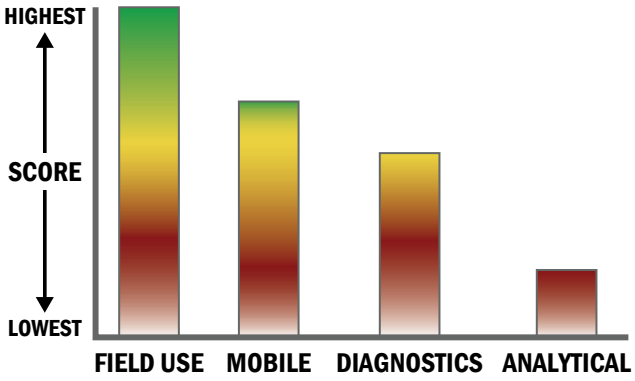
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Bottom Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Fourth Tier
ANALYTICAL Laboratory	N/A	N/A	Fourth Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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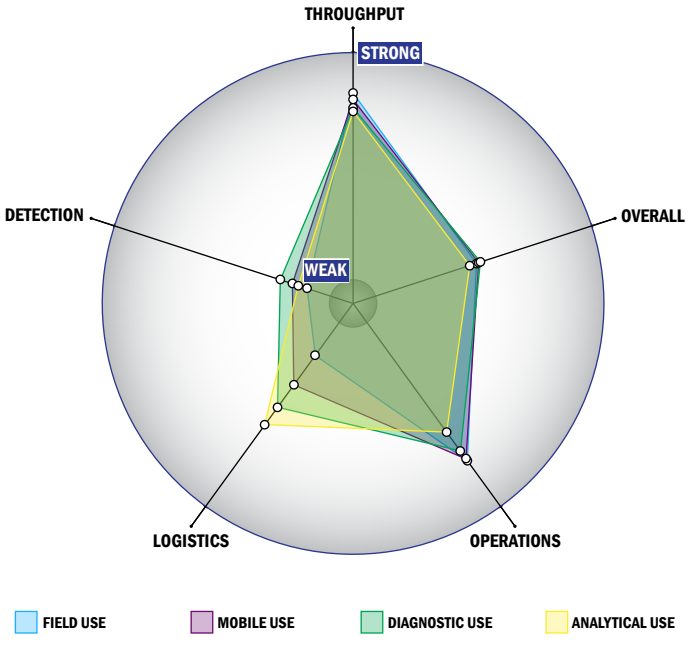


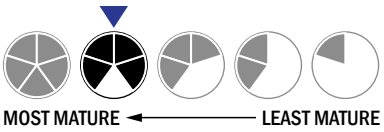
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- No set-up of the system is required
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- This system is not capable of transmitting data
- There is no electrical requirement



Operations:

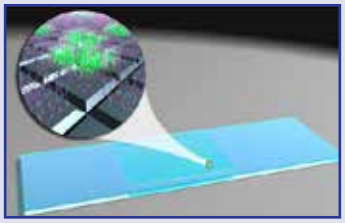
- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system or device is currently fully autonomous

Detection:

- This system does not test liquids
- System is used for personnel detection

Lawrence Livermore National Laboratory - Lawrence Livermore Microbial Detection Array (LLMDA)

GENERAL DESCRIPTION:



LLMDA is a broad-spectrum microarray with over 360,000 probes that can detect all sequenced bacteria, viruses, fungi, protozoa, and archaea as of the probe design date. It was designed for laboratory analysis of complex samples that were not negative for available PCR assays. LLMDA fills the gap between PCR panels and metagenomic sequencing for biodefense, biosurveillance, human/animal/plant health, food and product safety, etc.

TECHNICAL DESCRIPTION:

LLMDA uses microarray technologies that provide probes of at least 60bp. Originally developed using NimbleGen array technology, it has also been transitioned to Agilent. The array probes are designed at family, species, and strain taxonomic levels to ensure that novel strains and even species might be recognized.

CONTACT INFORMATION

Lawrence Livermore National Laboratory
7000 East Ave., Mail Stop L-174
Livermore, CA 94550
POC: Tom Slezak

COST

- $200,000/system
- <$500/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

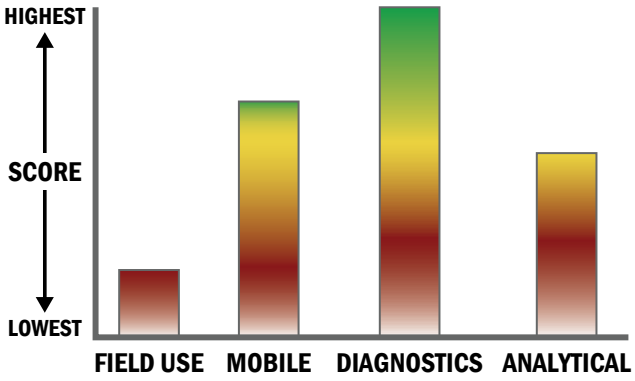
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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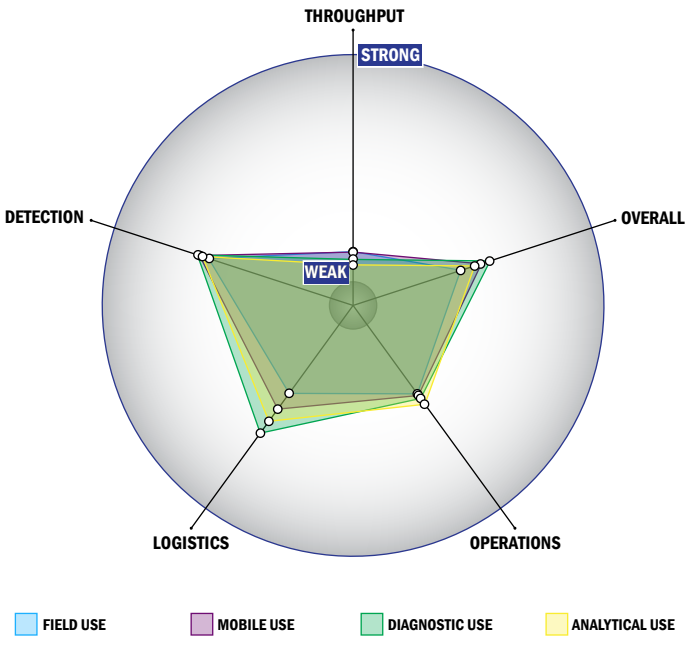


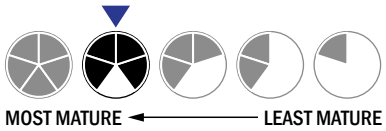
Evaluation Criteria

Throughput:

- Greater than 8 hours for detection
- 1 sample, >10 tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is designed for a single use
- 4 solutions, buffer, eluents, and/or reagents
- 4 components
- No set-up of the system is required
- 9-12 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 25 and 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be stored at 4°C
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 6 months shelf life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system is single use or this question does not apply to this device

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
- Less than 10 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- 100-1,000 CFU per mL
- 1,000-10,000 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Life Technologies - StepOne 48 Well Real-Time Polymerase Chain Reaction System

GENERAL DESCRIPTION:



StepOne™ 48 well and StepOnePlus™ 96 well Real-Time Polymerase Chain Reaction (PCR) System. This is a cost effective real-time PCR system. This system in conjunction with Life Technologies large menu of consumables and reagents can be used on a variety of applications. There are detailed user guides that describe all aspects of the workflow. We also have world-class field application scientists and engineers to support and help. Basically, the system takes processed DNA or RNA as inputs and amplifies them via real-time PCR (which allows for real time data collection). The data gathered allows for analysis to provide quantitative and/or qualitative information. The StepOne™ and StepOnePlus™ systems support any real time PCR application. Life Technologies offers predesigned or custom assays that exist for the following applications: SNP genotyping, Gene Expression profiling, MicroRNA expression, Methylation, Translocation analysis, Gene Detection, Viral Load Analysis and mutation scanning. Other application areas include human identification, food safety, agricultural biology and others.

TECHNICAL DESCRIPTION:

These systems employ real-time (TaqMan®, SYBR® Green or other chemistries) polymerase chain reaction amplification of DNA/RNA samples on a peltier-based thermocycling apparatus using software to analyze data to offer quantitative and/or qualitative results.

CONTACT INFORMATION

Life Technologies
850 Lincoln Centre Drive
Foster City, CA 94404
POC: Roland Tan
650-554-3308

COST

- $14,900-$29,900/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

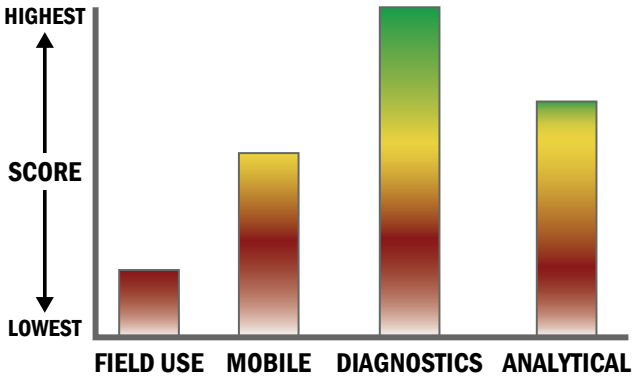
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Fourth Tier	N/A	N/A
DIAGNOSTIC Laboratory	Second Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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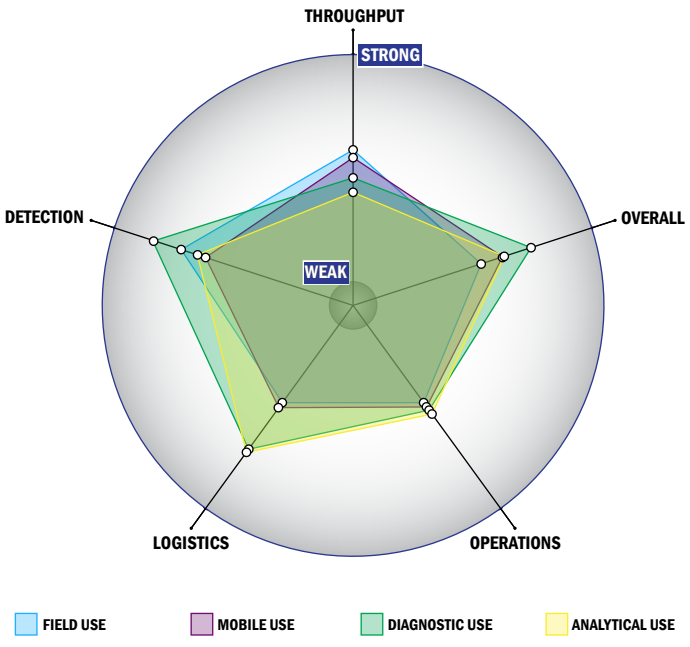


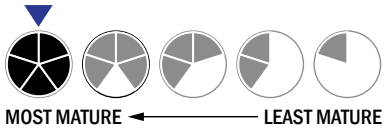
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 2 components
- Less than 5 minutes is required for set-up
- 6-8 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be frozen (-20°C)
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- 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 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Life Technologies - Veriti Thermal Cycler

GENERAL DESCRIPTION:

The Veriti® Thermal Cycler is a high quality instrument for amplifying target DNA sequences using Polymerase Chain Reaction (PCR). Veriti® Thermal Cyclers are available for research or diagnostic use.



TECHNICAL DESCRIPTION:

Veriti® performs polymerase chain reaction amplification of genes on a peltier-based thermocycling apparatus.

CONTACT INFORMATION

Life Technologies
5791 Van Allen Way
Carlsbad, CA 92008

COST

- $7,995/system
- ~$2/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

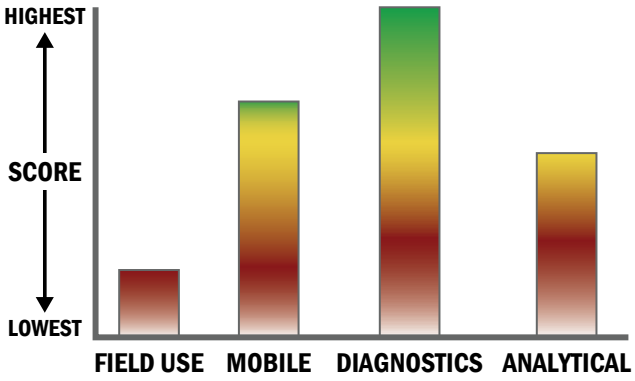
	Biological	Chemical	Radiological
FIELD USE System	Third Tier	N/A	N/A
MOBILE Laboratory	Fourth Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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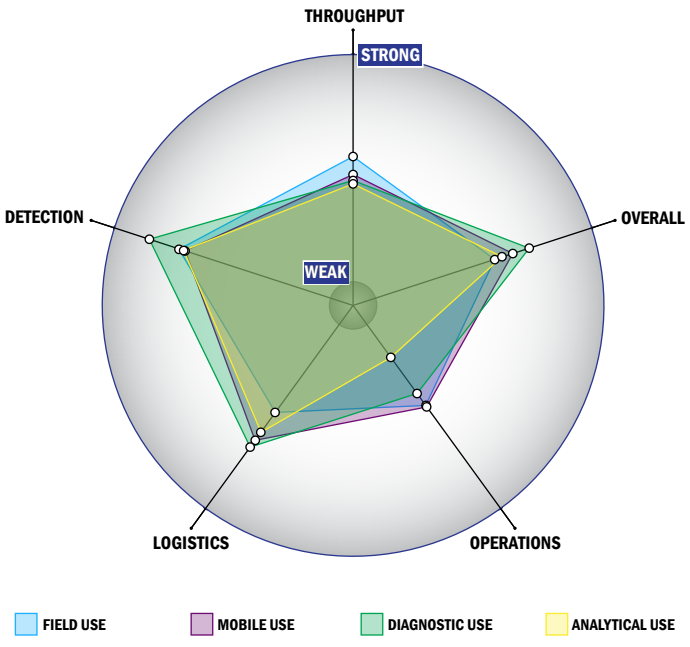


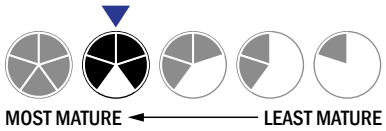
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- 749-350 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 2 components
- 5-10 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Approximately the size of a toaster
- Between 5 and 25 kg
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be frozen (-20°C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy

Detection:

- Efforts are underway to achieve 510K clearance
- System currently has FDA approval
- Less than 50 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Lockheed Martin - AbleSentry

GENERAL DESCRIPTION:



AbleSentry® is a flexible, functional, integrated system designed to provide tactical early warning of a possible attack with chemical, biological, or radiological agents. Fusing data from multiple sensor nodes over a wide area, AbleSentry® provides the capability to detect invisible threat clouds in sufficient time to permit units to take protective action and thus significantly mitigate potential effects. By utilizing a true network of integrated sensor nodes, AbleSentry® provides high detection probability with low false alarm rates while utilizing straight-forward, easy-to-maintain technologies.

TECHNICAL DESCRIPTION:

Chemical: IMS
Biological: Particle count, sizing, and fluorescence
Radiological: Gamma and Neutron

CONTACT INFORMATION

Lockheed Martin, Mission Systems & Sensors (MS2)
300 M Street
Washington, DC 20003
POC: Rick Read
703-367-1546
richard.read@lmco.com
www.lockheedmartin.com

COST

- $750,000/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

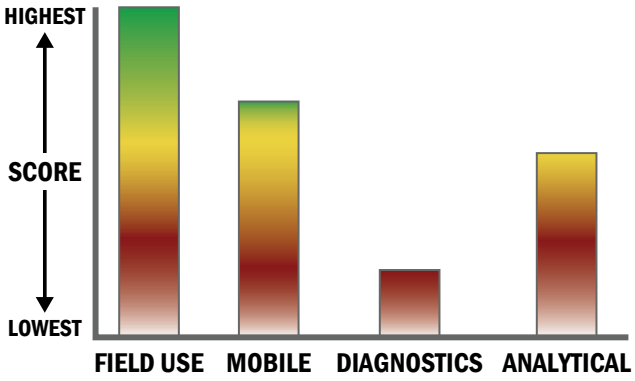
	Biological	Chemical	Radiological
FIELD USE System	Third Tier	Fourth Tier	Fourth Tier
MOBILE Laboratory	Bottom Tier	Bottom Tier	Bottom Tier
DIAGNOSTIC Laboratory	Bottom Tier	Bottom Tier	Bottom Tier
ANALYTICAL Laboratory	Bottom Tier	Bottom Tier	Bottom Tier

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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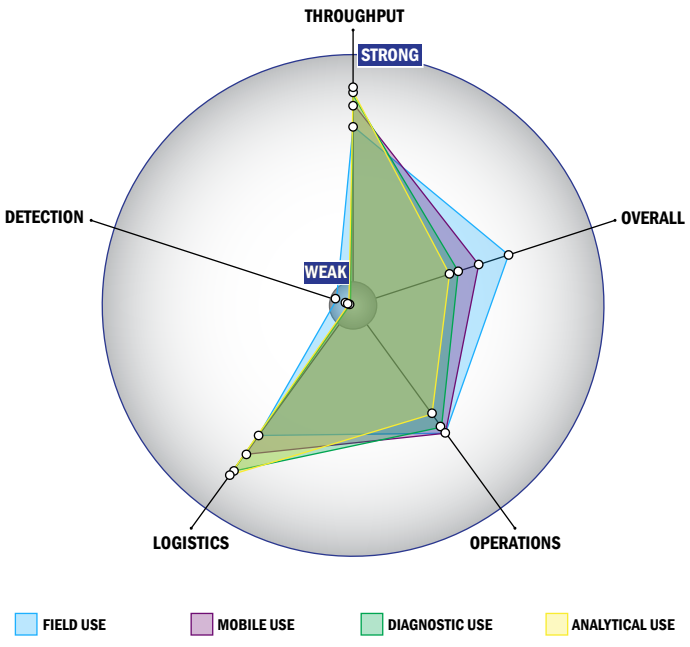


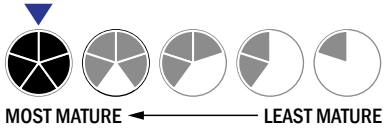
Evaluation Criteria

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 or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- Less than 5 minutes is required for set-up
- 3-5 steps are required for 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
- Satellite, wireless and wired connections are available
- System or device has 110V electrical requirement
- Is commercially available and meets military specifications



Operations:

- Can be used from -21°C to 41°C
- This system does not require consumable components
- Device or system has peak performance at normal relative humidity conditions
- 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 closed and not available for modification
- The system hardware is open and available for modification

Detection:

- Superior specificity. System has a false alarm rate approaching zero (~0%)
- System does not detect spores
- System currently can detect aerosolized chemical agent
- Not possible for the system to detect liquid chemical agent
- Manual kit not integrated with the system handles spore lysis

Ludlum Measurements, Inc. - Ludlum Model 9DP

GENERAL DESCRIPTION:



The Ludlum Model 9DP, pressurized ion chamber meter, provides highly sensitive measurements of exposure and exposure rate. It can simultaneously display the exposure rate and integrated value or the highest rate seen by the instrument. The integrated value can be reset (if desired) using one of the four convenient front-panel mounted buttons. The stunning 256-color, bit-mapped display provides an optimized presentation of the data and is accompanied with icons informing the user of the active functions and instrument status. All logged data are written in csv format to a plugged-in, industry standard, USB thumb drive for convenient retrieval by a PC spreadsheet or database program. Alarms are manifested using color changes on the display and an acknowledgeable audio output.

TECHNICAL DESCRIPTION:

RADIATION DETECTED: gamma & X-rays above 25 keV; beta above 1 MeV

OPERATING RANGES:

- With R/hr units: 0–500 µR/hr, 0–5 mR/hr, 0–50 mR/hr, 0–500 mR /hr, 0–5 R/hr
- With Sv/h units: 0–5 µSv/h, 0–50 µSv/h, 0–500 µSv/h, 0–5 mSv/h, 0–50 mSv/h

CHAMBER VOLUME: 230 cc (14 in^3) volume pressurized to 8 atmospheres (117 psi)

ACCURACY: +/-10%

RESPONSE TIME: 5 seconds in lowest range, 2 seconds in all other ranges, when measuring from 10% to 90% of final value

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	Fourth Tier
MOBILE Laboratory	N/A	N/A	Fourth Tier
DIAGNOSTIC Laboratory	N/A	N/A	Bottom Tier
ANALYTICAL Laboratory	N/A	N/A	Fourth Tier

CONTACT INFORMATION

Ludlum Measurements, Inc.
501 Oak Street
Sweetwater, TX 79556

COST

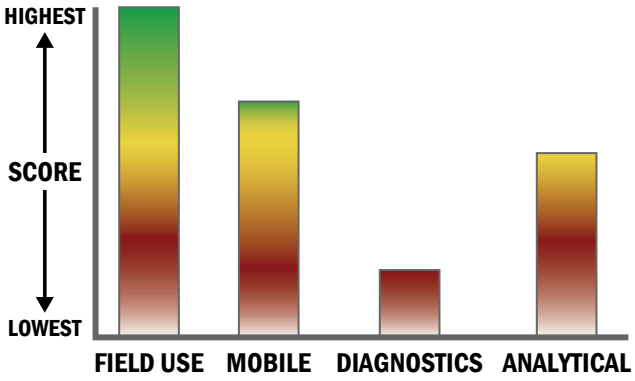
- $2,285/system
- $125/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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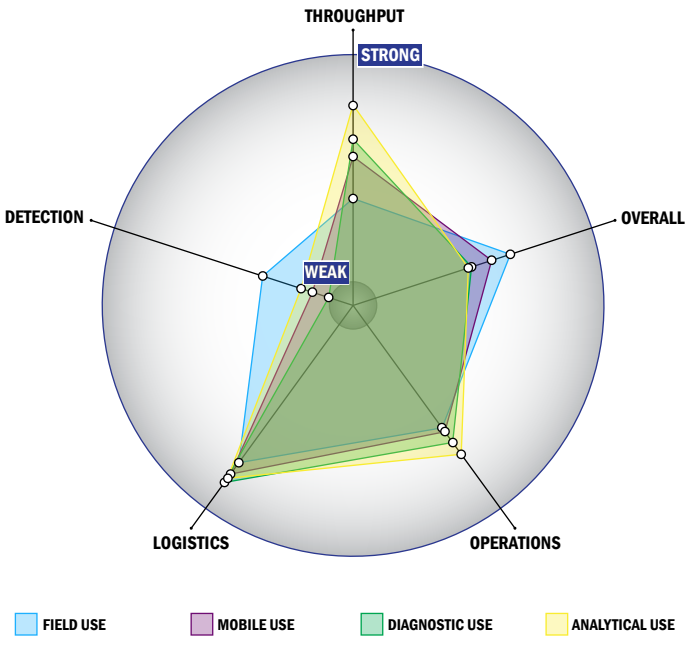


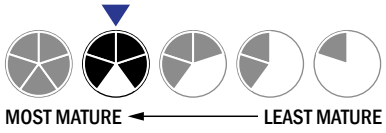
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- The system or approach is not amenable to full or semi-automation
- Device or system is intended for multiple detection assays
- 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 toaster
- Between 1 and 5 kg
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from -21°C to 41°C
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

Luminex Corporation - Luminex 100/200 System

GENERAL DESCRIPTION:



The Luminex 100/200 System is designed to meet the multiplexing needs of clinical and research laboratory professionals. The System is a versatile multiplexing platform capable of performing qualitative and quantitative analysis of proteins and nucleic acids in a variety of sample matrices. The Luminex 100/200 is a flexible analyzer based on the principles of flow cytometry. The System enables you to multiplex (simultaneously measure) up to 100 analytes in a single microplate well, using very small sample volumes. The System delivers fast and cost-effective bioassay results on many assay formats including nucleic acid assays, receptor-ligand assays, immunoassays and enzymatic assays. The Luminex 100/200 System is the combination of three core xMAP technologies. The first is xMAP microspheres, a family of 100 fluorescently dyed 5.6 micron-sized polystyrene microspheres that act as both the identifier and the solid surface to build the assay. Suspended microspheres give consistent, reproducible results and allow for easy quality control. The second is the flow cytometry-based Luminex 100/200 analyzer, which integrates key xMAP detection components such as lasers, optics, fluidics and high-speed digital signal processors. The third component is the xPONENT software, which is designed for protocol-based data acquisition with robust data regression analysis. The total system includes the Luminex 100/200 instrument, the Luminex XY plate handling platform, and the Luminex SD sheath fluid delivery system, software, and PC. A professional Training Session for one person is included.

TECHNICAL DESCRIPTION:

The system includes the Luminex 100/200 instrument, the XY plate handling platform, and the SD sheath fluid delivery system, software and PC. The System comprises three core xMAP technologies:

- The xMAP microspheres, a family of 100 fluorescently dyed 5.6 micron-sized polystyrene microspheres that act as both the identifier and the solid surface to build the assay.
- The flow cytometry-based Luminex 100/200 analyzer, which integrates key xMAP detection components such as lasers, optics, fluidics and high-speed digital signal processors.
- The xPONENT® software, which is designed for protocol-based data acquisition with robust data regression analysis.

CONTACT INFORMATION

Luminex Corporation
12212 Technology Blvd.
Austin, TX 78727
POC: Amy Altman, Ph.D. VP, Biodefense

COST

- $75,000/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	Fourth Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Notes

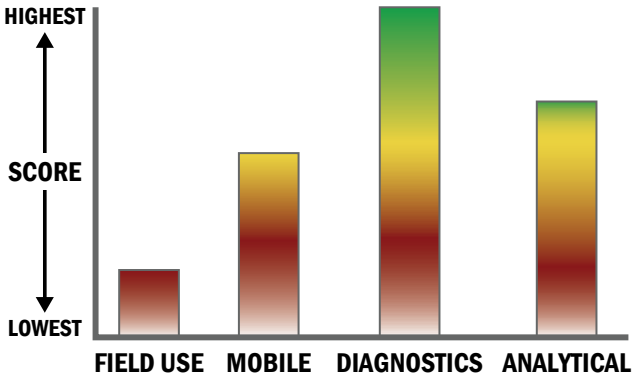
One of several systems that employ bead based xMAP technology.

Survey Source

Vendor Supplied Information

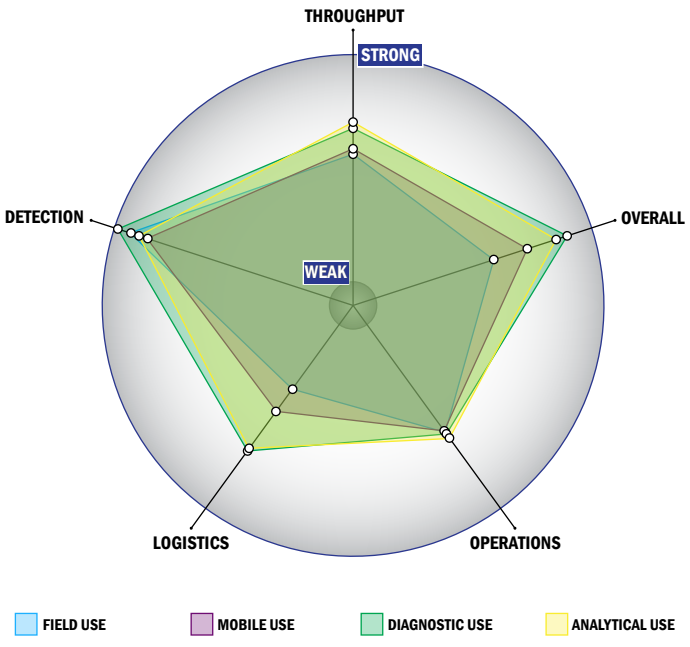
Scoring Analysis

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.



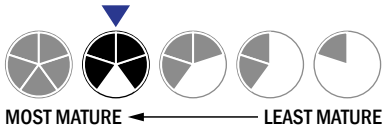
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- 349-96 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 4 solutions, buffer, eluents, and/or reagents
- 1 component
- Greater than 20 minutes is required for set-up
- 3-5 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
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at 4 °C
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- System currently has 510k clearance
- System currently has FDA approval
- Less than 50 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL
- Manual kit not integrated with the system handles spore lysis

Luminex Corporation - MAGPIX System

GENERAL DESCRIPTION:



The MAGPIX system is a versatile multiplexing platform capable of performing qualitative and quantitative analysis of proteins and nucleic acids in a variety of sample matrices. This affordable system requires small sample input and can perform up to 50 tests in a single reaction volume, greatly reducing sample input, reagents and labor while improving productivity. The MAGPIX analyzer is based on CCD imaging technology, which allows for a compact, more robust system. Streamlined start-up and shut-down protocols and minimal maintenance requirements make the system easy to operate and maintain. MAGPIX was designed to meet the needs of laboratory medicine and the care of patients, as well as the research environment. It can be ruggedized for biodefense field applications; a ruggedized prototype of MAGPIX was field tested in a Technology Readiness Evaluation by the US Army Research, Development and Engineering Command Edgewood Chemical and Biological Center. Testing was done at the Dugway Proving Ground, UT. System performance on an antibody-based test of seven agents of biological origin was run over a 3 month period. Although assay-level performance information is proprietary, the system proved to be adequately rugged with no performance faults throughout the testing period.

TECHNICAL DESCRIPTION:

The Luminex MAGPIX system comprises three components:

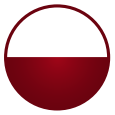
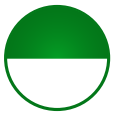
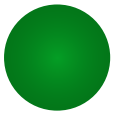
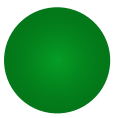
- The MAGPIX instrument, which integrates key components such as LED CCD cameras, optics, and high-speed digital signal processors.
- The MagPlex microspheres, 50 fluorescently dyed 6.5 micron-sized polystyrene paramagnetic microspheres, each with a distinct spectral address, that act as both the identifier and the solid surface to build the assay. They may be multiplexed together up to 50 per well and can be used for many assay formats such as nucleic acid assays and immunoassays.
- The xPONENT software, a modular, flexible, software package for control of the MAGPIX and data 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

CONTACT INFORMATION

Luminex Corporation
12212 Technology Blvd.
Austin, TX 78727
POC: Amy Altman, Ph.D. VP, Biodefense
www.luminexcorp.com

COST

- $35,000/system
- N/A/analysis

Notes

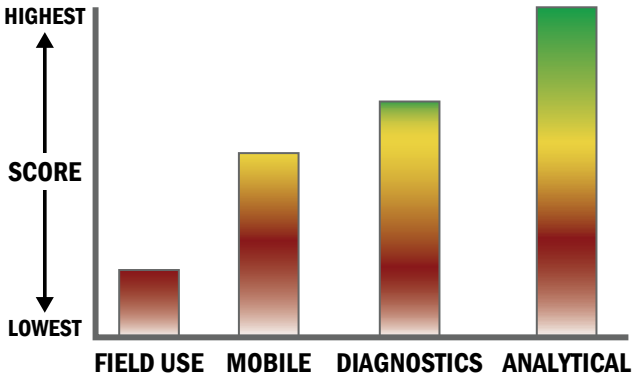
One of several systems that employ bead based xMAP technology. This system is in use by DoD laboratories through the Global Biosurveillance Technologies Initiative (GBTI).

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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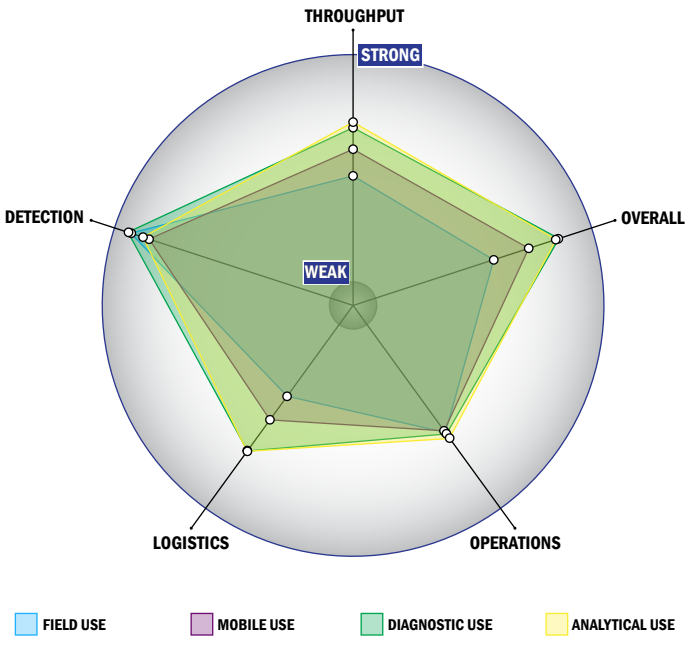


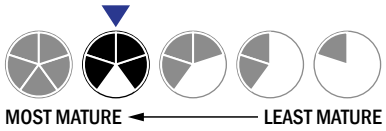
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Multiple samples, multiple tests/sample per run
- 349-96 samples
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 4 solutions, buffer, eluents, and/or reagents
- 3 components
- 10-20 minutes is required for set-up
- 3-5 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 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at 4 °C
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- 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
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL
- Manual kit not integrated with the system handles spore lysis

Lynntech, Inc. - BioAdvise Portable Detection Device

GENERAL DESCRIPTION:



The product is a deployable, low-power system for the screening of unknown powders and liquids for the presence of biological threat agents. The unit will be designed to interface with the laptops available in first responder vehicles; all system control and analysis functions will be carried out on the laptop. Minimal user training and experience will be required. After the user introduces a swab of unknown material into the system, the unit will automatically perform the steps of sample recovery, lysing, purification, real-time PCR amplification, and fluorescence detection in order to determine if the material contains genetic material with a sequence matching an on-board library of known threats.

TECHNICAL DESCRIPTION:

The unit will be capable of sample recovery, cell lysis, DNA purification, 19-plex real-time target amplification and subsequent fluorescence detection in a convective PCR cell. Hardware development will enable controlled generation of the thermal environment necessary for sample preparation, convective PCR and real-time detection and analysis of the fluorescence signals during the amplification process. Reagent stabilization will enable the PCR reagents to be stored on-cartridge for extended periods with minimal degradation.

CONTACT INFORMATION

Lynntech, Inc.
2501 Earl Rudder Freeway South
College Station, TX 77845
POC: Wayne Evans Program Manager - BioAdvise
979-764-2309
wayne.evans@lynntech.com
www.lynntech.com

COST

- $50,000/system
- $125/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

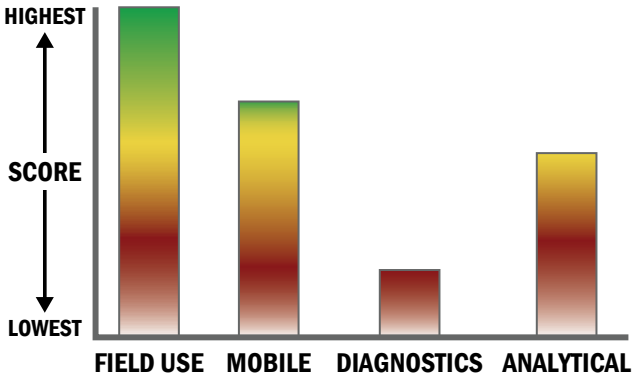
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

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

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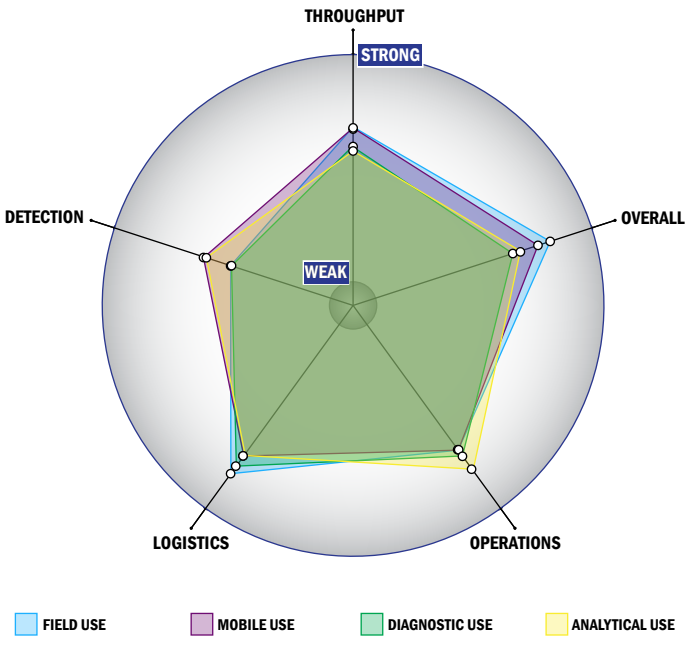


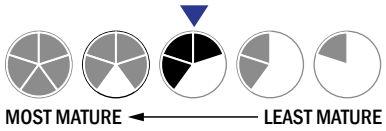
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, >10 tests/sample per run
- 349-96 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 1 component

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25 kg
- Satellite, 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 frozen (-20°C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- Less than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1,000-10,000 CFU per mL
- 1,000-10,000 PFU per mL
- Fully automated spore lysis

MagnaBioSciences - MICT (Magnetic Immuno-Chromatgraphic Test) System

GENERAL DESCRIPTION:

The MICT system uses a novel detection platform for rapid in-vitro diagnostics by using para magnetic labels to detect a wide range of analytes in a lateral flow format.



TECHNICAL DESCRIPTION:

The MICT instrument, both bench top and handheld use a disposable cassette to detect analytes by measuring paramagnetic labels that have antibodies attached to them in order to uniquely recognize analytes in a fluid sample. The sample can be blood, plasma, serum, urine, saliva, sewage or a buffer extracted surface swab. The sample is added to a disposable cassette that is inserted into the instrument after development. The labeled analytical capture region within the cassette is measured in a strong magnetic field where the paramagnetic label is magnetized by induction of a 100 kHz, ~1 Tesla AC field. The detector array measures the amount of magnetized material which is proportional to the amount of analyte. The instrument reads a 2D barcode on the cassette that identifies the type of assay, the date of manufacture, the calibration curve for each individual analyte and cassette, eliminating any calibration of the instrument by the user. The cassettes have a shelf life of at least 18 months.

CONTACT INFORMATION

MagnaBioSciences
6650 Lusk Blvd. Suite B606
San Diego, CA 92120
POC: Bruce Gardner
Bruce.Gardner@magnabiosciences.com

COST

- $5,000/system
- $5/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

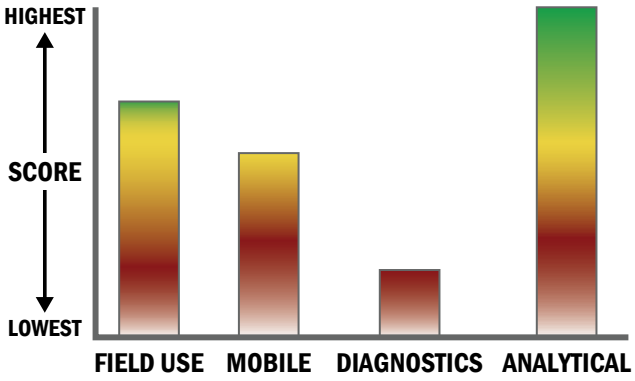
RANKINGS	Biological	Chemical	Radiological
FIELD USE System		N/A	N/A
MOBILE Laboratory		N/A	N/A
DIAGNOSTIC Laboratory		N/A	N/A
ANALYTICAL Laboratory		N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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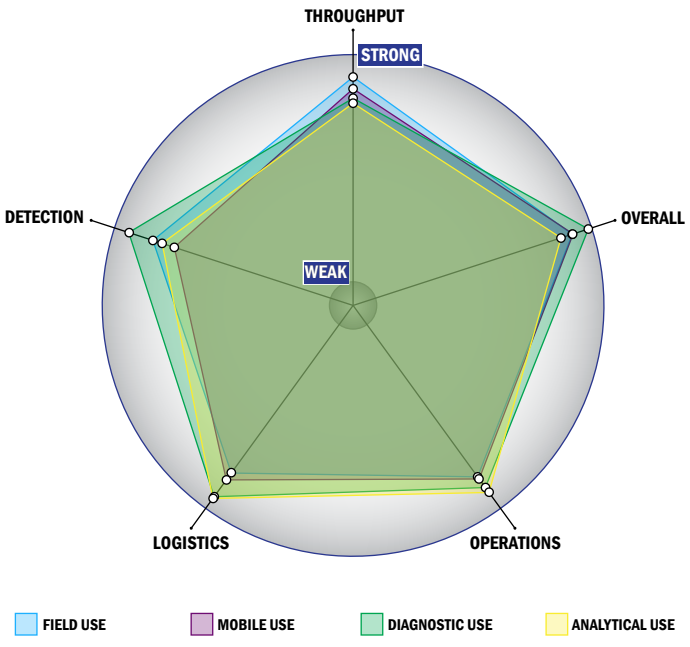


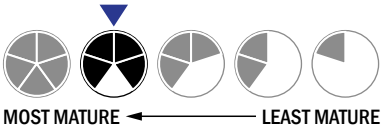
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Continuous operation with no defined runs
- 349-96 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
- 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 toaster
- Between 1 and 5 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

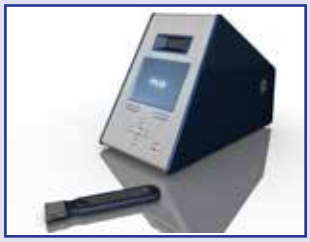
- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- System currently has 510k clearance
- System currently has FDA approval
- Less than 100 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- 100-1,000 PFU per mL
- Less than 1 ng per mL
- System does not detect spores

MBio Diagnostics, Inc. - MBio MQ

GENERAL DESCRIPTION:



The MBio MQ multiplexed assay system delivers quantitative fluorescence immunoassay results for panels of analytes – all from a single drop of blood, plasma, or serum. MQ is a simple reader and disposable cartridge system for point-of-care testing. MQ provides the data quality and multiple results of a clinical laboratory analyzer in an inexpensive format with workflow comparable to single analyte rapid diagnostic tests. Under design for a CLIA-waiver, the simple system uses minimal sample (5 to 10 microliters) and delivers results in less than 30 minutes. The MBio technologies fill an unmet need for near patient disease panels.

TECHNICAL DESCRIPTION:

MBio's diagnostic systems are all built on the company's LightDeck™ technology, a patent-protected fluorescence assay illumination method that is simultaneously simple, inexpensive and robust. It is a variation on planar waveguide technology, an approach that has been used for performing sensitive biological assays for over two decades. MBio's innovation has been to solve the light coupling reproducibility problem that has limited widespread use of the technology. The MBio MQ incorporates low cost consumer electronics (laser diodes and imagers) to create a robust reader device and for the MQ's single-use test cartridges.

CONTACT INFORMATION

MBio Diagnostics, Inc.
3122 Sterling Circle
Boulder, CO 80301
POC: Michael J. Lochhead, Ph.D. Vice President
303-952-2810
mike.lochhead@mbiodx.com
www.mbiodx.com

COST

- $5,000/system
- $5-$10/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

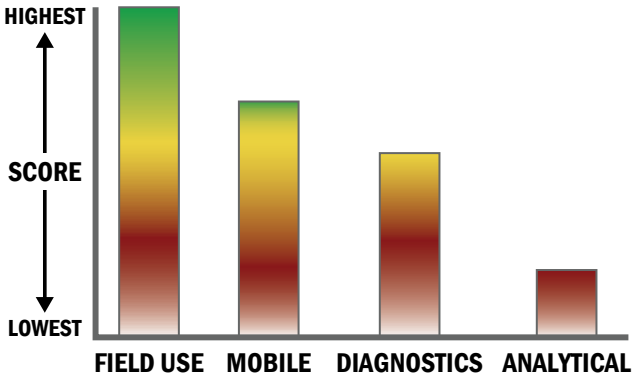
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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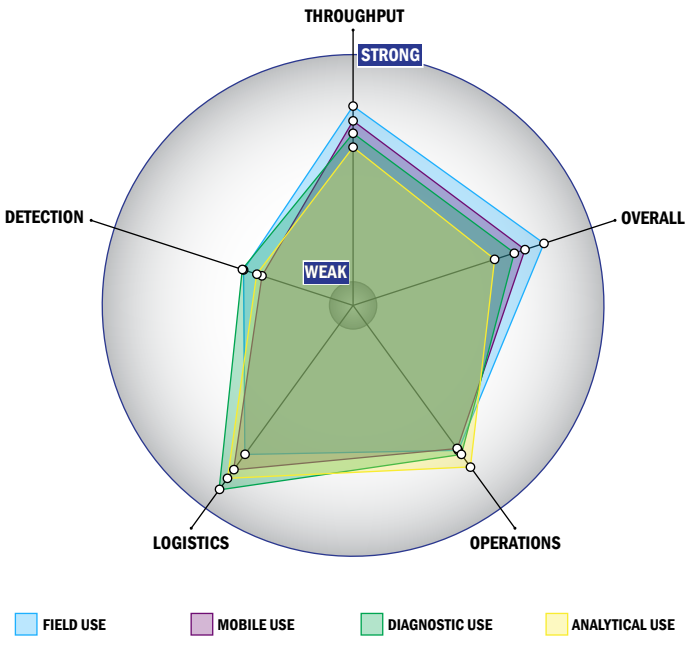


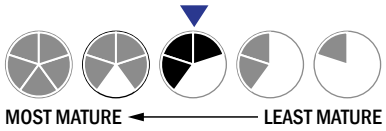
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 2 components
- 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 toaster
- Between 1 and 5 kg
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from 25 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 50 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 10,000-100,000 PFU per mL
- 1-10 ng per mL

MD Microscopes International - Home Healthcare Diagnostics

GENERAL DESCRIPTION:



A patent pending technology will enable home healthcare diagnostics for everyone, reducing primary healthcare costs and increasing healthcare availability. Rural communities, the elderly, the military, veterans, and families will have the conveyance of low cost diagnostics in their home. Through the convergence of old and new technologies, diagnostic tests can now be run anywhere in the world, in a variety of environments, without any skill. For the first time ever, the full array of morphological (e.g., cell count, hematology, white cell differential, bacteria, fluorescent markers, tissue sample, etc.) and diagnostic tests (e.g., immunological, protein, hormonal, chemical, genetic, etc.) on the same drop of blood (or body fluid) at wavelength limited resolution and fully automated, can be run by a child on a USB plug-and-play system. The system is mobile, can be USB or battery powered, is the size of an external hard drive and has an overnight FedEx shipping weight of 3.5 lbs. The system receives a disposable carrier having a demographically or geographically derived matrix of 5-100 tests – demographically derived may focus on age, combat situations, exposure expectations; geographically derived may focus on a combination of demographics along with the unique issues associated with the location. A sample is added, no pre-processing, and placed in the unit for automated analysis. In the US it is expected to reduce primary health care costs by at least 50%; and to be sold in chain stores (e.g., Wal-Mart, Walgreens, etc.).

TECHNICAL DESCRIPTION:

The Home Healthcare Diagnostics provides fully automated wavelength limit analysis, bright field and fluorescence, in a mobile USB plug-and-play device. This fundamental advance in technology is applicable across a multitude of applications. In one application, a carrier is inserted without pre-processing for healthcare diagnostics, chemical assays, immunoassays and biological assessments. Other uses include all fully automated microscopy needs and applications; genetic, microbiology, bacteriology, virology, etc. The full automation enables the data to be transmitted to experts anywhere in the world and remote from the test site.

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

CONTACT INFORMATION

Microscopes International
555 Republic Drive
Plano, TX 75074
POC: Glenn Spaulding, MD
281-827-4707

Survey Source

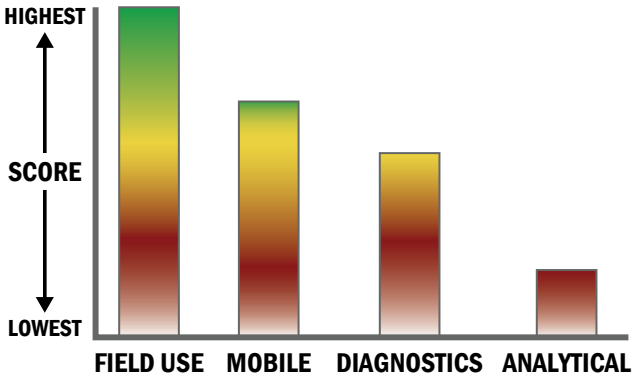
Vendor Supplied Information

COST

- $400-$10,000/system
- $20/analysis

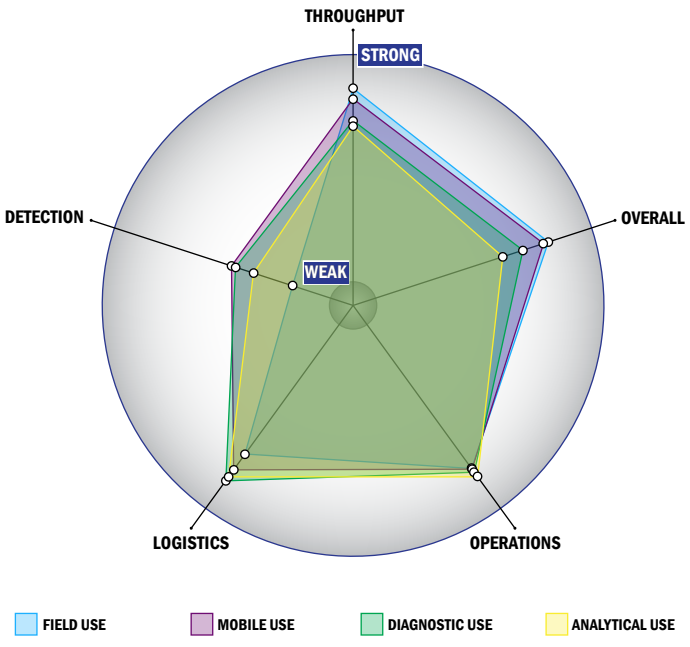
Scoring Analysis

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.



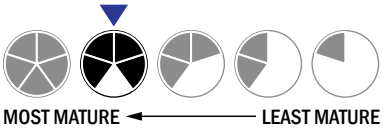
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- 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
- No set-up of the system 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 toaster
- Between 1 and 5 kg
- Satellite, wireless and wired connections are available
- System or device uses batteries
- 1-2 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 50 µL
- Add on capability that is full or semi-automated for spore lysis

Medmira, Inc. - Multiplo Rapid Test For The Detection of Antibodies

GENERAL DESCRIPTION:



MedMira's unique rapid flow through technology features simple steps and instant results. Its current single disease product portfolio for infectious diseases is comprised of Reveal HIV, Reveal HP, and Reveal TP. Its current offer for multiplex product line (the Multiplo) includes combination of testing solution for HIV1/2, hepatitis B and C and syphilis. These tests can be deployed at all possible settings such as POCT, over the counter (OTC), and laboratories. These types of tests also eliminate the need for cold chain transport. MedMira's world-class technology offers a number of distinct advantages: speed, multiplex testing, quality and value. MedMira diagnostics are the fastest rapid flow-through diagnostics for multiplex testing of infectious diseases in the world. In less than three minutes, users can perform the test and have an instant result. MedMira's technology is unique in its ability to detect multiple biomarkers specific to several diseases on a single cartridge using a single specimen.

TECHNICAL DESCRIPTION:

The technology facilitates the formation of highly specific antigen-antibody reactions allowing disease-specific biomarkers in human whole blood, serum or plasma to be captured and visualized on a unique membrane. The simple test procedure involves adding the specimen to the device and allowing it to flow through the membrane. If the specimen contains the target antibodies or antigens, they are captured on the test membrane and can be visually interpreted immediately after the addition of a detection reagent. Our technology platform is unique in its ability to detect multiple biomarkers specific to several diseases using a single cartridge. Our Multiplo line of rapid tests for HIV, Hepatitis B and C, and syphilis uses the platform's advanced capabilities to deliver up to four test results using one test cartridge and one drop of specimen.

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

CONTACT INFORMATION

Medmira, Inc.
155 Chain Lake Drive, Suite 1-5
Halifax, NS, Canada B3S 1B3
POC: Hermes Chan, CEO
902-450-1588
hchan@medmira.com
www.medmira.com

COST

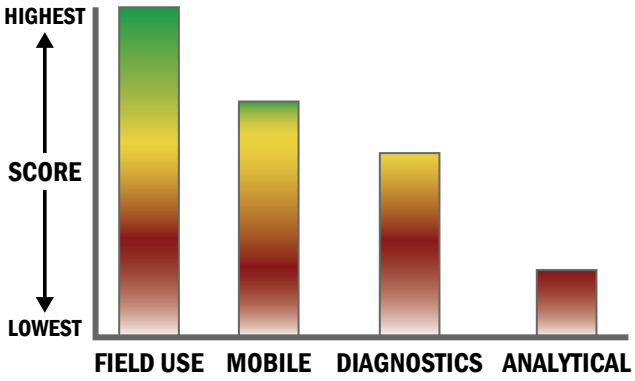
- N/A/system
- $25-$30/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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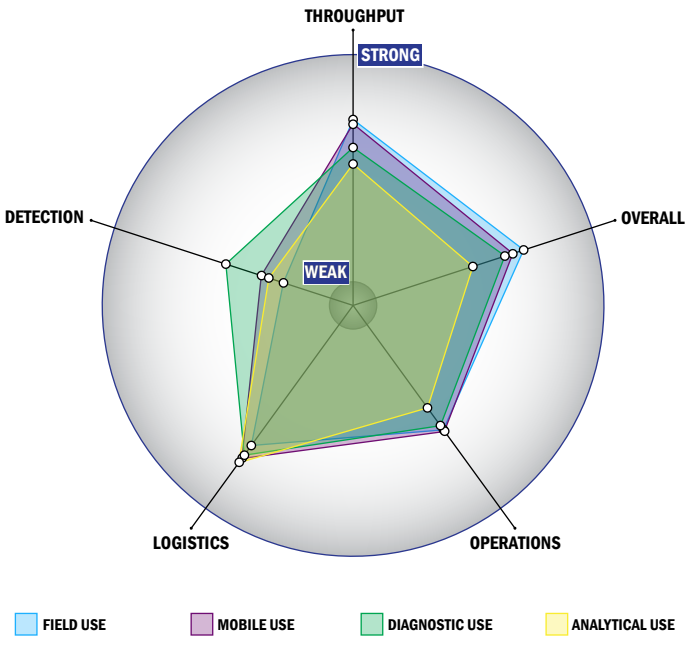


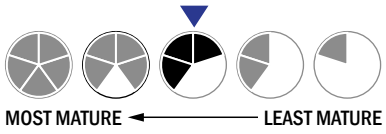
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system or approach is not amenable to full or semi-automation
- Device or system is designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 3 components
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- This system is not capable of transmitting data
- There is no electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- The system is not capable of autonomy

Detection:

- Efforts are underway to achieve FDA approval
- Less than 50 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Manual kit not integrated with the system handles spore lysis

Medmira, Inc. - Rapid Flow-through Diagnostic Technology Platform

GENERAL DESCRIPTION:

MedMira's patented rapid flow-through technology platform is the basis of the Company's rapid tests Key features of the rapid tests:



- A 3-minute procedure that produces instant results
- Capabilities to test whole blood, serum or plasma specimens as well as others
- Multiplexing capabilities; multiple results on a single cartridge using a single specimen
- Up to a 24 month shelf-life at 2-30° C
- A compact, single-use, 0.7 oz. package
- No refrigeration required
- A built-in procedural and reagent control line
- A standardized procedure across all products

The Company's current product line includes single rapid tests for HIV, Syphilis and H. Pylori, and multiplex tests for HIV, Hepatitis B and C, and Syphilis in various combinations. The Company's quality management system is ISO9001:2008 and ISO13485:2003. MedMira's rapid tests and technology platform have been evaluated and approved by the world's leading regulatory agencies.

TECHNICAL DESCRIPTION:

MedMira's patented rapid flow-through technology is a highly versatile product engine, enabling our team to quickly move new rapid testing applications through the discovery, design and development, and clinical phases to full commercialization.

The technology facilitates the formation of highly specific antigen-antibody reactions allowing disease-specific biomarkers in human whole blood, serum or plasma to be captured and visualized on a unique membrane. The simple test procedure involves adding the specimen to the device and allowing it to flow through the membrane. If the specimen contains the target antibodies or antigens, they are captured on the test membrane and can be visually interpreted immediately after the addition of a detection reagent. Our technology platform is unique in its ability to detect multiple biomarkers specific to several diseases using a single cartridge. Precision pipetting, sample manipulation, specialized equipment and training are not required to perform any of MedMira's rapid tests, making it an invaluable diagnostic resource in a broad range of settings.

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

CONTACT INFORMATION

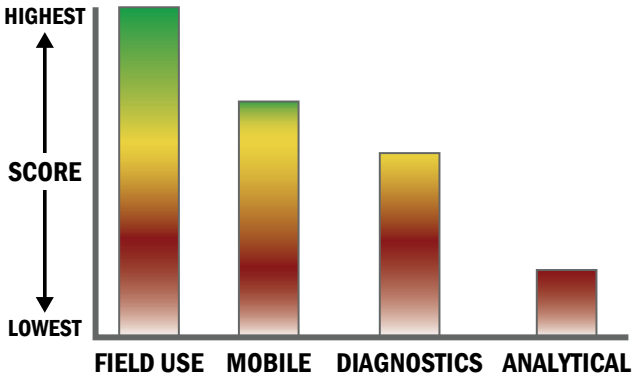
Medmira, Inc.
155 Chain Lake Drive, Suite 1
Halifax, Nova Scotia B3S 1B3 Canada
POC: Andrea Young, Senior Manager, Marketing Communications
ayoung@medmira.com

COST

- $10-$50/analysis
- N/A/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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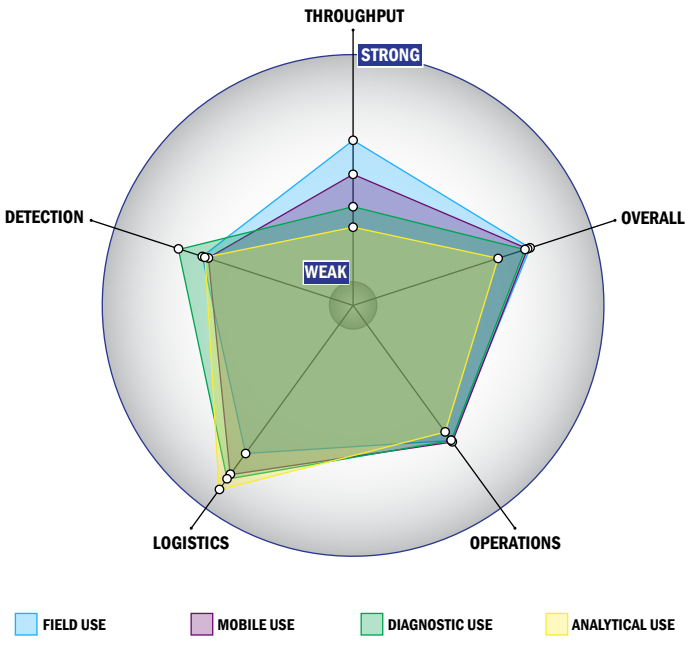


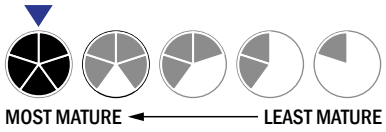
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, single test/sample per run
- 95-32 samples every 2 hours
- The system or approach is not amenable to full or semi-automation
- Device or system is designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- No set-up of the system is required
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- This system is not capable of transmitting data
- There is no electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system does not employ any software

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- System currently has FDA approval
- Less than 50 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1,000-10,000 CFU per mL
- 1-10 ng per mL
- Spore lysis not necessary for detection by system

Menon International - MENTOR-100

GENERAL DESCRIPTION:



The MENTOR-100 biodetector is a compact, portable system that uses a patented nucleic-acid based assay ('NMR Bioassay') to detect and identify biological agents. Currently the system is capable of detecting liquid, powder and aerosolized agents. The system is fully automated from sample collection to detection, has automated decontamination, and is fully reusable. The results are presented in a simple no threat/threat format that requires no operator interpretation. Clinical samples can be handled by developing and interfacing the appropriate sample processing module. Currently the MENTOR-100 can detect all the bacterial agents and has been blind tested for the biothreats Bacillus anthracis, Francisella tularensis, *Yersinia pestis* in a multiplex format. Other biothreats including viruses can be added to the system library by developing the appropriate NMR Bioassay. The system is also capable of adapting existing nucleic acid assays developed for other detection platforms. Applications include threat monitoring and biosurveillance, bioprocessing, clinical diagnosis, and food and water safety. The small footprint of the system will allow it to be used in a wide variety of locations, including public buildings, transportation centers, clinics and food processing establishments. The development of the MENTOR-100 has been supported by the Department of Homeland Security (DHS) and the Defense Threat Reduction Agency (DTRA). The MENTOR-100 has successfully detected blind assays at the Edgewood Chemical Biological Center (ECBC).

TECHNICAL DESCRIPTION:

The MENTOR-100 biodetector uses the properties of paramagnetic nanoparticles to change the nuclear magnetic resonance (NMR) relaxation time of protons in an aqueous solution. Paramagnetic nanoparticles coated with a molecular binding agent together with specialized nucleic acid probes are introduced into the assay and processed. The interaction of the nanoparticles, probes and the target's nucleic acid causes a change in the NMR relaxation time when the target is present compared to when it is absent. This change in relaxation time is used to indicate the presence of the target.

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

CONTACT INFORMATION

Menon International
16550 W Bernardo Dr., Bldg 5, Ste:525
San Diego, CA 92127
POC: skumar@menon.us
www.menon.us

COST

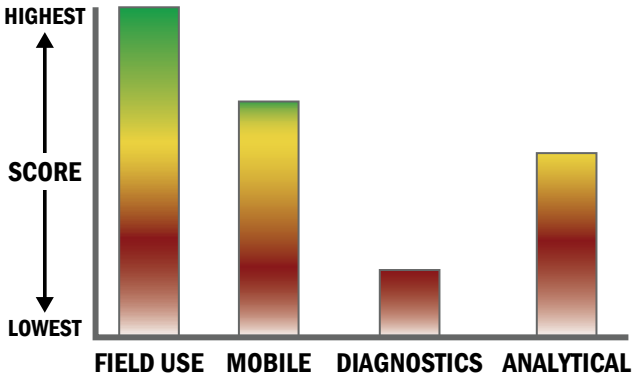
- $120,000/system
- $2.50/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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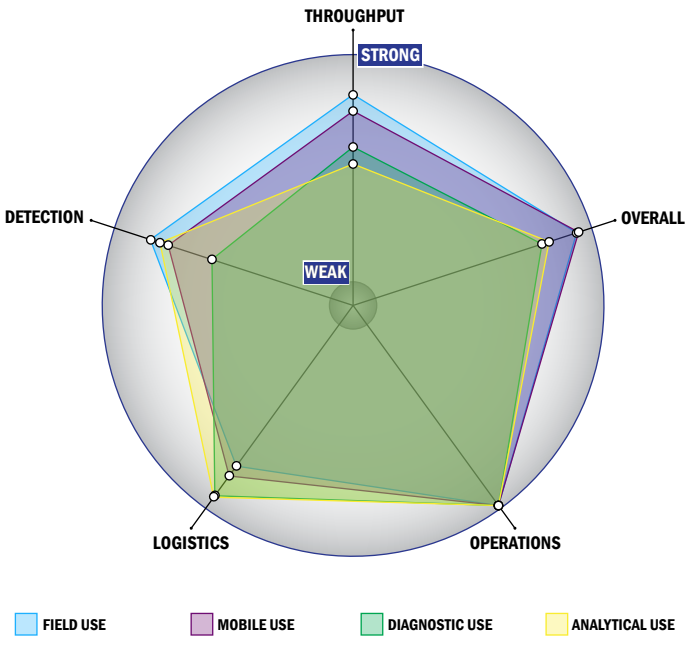


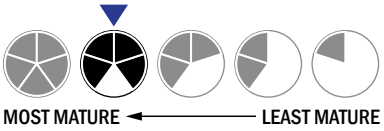
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 0 components
- No set-up of the system is required
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- 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:

- 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Less than 1 ng per mL
- Fully automated spore lysis

Mesa Tech Intl, Inc. - MTIDx: Rapid Multiplexed Molecular Diagnostics in a Stand-Alone Low Cost Disposable Platform

GENERAL DESCRIPTION:



MITDx is a stand-alone (instrumentation independent), disposable, nucleic acid-based molecular diagnostic platform that integrates nucleic acid extraction, amplification and detection into one simple self-contained device for point of care or resource-limited settings. It does not require elaborate lab infrastructure, expense instrumentation and highly trained personnel. It has capability to detect and differentiate multiple pathogen targets, subtypes, antibiotic resistance from sample-to-answer in <45 minutes. The readout module can either be simple colorimetric Yes or No answers, or digital quantitative readout via the use of a cell phone-sized reader. The data collected from the diagnostic device has the option to be submitted to the remote data processing center via wireless or secure data transferring methods. The device has the option to be run on batteries or regular AC electricity outlets.

TECHNICAL DESCRIPTION:

The MTIDx platform relies on the novel integration of novel paper chromatography-based passive nucleic acid extraction, robust Oscillating nucleic acid amplification and colorimetric lateral flow-based hybridization detection into one simple cell-phone sized device. It employs greatly simplified engineering solutions that does not requires traditional active valves, pumps, moving parts, Peltier-based thermocycling apparatus etc. The fluid flow is controlled by the combination of gravity and capillary motion via a set of temperature-sensitive valves. The firing of the valves of controlled by a low cost, programmable, micro-controller unit.

CONTACT INFORMATION

Mesa Tech Intl, Inc.
2778 Agua Fria St, C/A
Santa Fe, NM 87507
POC: Hong Cai
505-424-1114
hcai@mesabiotech.com
www.mesabiotech.com

COST

- N/A/system
- $20-$50/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

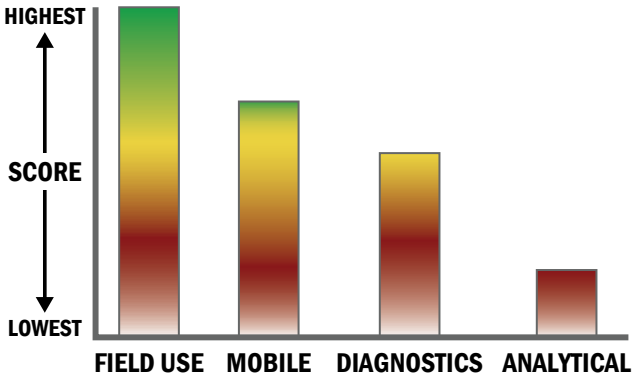
	Biological	Chemical	Radiological
FIELD USE System		N/A	N/A
MOBILE Laboratory		N/A	N/A
DIAGNOSTIC Laboratory		N/A	N/A
ANALYTICAL Laboratory		N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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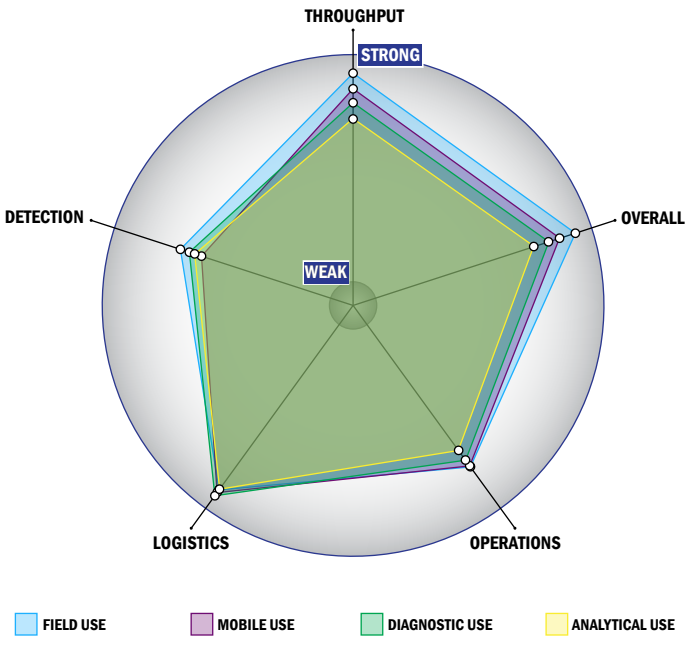


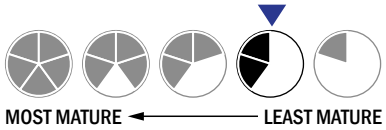
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- 1 sample, >10 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 designed for a single use
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

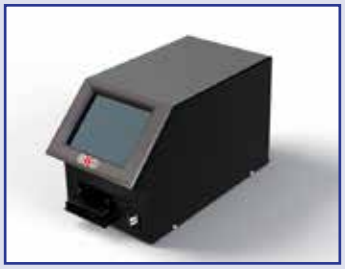
- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- Less than 1 year expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system does not employ any software
- The system is single use or this question does not apply to this device

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
- Less than 100 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- 100-1,000 ng per mL
- Add on capability that is full or semi-automated for spore lysis

Meso Scale Diagnostics (MSD), LLC - Cartridge Reader

GENERAL DESCRIPTION:



The Cartridge Reader system uses MSD's MULTI-ARRAY® electrochemiluminescence (ECL) technology to enable highly sensitive multiplexed immunoassay measurements in a compact, fully-automated format. The Cartridge Reader system consists of a compact reader instrument (12.5 lbs., 9" H x 8" W x 14" D) and single-use disposable cartridges that can conduct multiplexed measurements of up to 20 targets or controls per sample. The cartridges include integrated microfluidics to allow for fully automated sample processing and analysis without user intervention. Two cartridges types are available: one for analyzing liquid samples and the other for swab samples. To run an assay, the sample (liquid or swab) is inserted into the appropriate cartridge and the cartridge is then capped and loaded into the reader. All subsequent processing steps, including swab extraction (swab cartridge) and multiplexed ECL detection are fully automated. The system can detect and measure bacteria, viruses, and toxins with limits of detection many times lower than lateral flow immunoassays. The system is extremely simple to operate and provides a result in about 15 minutes. The Cartridge Reader system is still under development for laboratory and point-of-care clinical and environmental testing applications and is not yet commercially released. However, the instrument has been tested at DoD technology readiness evaluations (TREs) and has been through clinical evaluations in the U.S. and other locations worldwide for influenza diagnostics.

TECHNICAL DESCRIPTION:

MSD's PR2 and Cartridge Reader instruments employ MSD's MULTI-ARRAY® technology that combines electrochemiluminescence (ECL) detection and array-based multiplexed measurements. ECL immunoassays enable highly sensitive measurement of samples for the presence of bacteria, viruses, and toxins. The measurements are performed on arrays printed on carbon ink electrodes that are incorporated into multi-well assay plates and cartridges. MULTI-ARRAY technology consistently has been demonstrated to provide high performance measurement capability in a wide range of matrices and in the presence of many interferents. While MULTI-ARRAY technology is primarily used for immunoassays, the technology can also be used for multiplexed nucleic acid measurements.

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

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

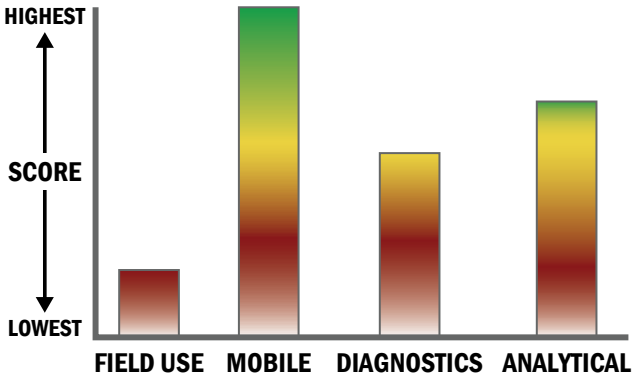
Meso Scale Defense, a division of Meso Scale Diagnostics (MSD®), LLC
POC: Charles Clinton
240-631-2522 x4617
cclinton@mesoscale.com
www.mesoscale.com

COST

N/A

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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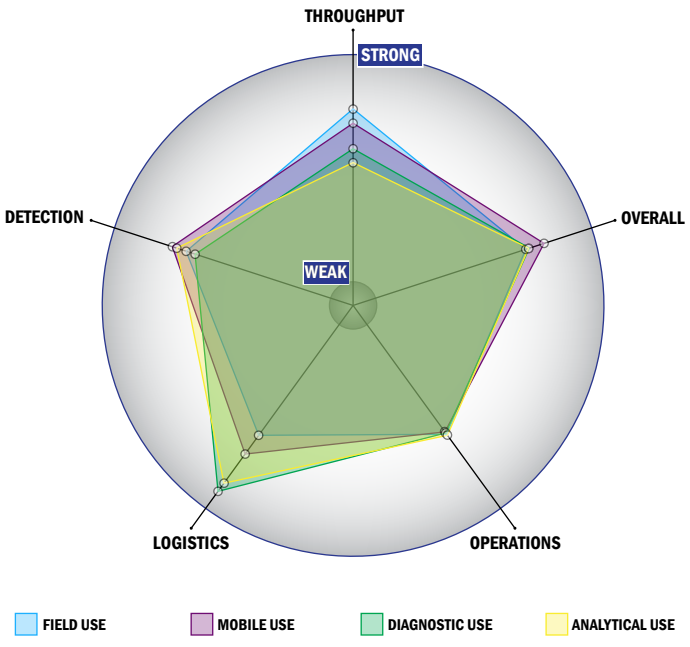


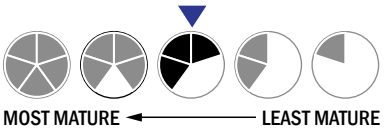
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, >10 tests/sample per run
- Less than 32 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
- 2 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at 4 °C
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results cannot 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:

- 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
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1,000-10,000 CFU per mL
- 10,000-100,000 PFU per mL
- Less than 1 ng per mL
- Spore lysis not necessary for detection by system

Meso Scale Diagnostics (MSD), LLC - SECTOR® PR2 Model 1500

GENERAL DESCRIPTION:



The SECTOR® PR2 instrument product line uses MSD's MULTI-ARRAY® electrochemiluminescence (ECL) technology to carry out highly sensitive, multiplexed immunoassays for biothreat agents. The PR2 instruments work with MSD's MULTI-ARRAY® 96-well assay plates. Each well of the plate has an array of up to 25 different antibodies to enable multiple targets (including bacteria, viruses, toxins and internal process controls) to be measured simultaneously. To provide stability and ease of use, the plates are sealed and contain all the required antibody reagents in dry format. The PR2 product line has been used to test a wide variety of sample types including many clinical sample types, dry filter unit extracts, aerosol samples, food and beverage samples, water, and soil samples. MSD's MULTI-ARRAY biodefense assays have undergone a range of sensitivity, near neighbor, interferent, and suspicious powder testing.

The PR2 Model 1500 instrument is designed for OEM use in aerosol, water, or other sampling applications where autonomous sample analysis is desired. The Model 1500 includes a sample reservoir that accepts a 1mL liquid sample from the host system. The Model 1500 can then be commanded via the instrument's Ethernet interface to analyze the sample and provide results back to the host system in XML format. Time to result can be as short as 15 minutes. The instrument can accept a new liquid sample every five minutes and process multiple samples in parallel.

TECHNICAL DESCRIPTION:

MSD's PR2 and Cartridge Reader instruments employ MSD's MULTI-ARRAY® technology that combines electrochemiluminescence (ECL) detection and array-based multiplexed measurements. ECL immunoassays enable highly sensitive measurement of samples for the presence of bacteria, viruses, and toxins. The measurements are performed on arrays printed on carbon ink electrodes that are incorporated into multi-well assay plates and cartridges. MULTI-ARRAY technology consistently has been demonstrated to provide high performance measurement capability in a wide range of matrices and in the presence of many interferents. While MULTI-ARRAY technology is primarily used for immunoassays, the technology can also be used for multiplexed nucleic acid measurements.

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

This system has been selected for future fielding by the U.S. DoD.

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

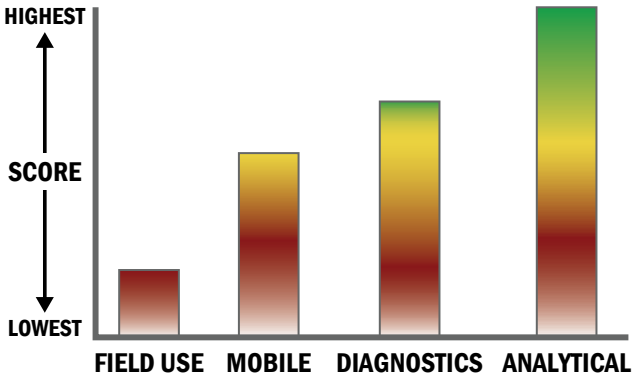
Meso Scale Defense, a division of Meso Scale Diagnostics (MSD®), LLC
POC: Charles Clinton
240-631-2522 x4617
cclinton@mesoscale.com
www.mesoscale.com

COST

- $90,000/system
- ~$4.50/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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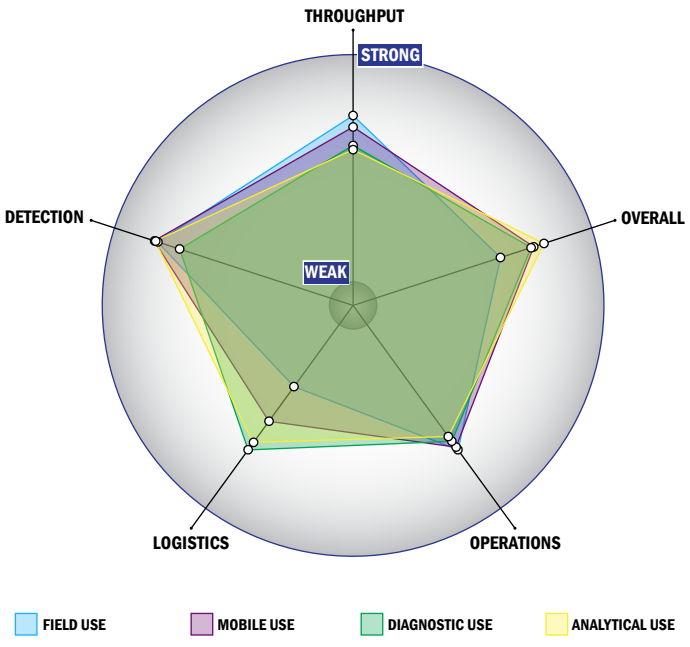


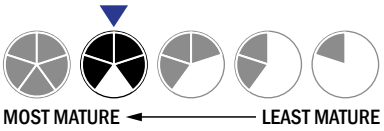
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 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
- 1 component
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 25 and 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- 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
- Greater than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Less than 1 ng per mL
- Spore lysis not necessary for detection by system

Meso Scale Diagnostics (MSD), LLC - SECTOR® PR2 Model 1800

GENERAL DESCRIPTION:



The SECTOR® PR2 instrument product line uses MSD's MULTI-ARRAY® electrochemiluminescence (ECL) technology to carry out highly sensitive, multiplexed immunoassays for biothreat agents. The PR2 instruments work with MSD's MULTI-ARRAY® 96-well assay plates. Each well of the plate has an array of up to 25 different antibodies to enable multiple targets (including bacteria, viruses, toxins and internal process controls) to be measured simultaneously. To provide stability and ease of use, the plates are sealed and contain all the required antibody reagents in dry format. The PR2 product line has been used to test a wide variety of sample types including many clinical sample types, dry filter unit extracts, aerosol samples, food and beverage samples, water, and soil samples. MSD's MULTI-ARRAY biodefense assays have undergone a range of sensitivity, near neighbor, interferent, and suspicious powder testing.

The PR2 Model 1800 instrument is a plate reader that is used for final readout of MULTI-ARRAY plates. Assay processing consists of sample introduction into the plate (125 µL), incubation (15-30 minutes), and wash steps prior to readout on the PR2 Model 1800 instrument. Using this semi-automated approach enables very high throughput testing of samples. With a 5 minute read time for 96-well plates, the PR2 Model 1800 instrument can test 1000+ samples per hour each in multiplex format up to 25-plex. The instrument includes a graphical user interface for analysis of results and an on-board database for storage of results.

TECHNICAL DESCRIPTION:

MSD's PR2 and Cartridge Reader instruments employ MSD's MULTI-ARRAY® technology that combines electrochemiluminescence (ECL) detection and array-based multiplexed measurements. ECL immunoassays enable highly sensitive measurement of samples for the presence of bacteria, viruses, and toxins. The measurements are performed on arrays printed on carbon ink electrodes that are incorporated into multi-well assay plates and cartridges. MULTI-ARRAY technology consistently has been demonstrated to provide high performance measurement capability in a wide range of matrices and in the presence of many interferents. While MULTI-ARRAY technology is primarily used for immunoassays, the technology can also be used for multiplexed nucleic acid measurements.

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

Notes

In use by DoD Laboratories.

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

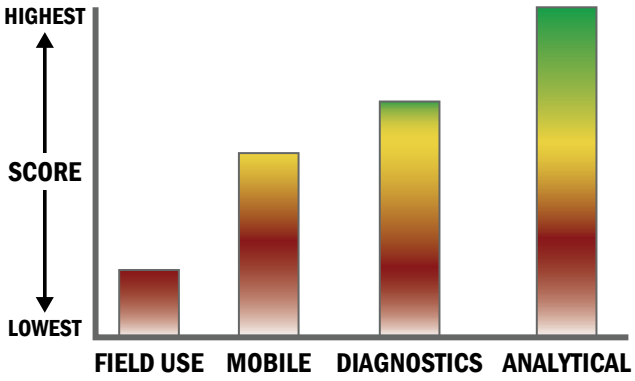
Meso Scale Defense, a division of Meso Scale Diagnostics (MSD®), LLC
POC: Charles Clinton
240-631-2522 x4617
cclinton@mesoscale.com
www.mesoscale.com

COST

- $80,000/system
- ~$4.50/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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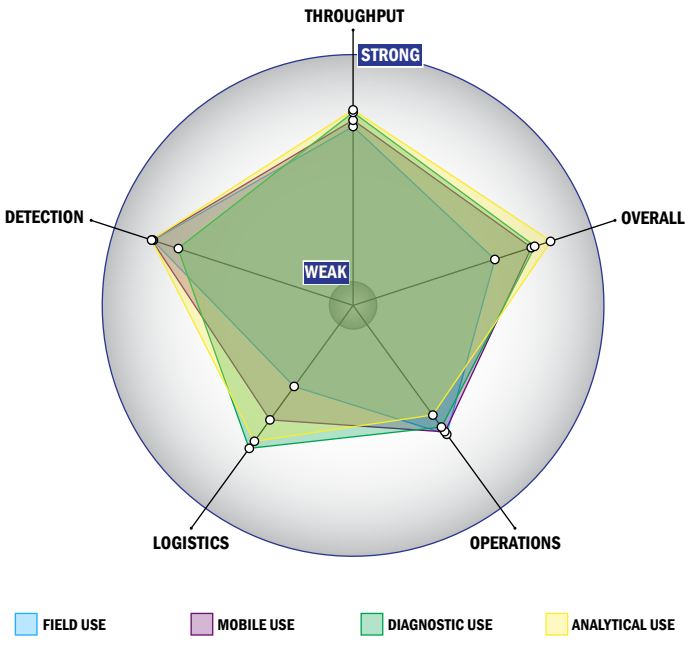


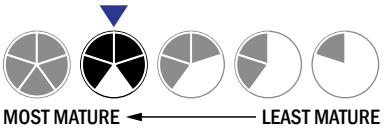
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 3 components
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 25 and 50 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- 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
- Less than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Less than 1 ng per mL
- Spore lysis not necessary for detection by system

Microfluidic Systems - Microfluidic - Bioagent Autonomous Networked Detector (M-BAND)

GENERAL DESCRIPTION:



The Microfluidic - Bioagent Autonomous Networked Detector (M-BAND) is a fully automated, wirelessly networked airborne pathogen detection and identification system designed to run for up to 1 month continuously without human intervention. It can specifically identify bacteria, viruses, and toxins at threat levels indoors and outdoors. It has been field tested for over 2 years by several independent agencies domestically and internationally.

TECHNICAL DESCRIPTION:

The M-BAND is a modular and fully integrated system that includes a high volume air collector, sample purification, Taqman PCR for bacteria and viruses, and chemiluminescence immunoassays for toxins. It includes 16 multiplexed PCR signatures for 6 bio-threat agents, and immunoassays for 3 toxins. It has extra capacity designed into the system for additional bio-threat agents to be included in detection. It is fully networked and remotely operable.

CONTACT INFORMATION

Microfluidic Systems
1252 Quarry Lane, Suite A
Pleasanton, CA 94566
POC: Lyle Probst
Lprobst@microfluidicsystems.com
925-474-2189

COST

- $190,000/system
- $35/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

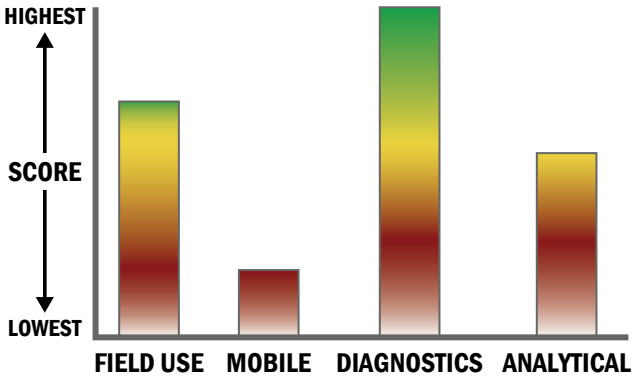
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Fourth Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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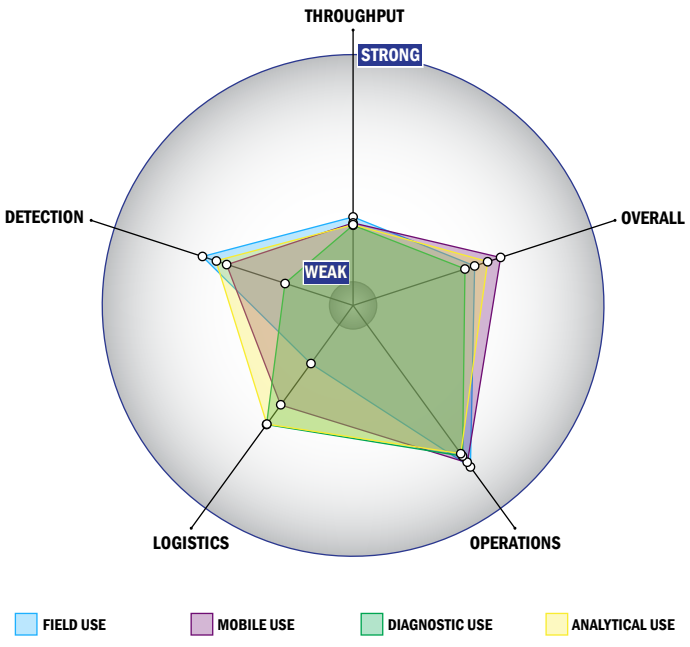


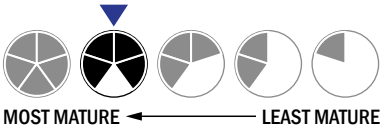
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- 1 sample, >10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 1 component
- Greater than 20 minutes is required for set-up
- Automatic detection

Logistics:

- A day of training and technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device requires multiple outlets or a dedicated circuit breaker



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at 4°C
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results cannot 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

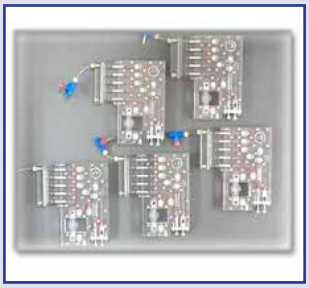
Detection:

- Greater than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- 1-10 ng per mL
- Fully automated spore lysis

Microfluidic Systems - The Dragonfly System

GENERAL DESCRIPTION:

The Dragonfly System platform offers the precision of molecular diagnostics in an easy to use format that can deliver confirmatory results in 30 minutes or less. The Dragonfly platform is being designed to be a Role 1 CLIA-waived diagnostic device that is highly multiplexed and designed for diagnostic/confirmatory field use by a medically trained operator in a "primary care" setting (Point of Care or Point of Need settings).



TECHNICAL DESCRIPTION:

The assay format of the Dragonfly platform is TaqMan probe-based chemistry in a single-use disposable cartridge. The Dragonfly platform cartridge system is able to process clinical samples such as blood, urine, saliva, buccal and nasopharyngeal swabs. It is also anticipated that the system will have the ability to process stool samples in subsequent generations of the device. All sample preparation necessary post-collection is performed within the disposable cartridge of the Dragonfly platform system. The Dragonfly platform uses ultrasonic lysis for the rupture of tough cell membranes that are then microfluidically passed through a purification column preferentially binding the nucleic acid in the presence of chaotropic agents. The nucleic acid is washed with multiple steps prior to being eluted into the detection chamber of the instrument. The current time-to-result for the Dragonfly platform is thirty (30) minutes or less, depending on which assay panel is being performed. We anticipate a further reduction in time-to-result in subsequent generations of the system. The Dragonfly platform will be fully automated with radio frequency identification (RFID) chips embedded in each cartridge allowing for efficient, automated, error-free protocol determination by the Platform programming. Required training for the Dragonfly platform will be minimal taking less than 1 hour and utilizing easy to understand simple visual aids. The Dragonfly platform requires no human interpretation and is capable of reporting data out-put (positive/negative) to a local, on-screen digital readout and or electronic data output to a remotely located server.

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

CONTACT INFORMATION

Microfluidic Systems
1252 Quarry Ln. Suite A
Pleasanton, CA 94566

COST

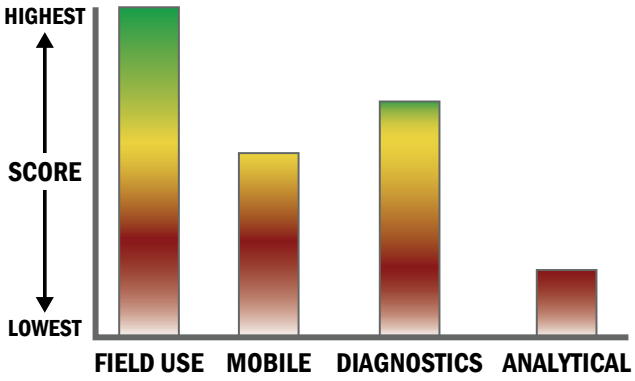
- $15,000-$20,000/system
- $10-$15/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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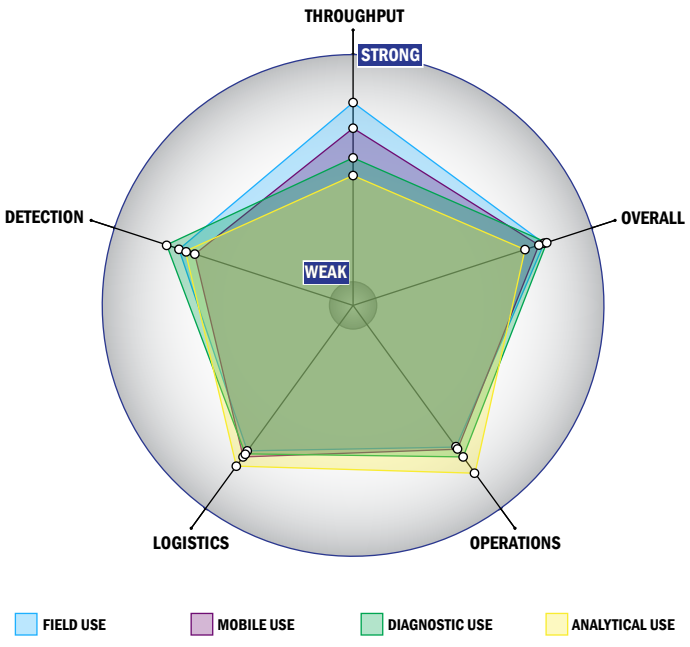


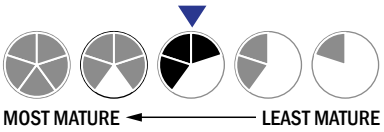
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 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
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25 kg
- Satellite, wireless and wired connections are available
- System or device uses batteries
- 1-2 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- 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
- Possible the system could receive FDA approval, no current efforts at this time
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- 1-10 ng per mL
- Fully automated spore lysis

Micronics, Inc. - PanNAT system

GENERAL DESCRIPTION:



The PanNAT system is a sample-to-solution, man-portable, PCR-based instrument that is mains and/or battery powered, lightweight and WiFi-enabled. It processes a microfluidics-enabled cartridge into which all reagents are integrated for extraction, amplification and detection of multiple targets from a single sample. Waste is captured on cartridge. Designed for lowest cost, the system employs molecular beacon probe technology and BTI dyes and quenchers together with Micronics' novel heating and cooling method for end point detection. It is real time capable. The system is designed for use at ambient temp; no refrigeration is required. The system is designed to meet the FDA's 510(k) Class II device and CLIA Waiver guidelines.

TECHNICAL DESCRIPTION:

Microfluidics-enabled sample processing of all nucleic acid assay steps with reagents integrated into the disposable cartridge for multiplex end point polymerase chain reaction detection in a man-portable point of care instrument. Novel heating and cooling platform and lowest cost fluorescent detection.

CONTACT INFORMATION

Micronics, Inc.
8463 154th Avenue N.E.
Redmond, WA 98052
POC: Reed Simmons VP, Manufacturing
PH (425)895-9197 x 141
rsimmons@micronics.net

COST

- $8,000/system
- $4/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

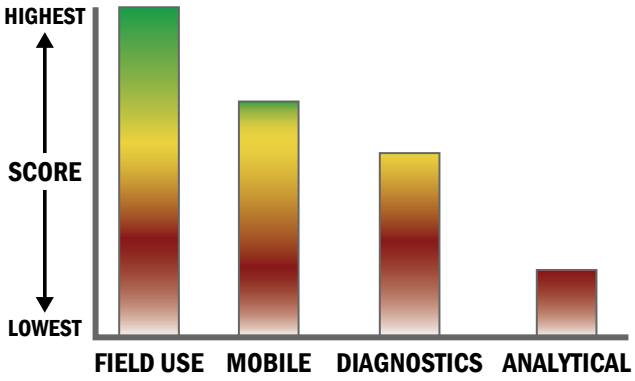
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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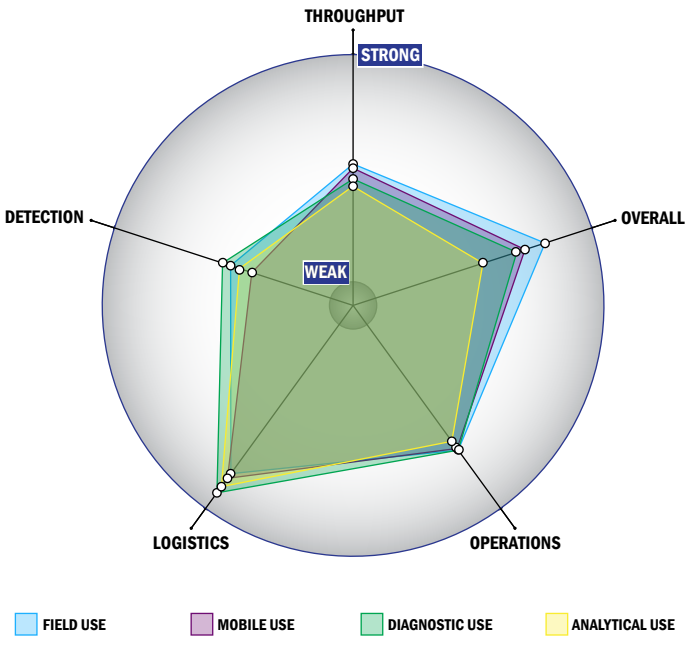


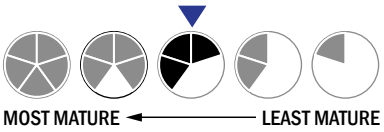
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- 1 sample, >10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 4 solutions, buffer, eluents, and/or reagents
- 1 component
- Less than 5 minutes is required for setup
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- 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 room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- 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
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL

Microscopes International - µScope MX - POC Diagnostics

GENERAL DESCRIPTION:



Microscopes International (MI) builds portable digital slide microscopes for brightfield and fluorescence microscopy. In a transportable form factor these USB attachable devices are small, lightweight and easy to use. The µScope MX is small enough for field work and powerful enough for laboratory use. When used with Microscopes International multi-test slides and diagnostic software the µScope MX can automatically perform a large variety of biological tests with a single sample. Digital automation enables remote control and diagnostics to be performed by experts anywhere in the world. The µScope MX is USB connected to a computing device (PC, Laptop, Tablet) and can be used to automate any test that a microscope can detect. Software API's can be used to attach the µScope MX to existing biological detection software or to create specialized tests.

TECHNICAL DESCRIPTION:

Microscopes International has created the first portable low cost wavelength limited Digital Microscope (µScope MX). A full array of morphological (e.g., cell count, hematology, white cell differential, bacteria, fluorescent markers, tissue sample, etc.) and diagnostic tests (e.g., immunological, protein, hormonal, chemical, genetic, etc.) can be performed on the same drop of blood (or body fluid) at wavelength limited resolution and is fully automated. The system is mobile, can be powered by USB, battery or wall plug, is the size of an external hard drive and has an overnight FedEx shipping weight of less than 4 lbs.

CONTACT INFORMATION

Microscopes International
555 Republic Drive, Suite 105
Plano, TX 75074-5469
POC: Scott Byker
888-726-7350 x712
scott.byker@uscopes.com
www.microscopesinternational.com

COST

- $12,500/system
- $20/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

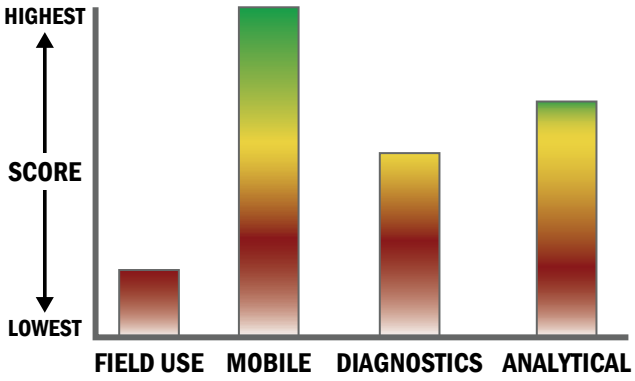
	Biological	Chemical	Radiological
FIELD USE System	Top Tier	N/A	N/A
MOBILE Laboratory	Top Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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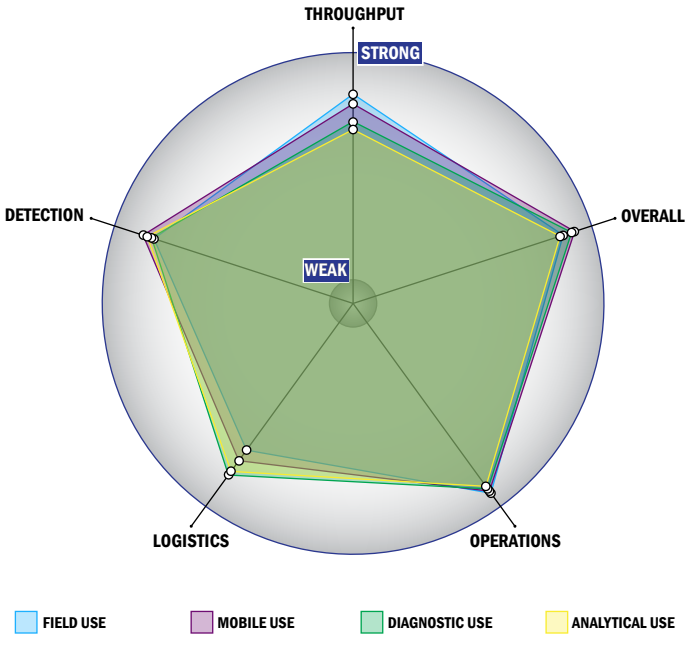


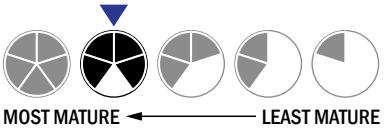
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- Less than 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:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- Satellite, wireless and wired connections are available
- System or device uses batteries
- 1-2 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 3-5 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- System currently has FDA approval
- Less than 10 µL
- 1-100 CFU per mL
- 1-100 PFU per mL
- 1-10 ng per mL
- Spore lysis not necessary for detection by system

Mine Safety Appliances (MSA) Co., Inc. - Biosensor 2200R

GENERAL DESCRIPTION:



The BIOSENSOR 2200R biological agent detector is a handheld, portable, on-site instrument for rapid detection, analysis, and identification of biological agents. Unique bioassay technology offers excellent sensitivity and low false positives while offering ease of use in the field. This highly accurate detection method provides rapid measurement of biohazards such as anthrax, ricin, botulism, SEB, and plague. Exclusive five minute time-to-answer allows first responders to make informed critical decisions more rapidly than any other biological agent detector. The BIOSENSOR 2200R employs dynamic surface generation, a patent pending type of immunomagnetic assay detection technology. This technology offers significant advantages over other field-based assay methods by combining the benefits of both the free solution and lateral flow types. The result is more rapid analysis, a user-friendly format, and detector stability within a wide range of climates. Both wet and dry samples may be tested and results are displayed with a simple red (target present) or green (no target present) indication. As tests are nondestructive, samples may be retained as evidence. Single-test, disposable cartridges with on-board reagents have a 16 month shelf life. This instrument is IP 67 certified and permanently housed in a sturdy, light weight fully decon-able Pelican case. Recent research and development has demonstrated that the Biosensor 2200R can identify targets in whole blood and can be utilized as a human diagnostic device.

TECHNICAL DESCRIPTION:

The BIOSENSOR 2200R employs dynamic surface generation, a patent pending type of immunomagnetic sandwich assay technology.

- MIX Sample is mixed with the sensing solution which contains: a magnetic component, a fluorescent component and receptors for the biological agent(s) of interest.
- BIND Sensing materials bind to target during incubation.
- MAGNETIZE All bound and unbound magnetic material is pulled to surface.
- WASH All remaining sensing and non-target material is washed away. False positives are virtually eliminated by removing potential interferents.
- READ Concentrated sample (pellet) is illuminated and emits a signal if target is present

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 and Internet Supplied Information

CONTACT INFORMATION

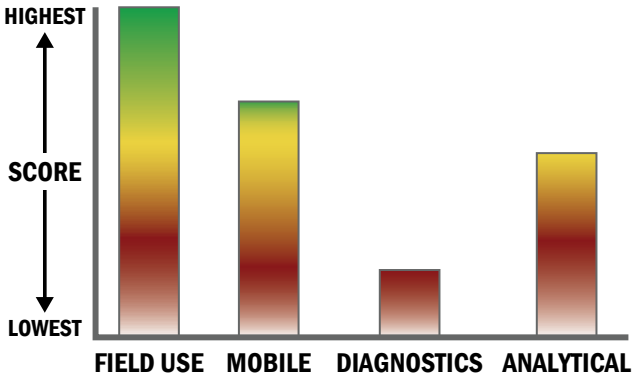
Mine Safety Appliances Co. (MSA), Inc.
1000 Cranberry Woods Drive
Cranberry Township, PA 16066
POC: Norm Davis
724-776-8884 or 412-551-1017
Norm.Davis@MSAnet.com
www.msasafety.com

COST

- $15,995/system
- <$50/analysis

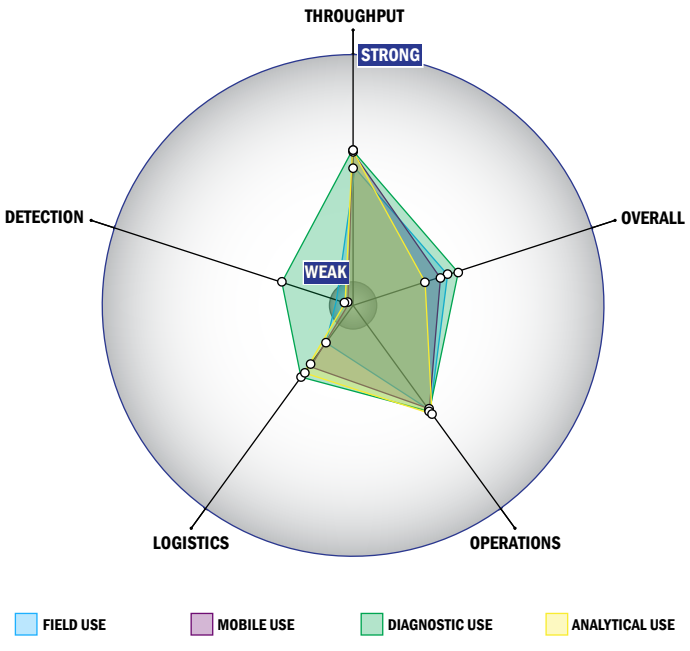
Scoring Analysis

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.



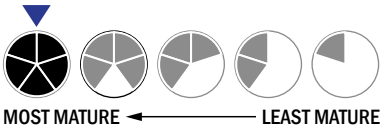
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 6-8 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- 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 room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Less than 1 ng per mL
- Spore lysis not necessary for detection by system

Mine Safety Appliances (MSA) Co., Inc. - BIOSENSOR 4000

GENERAL DESCRIPTION:



The BIOSENSOR 4000 offers first responders and emergency medical technicians an automated instrument to further advance biological agent detection in the field, on the ambulance and in the laboratory. The BIOSENSOR 4000 fully automates the detection process from wet or dry sample introduction to result. The assay cartridge enables users to test simultaneously for up to eight pathogens. Unique bioassay technology offers excellent sensitivity and low false positives while offering ease of use in the field. This highly accurate detection method provides rapid measurement of multiple biohazards. Exclusive five minute time-to-answer allows first responders to make informed critical decisions more rapidly than any other biological agent detector. The BIOSENSOR 4000 employs dynamic surface generation, a patent pending type of immunomagnetic assay detection technology. The instrument and technology offer significant advantages over other field and lab based assay methods. Results are displayed with a simple red or green indication. As tests are nondestructive, samples may be retained as evidence. This instrument is IP 67 certified and permanently housed in a sturdy, light weight fully decon-able Pelican case. Research and development has demonstrated that the BIOSENSOR 4000 can identify targets in whole blood and can be utilized as a human diagnostic device.

TECHNICAL DESCRIPTION:

The BIOSENSOR 4000 employs dynamic surface generation, a patent pending type of immunomagnetic sandwich assay technology.

1. MIX Sample is mixed with the sensing solution which contains: a magnetic component, a fluorescent component and receptors for the biological agent(s) of interest.
2. BIND Sensing materials bind to target during incubation.
3. MAGNETIZE All bound and unbound magnetic material is pulled to surface.
4. WASH All remaining sensing and non-target material is washed away. False positives are virtually eliminated by removing potential interferents.
5. READ Concentrated sample (pellet) is illuminated and emits a signal if target is present.

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 and Internet Supplied Information

CONTACT INFORMATION

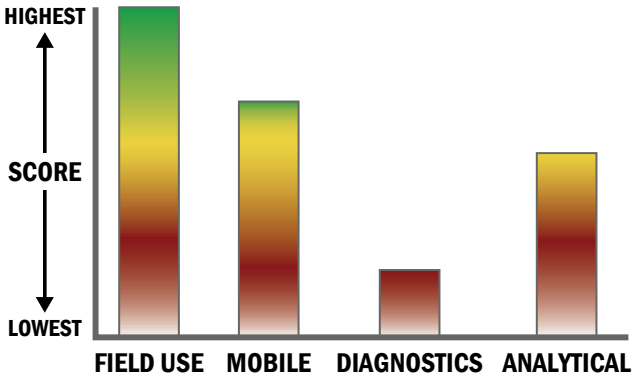
Mine Safety Appliances Co. (MSA), Inc.
1000 Cranberry Woods Drive
Cranberry Township, PA 16066
POC: Norm Davis
724-776-8884 or 412-551-1017
Norm.Davis@MSAnet.com
www.msasafety.com

COST

- $17,995/system
- <$75/analysis

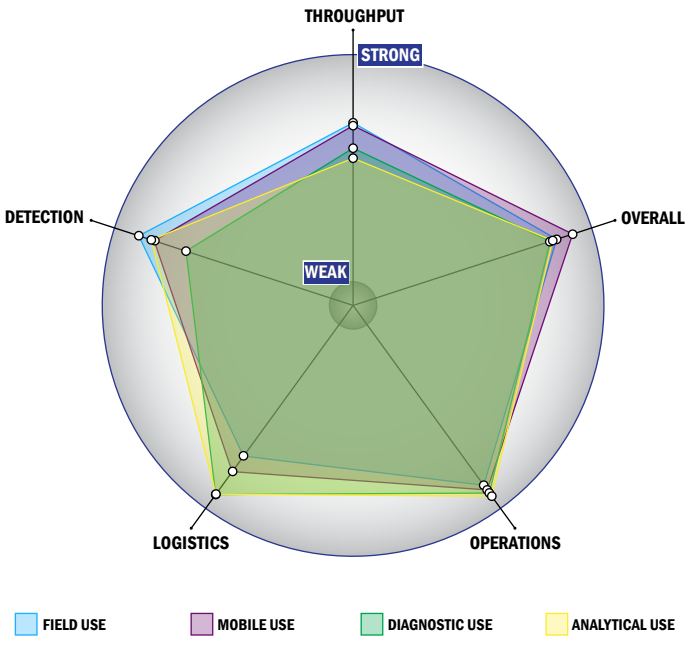
Scoring Analysis

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.



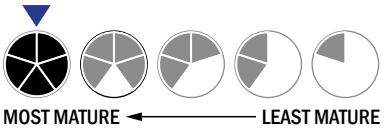
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25 kg
- Wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 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 open and available for modification
- The system hardware is open and 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Less than 1 ng per mL
- Spore lysis not necessary for detection by system

Mine Safety Appliances Co. (MSA), Inc. - HAZMATCAD and HAZMATCAD Plus (Hazardous Material Chemical Agent Detector)

GENERAL DESCRIPTION:

The HAZMACTAD series instruments are designed to detect chemical warfare agents (CWA) and toxic industrial chemicals (TICs). This product was designed for 1st responder application for an easy to operate instrument that can quickly determine to threats are present.



TECHNICAL DESCRIPTION:

The HAZMATCAD series uses a hybrid configuration of electrochemical cell array for the detection of blood (HCN), choke (COCl2), halogens (Cl2) and (Br2) and hydride gases (arsine, phosphine). It also use surface acoustic wave array for chemical agent detection.

CONTACT INFORMATION

Mine Safety Appliances Co. (MSA), Inc.
1000 Cranberry Woods Drive
Carnberry Township, PA 16066

COST

- $8,000/HAZMATCAD Plus system; $5,500/HAZMATCAD system
- <$1.00/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

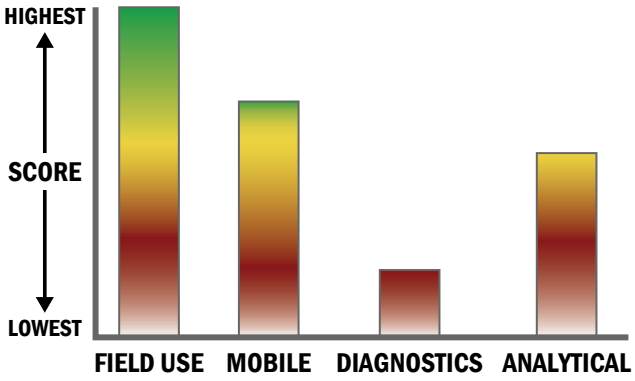
	Biological	Chemical	Radiological
FIELD USE System	N/A	Top Tier	N/A
MOBILE Laboratory	N/A	Second Tier	N/A
DIAGNOSTIC Laboratory	N/A	Third Tier	N/A
ANALYTICAL Laboratory	N/A	Second Tier	N/A

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

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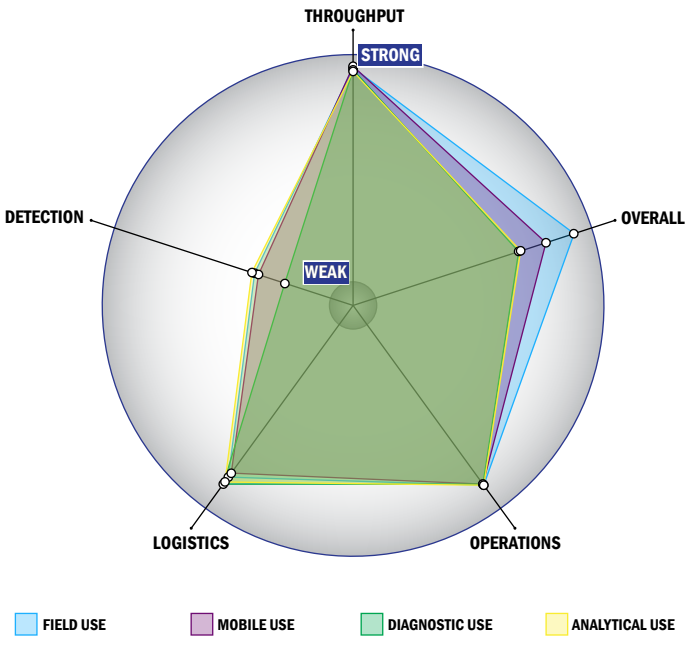


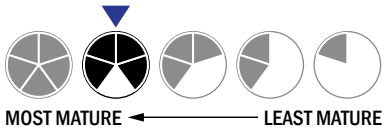
Evaluation Criteria

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 or device is currently fully automated
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from -21°C to 41°C
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 3-5 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- >$1x10^{-3}$ mg/m^3
- 1 ppb-1 ppm
- Possible system could identify liquid chemical agent

Mine Safety Appliances Co. (MSA), Inc. - SAFESITE MTX (Multi-Threat Monitor)

GENERAL DESCRIPTION:

The SAFESITE® Multi-Threat Wireless Detection System monitors, detects and communicates the presence of up to six potential threats, including chemical warfare agents (CWA), gamma radiation, volatile organic compounds (VOC), toxic industrial chemicals (TIC), combustible gas and oxygen deficiency, and operates within a wireless network.



- Toxic Industrial Chemicals – Detects for many (TICs) such as chlorine ammonia hydrogen cyanide and hydrogen chloride
- Gamma Radiation – and µ to m REM levels
- Volatile Organic Compounds - Uses a Photoionization detector 10.6 eV ionization source to detect chemicals
- Chemical Warfare Agents – Uses a SAW array to detect both nerve and blister agents. Excellent false positive resistance and sub mg/m^3 detection levels.
- Integrated GPS for automatic sensor position on GIS charts
- Compatible with ADASHI OptiMetrics 1st Responder Software –chemical plume modelling and weather integration.
- SAFESITE MTX monitor is designed as an open architecture data communication platform.

TECHNICAL DESCRIPTION:

This sensor uses different technologies to meet the mission requirement, electrochemical sensor, catalytic, photoionization, CZT, Geiger Muller and Surface Acoustic Wave (SAW) array.

CONTACT INFORMATION

MSA
1000 Cranberry Woods Drive
Cranberry Township, PA 16066

COST

- $40,000/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

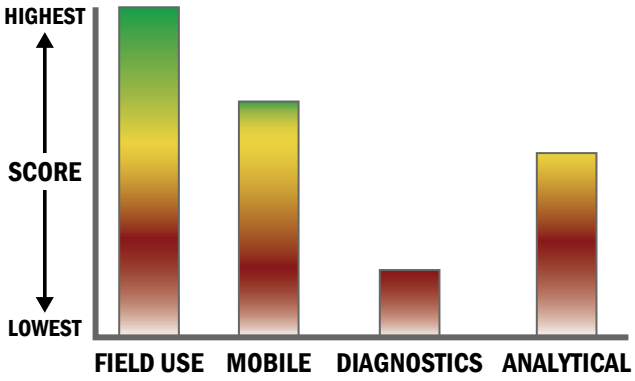
	Biological	Chemical	Radiological
FIELD USE System	N/A	Top Tier	Top Tier
MOBILE Laboratory	N/A	Top Tier	Third Tier
DIAGNOSTIC Laboratory	N/A	Top Tier	Third Tier
ANALYTICAL Laboratory	N/A	Top Tier	Third Tier

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

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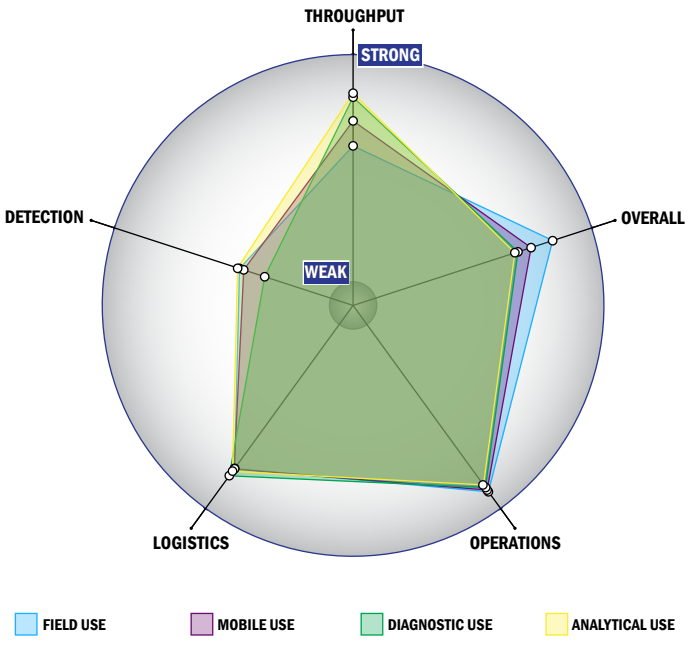


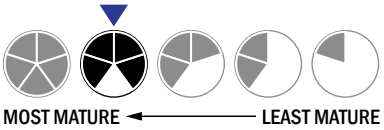
Evaluation Criteria

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 or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 1 component
- 5-10 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 < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 3-5 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- > $1x10^{-3}$ mg/m^3
- 1 ppb-1 ppm
- System currently can identify aerosolized chemical agent
- Possible the system could identify liquid chemical agent Only dose rate
- Display indicates 0 until more than 1 mR/hr is detected for dose rate
- System is used for area air sampling

Mirion Technologies, Inc. (MGPI) - HDS-101GN Search And Identification

GENERAL DESCRIPTION:

The HDS-101GN is designed to search for and identify radioactive materials and to respond to radiological threats such as illicit trafficking and RDDs. The HDS-101Gn can identify radionuclides and classify them as medical, industrial, naturally occurring radioactive materials (NORM) and special nuclear materials (SNM). The HDS-101G/GN are ideally suited for First Responders, Border & Customs inspectors, Law Enforcement Officers, Site Security in critical infrastructures, and for all applications related to the control of radioactive and nuclear materials.



TECHNICAL DESCRIPTION:

NORM Medical Discrimination algorithm (NMD) categorizes and identifies up to 4 isotopes simultaneously.

CONTACT INFORMATION

Mirion Technologies, Inc. (MGPI)
5000 Highlands Parkway, Ste 150
Smyrna, GA 30082
POC: Keith Spero
770-432-2744 x163
www.mirion.com

COST

- $9,500/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

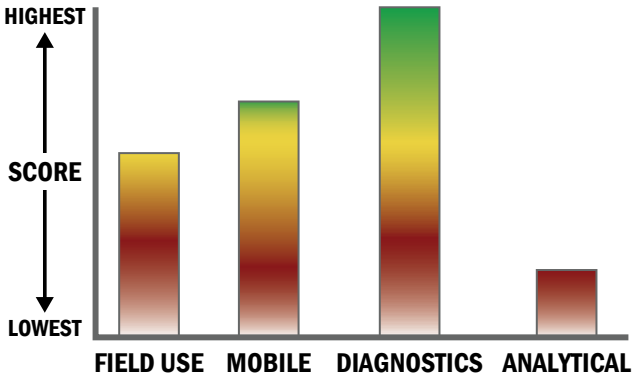
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Bottom Tier
MOBILE Laboratory	N/A	N/A	Fourth Tier
DIAGNOSTIC Laboratory	N/A	N/A	Fourth Tier
ANALYTICAL Laboratory	N/A	N/A	Third Tier

Survey Source

Vendor and Internet Supplied Information

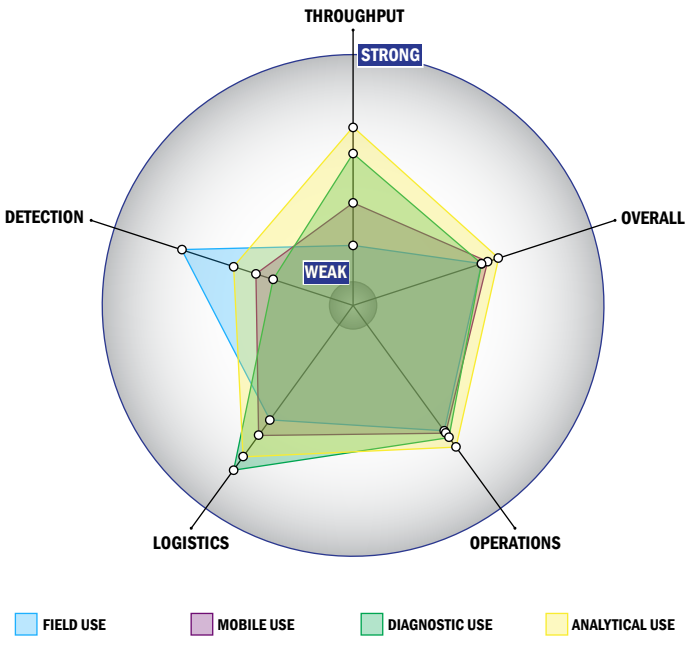
Scoring Analysis

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.



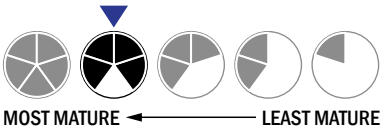
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple 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
- Less than 5 minutes is required for set-up

Logistics:

- An afternoon of training and some technical skills required
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from -21°C to 41°C
- 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 open but modification requires licensing

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

Mirion Technologies, Inc. (MGPI) - SPIR-ID Handheld Detection & Identification

GENERAL DESCRIPTION:



The SPIR-ID is a rugged handheld device designed to efficiently search for radioactive materials and "on the fly" discriminate threats such as illicit trafficking and Radiological Dispersal Devices (RDDs). The SPIR-ID quickly and reliably identifies and categorizes radionuclides for demanding scenarios including heavily shielded or masked threats due to a large volume detector associated with the Identpro/SIA algorithm specifically designed for homeland security. Detection and Identification performances exceed all ANSI N42-34 requirements. Rugged construction and simple routine user mode are ideally suited for field use in harsh environments.

TECHNICAL DESCRIPTION:

The SPIR-ID 3" NaI(Tl) includes a 3*2" rugged NaI(Tl) detector, plus a GM tube and 2 ancillary LiI(Eu) Neutron detectors. Identification performance allow correct threat assessment for very demanding scenarios exceeding current standards such as mixed isotopes, heavily shielded isotopes, medical isotopes or background masked SNMs.

CONTACT INFORMATION

Mirion Technologies, Inc. (MGPI)
5000 Highlands Parkway, Ste 150
Smyrna, GA 30082
POC: Keith Spero
770-432-2744 x163
www.mirion.com

COST

- $25,000/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

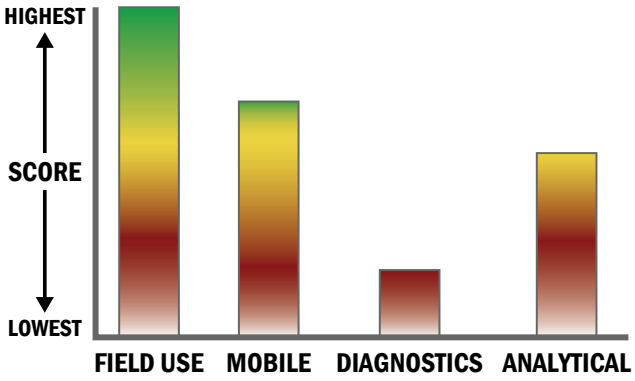
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Third Tier
MOBILE Laboratory	N/A	N/A	Third Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Second Tier

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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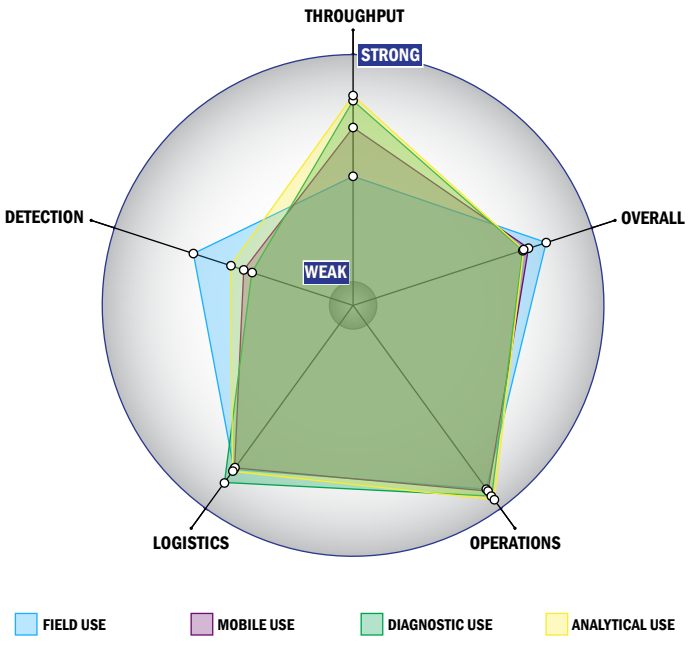


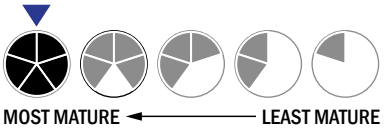
Evaluation Criteria

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 or device is currently fully automated
- Device or system is intended for multiple detection assays
- Less than 5 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- A day of training and technical skills are 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 < -21°C to > 42°C (All temperatures)
- 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 open but modification requires licensing

Detection:

- This system does not test liquids
- Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

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

MIT Lincoln Laboratories
244 Wood Street
Lexington, MA 02420
POC: Benjamin L. Ervin, Ph.D.
339-223-5332 or 781-981-5124
ben.ervin@LL.mit.edu

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	Bottom Tier	N/A
MOBILE Laboratory	N/A	Bottom Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Bottom Tier	N/A

Notes

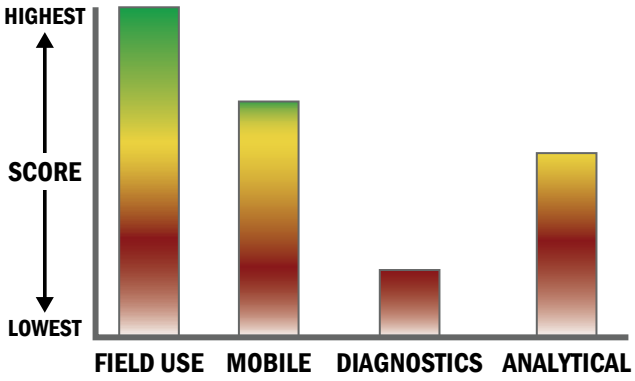
Not to be confused with the DoD's Common Analytical Laboratory System (CALS) which shares the same acronym.

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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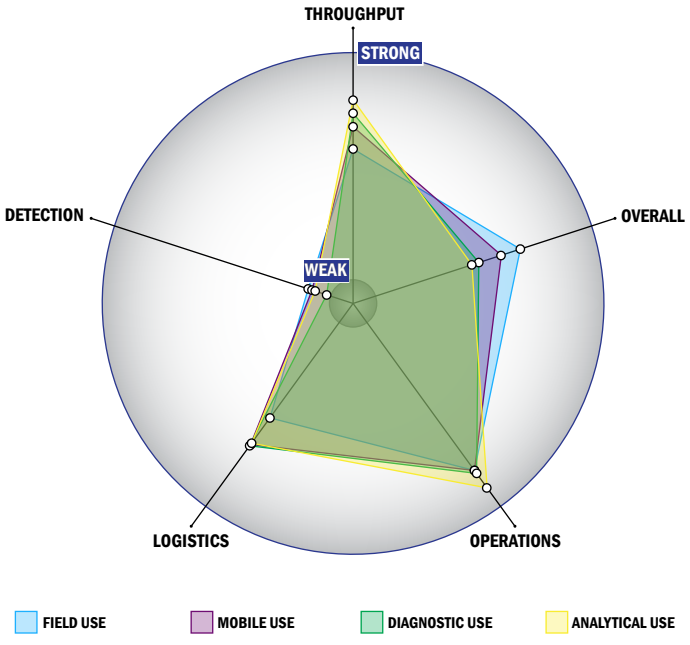


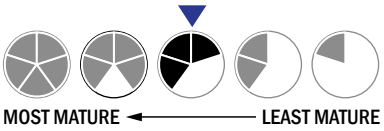
Evaluation Criteria

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



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

MKS Instruments, Inc. - AIRGARD and AIRGARD Plus (w/EC sensor)

GENERAL DESCRIPTION:



AIRGARD is an FTIR based chemical point sensor for simultaneous detection and alarming on 50+ CWAs and TICs at the ppb level within 10 seconds. It is designed to be for fixed installations, such as HVAC and ambient air monitoring. AIRGARD Plus is a version which also contains ancillary electrochemical sensors for detection of halogen and hydrogen sulfide vapors which have either little or no infrared signature. The AIRGARD has a near 0% false alarm rate as proven in significant government testing.

TECHNICAL DESCRIPTION:

AIRGARD uses a cryogenically cooled infrared quantum detector (MCT) to sensitively detect very small infrared absorptions from vapors enclosed in our patented 10.18 meter path length (400 mL volume) multipass cell. The classical least squares algorithm then processes any absorptions against our library of 370+ vaporous compounds and will alarm if any threat agent is detected with high certainty. The sample is introduced into the cell with a 10 L/min diprhagm pump, resulting in a T90 of approx. 4.5 seconds.

CONTACT INFORMATION

MKS Instruments, Inc.
651 Lowell Street
Methuen, MA 01844
POC: Robert G. Mallaney
910-842-2490
www.mksinst.com

COST

- $72,500/system
- ~0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

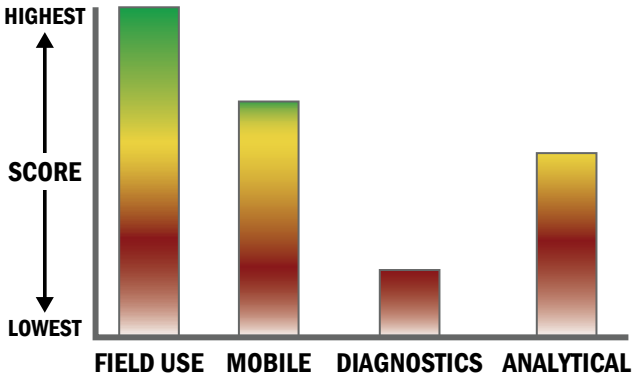
	Biological	Chemical	Radiological
FIELD USE System	N/A	Fourth Tier	N/A
MOBILE Laboratory	N/A	Fourth Tier	N/A
DIAGNOSTIC Laboratory	N/A	Fourth Tier	N/A
ANALYTICAL Laboratory	N/A	Third Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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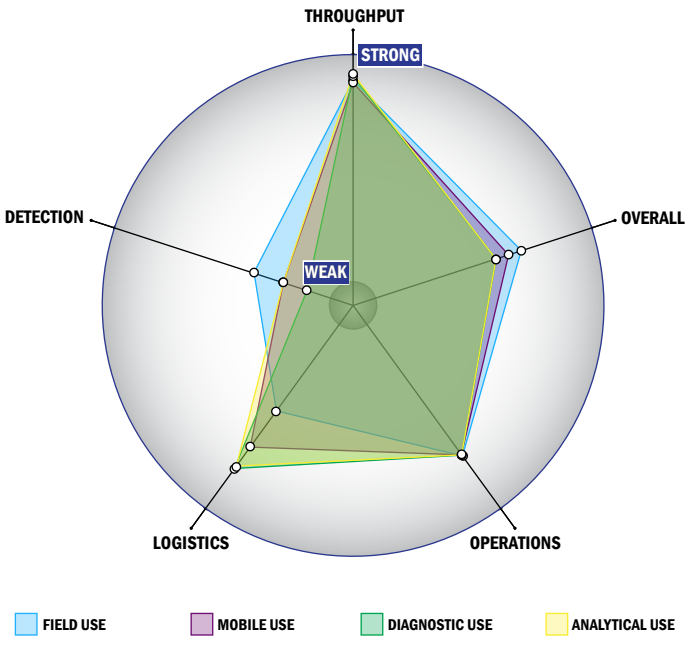


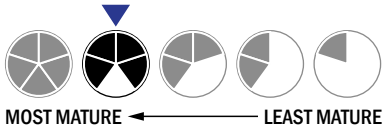
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- Greater than 750 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
- 10-20 minutes is required is required for setup
- Almost instantaneous 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
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Device or system has peak performance at normal relative humidity conditions
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- > $1x10^{-3}$ mg/m^3
- System currently can identify aerosolized chemical agent
- System could be adapted to identify liquid chemical agent

MKS Instruments, Inc. - AIRGARD FTIR Air Monitor

GENERAL DESCRIPTION:

AIRGARD is an FTIR-based air monitoring system which is designed to detect and alarm on ppb levels of 50+ chemical warfare agent and toxic industrial chemicals simultaneously. It does this within 20 seconds of detection.



TECHNICAL DESCRIPTION:

AIRGARD uses a FTIR (Fourier Transform Infrared) spectrometer with a Stirling-cooled mercury cadmium telluride detector using an advanced classical least squares algorithm for extremely sensitive detection (single to low double digit part-per-billion level) of vaporous harmful chemicals.

CONTACT INFORMATION

MKS Instruments, Inc.
651 Lowell Street
Methuen, MA 01844
POC: Leonard Kamlet, Ph.D
rsimmons@micronics.net

COST

- $72,500/system
- ~0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier
Fourth Tier Bottom Tier

RANKINGS

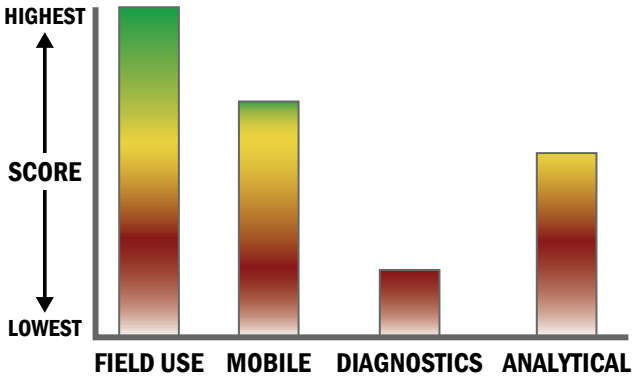
	Biological	Chemical	Radiological
FIELD USE System	N/A	Bottom Tier	N/A
MOBILE Laboratory	N/A	Bottom Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Third Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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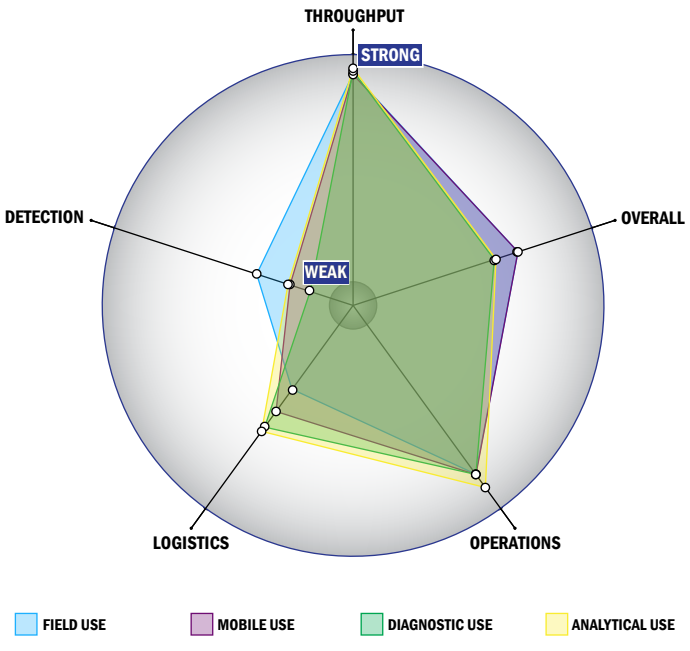


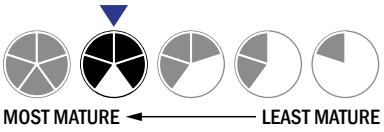
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- 5-10 minutes is required for setup
- Automatic 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
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- > $1x10^{-3}$ mg/m^3
- System currently can identify aerosolized chemical agent
- Not possible to identify liquid chemical agent

Morphix Technologies - Chameleon

GENERAL DESCRIPTION:



The Chameleon is a hands-free, power-free chemical detection for gases and vapors in air. The Chameleon consists of an armband and disposable chemical detecting cassettes. The armband holds up to ten chemical cassettes to detect ten different chemicals or families of chemicals. The Chameleon is easy to use and provides a clear color change on half the sensor if the targeted chemical is present. The Chameleon has been successfully third party tested and is designed for use in a wide variety of operating environments including desert, arctic and tropic. The Chameleon can even be immersed in salt and fresh water for an hour under pressure. It is very rugged and accurate.

TECHNICAL DESCRIPTION:

The Chameleon utilizes sensitive, selective, low-cost, easy to use colorimetric chemistry sensors. The design of the Chameleon cassette allows the Chameleon to be completely water resistant and usable in a wide range of harsh environmental conditions.

CONTACT INFORMATION

Morphix Technologies
2557 Production Road
Virginia Beach, VA 23454
POC: Kimberly Pricenski
757-431-2260
kpricenski@morphtec.com
www.morphtec.com

COST

- $60/system
- $3/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

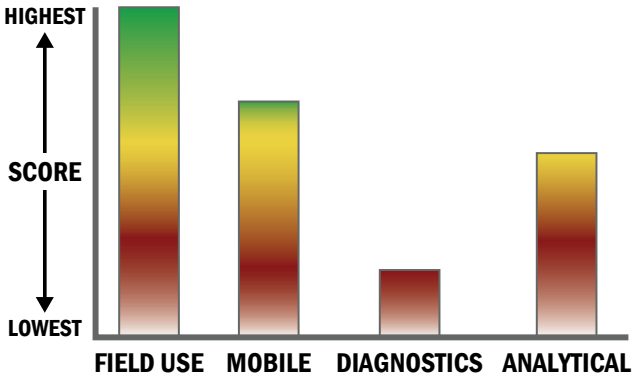
	Biological	Chemical	Radiological
FIELD USE System	N/A	Third Tier	N/A
MOBILE Laboratory	N/A	Second Tier	N/A
DIAGNOSTIC Laboratory	N/A	Third Tier	N/A
ANALYTICAL Laboratory	N/A	Second Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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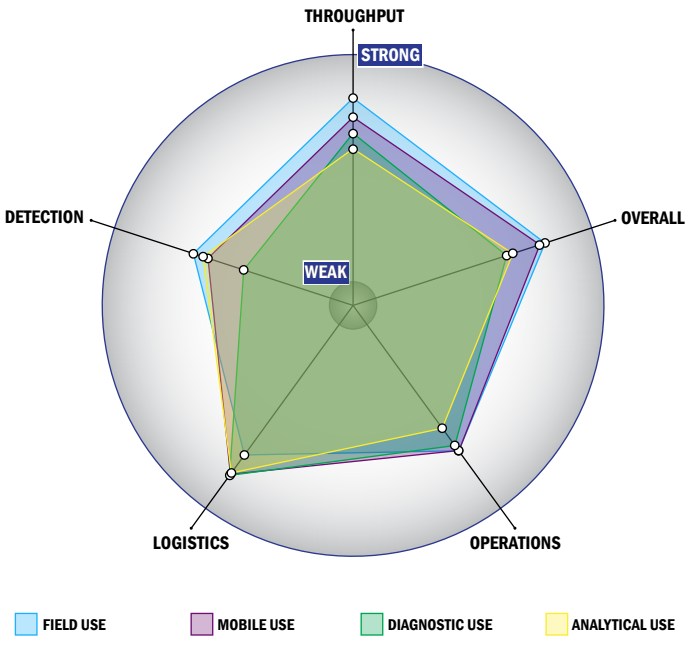


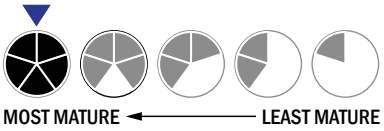
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, >10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- 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 soda can
- Less than 1 kg
- This system is not capable of transmitting data
- There is no electrical requirement



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with some effort
- The system does not employ any software

Detection:

- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- $1x10^{-6}$-$3x10^{-5}$ mg/m^3
- 1 ppb – 1 ppm
- Possible system could identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Morphix Technologies - Morphix ChemBio Detector

GENERAL DESCRIPTION:



In January 2005, Morphix Technologies was awarded a contract by the Defense Threat Reduction Agency (DTRA) to develop a hand-held chemical / biological detection unit for use by the military and first responders. After completion of this two-year program, three prototypes have been developed. The wireless, electronic, chemical biological agent detector is very small (35mm x 85mm x 105mm) and weighs less than 400 grams. The Morphix chem/bio detector is easy to use. Simply insert the colorimetric coupon coated with chemical formulations specific for classes of chemical and biological agents, into the Morphix chem/bio detector and turn the unit on. Optoelectronic sensing of the coupon occurs at a predetermined rate. Upon detection of a color change on the coupon, the results are communicated wirelessly. The modular net-centric wireless communication technology is adaptable to multiple communication protocols. The modularity of this device makes it adaptable to many applications including as a personal detection badge, perimeter detection, standoff detection and mounted on an unmanned aerial vehicle or unmanned ground vehicle. Given it is the only known device capable of detecting both chemical and biological threats in such a compact package, the Morphix chem/bio detector is an excellent screening tool. This device has broad applicability within the military and first responder communities. The wireless, electronic, chemical, biological agent detection module provides broad chemical and biological agent class detection with significantly smaller size, weight, cost, training requirements and power requirements than current technologies.

TECHNICAL DESCRIPTION:

Generic biological agent class detection (e.g. bacterial vegetative cells or bacterial endospores) is achieved through the use of colorimetric, labeled antibodies, and fluorescence-on chemistries coupled with optical spectroscopy. Chemistries are contained in stable, proprietary formulations which have been hardened to perform under mil-spec environmental conditions.

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	Top Tier	Top Tier	N/A
MOBILE Laboratory	Third Tier	Fourth Tier	N/A
DIAGNOSTIC Laboratory	Fourth Tier	Fourth Tier	N/A
ANALYTICAL Laboratory	Bottom Tier	Bottom Tier	N/A

Survey Source

Vendor and Internet Supplied Information

CONTACT INFORMATION

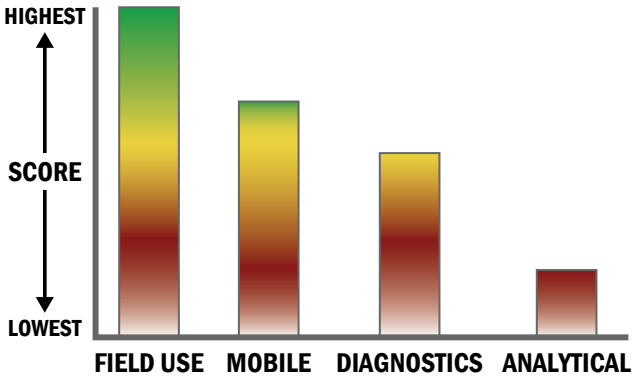
Morphix Technologies
2557 Production Road
Virginia Beach, VA 23454
POC: Kim Chapman

COST

- $1,500/system
- $25/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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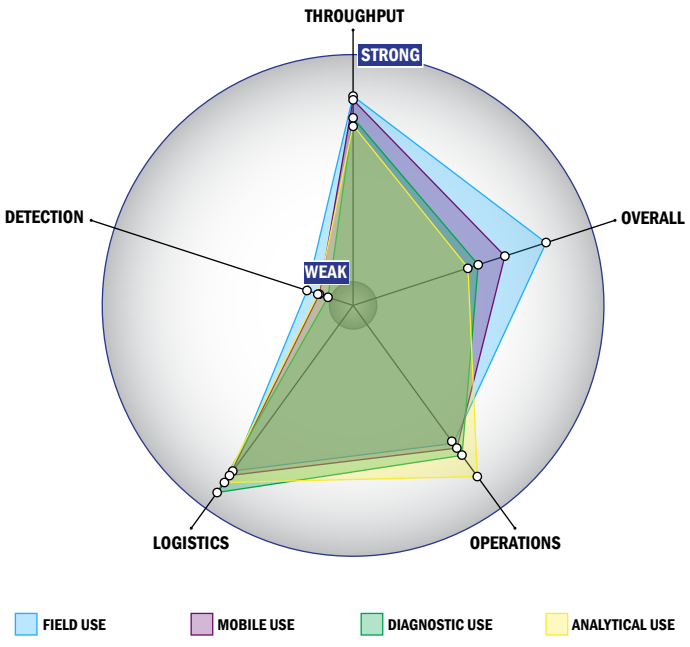


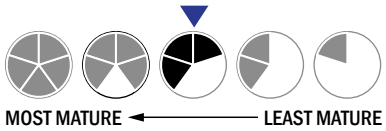
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, single test/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
- 2 components
- 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 soda can
- Less than 1 kg
- Wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 25 °C to 37 °C
- Between 6 months and 1 year shelf life
- 1-3 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
- Spore lysis not necessary for detection by system
- $1x10^{-3}$ mg/m^3
- Possible the system could identify aerosolized chemical agent

Morpho Detection, Inc. - Hardened MobileTrace

GENERAL DESCRIPTION:

Trace contraband detection system designed for the challenging environments in which you work. It has been tested to military and government standards and has expanded capabilities for detecting chemical warfare agents (CWAs) and toxic industrial chemicals (TICs).



- Detects CWAs, TICs, explosives, precursors, narcotics and taggants.
- Designed for challenging environments: extreme temperature, dust, moisture, salt fog, and rain. Drop- and vibration-tested.
- Physical shock- and vibration-resistant
- Temperatures range: -20°C to 55°C (-4°F to 131°F). Humidity range: 0-95% rH noncondensing
- CWAs library: blood, blister, nerve
- TICs library: including chlorides, cyanides, acids and ammonias
- Lightweight. Two batteries for up to six hours of operation. Internal back up batteries for "hot swap" ability.
- False alarm rates <2%
- Results verified at third-party laboratories
- Daylight readable touch screen (800 NIT)
- Simple user interface and intuitive menus
- Phone, e-mail, and field service engineer technical support and troubleshooting 24/7
- Ergonomically designed

TECHNICAL DESCRIPTION:

Ion Trap Mobility Spectrometry (ITMS™): ionizes and identifies contraband particles/vapors based their unique times-of-flight in an electric field. ITMS™ enables extremely low concentrations of electrophillic vapors to be trapped/detected. Simultaneous dual-mode detection allows analysis of both positive/negative ions in a single sample allowing detection/identification of a greater range of explosive types. A semi-permeable membrane excludes dust and dirt increasing sensitivity facilitating operation in environments with high traffic, humidity or contamination.

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

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

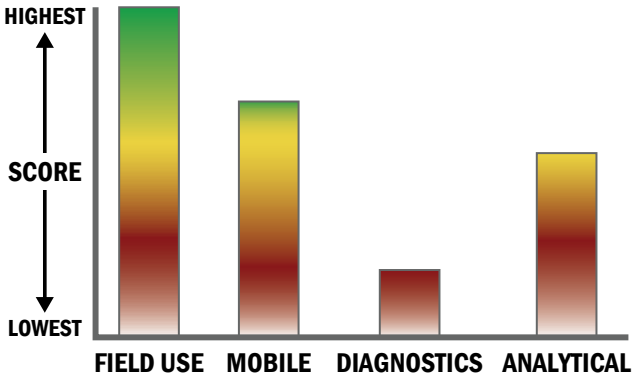
Morpho Detection, Inc.
205 Lowell Street
Wilmington, MA USA 01887
800-433-5346
www.morpho.com/detection

COST

- $39,500/system
- $0.21/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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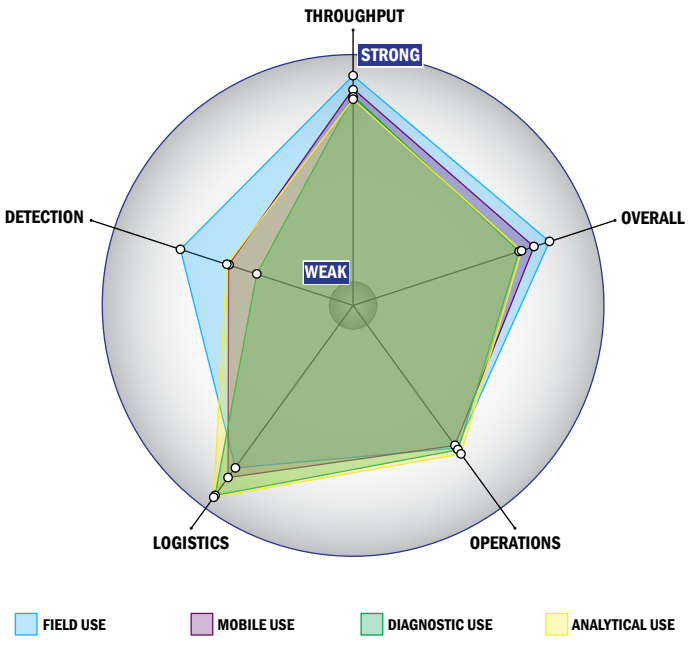


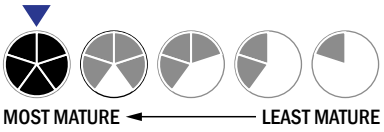
Evaluation Criteria

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
- 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 toaster
- Between 5 and 25 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from -21°C to 41°C
- Performance is not influenced by relative humidity
- 5-10 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:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- < $1x10^{-6}$ mg/m^3
- System currently can identify aerosolized chemical agent
- Possible system could identify liquid chemical agent

Morpho Detection, Inc. - StreetLab® Mobile

GENERAL DESCRIPTION:



- Innovative threat identification technology
- Optimized for field use
- Identifies broad range of substances, i.e., toxic industrial chemicals (TICs), toxic industrial materials (TIMs), explosives, chemical warfare agents (CWAs), narcotics, precursors, and white powders
- Samples chemicals through glass, plastic, transparent– and even some translucent– materials
- No sample preparation required for chemical identification
- < 2 minute analysis for most compounds
- "Point-and-shoot" one-hand operation with joystick controls
- Simple software interface delivers on-board results
- 24 x 7 technical support and spectral analysis by hazmat-trained analytical chemists
- Lightweight unit: 6.5 lbs (3.0 kg) including battery
- 5 hour battery life for field operation (2 batteries provided)
- Hard case for added protection during shipping and transportation
- Extended Wireless Capability. Remote control operation to safely interrogate samples from a distance
- Rugged, Go-Anywhere Design. Large buttons, trigger activation and joystick enables operation in Level A gear.
- LEXAN® EXL fabrication with rubber molding for strength, durability and resistance to corrosive chemicals
- Submersible for full post-use decontamination, meets IP67 rating.
- Expandable Library & Accurate Mixture Analysis. Extensive and expandable threat libraries drawn from Environmental Protection Agency (EPA) and hazardous materials lists.
- Quick analysis of chemicals and mixtures
- Accurately identifies chemicals in mixtures at concentrations as low as 10% (dependent on mixture's specific chemical(s) and substances.)

TECHNICAL DESCRIPTION:

StreetLab® Mobile identifies chemical substances using Raman spectroscopy, which permits samples to be analyzed with lasers and can be used to identify a wide range of substances including toxic industrial chemicals, explosives, and narcotics. Results are clear, repeatable and completed with minimal operator interaction.

- Direct Measurement—evaluates the molecular activities of chemicals
- Analyzes frequency shifts in laser light as it scatters off a sample to identify sample's unique "spectral fingerprint"
- Recognizes substances in the bulk–phase Raman spectrum—effective only with substances that have a Raman spectrum

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

CONTACT INFORMATION

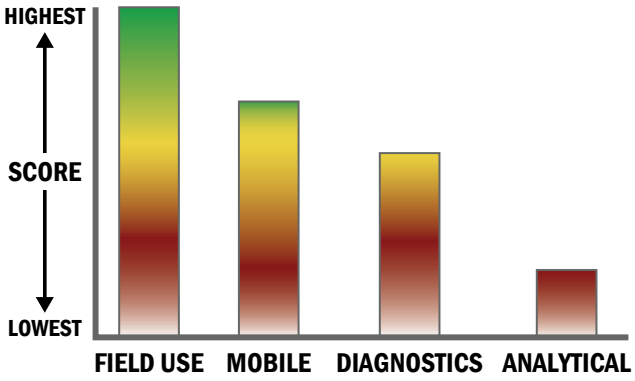
Morpho Detection, Inc.
205 Lowell Street
Wilmington, MA 01887
800-433-5346
www.morpho.com/detection

COST

- $35,000/system
- $0/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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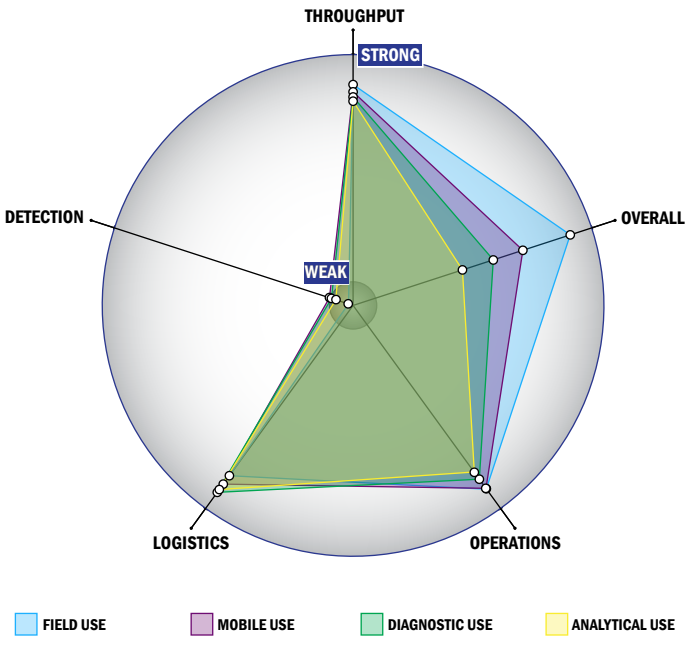


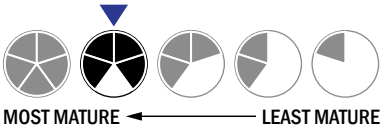
Evaluation Criteria

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
- 1 component
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- 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 < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- 5-10 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:

- Greater than 250 µL
- System currently can identify liquid chemical agent

Nanosphere, Inc. - Verigene System

GENERAL DESCRIPTION:



Nanosphere (Northbrook, IL) has developed the FDA-cleared Verigene® System, which is comprised of instrumentation and single use Verigene® Test Cartridges (IVDs) based on proprietary gold nanoparticle technology. With the Verigene System, users can accomplish sensitive, accurate, and rapid multiplex detection of nucleic acid and protein targets using enhanced signal-amplification techniques.

TECHNICAL DESCRIPTION:

We have developed a generically applicable, microarray based nano-probe test. The assay uses a multi-step robotic process, which relies on non-isotropically oriented antibodies on functionalized glass as multiplexed microarrays to capture targets from an assay sample. Functionalized, 130 angstrom diameter gold nano-probes (measured by static light scattering, 5 nm S.D.) also bind to the target through a molecular-scale complex containing antibodies. The target-bound molecular complex is then quantified through silver enhancement of the functionalized gold. Assays in this format can be rapidly configured and implemented for a wide array of potential biomarkers. For example we have demonstrated a robust and ultra-sensitive assay for cardiac troponin with an LOD of less than 500 femtograms per mL serum, and an overall CV of less than 20%. The assay also shows very low background, a broad dynamic range and over 3 logs of linear dose response.

CONTACT INFORMATION

Nanosphere, Inc.
4088 Commercial Ave
Northbrook, IL 60062
847-400-9000
info@nanosphere.us

COST

- $40,000/system
- $35-$85/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

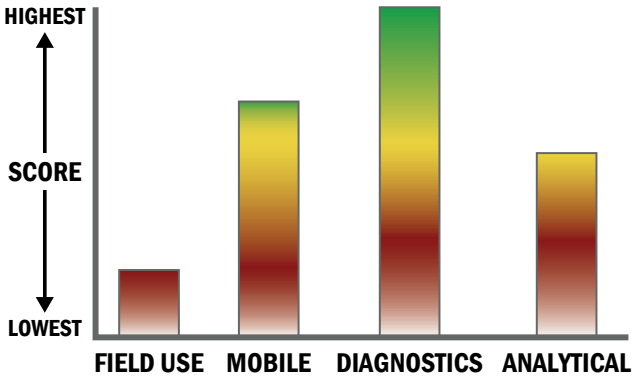
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

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

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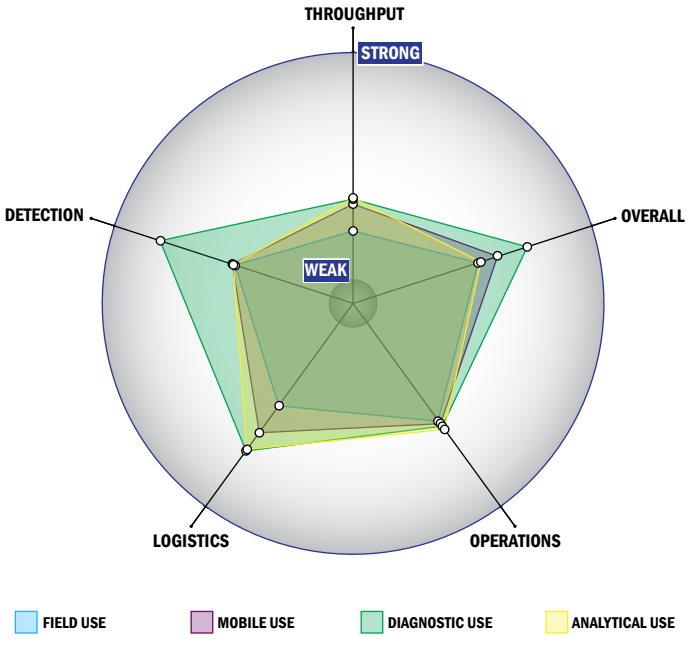


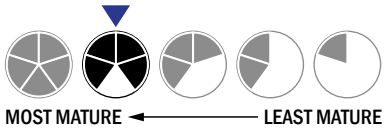
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- 1 sample, >10 tests/sample per run
- 349-96 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- Less than 5 minutes is required for set-up
- 3-5 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
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- Results cannot 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:

- System currently has 510k clearance
- System currently has FDA approval
- Less than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Less than 1 ng per mL
- Add on capability that is full or semi-automated for spore lysis

New Horizons Diagnostics - Bioluminometer

GENERAL DESCRIPTION:



Total ATP tests have been developed (3M Clean Trace) in recent years, but they measure total biomass and do not differentiate ATP derived from bacteria. We have taken the proven total ATP methodology; improved sensitivity, eliminated false positives from non-bacteria cells, and eliminated false negatives from quenching agents often present in these samples. Thus we have a rapid, point-of-care bacteria detection system that only detects live bacteria. The test system is portable and can be taken into the field for monitoring of bacteria and easily used by non-laboratory personnel. Test time is under one minute. Detection limits go down to 100 CFU. The product is commercial and currently is used for bacteria detection in healthcare, food and water applications.

TECHNICAL DESCRIPTION:

This kit detects the presence of living bacterial cells by measuring the amount of ATP in the sample. ATP is a cellular metabolite present in all living cells; the amount of ATP in a sample is proportional to the number of living cells. The test can distinguish bacteria from human cells through the use of sample preparation methods that release ATP selectively from microbial cells. The system has two main components: a microluminometer to read ATP-induced luminescence and a "Filtravette" (a filter device and cuvette combined) to concentrate cells from a sample solution and remove chemical contaminants. Samples and solutions are processed through the filtravette using an empty syringe. After the sample is processed, a solution is applied to remove non-microbial sources of ATP. Then a microbial lysis solution is added to the filtravette followed by a luciferase solution that produces light in the presence of ATP. After pipette mixing, the filtravette is placed in the reader and the intensity of emitted light (luminescence) is recorded.

CONTACT INFORMATION

New Horizons Diagnostics
1450 South Rolling Road
Baltimore, MD 21227

COST

- $5,000/system
- $5/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

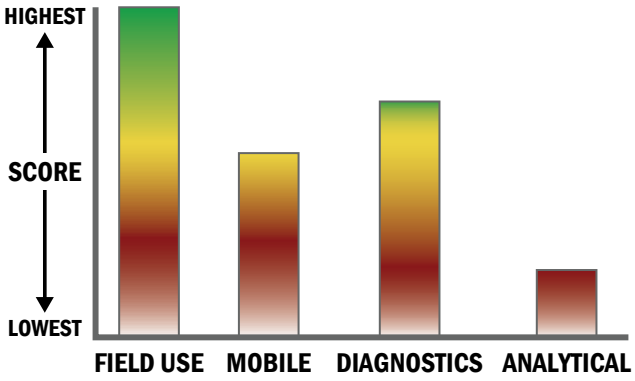
	Biological	Chemical	Radiological
FIELD USE System		N/A	N/A
MOBILE Laboratory		N/A	N/A
DIAGNOSTIC Laboratory		N/A	N/A
ANALYTICAL Laboratory		N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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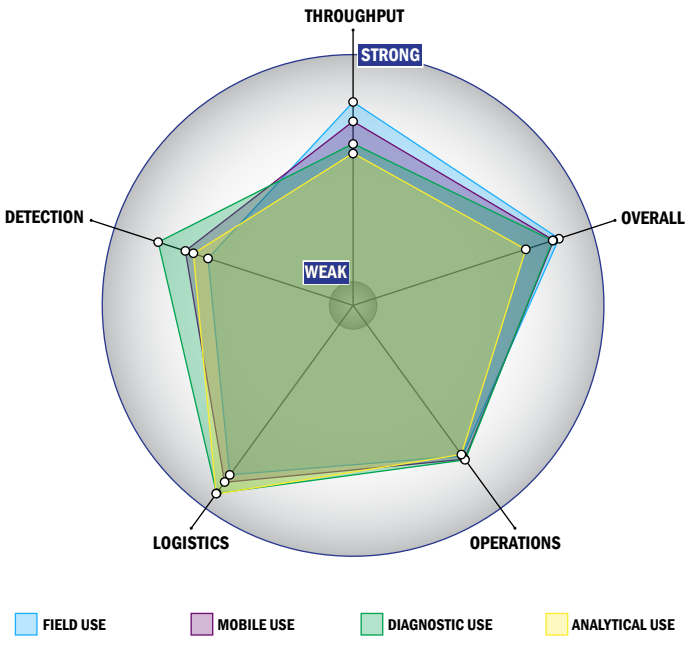


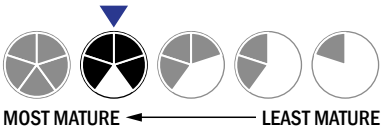
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/sample per run
- 349-96 samples every 2 hours
- The system could easily be adapted into a fully automated system
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- 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 room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year 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 open and available for modification
- The system hardware is open and available for modification

Detection:

- System currently has 510k clearance
- System currently has FDA approval
- Less than 50 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 CFU per mL
- Semi-automated spore lysis

Northrop Grumman Corporation - Next Gen Autonomous Detection System (NG-ADS)

GENERAL DESCRIPTION:



The NG-ADS is an autonomous biodetection system designed to collect and analyze air samples for biological threat agents. The system is designed to run unattended in indoor and outdoor environments for several weeks between replenishments. The system includes many on-board diagnostics and built-in controls with every test to monitor system performance and assure proper functionality. The NG-ADS is fully networked and provides alerts to users through a number of communication pathways. Real time data access and remote command/control are available through a simple web application accessible on any desktop, laptop, smartphone or other web-enabled device. This allows remote start/stop commands, execution of built in diagnostic routines, anytime access to instrument data, and on the fly sampling interval changes. The system can perform a retest on a sample to confirm results, and it can also be configured to accept liquid samples, if desired.

System operation is supported by an optional suite of logistics management applications tailored for NG-ADS. These applications provide closed-loop tracking of maintenance actions, inventory management, calibration tracking, maintenance history reports, and other logistics information.

The NG-ADS has undergone extensive testing by a variety of government test entities and has demonstrated real world performance in several recent field tests.

TECHNICAL DESCRIPTION:

The NG-ADS uses a continuous flow wet cyclone aerosol collector to collect aerosol particles from ambient air or a targeted source. The collected liquid sample is then tested by the system at user-configurable intervals. The system is capable of performing multiplexed PCR analysis or multiplexed immunoassay analysis, or both, on each collected sample. The PCR analysis is a highly multiplexed flow through PCR reaction coupled with Luminex's xMAP® liquid encoded bead array technology. 50 or more discrete targets can be detected simultaneously. The immunoassay assay uses the same liquid encoded bead array technology to perform a multiplexed sandwich immunoassay.

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	Bottom Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

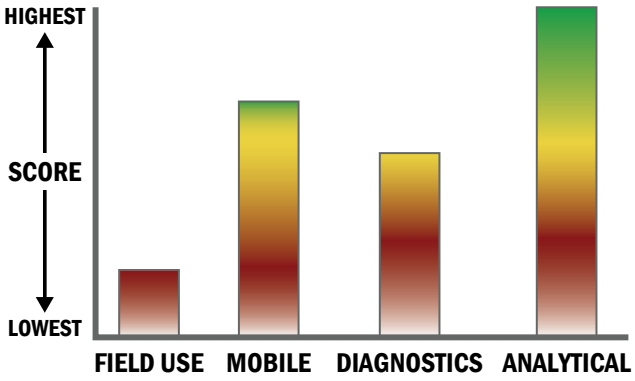
Northrop Grumman Corporation
2980 Fairview Park Drive
Falls Church, VA 22042
POC: Virginia Morlock Government Relations-CBRNE Systems
703-280-4530 or 508-450-5500
virginia.morlock@ngc.com
www.northropgrumman.com/capabilities/biodefense

COST

N/A

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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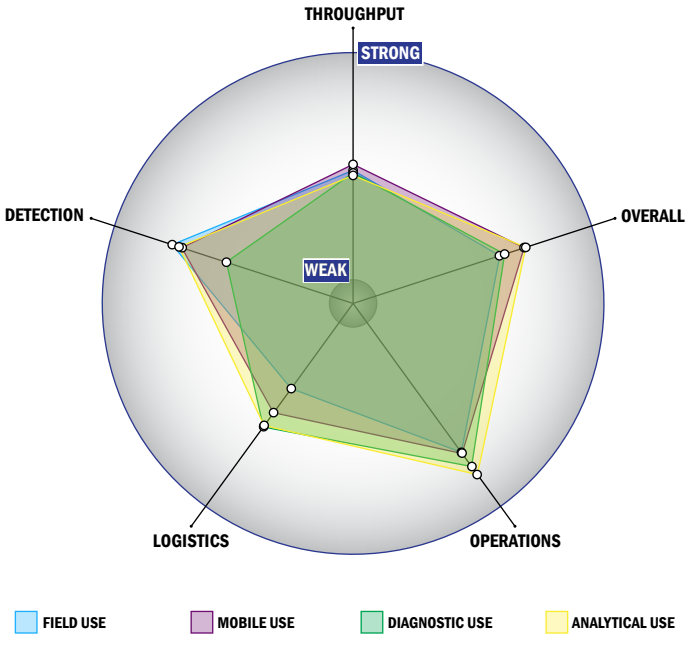


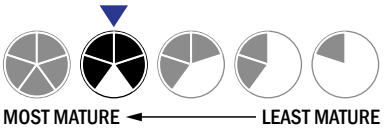
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 0 components
- Greater than 20 minutes is required for set-up
- Automatic detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at 4 °C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year 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 but modification requires licensing
- The system hardware is open but modification requires licensing

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
- Less than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Less than 1 ng per mL
- Fully automated spore lysis

Nucsafe, Inc. - Guardian Predator

GENERAL DESCRIPTION:

The Guardian Predator, Generation 4.3, backpack is built for military, first responder and law enforcement search applications. It is a human portable instrument primarily used for field search missions over a large area. Detects gamma rays, neutrons, alpha and beta particles. Gamma ray information includes isotope identification. Instrument displays exposure rate as well. Data is collected within the system on board computer and correlated to time and GPS positions. Transmission of data is performed one of two ways, either 802.11 wireless or Ethernet cable.



TECHNICAL DESCRIPTION:

The Guardian Predator, Generation 4.3spectroscopic backpack includes: a neutron detection unit (lithium-6), a gross counting gamma detector (PVT), one (1) spectroscopy grade detector (NaI(Tl)), one GM Tube, one alpha/beta detector, an operator display interface (ODI), 802.11 radio, and a GPS. The system is comprised of the following: data analysis, alarm and reporting of neutron and gamma ray detection as well as the ability to perform gamma spectroscopy with 1024 channels and provides nuclide identification using a library of standards. The system is supplied with data logging, all required electronics, cables, batteries (greater than 8 hours operation, rechargeable), and transport case. This system is a full featured gamma/neutron measurement system for wide-area searches.

CONTACT INFORMATION

Nucsafe, Inc.
601 Oak Ridge Turnpike
Oak Ridge, TN 37830
POC: Stanley C. Cass
865-220-5050
scass@nucsafe.com

COST

- $52,000/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

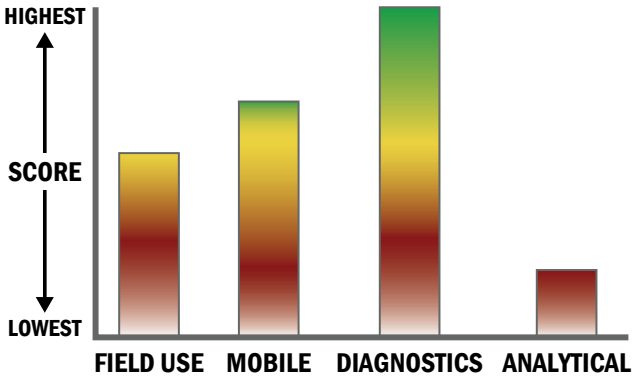
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Fourth Tier
MOBILE Laboratory	N/A	N/A	Second Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Top Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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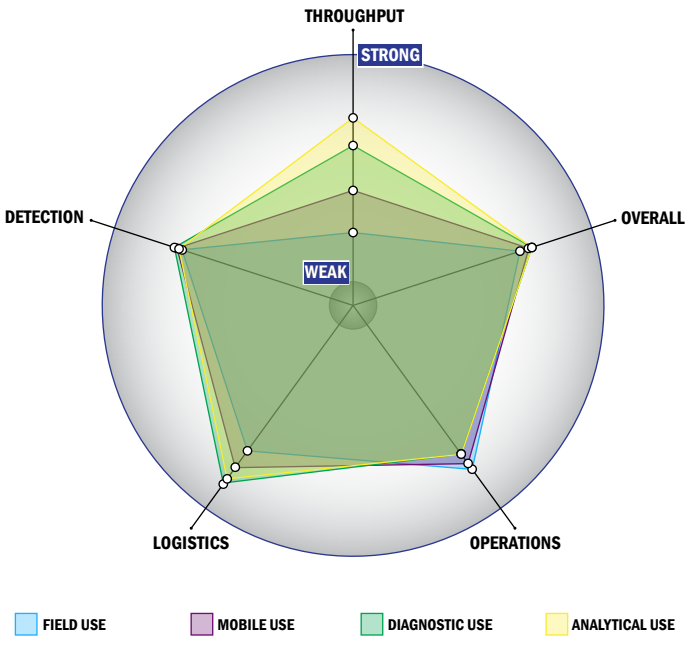


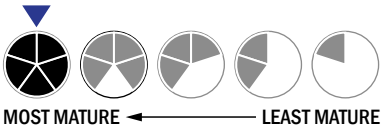
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- Less than 5 minutes is required for set-up

Logistics:

- An afternoon of training and some technical skills required
- 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°C to 41°C
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

Operational Technologies Corporation - FLASH Reader

GENERAL DESCRIPTION:

The Fluorescent Assay Sandwich Handheld (FLASH) Reader is a second generation portable fluorometer with epifluorescence optics designed to rapidly and sensitively assess fluorescence emanating from magnetic bead-based sandwich assays. In particular, the FLASH Reader is customized to read OpTech's DNA Aptamer-based magnetic bead sandwich assays for a variety of foodborne pathogens, arboviruses, rickettsia and Leishmania parasites.



TECHNICAL DESCRIPTION:

The basic technology centers on epifluorescence using a 630 nm red laser and PMT to read DNA aptamer-based magnetic bead sandwich or FRET assays.

CONTACT INFORMATION

Operational Technologies Corporation
4100 NW Loop 410, Suite 230
San Antonio, TX 78229
POC: Dr. John Bruno
john.bruno@otcorp.com

COST

- $4,500/system
- <$2/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

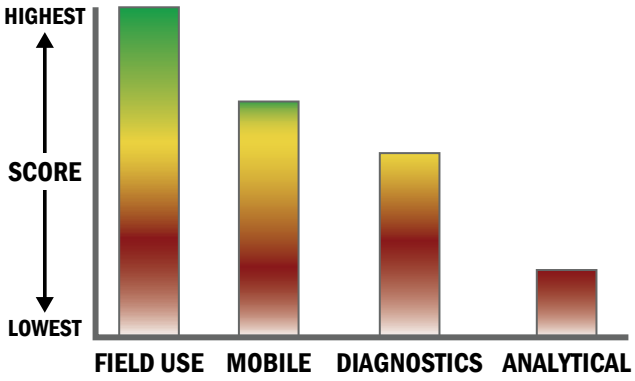
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	Third Tier	N/A
MOBILE Laboratory	Top Tier	Third Tier	N/A
DIAGNOSTIC Laboratory	Second Tier	Third Tier	N/A
ANALYTICAL Laboratory	Second Tier	Fourth Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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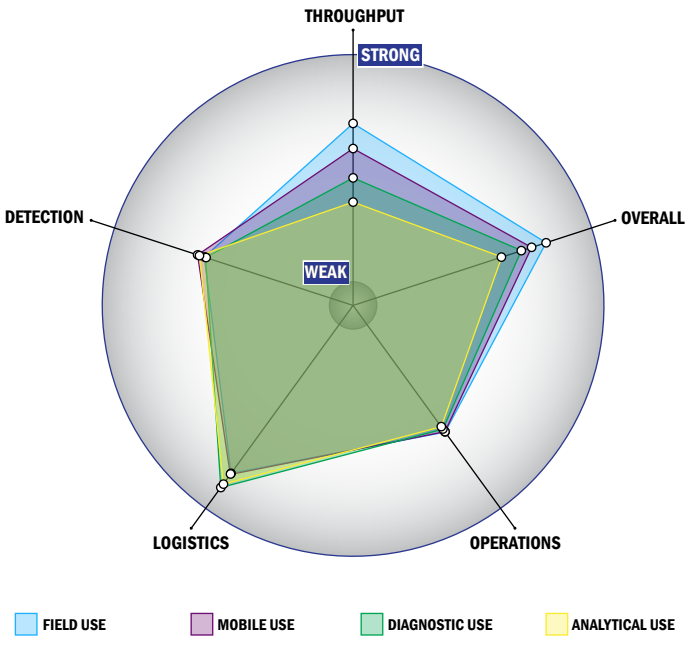


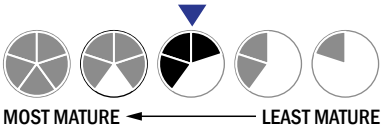
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- 1 sample, single test/sample per run
- Less than 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
- 2 components
- 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 toaster
- Between 1 and 5 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °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 could be adapted to a fully autonomous system with significant effort
- The system software is open and available for modification
- The system hardware is open and 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
- Greater than 250 µL
- Good specificity. Consistently low level of false alarms (2-5%)
- 1-100 CFU per mL
- 100-1,000 PFU per mL
- 1-10 ng per mL
- Spore lysis not necessary for detection by system
- $3x10^{-5}$ - $1x10^{-4}$ mg/m^3
- 1 ppm – 100 ppm

Operational Technologies Corporation - Handheld FRET-Aptamer Sensor for CB Detection

GENERAL DESCRIPTION:



The Handheld Fluorescence Resonance Energy Transfer (FRET)-DNA Aptamer Sensor is a highly mobile, rugged, waterproof, and 4X AA battery-operated sensor for specific CB agents. The system enables one-step homogeneous or "lights on" FRET assays with the affinity (sensitivity), specificity, and reproducibility of DNA aptamers (instead of antibodies) using lyophilized intrachain or competitive FRET-aptamer reagents with long shelf-lives in capped plastic cuvettes. The handheld fluorometer OEM is Turner Biosystems or Promega and OpTech produces the patented FRET-aptamer reagents (US Patent No. 7,906,280).

TECHNICAL DESCRIPTION:

The best way to describe the FRET-aptamer technology is for interested parties to review the following publications:

- J. Fluorescence. 22:915-924, 2012.
- Biosensors & Bioelectronics. 31:240-243, 2012.
- J. Fluorescence. 21:2021-2033, 2011.
- J. Fluorescence, 20:1211-1223, 2010.
- J. Molecular Recognition. 22:197-204, 2009.
- J. Biomolecular Techniques. 19:311-321, 2008.
- J. Fluorescence. 18:867-876, 2008.
- J. Biomolecular Techniques. 19:109-115, 2008.
- Combinational Chemistry & High Throughput Screening. 14:622-630, 2011.

CONTACT INFORMATION

Operational Technologies Corporation
4100 NW Loop 410, Suite 230
San Antonio, TX 78229
POC: Dr. John Bruno

COST

- $2,000-$3,000/system
- <$5-$15/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

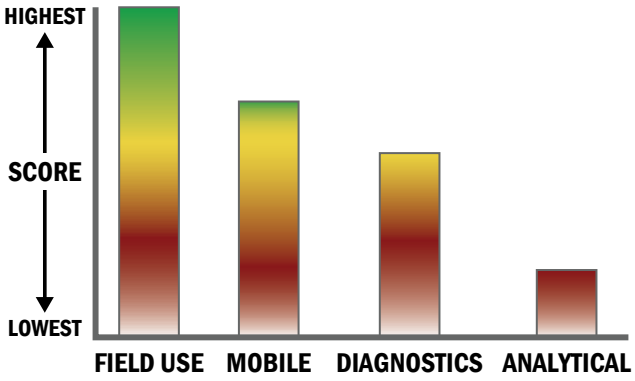
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	Third Tier	N/A
MOBILE Laboratory	Second Tier	Third Tier	N/A
DIAGNOSTIC Laboratory	Third Tier	Second Tier	N/A
ANALYTICAL Laboratory	Second Tier	Third Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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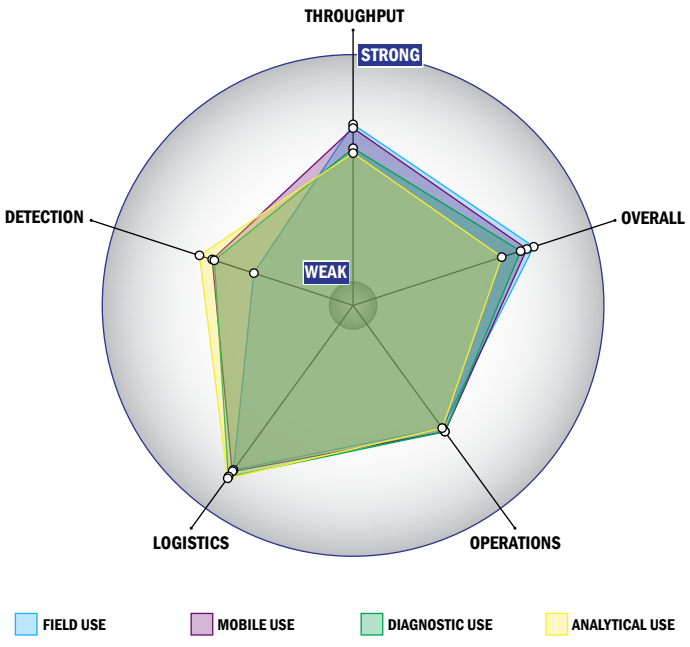


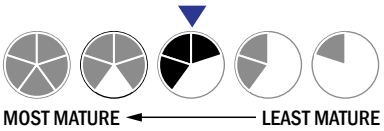
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, single tests/sample per run
- 349-96 samples every 2 hours
- The system could be adapted to a fully automated system with some effort
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 3 components
- 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 soda can
- Between 1 and 5 kg
- This system is not capable of transmitting data
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Device must be used in a temperature stable, dry environment for optimum performance
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- The system could be adapted to a fully autonomous system with significant effort
- The system software is closed and not available for modification
- The system hardware is open but modification requires licensing

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
- Greater than 250 µL
- Good specificity. Consistently low level of false alarms (2-5%)
- 100-1,000 PFU per mL
- 1-10 ng per mL
- Spore lysis not necessary for detection by system
- 1 ppb – 1 ppm

Overhoff Technology Corporation - Overhoff Model 357RM Tritium Monitor

GENERAL DESCRIPTION:

Low cost monitor for the detection and measurement of airborne Tritium. 19" rack mount configuration and also suited for table top use.

TECHNICAL DESCRIPTION:

Ionization chamber and electrometer technology with radon rejection circuitry.



CONTACT INFORMATION

Overhoff Technology Corporation
1160 U.S. Route 50
Milford, Ohio 45150
POC: Dell Williamson

COST

- $13,250/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	Bottom Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Bottom Tier
ANALYTICAL Laboratory	N/A	N/A	Bottom Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

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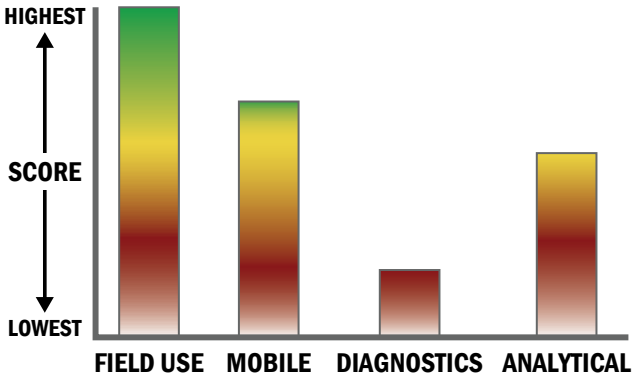

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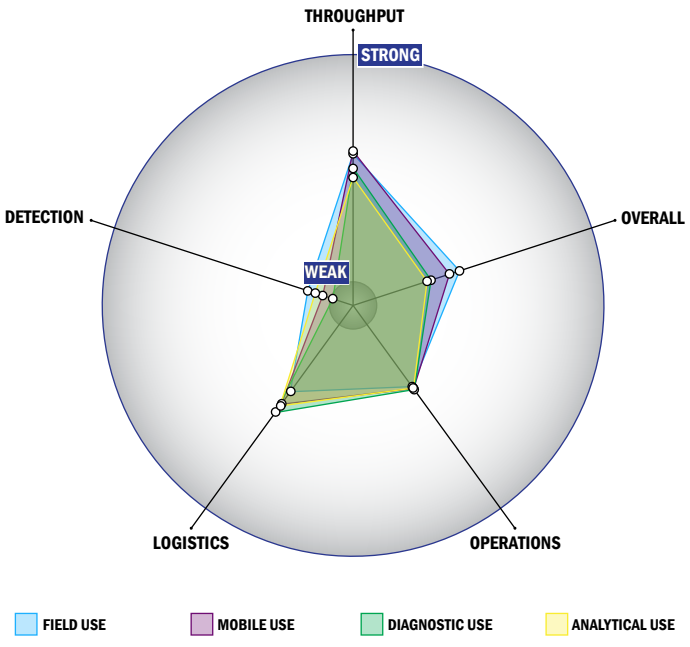


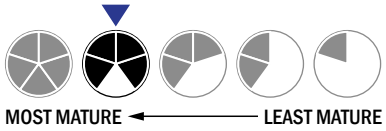
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/sample per run
- System is continuous and provides real time analysis with no defined tests/samples
- The system or approach is not amenable to full or semi-automation
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- Less than 5 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Components must be stored at room temperature (27°C)
- Device or system has peak performance at normal relative humidity conditions
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- System is used for area air sampling

Overhoff Technology Corporation - Overhoff Technology Model 400AC

GENERAL DESCRIPTION:

The Model 400AC portable tritium monitor is a small, high sensitivity, hand held, battery (rechargeable) operated, fully gamma-compensated survey meter with RS232 serial data output and user recalibration features.

TECHNICAL DESCRIPTION:

Ionization chamber and electrometer with radon rejection circuitry.



CONTACT INFORMATION

Overhoff Technology Corporation
1160 U.S. Route 50
Milford, OH 45150
POC: Dell Williamson
513-248-2400
sales@overhoff.com
www.overhoff.com

COST

- $12,500/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

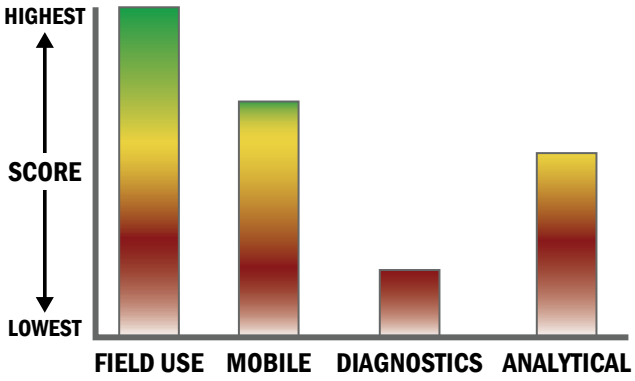
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Fourth Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Bottom Tier
ANALYTICAL Laboratory	N/A	N/A	Bottom Tier

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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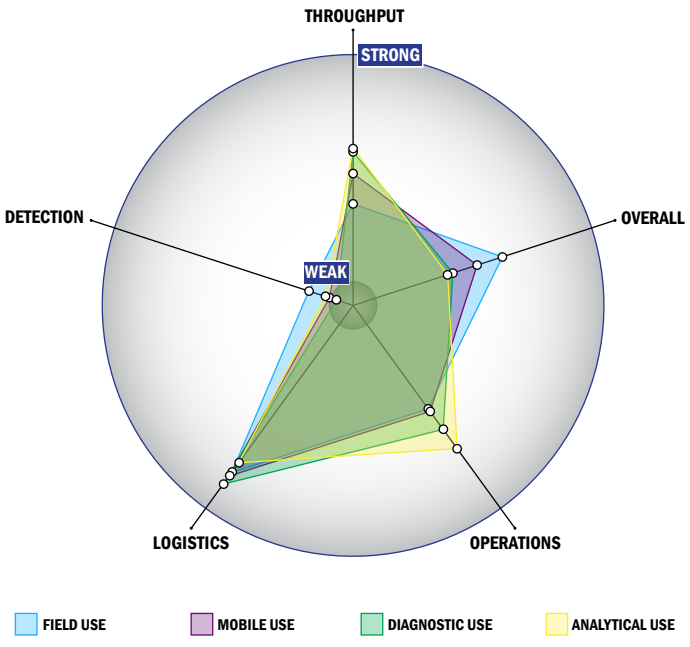


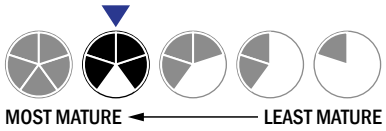
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/sample per run
- System is continuous and provides real time analysis with no defined tests/samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 5-10 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- A day of training and technical skills are 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 room temperature (27 °C)
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- System is used for area air sampling

Pacific Advanced Technology - Warlock

GENERAL DESCRIPTION:



The Warlock was designed to detect contaminated surfaces with chemical agents as well as remotely detecting chemical agent and biological agents that have been aerosolized and dispersed in the atmosphere. The Warlock can be used both in the field and in a laboratory environment to analysis chemical and biological warfare agents. The system is versatile and adaptive for many applications within the Chemical and Biological agent warfare. The Warlock is an imaging spectrometer that operates in the short, mid and long-wave infrared to give the operator an image of the chemical or biological agent on a surface or in a cloud that has been dispersed at an extended range up to many kilometers.

TECHNICAL DESCRIPTION:

The Warlock is based on an embedded diffractive optical assembly that images in many spectral bands creating an hyper-spectral data cube. Using any number of software tools, some provided with the Warlock and other typical used by the Hyper-spectral community, allows for analysis of the spectral of any object in the field of view of the camera. Various algorithms can be implemented in real-time in an embedded processor in the Warlock or in post processing using PC computers.

CONTACT INFORMATION

Pacific Advanced Technology
2029 Village Lane, Suite 202 PO Box 140
Solvang, CA 93464-0140

COST

- $150,000/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

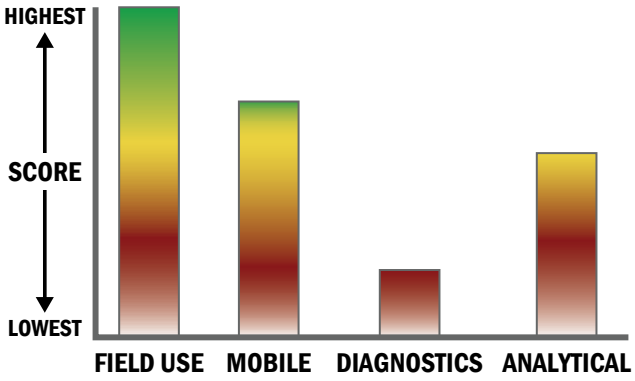
	Biological	Chemical	Radiological
FIELD USE System	N/A	Third Tier	N/A
MOBILE Laboratory	N/A	Fourth Tier	N/A
DIAGNOSTIC Laboratory	N/A	Fourth Tier	N/A
ANALYTICAL Laboratory	N/A	Fourth Tier	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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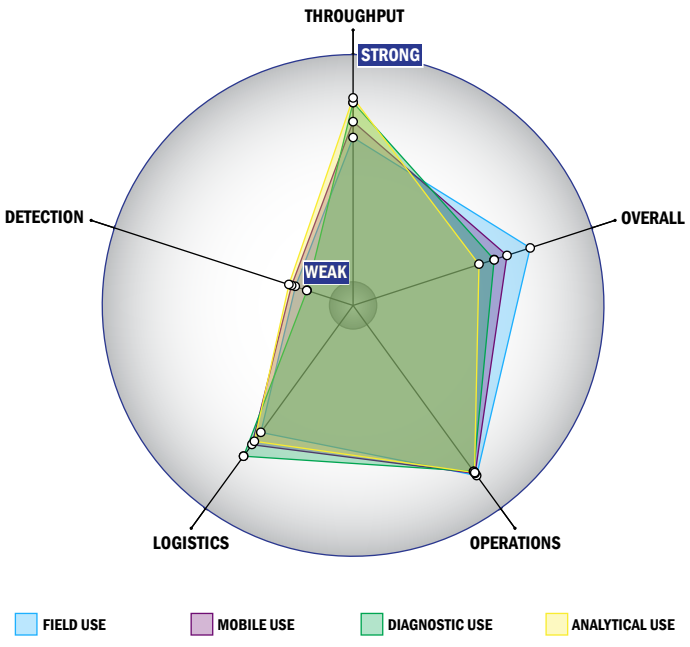


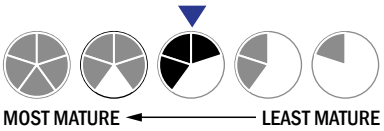
Evaluation Criteria

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 intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 5-10 minutes is required for set-up
- 1-2 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 5 and 25 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



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
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Less than 10 µL
- >1x10^{-3} mg/m^3
- 100 ppm–1 ppt
- Possible the system could identify aerosolized chemical agent
- Possible system could identify liquid chemical agent

Pajarito Scientific Corporation - TechniCART

GENERAL DESCRIPTION:



The TechniCART™ has been engineered to allow rapid and easy transportation of an entire portable nondestructive assay (NDA) system, e.g. a High Purity Germanium (HPGe) detector, shield and collimator together with laptop and acquisition electronics. The flat-free large caster wheels permit movement through grass, dirt and gravel type terrain. The TechniCART™ also allows the detector to be positioned at different angles, from vertically downward to vertically upward. The design of the system results in a multi-use platform that is mobile, adaptable, rugged and ergonomically efficient. The TechniCART™ has a light-weight aluminum frame that accommodates 200 lbs of equipment. An extension arm can be supplied that allows a vertical reach of 96 inches. An outrigger arm provides additional stability for extended heights.

TECHNICAL DESCRIPTION:

One of the uses of the TechniCART™ is to allow first responders to rapidly deploy a non-destructive assay system at a selected location to identify and quantify radioactive material. The flat-free large caster wheels permit movement through grass, dirt and gravel type terrain. The TechniCART™ also allows the detector to be positioned at different angles, from vertically downward to vertically upward. The design of the system results in a multi-use platform that is mobile, adaptable, rugged and ergonomically efficient. The TechniCART™ has a light-weight aluminum frame that accommodates 200 lbs of equipment. An extension arm can be supplied that allows a vertical reach of 96 inches. An outrigger arm provides additional stability for extended heights.

CONTACT INFORMATION

Pajarito Scientific Corporation
2976 Rodeo Park Drive East
Santa Fe, NM 87505, USA
505-424-6660
info@PajaritoScientific.com

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

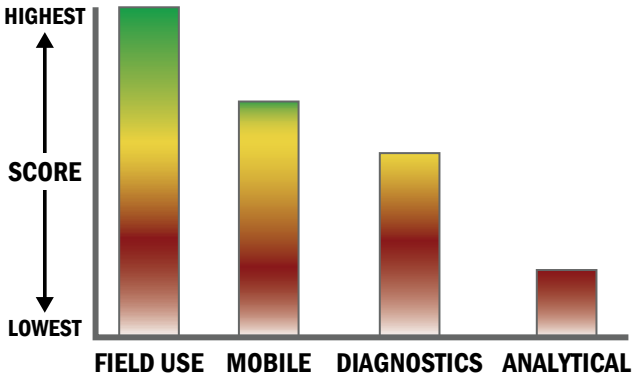
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Bottom Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Bottom Tier
ANALYTICAL Laboratory	N/A	N/A	Bottom Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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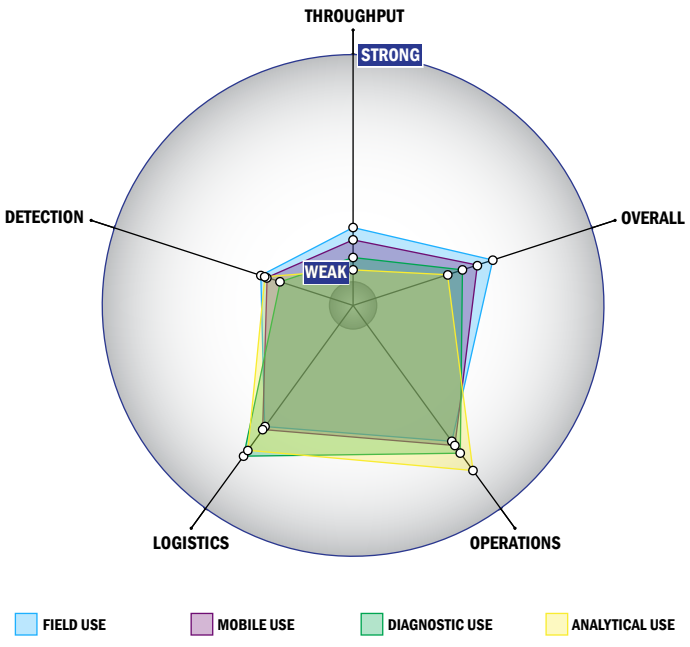


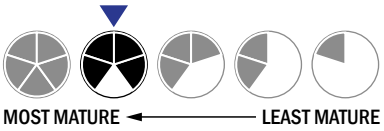
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, single test/sample per run
- Less than 32 samples every 2 hours
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- Greater than 20 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Larger than a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Greater than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Only count rate
- Down to background level radiation for count rate
- System is used for surveying

Partner Airogistic, LLC - AIROCOLLECT-DETECT-288

GENERAL DESCRIPTION:



The AiroCollect-Detect is a combined laser induced florescence (LIF) detector and wetted-wall plastic cyclone (WWPC) bio-aerosol sample collection device that runs on AC power or batteries. This product was developed to be power efficient, light weight, and portable with the option to configure the product into a man portable backpack. The LIF detector continuously analyzes air samples for airborne pathogens. It statistically correlates particle size and florescence comparing samples to statistically known signatures of dangerous pathogens. If it finds a match, it triggers real-time collection of the airborne particulates into a saline solution. The AiroCollect-Detect is easy to operate and designed in modular fashion, so it can be easily packaged into larger systems. Alternatively, it can be environmentally enclosed and temperature regulated to operate standalone.

TECHNICAL DESCRIPTION:

The WWPC Collector uses inertial aerodynamic separation of bio-aerosols particulates in the human aspiration size range. Particles larger than 10 microns are removed using a pre-separator and inlet. Particles smaller than ½ micron escape the cyclonic force. The walls of the cyclone are wetted to achieve high collection efficiencies and concentration factors. The LIF Detector operates on the principle of Mie scattering, concurrently examining each particle for the presence of the metabolites NADH and riboflavin. The detector simultaneously measures particle size and florescence with a single illumination. It processes the two signals and compares results to known biological signatures.

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	Third Tier	Fourth Tier	Bottom Tier
MOBILE Laboratory	Fourth Tier	Bottom Tier	Bottom Tier
DIAGNOSTIC Laboratory	Bottom Tier	Bottom Tier	Bottom Tier
ANALYTICAL Laboratory	Fourth Tier	Bottom Tier	Bottom Tier

CONTACT INFORMATION

Partner Airogistic, LLC
211 East 17 Street Suite 111L
Austin, TX 78701
POC: Jeff Michalski
512-743-3271
michalski@airogistic.com

COST

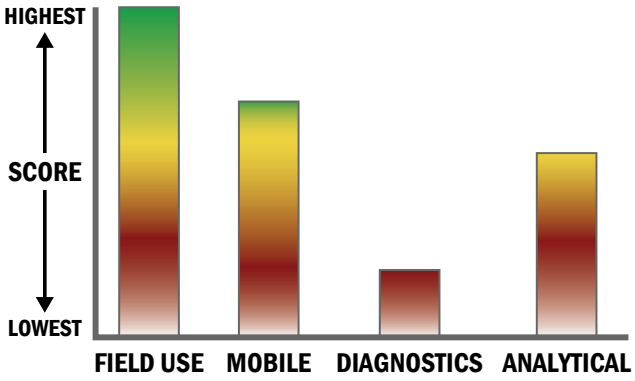
- $25,000-$50,000/system
- $0.01/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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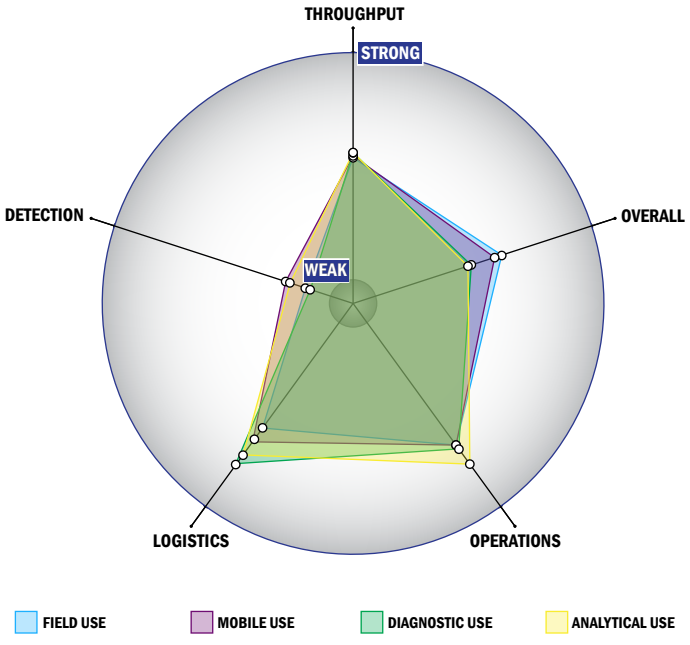


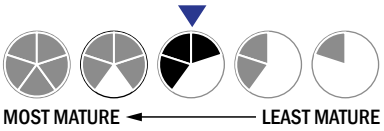
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 3 components
- 5-10 minutes is required for setup
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Components must be frozen (-20°C)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 5-10 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 but modification requires licensing

Detection:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- Less than 10 µL
- 1-100 CFU per mL
- Spore lysis not necessary for detection by system

Partner Airogistic, LLC - DCI-I

GENERAL DESCRIPTION:



DCI-I is a complete biological, chemical and radiological detection, collection and Identification system. It combines into a 19" rack mount chassis a laser induced florescence (LIF) detector, wetted walled plastic cyclone collector (WWPC), a rapid presumptive identifier based on "Canary" technologies, and an interface to a confirmatory PCR identifier. This system also scales optional interfaces to government chemical detectors and industrial radiation detectors using existing and established software drivers to these devices. The DCI-I includes a video surveillance option that allows triggered events to be correlated with live video recording and real-time image recognition.

TECHNICAL DESCRIPTION:

A laser induced florescence detector (LIF) searches for bio signatures examining each particle for the presence of metabolites by correlating size and florescence. If a statistical match occurs, the detector triggers the presumptive "CANARY" identifier and a wetted wall plastic cyclone collector (WWPC), which efficiently collects airborne aerosolized particulates into a phosphate buffer solution. The system provided video monitoring of the location for play back and determining the source of the event. The system communicates to authorities through network software as it prepares samples for on-site confirmatory and forensic PCR analysis.

CONTACT INFORMATION

Partner Airogistic, LLC
5204 Wheeler Branch Circle Suite 111L
Austin, TX 78701
POC: Jeff Michalski
512-743-3271
michalski@airogistic.com

COST

- $75,000-$200,000/system
- $96.10/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

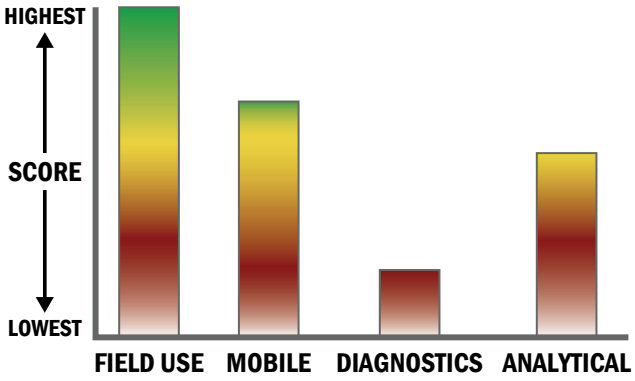
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	Bottom Tier	Bottom Tier
MOBILE Laboratory	Fourth Tier	Bottom Tier	Bottom Tier
DIAGNOSTIC Laboratory	Bottom Tier	Bottom Tier	Bottom Tier
ANALYTICAL Laboratory	Third Tier	Bottom Tier	Bottom Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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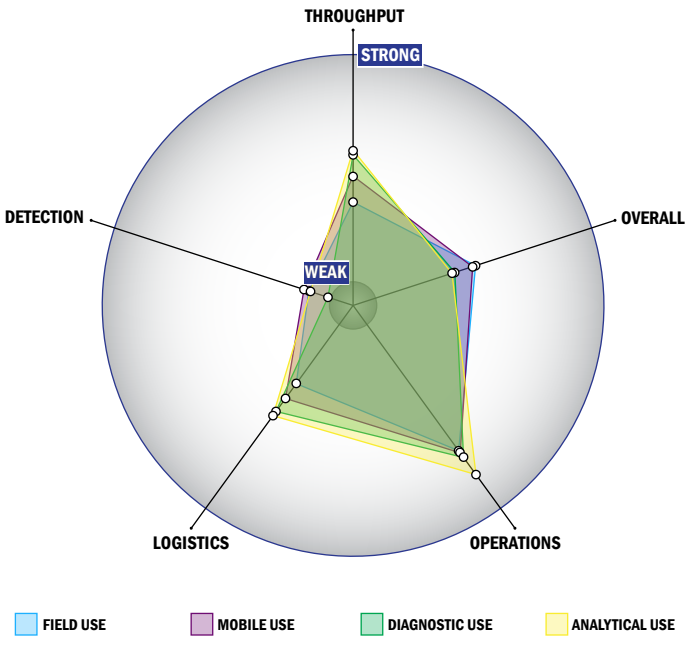


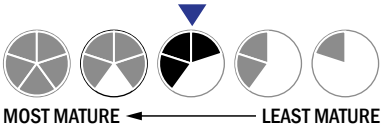
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 4 components
- 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
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 1-2 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at 4°C
- Performance is not influenced by relative humidity
- Between 1 to 6 months shelf life
- 5-10 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 open but modification requires licensing

Detection:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- Less than 100 µL
- 1-100 CFU per mL
- 100-1,000 PFU per mL
- Spore lysis not necessary for detection by system

PathSensors, Inc. - BioFlash-E

GENERAL DESCRIPTION:

Incorporating the CANARY® technology, the BioFlash-E® Biological Identifier provides rapid, sensitive and specific identification of up to 21 biological threat agents. The portable and compact BioFlash-E® Biological Identifier offers breakthrough capabilities in sampling performance, reliability and operational cost.



TECHNICAL DESCRIPTION:

The BioFlash-E® Biological Identifier uses proprietary aerosol collection technology and MIT Lincoln Labs developed CANARY® detection technology to offer a complete, stand-alone solution for biological identification.

CONTACT INFORMATION

PathSensors, Inc.
800 West Baltimore Street
Baltimore, MD 21201
POC: David Parrish

COST

- $35,000/system
- $96/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

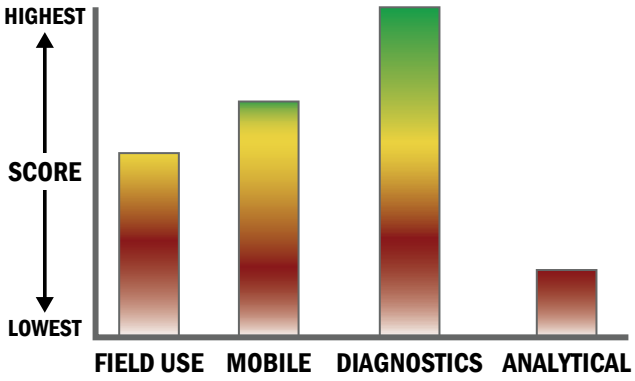
	Biological	Chemical	Radiological
FIELD USE System		N/A	N/A
MOBILE Laboratory		N/A	N/A
DIAGNOSTIC Laboratory		N/A	N/A
ANALYTICAL Laboratory		N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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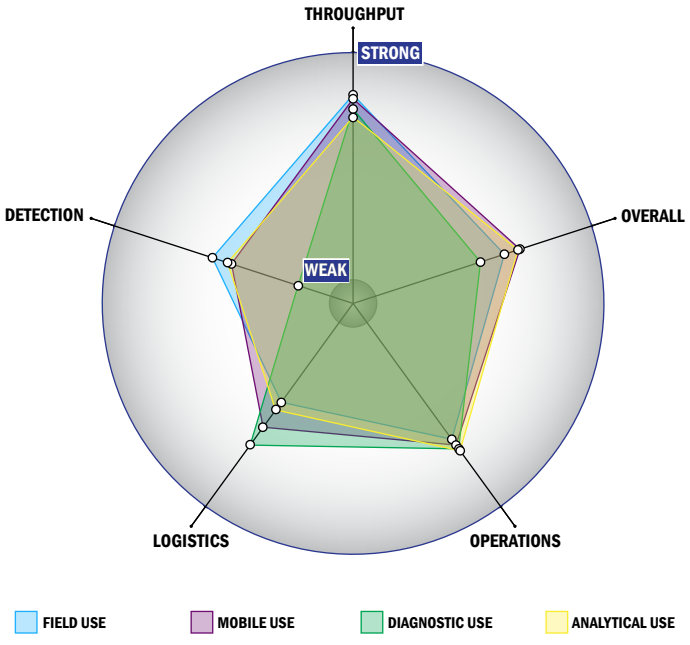


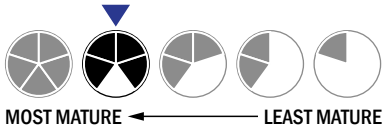
Evaluation Criteria

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 fully automated
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 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
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at 4°C
- Performance is not influenced by relative humidity
- Between 1 to 6 months shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- Less than 50 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 100-1,000 PFU per mL
- Spore lysis not necessary for detection by system

Physical Sciences, Inc. - Adaptive Infrared Imaging Spectroradiometer - Wide Area Detector (AIRIS-WAD)

GENERAL DESCRIPTION:



The AIRIS-Wide Detector is a passive multispectral imaging system designed specifically to address the need to detect chemical agent and toxic industrial chemical releases from fixed site, ground mobile, and airborne platforms. The system incorporates advanced infrared focal plane array technology to enable high spatial resolution for the detection of smaller releases while affording the rapid data acquisition capability needed to operate from moving platforms without degradation of sensitivity. The system's real-time processor provides immediate identification, display, and geo-location of threats using integrated GPS and pointing systems. On board capability is present to transmit threat location via the Joint Warning and Reporting Network.

TECHNICAL DESCRIPTION:

The system consists of a Fabry-Perot interferometer with 10 wavenumber spectral resolution and 8 to 11 micron tuning range. It incorporates an advanced low-noise 256 x 256 pixel HgCdTe focal plane array with integrated cooled optics and a FPGA/DSP based real-time signal processor incorporating multi-frame signal averaging for sensitivity enhancement. A MIL-STD-810E qualified operator display unit with simplified button-initiated pull-down window control is also included. Remote display and RS-232 based control is possible including air to ground telemetry.

CONTACT INFORMATION

Physical Sciences, Inc.
20 New England Business Center
Andover, MA 01810
POC: William Marinelli
978-689-0003
marinelli@psicorp.com
www.psicorp.com

COST

- $425,000/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

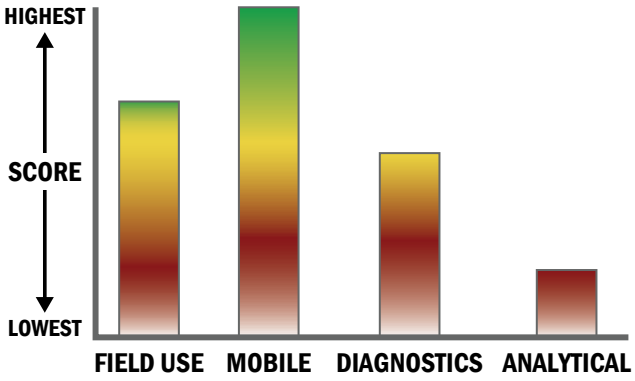
	Biological	Chemical	Radiological
FIELD USE System	N/A	Bottom Tier	N/A
MOBILE Laboratory	N/A	Bottom Tier	N/A
DIAGNOSTIC Laboratory	N/A	Third Tier	N/A
ANALYTICAL Laboratory	N/A	Third Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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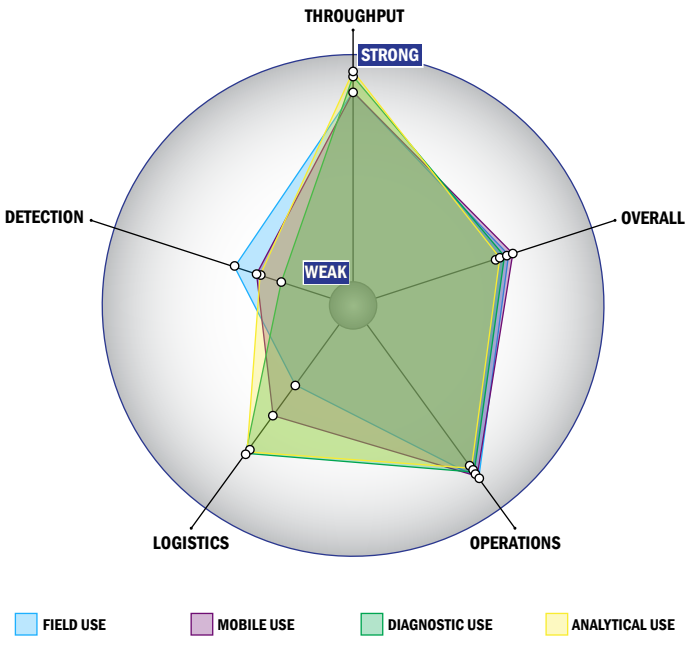


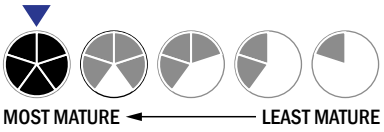
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- Greater than 20 minutes is required for setup
- Automatic detection

Logistics:

- Approximately the size of a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- The device is not intended for portable use



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- This system does not require consumable components
- Performance is not influenced by relative humidity
- There are no system reagents or test kits
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids and this question does not apply
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- > 1x10^-3 mg/m^3
- System currently can identify aerosolized chemical agent
- Not possible for the system to identify liquid chemical agent

Polimaster, Inc. - Combined Gamma Dosimeter and Chemical Agent Detector PM2012M

GENERAL DESCRIPTION:



Combined Gamma Dosimeter and Chemical Agent Detector PM2012M is a two-in-one instrument featuring chemical detector and gamma radiation detector in one unit. The device is designed to detect chemical warfare agents and toxic compounds and differentiate between organophosphorus and arsenic-containing compounds, as well as continuously monitor radiation background, measure gamma dose and dose rate and provide audible, visual alarms when preset thresholds are exceeded is invaluable for first responders, police officers, military, and customs and border patrol services in the day-to-day monitoring of public safety as well as in special HazMat operations. It can be used as a personal detector, a monitor for surveying contaminated areas, or as a fixed-installed detector

TECHNICAL DESCRIPTION:

For Combined Gamma Dosimeter and Chemical Agent Detector PM2012M: Instrument's operation principle in the TCV air presence detection mode is based on toxic chemical vapors detection module. Instrument measures current strength of the ionization chamber with beta-source 63Ni. Analyzed air at that is forcedly pumped through the chamber by micro purge pump. Microprocessor-based controller with internal analog-digital converter controls GEDM and TCVDM modules. Instrument operation algorithm enables continuous measurement of ambient dose equivalent of gamma- and roentgen radiation H*(10) , measurement of photon emission ambient dose equivalent H*(10) and detection of toxic vapors air presence, statistical analysis of measurement data, and quick adaptation to variations of radiation strength (setting of measurement time periods irreversibly to radiation strength). Internal non-volatile instrument's memory accumulates and stores information. IR-link is used for MPC-PC information communication.

CONTACT INFORMATION

Polimaster, Inc.
112, Bogdanovich str.
Minsk 220040, Republic of Belarus
POC: Mr.Yury Kurlovich, Managing Director
+375 17 2177083
polimaster@polimaster.com
www.polimaster.us

COST

- $7,282/system
- $500/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

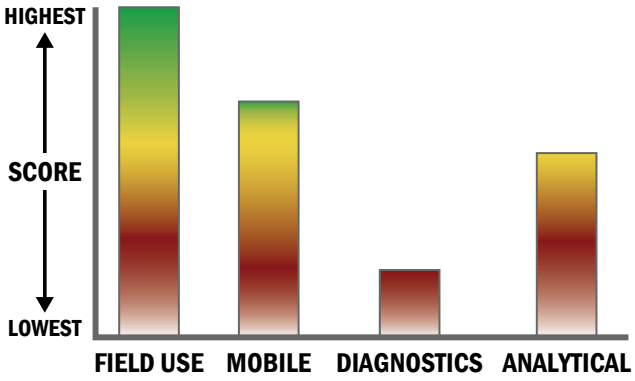
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Bottom Tier
MOBILE Laboratory	N/A	N/A	Fourth Tier
DIAGNOSTIC Laboratory	N/A	N/A	Bottom Tier
ANALYTICAL Laboratory	N/A	N/A	Bottom Tier

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

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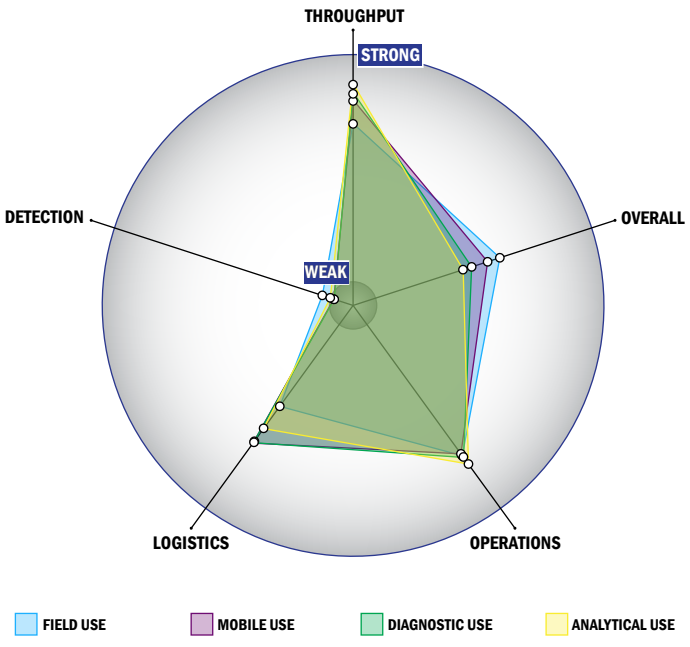


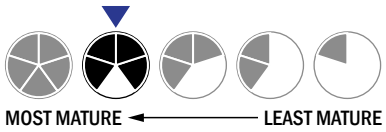
Evaluation Criteria

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 or device is currently fully automated
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 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
- Less than 1 kg
- Wireless and wired connections are available



Operations:

- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not 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
- Total dose and dose rate
- System is used for surveying

Polimaster, Inc. - Personal compact dosimeter PM1604A (B)

GENERAL DESCRIPTION:



The compact personal dosimeter PM1604A(B) is a miniature energy-compensated personal dosimeter that measures both personal dose equivalent and personal dose equivalent rate of both gamma and X-ray radiation. Recommended for professionals who work with or around the radioactive materials. The instrument automatically compares the average dose and dose rate of gamma radiation from the detector with the alarm threshold value chosen by the user. If the threshold value is exceeded, the instrument triggers an audible alarm. The user interface has friendly controls for routine operation and is characterized by simplicity, as well as by the convenient location of control buttons to switch between modes and settings. Thus the device can be operated even by the non-trained users, without any experience in radiation control.

TECHNICAL DESCRIPTION:

The dosimeter measures personal dose equivalent and personal dose equivalent rate of both gamma and X-ray radiation in a wide range. The functionality of the device based on the principle that some materials (radiation detectors) can register and detect gamma radiation. Production technology utilizes Geiger-Muller counters. Geiger-Muller counter utilizes small metal tubes filled with inert gas. When gas molecules inside the tube are excited by the incident radiation, they create an electrical current for the readout. The magnitude of the current is proportional to the energy of an incident photons and therefore of dose of incident radiation.

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	

CONTACT INFORMATION

Polimaster, Inc.
2300 Clarendon Blvd. Suite 708
Arlington VA, 22201
POC: Vladimir Kanevsky President
703-525-5075 or 703-608-3850
kanevsky@polimaster.us
www.polimaster.us

COST

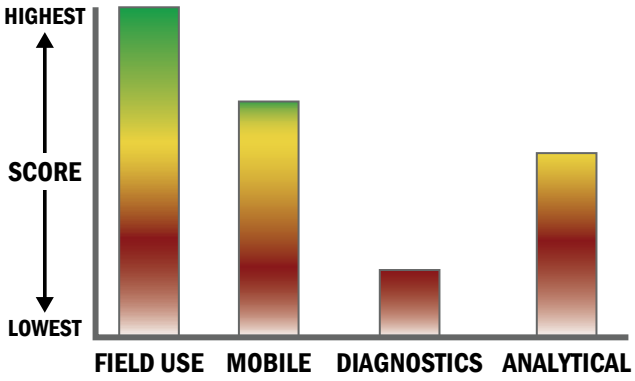
- $611-$700/system
- $0/analysis

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

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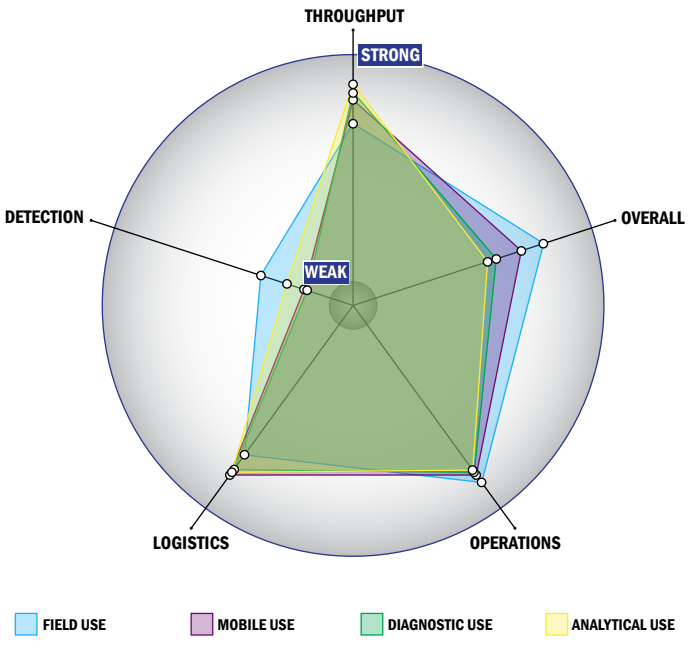


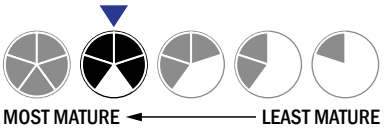
Evaluation Criteria

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 or device is currently fully automated
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 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 soda can
- Less than 1 kg
- Wireless and wired connections are available
- System or device uses batteries



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Only total dose and dose rate
- Down to background level radiation for dose rate
- System is used for personnel detection

PROENGIN SAS - AP4C

GENERAL DESCRIPTION:



The handheld chemical detector AP4C is able to detect an extended range of chemicals. All dangerous compounds containing Sulphur, Phosphorus, Arsenic, and/or the HNO chemical liaison can be detected. AP4C has been designed for use on the field to detect Chemical Warfare Agents and/or TICs. AP4C has the capacity to work in very severe environmental conditions and the measurements are unaffected by high humidity levels or presence of other organic chemical compounds. The AP4C technology allows the simultaneous detection of an unlimited number of gases.

The response time is among the shortest on the market but what makes the AP4C unique is the recovery time after a positive detection. Where other detectors may take minutes or hours after a positive detection, AP4C will be ready after seconds.

TECHNICAL DESCRIPTION:

AP4C detection is based upon Flame Photometry Detection (FPD), detection of the physical signature of the chemical atoms and bonds within the products and compounds.

AP4C burns all gas and particles providing energy to the electrons; that energy is emitted as photons. AP4C immediately analyses the photons, looking for Phosphorus, Sulfur, Arsenic or HNO signatures. This technology is sensitive, reliable, and resistant to humidity and temperature. AP4C requires no service and nearly no maintenance. It is able to be operational less than 3 minutes after a positive detection, following NATO requirements. Since FPD is not based on any database but relies upon signature detection, each AP4C is able to detect and measure concentration for the full list of agents.

CONTACT INFORMATION

PROENGIN SAS
1 rue de l'Industrie, 78210 Saint Cyr L'Ecole, France
POC: Mr Eric Damiens, Marketing and sales director
+33 1 30 58 47 34
Contact@proengin.com

COST

- €20,000/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

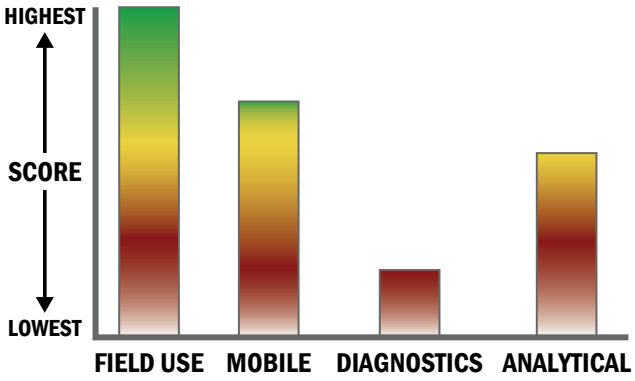
	Biological	Chemical	Radiological
FIELD USE System	N/A	Top Tier	N/A
MOBILE Laboratory	N/A	Second Tier	N/A
DIAGNOSTIC Laboratory	N/A	Third Tier	N/A
ANALYTICAL Laboratory	N/A	Third Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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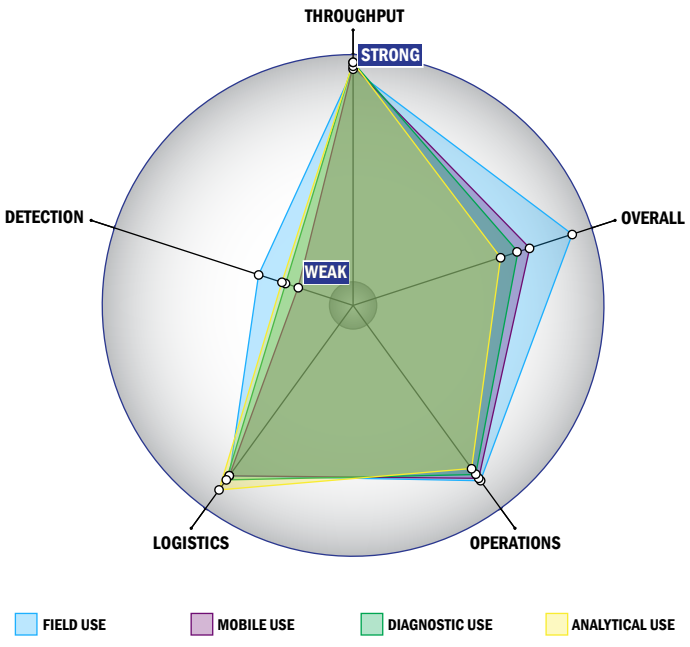


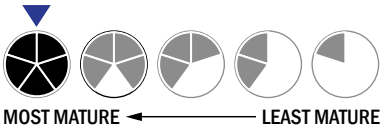
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 1 component
- Less than 5 minutes is required for setup
- (Automatic) detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- Wireless and wired connections are available
- System or device uses batteries
- Battery life



Operations:

- Can be used from < -21°C to > 42°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 closed and not available for modification
- 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- > $1x10^{-3}$ mg/m^3
- 1 ppb – 1 ppm

PROENGIN SAS - AP4C-FB

GENERAL DESCRIPTION:



AP4C detection is based upon Flame Photometry Detection (FPD), detection of the physical signature of the chemical atoms and bonds within the products and compounds.

AP4C burns all gas and particles providing energy to the electrons; that energy is emitted as photons. AP4C immediately analyses the photons, looking for Phosphorus, Sulfur, Arsenic or HNO signatures. This technology is sensitive, reliable, and resistant to humidity and temperature. AP4C requires no service and nearly no maintenance. It is able to be operational less than 3 minutes after a positive detection, following NATO requirements. Since FPD is not based on any database but relies upon signature detection, each AP4C is able to detect and measure concentration for the full list of agents.

TECHNICAL DESCRIPTION:

AP4C-FB combines chemical and biological detection, the two of them being based upon Flame Photometry Detection (FPD), detection of the physical signature of the chemical atoms and bonds within the products and compounds. More precisely, AP4C- burns all gas and particles providing energy to the electrons; that energy is emitted as photons. AP4C-FB immediately analyses the photons, looking for:

- Phosphorus, Sulfur, Arsenic or HNO signatures (chemical detection)
- Sodium, Potassium, Calcium and more signatures (biological detection)

This technology (FPD) is sensitive (state of the art thresholds), reliable (no false positive, no false negative alarm), not sensitive to humidity, temperature or mixture of compounds. AP4C-FB requires light service and maintenance. AP4C-FB offers the most reliable information on the field, regarding both chemical detection and biological monitoring.

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	Third Tier	Fourth Tier	N/A
MOBILE Laboratory	Fourth Tier	Bottom Tier	N/A
DIAGNOSTIC Laboratory	Bottom Tier	Bottom Tier	N/A
ANALYTICAL Laboratory	Bottom Tier	Bottom Tier	N/A

CONTACT INFORMATION

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www.proengin.com

COST

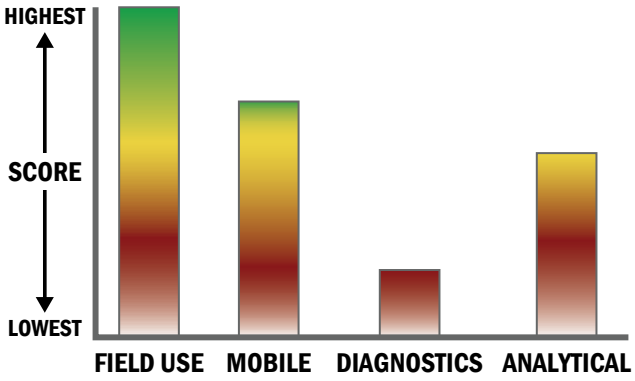
- €80,000/system
- N/A/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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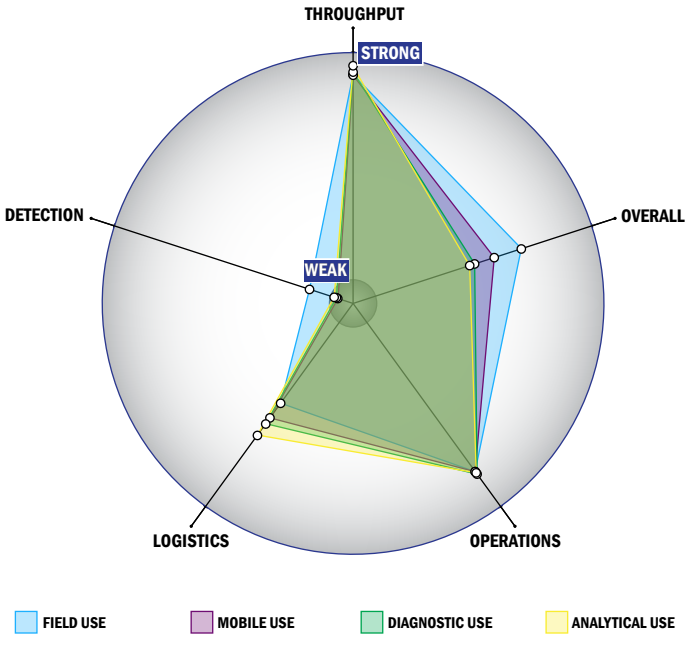


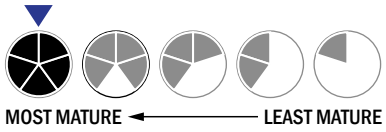
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- 10-20 minutes is required for setup
- 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
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- 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 closed and not available for modification
- 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
- Good specificity. System has a consistently low level of false alarms (2-5%)
- > $1x10^{-3}$ mg/m^3

PROENGIN SAS - AP4C- V

GENERAL DESCRIPTION:



AP4C-V is designed for vehicles and is able to detect an extended range of chemicals containing Sulphur, Phosphorus, Arsenic, and/or the HNO chemical signatures. AP4C-V has been designed for use on the field to detect Chemical Warfare Agents and/or TICs. The AP4C-V has the capacity to work in severe environmental conditions and the measurements are unaffected by high humidity levels or by presence of other organic chemicals. The AP4C-V technology allows the simultaneous detection of an unlimited number of gases (identification of the constituting chemical elements).

The response time is among the shortest on the market but what makes the AP4C-V unique is the recovery time after a positive detection. Where other detectors may take long minutes or hours after a positive detection or pollution by chemicals, AP4C-V will be ready after some seconds whatever the level of contamination.

TECHNICAL DESCRIPTION:

AP4C-V detection is based upon Flame Photometry Detection (FPD) of the physical signature of the chemical atoms and bonds within the products and compounds.

AP4C-V burns all gas and particles providing energy to the electrons; that energy is emitted as photons. AP4C-V immediately analyses the photons, looking for Phosphorus, Sulfur, Arsenic or HNO signatures. This technology is sensitive, reliable, and resistant to humidity and temperature. AP4C requires no service and nearly no maintenance. It is able to be operational less than 3 minutes after a positive detection, following NATO requirements. Since FPD is not based on any database but relies upon signature detection, each AP4C-V is able to detect and measure concentration for the full list of agents:

- 33 out of 33 CWA schedule 1 from Chemical Warfare Convention (64 out of 69 all categories)
- 42 more TICs (NATO ITF-25 list)

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

CONTACT INFORMATION

PROENGIN SAS
1 rue de l'Industrie, 78210 Saint Cyr L'Ecole, France
POC: Mr Eric Damiens, Marketing and sales director
+33 1 30 58 47 34
Contact@proengin.com
www.proengin.com

COST

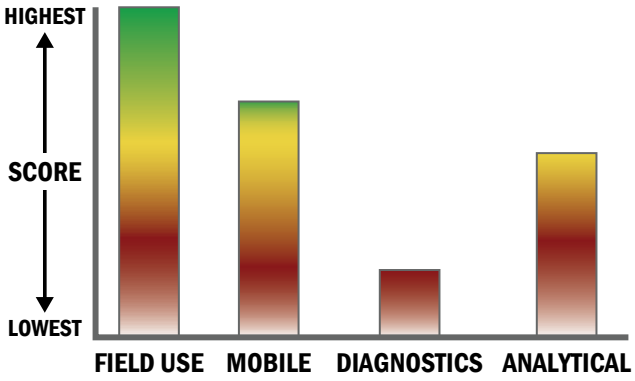
- €30,000/system
- N/A/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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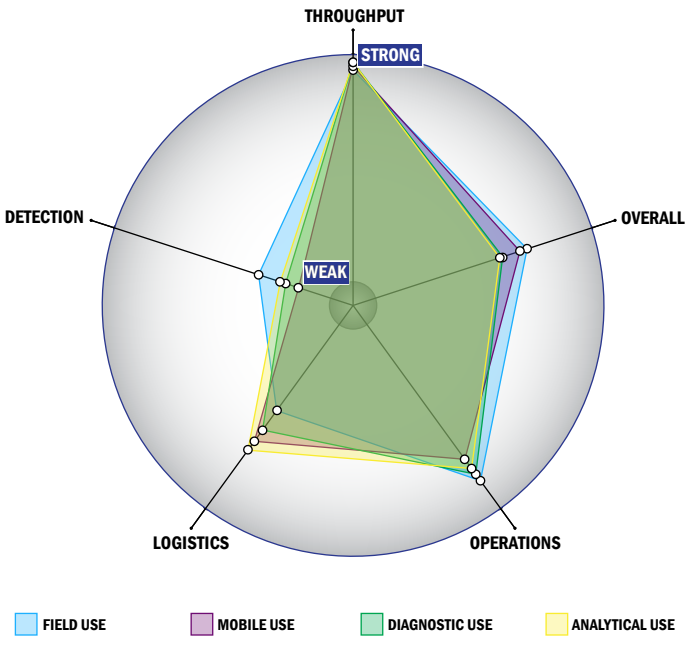


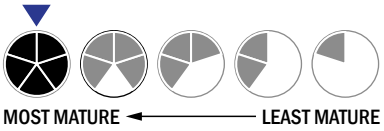
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 1 component
- Less than 5 minutes is required for setup
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- Wired connections are available



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- 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 closed and not available for modification
- 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- > $1x10^{-3}$ mg/m^3
- 1 ppb – 1 ppm

PROENGIN SAS - MAB

GENERAL DESCRIPTION:



MAB has the unique capacity of detecting and categorizing biological particles with a proven extremely low false alarm rate and the unique capacity to discriminate dangerous or suspicious biological particles.

MAB has been designed for use on the field by Armed Forces to give early warning about any kind of Biological Warfare Agents event. MAB gives instantaneous information about incoming biological event thus telling when to take a sample and make further analysis to confirm the presence and nature of biological agent. The very liable MAB has also been designed to be mounted on track vehicles. As all Proengin products and thanks to the flame spectrophotometry technology, MAB is running in very severe outside conditions, shows the lowest false alarm rates (negative and positive) and requires reduced maintenance. It shows such a high level of availability.

TECHNICAL DESCRIPTION:

MAB biological detection is based upon Flame Photometry Detection (FPD), detection of the physical signature of the chemical atoms and bonds within the products and compounds. More precisely, MAB takes the air in, burns all gas and particles in it and provides energy to the electrons that get onto upper levels of energy. When these electrons go back to their standard energy levels, they emit the consequent energy by emission of a photon (light). MAB immediately detects and analyses this light. This is the way MAB detects and calculates all particles containing the precise ratio of components, this being a signature for biological particles.

This technology (FPD) is sensitive, reliable, not sensitive to humidity, temperature or mixture of compounds. MAB requires no service and nearly no maintenance. MAB remains operational after a positive detection. MAB offers the most reliable information on the field, not being lured by fluorescent or same size particles, with the best on field reliability.

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

CONTACT INFORMATION

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78210 Saint Cyr L'Ecole, France
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+33 1 30 58 47 34
Contact@proengin.com
www.proengin.com

COST

N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

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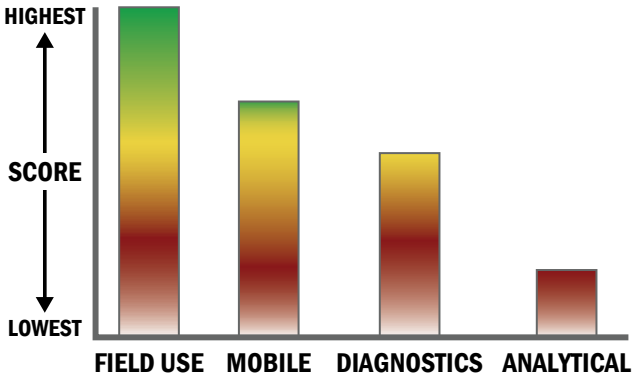

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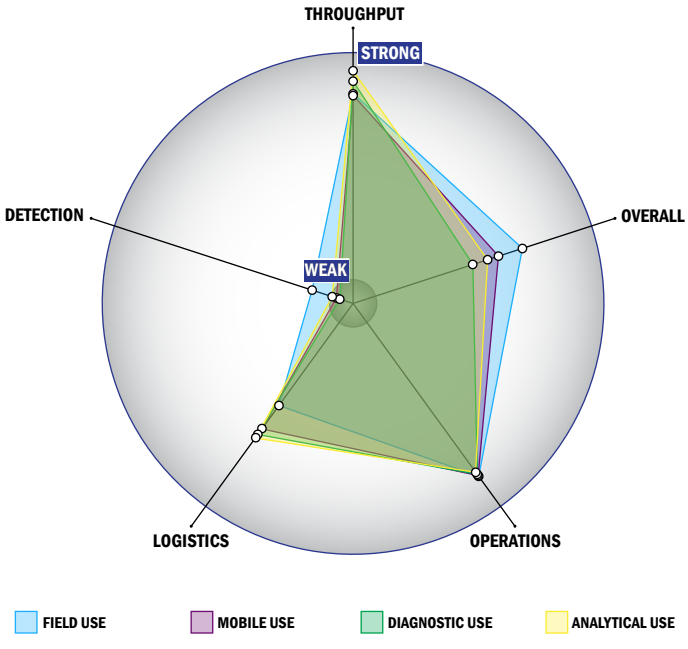


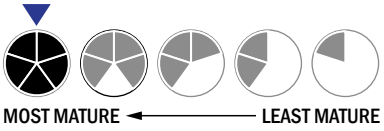
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- 5-10 minutes is required for set-up
- Automatic detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a carry-on luggage suitcase
- Between 5 and 25 kg
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- 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 closed and not available for modification
- 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)

Prognosys, LLC - AIDA: Autonomous Identification Diagnostics and Alert

GENERAL DESCRIPTION:



The AIDA™ system is comprised of a multiple pathogens and toxins diagnostic strip, a smart telephone for reading, analyzing and telemetry of the results indicated on the diagnostic strip, and a secure (encrypted) web portal for capturing test data, tracking results, prognosis, decision support, and mapping of identified pathogens and toxins anywhere on the globe.

AIDA™ can be used to detect as many as ten pathogens, toxins, chemical threats, and physical conditions (such as temperature, time, and vibration) simultaneously. AIDA™ devices can be configured as qualitative devices or fully quantitative systems with a limit of detection of about 50 ng/mL or 104 CFU, specificity of 95% or better, coefficient of variation of 5% or less, and detection time of less than 10 minutes for all indications on the strip. Prognosys has recently developed multiple pathogen cassettes for *B. anthracis* spores and PA, C. botulinum toxin, Yersenia pestis, SEB and Ricin, and a number of other diagnostics such as enteric diseases (V. colerae 01, 0139, E-coli 0157, Salmonella), cardiovascular disease markers (CRP, cTnI, TpP), and a number of kidney disease markers. Developed by Prognosys, LLC as point-of-care diagnostic system, AIDA™ can be used by un-trained individuals at home, in the field, and points of care, without the need for instruments, reagents, and processing. AIDA™ is highly configurable not only for biological threats and medical applications, but also for supply chain tracking and security, tamper detection, and organizational planning and decision support.

TECHNICAL DESCRIPTION:

Commercially available lateral flow immuno-assays using colloidal gold labeled antibodies, incorporated into barcode diagnostic devices.

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

CONTACT INFORMATION

Prognosys, LLC
POC: Dr. Kenneth Gabriel, President & CEO
KenGabriel@PrognosysInc.com

COST

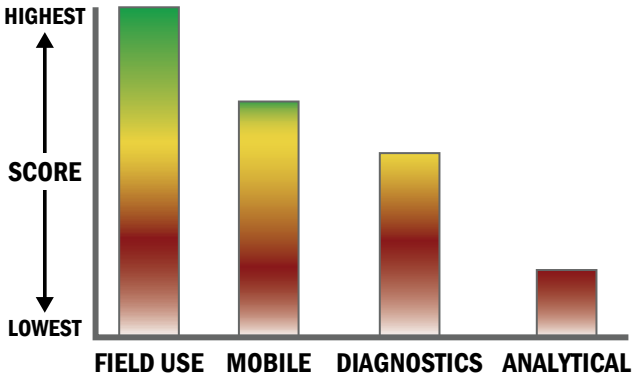
- $20-$40/system
- $5/analysis

Survey Source

Vendor and Internet Supplied Information

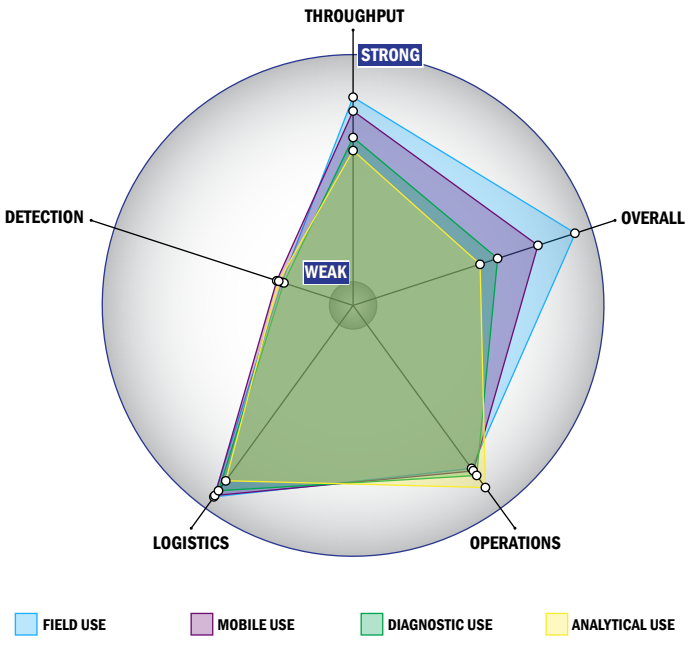
Scoring Analysis

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.



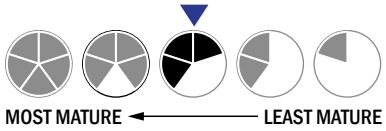
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, >10 tests/sample per run
- 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
- No set-up is required for setup
- 1-2 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a soda can
- Less than 1 kg
- Satellite, wireless and wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at 4 °C
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- 1-3 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- Less than 50 µL
- 10,000-100,000 CFU per mL
- 10,000-100,000 PFU per mL
- Greater than 10,000 ng per mL
- Manual kit not integrated with the system handles spore lysis
- > $1x10^{-3}$ mg/m^3
- 1 ppb – 1 ppm

Program of Record - Joint Biological Tactical Detection System (JBTDS)

GENERAL DESCRIPTION:

The Joint Biological Tactical Detection System is intended to be a lightweight, low-cost, battery and/or shore power operable, system designed to rapidly detect, collect, and identify Biological Warfare Agents (BWAs) which are assessed to pose a threat to the Joint Forces. JBTDS will be a modular set of components that can be utilized individually or together to provide an integrated capability set. These components perform the core biological defense functions of biological aerosol detection, collection, identification and reporting. The JBTDS will be a man-portable system that can be carried by one Warfighter over distances ranging from 500 m to 1 km. JBTDS will be a modular set of components that can be utilized individually or together to provide an integrated capability set. JBTDS will provide the flexibility to employ JBTDS components in several missions to include: biological surveillance, biological monitoring, consequence management and combating weapons of mass destruction (WMDs).

TECHNICAL DESCRIPTION:

The JBTDS is anticipated to be a modular set of components (collection-only sensor, detection-collection sensor, identification capability, and Base Station Communication Capability (BSCC)) to provide biological aerosol detection, sample collection, and presumptive/confirmatory identification. The JBTDS will provide a net centric capability by connecting to the Joint Warning and Reporting Network (JWARN). The JBTDS will consist of Commercial Off the Shelf (COTS) and Government Off the Shelf (GOTS) materiel solutions with certain capabilities networked together to provide remote control capability.

CONTACT INFORMATION

Joint Product Manager for Biological Detection Systems
5381 Blackhawk Rd., Bldg E3551
Aberdeen Proving Ground, MD 21010
POC: MAJ Aaron McCullough
aaron.m.mccullough.mil@mail.mil
410-436-7253

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

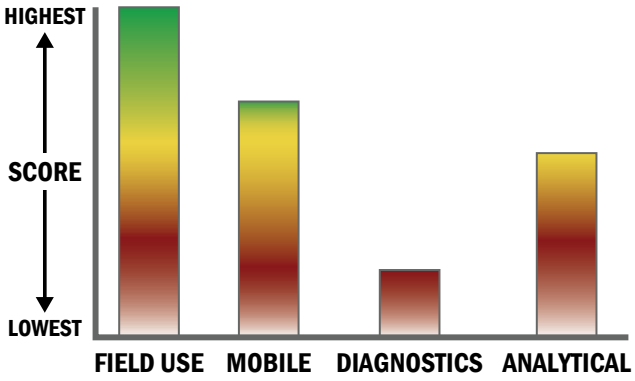
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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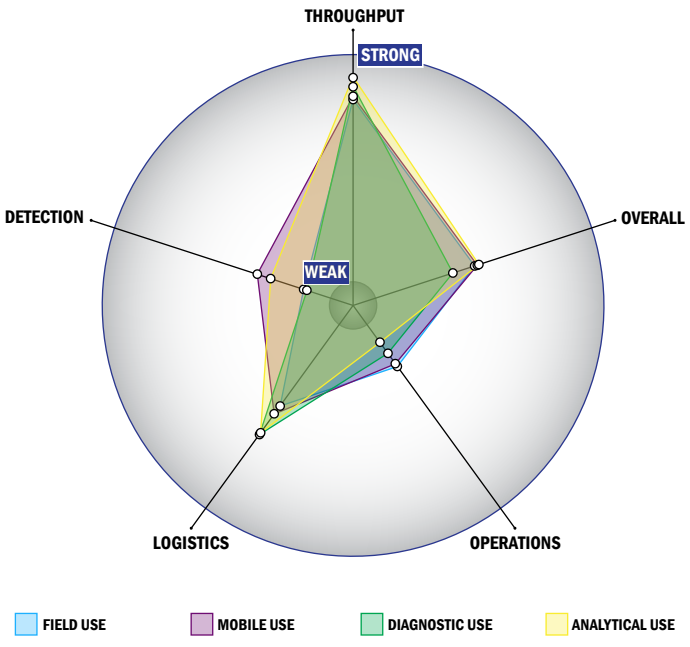


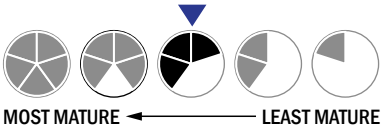
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 2 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
- Between 25 and 50 kg
- Satellite, wireless and wired connections are available
- System or device has 110V electrical requirement
- 1-2 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at room temperature (27°C)
- Between 1 to 3 years shelf life
- Results can be viewed in real-time

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
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Add on capability that is full or semi-automated for spore lysis

QTL Biosystems - Biosensor 2200R

GENERAL DESCRIPTION:



The BIOSENSOR 2200R biological agent detector is a handheld, portable, on-site instrument for rapid detection, analysis, and identification of biological agents. Unique bioassay technology offers excellent sensitivity and low false positives while offering ease of use in the field. This highly accurate detection method provides rapid measurement of biohazards such as anthrax, ricin, botulism, SEB, and plague. Exclusive five minute time-to-answer allows first responders to make informed critical decisions more rapidly than any other biological agent detector. The BIOSENSOR 2200R employs dynamic surface generation, a patent pending type of immunomagnetic assay detection technology. This technology offers significant advantages over other field-based assay methods by combining the benefits of both the free solution and lateral flow types. The result is more rapid analysis, a user-friendly format, and detector stability within a wide range of climates. Both wet and dry samples may be tested and results are displayed with a simple red (target present) or green (no target present) indication. As tests are nondestructive, samples may be retained as evidence. Single-test, disposable cartridges with on-board reagents have a 16 month shelf life. This instrument is IP 67 certified and permanently housed in a sturdy, light weight fully decon-able Pelican case. Recent research and development has demonstrated that the Biosensor 2200R can identify targets in whole blood and can be utilized as a human diagnostic device.

TECHNICAL DESCRIPTION:

The BIOSENSOR 2200R employs dynamic surface generation, a patent MIX Sample is mixed with the sensing solution which contains: a magnetic component, a fluorescent component and receptors for the biological agent(s) of interest.

- BIND Sensing materials bind to target during incubation.
- MAGNETIZE All bound and unbound magnetic material is pulled to surface.
- WASH All remaining sensing and non-target material is washed away. False positives are virtually eliminated by removing potential interferents.
- READ Concentrated sample (pellet) is illuminated and emits a signal if target is present.

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 and Internet Supplied Information

CONTACT INFORMATION

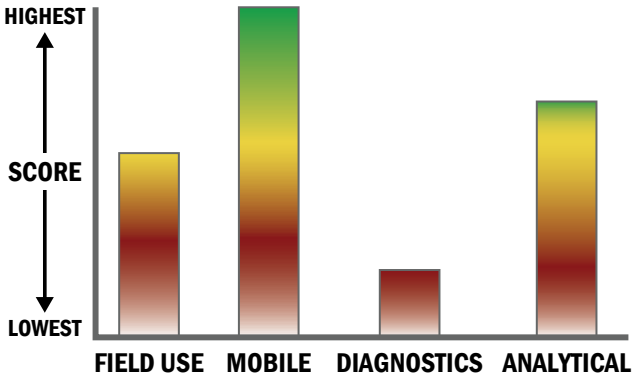
QTL Biosystems
935 4th Ave.
New Kensington, PA 15068
POC: Brian Oswalt
724-575-0033
boswalt@qtlbio.com

COST

- $15,995/system
- <$50/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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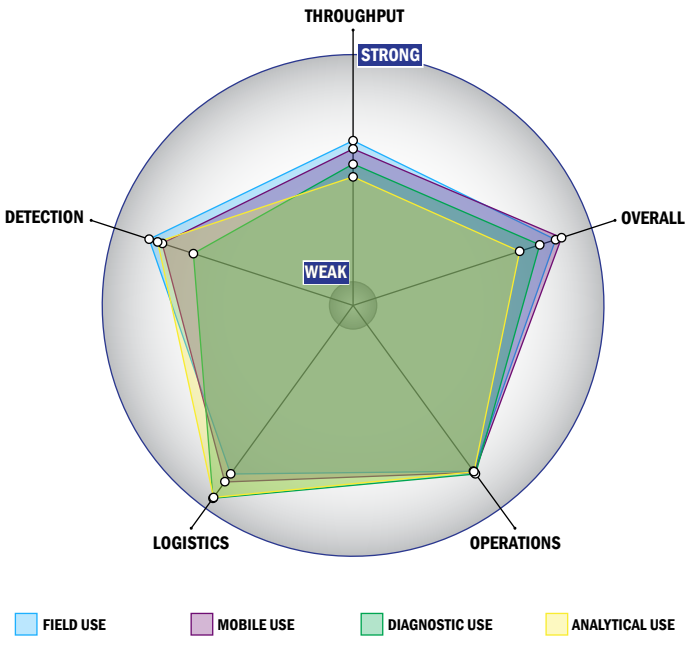


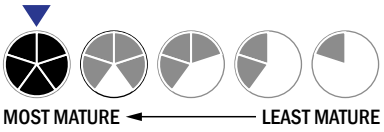
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required for set-up
- 6-8 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- 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 room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Less than 1 ng per mL
- Spore lysis not necessary for detection by system

QTL Biosystems - BIOSENSOR 4000

GENERAL DESCRIPTION:



The BIOSENSOR 4000, built on the proven technology of the Biosensor 2200R, offers first responders and emergency medical technicians an automated instrument to further advance biological agent detection in the field, on the ambulance and in the laboratory. The BIOSENSOR 4000 fully automates the detection process from wet or dry sample introduction to result with no other user interaction required. The assay cartridge enables users to test simultaneously for up to eight pathogens. Unique bioassay technology offers excellent sensitivity and low false positives while offering ease of use in the field. This highly accurate detection method provides rapid measurement of multiple biohazards such as anthrax, ricin, botulism, SEB, tularemia, plague, smallpox and West Nile virus. Exclusive five minute time-to-answer allows first responders to make informed critical decisions more rapidly than any other biological agent detector. The BIOSENSOR 4000 employs dynamic surface generation, a patent pending type of immunomagnetic assay detection technology. The instrument and technology offer significant advantages over other field and lab based assay methods including better sensitivity, faster analysis, a user-friendly format, and detector stability within a wide range of climates. Results are displayed with a simple red (target present) or green (no target present) indication. As tests are nondestructive, samples may be retained as evidence. This instrument is IP 67 certified and permanently housed in a sturdy, light weight fully decon-able Pelican case. Research and development has demonstrated that the BIOSENSOR 4000 can identify targets in whole blood and can be utilized as a human diagnostic device.

TECHNICAL DESCRIPTION:

The BIOSENSOR 4000 employs dynamic surface generation, a patent pending type of immunomagnetic sandwich assay technology.

- MIX Sample is mixed with the sensing solution which contains: a magnetic component, a fluorescent component and receptors for the biological agent(s) of interest.
- BIND Sensing materials bind to target during incubation.
- MAGNETIZE All bound and unbound magnetic material is pulled to surface.
- WASH All remaining sensing and non-target material is washed away. False positives are virtually eliminated by removing potential interferents.
- READ Concentrated sample (pellet) is illuminated and emits a signal if target is present.

CONTACT INFORMATION

QTL Biosystems
935 4th Avenue
New Kensington, PA 15068
POC: Brian Oswalt
724-575-0033
boswalt@qtlbio.com

COST

- $17,995/system
- <$75/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

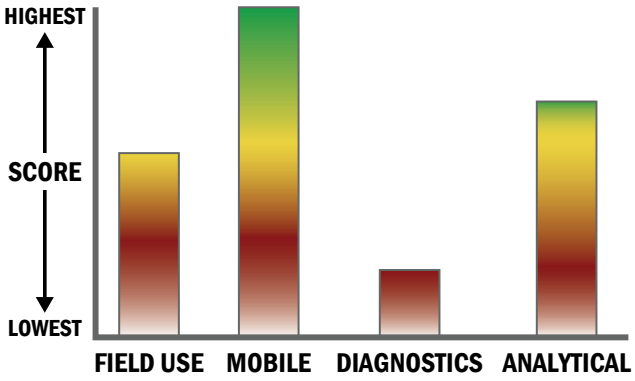
	Biological	Chemical	Radiological
FIELD USE System	●	N/A	N/A
MOBILE Laboratory	●	N/A	N/A
DIAGNOSTIC Laboratory	●	N/A	N/A
ANALYTICAL Laboratory	●	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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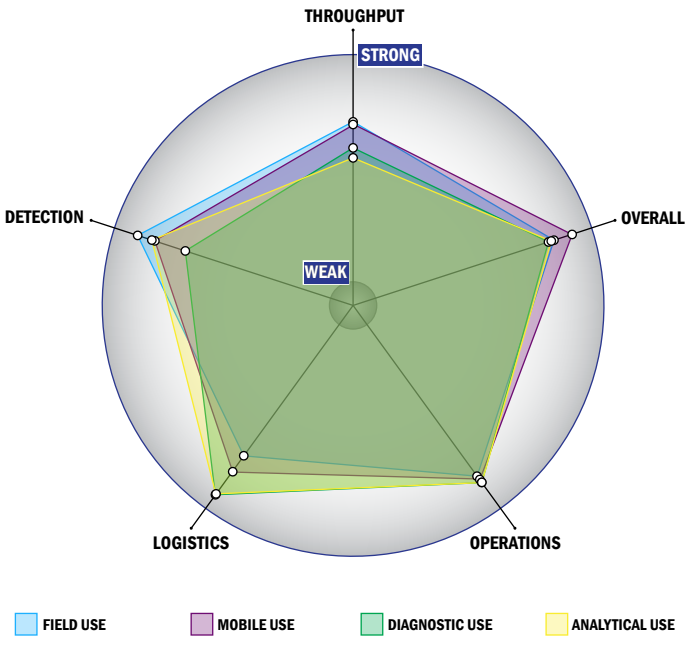


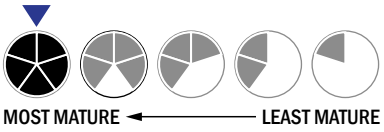
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system 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 toaster
- Between 5 and 25 kg
- Wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 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 open and available for modification
- The system hardware is open and 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- Less than 1 ng per mL
- Spore lysis not necessary for detection by system

Quant Technologies - NQAD QT-500 Detector

GENERAL DESCRIPTION:



The NQAD is a Universal HPLC detector that can be used in-line with other detectors or as the detector of choice for various HPLC analyses including UHPLC, HPLC, GPC, and SFC. The NQAD line of detectors utilizes water condensation nucleation technology which does not rely on a specific characteristic of the compound to be detected. The detector first nebulizes the HPLC stream then, second, evaporates the mobile phase leaving a dried aerosol particle. Third, water is condensed on the particle to increase its size. Only then is each particle individually counted. At a basic level, the NQAD is a particle counter that works well as a mass counter as well. With a strong separation method, the NQADs high sensitivity, linearity, wide dynamic range and high reproducibility lead to nanogram on column sensitivity. Detection does not rely on a specific characteristic of the compound; therefore, no derivatization is needed. The detector works well with gradient methods, mobile phases of any pH, is linear over 3-4 orders of magnitude and displays a peak reading in real time.

TECHNICAL DESCRIPTION:

The Quant line of NQAD detectors utilizes “Water Condensation Nucleation” technology. This technology has been used in air particle analyzers, which are generally used for clean room analysis and environmental monitoring. In addition, it has been used as a nonvolatile residue monitor that tests the amount of nonvolatile residue in ultrapure water system (crucial in the semiconductor industry). The NQAD line of detectors was created by taking this robust technology and applying it to chromatography.

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	Fourth Tier	N/A
MOBILE Laboratory	N/A	Fourth Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Fourth Tier	N/A

CONTACT INFORMATION

Quant Technologies
1463 94th Lane NE
Blaine, MN 55449
POC: Melissa Tucker Nelson
763-398-0508
MelissaN@QuantTechnologies.com

COST

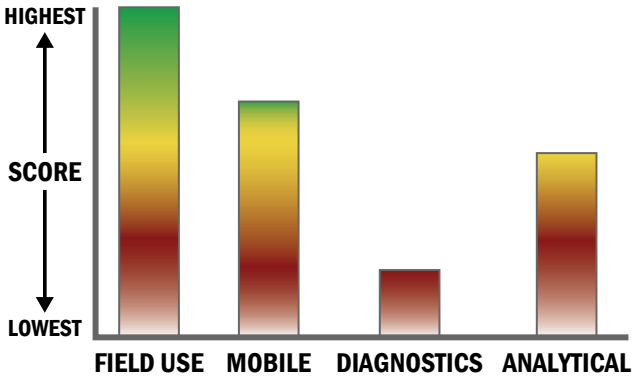
- $25,500-$36,500/system
- N/A/analysis

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

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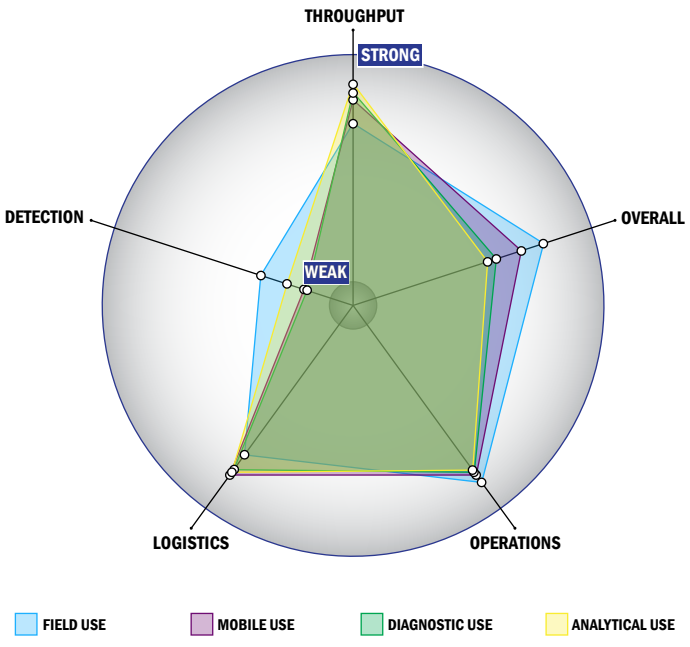


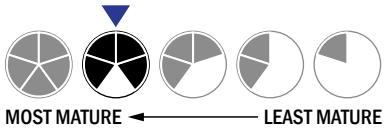
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 1 component
- 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 toaster
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 6 months shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system hardware is open but modification requires licensing

Detection:

- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1 ppb-1 ppm
- Possible system could identify liquid chemical agent

RADeCO, Inc. - Tru-Dac

GENERAL DESCRIPTION:

Tru-Dac is a personal Alarming Alph/ Beta Monitor. Detects airborne radiation for inhalation dose in an ultra-portable package. The device can be used for either First Responders or Laboratory use. Utilizes a membrane filter. Collected airborne activity is analyzed by internal detector with Alpha spectroscopy and gross Beta counting.



TECHNICAL DESCRIPTION:

Aerosol is collected at the surface of a filter. A semiconductor detector is used to Detect Alpha & Beta particles. Separation of long living Alpha Nuclides from Radon daughters by using alpha-spectroscopy. Beta gross counting and natural background subtraction is also included in the detection system.

CONTACT INFORMATION

RADeCO, Inc.
17 West PKWY
Plainfield, CT 06374

COST

- $5,750/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

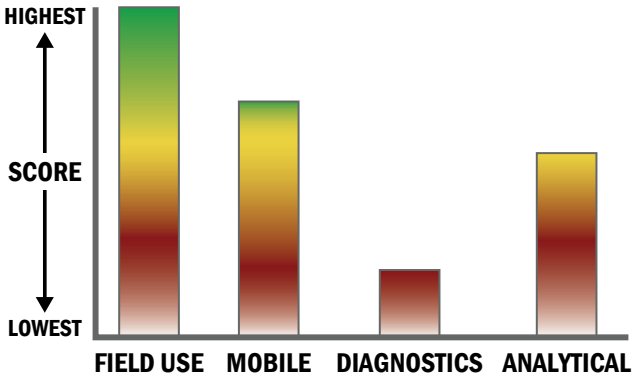
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	
MOBILE Laboratory	N/A	N/A	
DIAGNOSTIC Laboratory	N/A	N/A	
ANALYTICAL Laboratory	N/A	N/A	

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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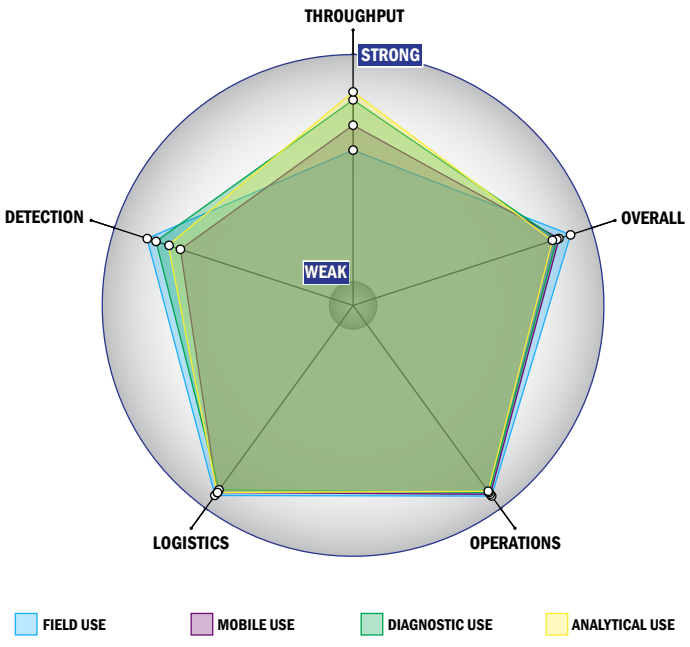


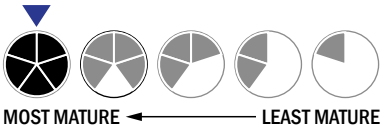
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 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 soda can
- Less than 1 kg
- Satellite, wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Only total dose and count rate
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for personnel detection

Radiation Solutions, Inc. - Mobile Radiation Detection & Monitoring System

GENERAL DESCRIPTION:



The RS-700 Series are self-contained gamma-ray and neutron (optional) radiation detection and monitoring systems. They can be used in land vehicles, helicopters or at a fixed site. The system has a built in GPS receiver to accurately locate each measurement. It is also supplied with the RadAssist survey program for user control, monitoring and recording. The system is flexible enough to permit real-time monitoring with a computer or operate in a stand-alone configuration with the data being recorded internally and later retrieved. Alternatively, the data can be transmitted to a central command point in real time stored and transmitted at a later time. The RS-700 utilizes advanced DSP /FPGA technology and software techniques that provide laboratory levels of spectral performance that were previously unachievable on mobile platforms. Despite its state-of-the-art technology, the RS-700 is extremely operator friendly and can be rapidly deployed. The system provides - full 1024 channel spectrum - navigation track with 'breadcrumb' trail - Mapping displays - nuclide identification - alarm capability.

TECHNICAL DESCRIPTION:

A basic RS-700 system uses a 256 or 128 cubic inch sodium iodide detector as its primary detector. Other types are optionally available. Up to five detectors can be placed on the system The heart of the system is the Advanced Digital Spectrometer (ADS) module. Each individual NaI crystal detector has its own high speed analog to digital converter and a DSP /FPGA processor assembly. This module converts the analog signal from the detector to a digital spectrum with a 1,000,000 channel resolution. Using a unique detector energy calibration curve stored in the ADS assembly, the spectrum is linearized and compressed to the system's active 1024 channel resolution.

CONTACT INFORMATION

Radiation Solutions, Inc.
386 Watline Ave
Mississauga, Ontario, Canada L4Z 1X2

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

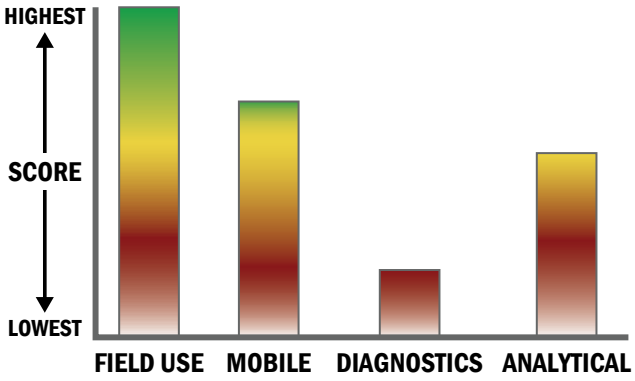
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Bottom Tier
MOBILE Laboratory	N/A	N/A	Fourth Tier
DIAGNOSTIC Laboratory	N/A	N/A	Fourth Tier
ANALYTICAL Laboratory	N/A	N/A	Fourth Tier

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

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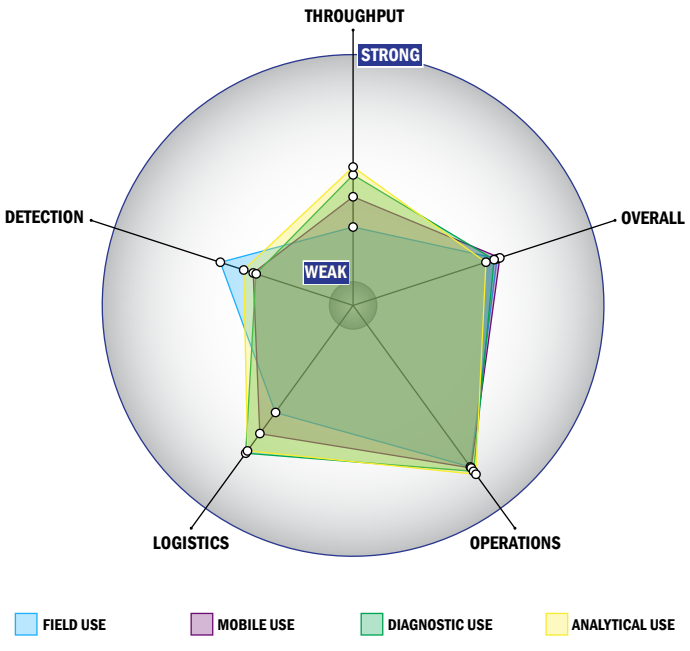


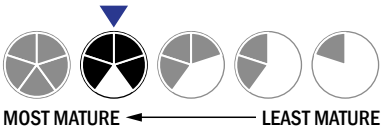
Evaluation Criteria

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
- Less than 5 minutes is required for set-up

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a carry-on luggage suitcase
- Between 5 and 25 kg
- Wireless and wired connections are available
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Total dose, dose rate and count rate with operator selection to show the display, may differentiate between types of radiation
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for area air sampling

RAE Systems, Inc. - AreaRAE GAMMA Steel

GENERAL DESCRIPTION:



The AreaRAE Gamma is a combination multi-gas and radiation detector equipped with a wireless, RF (radio-frequency) modem that allows the unit to communicate and transmit sensor and other information on a real-time basis with a remotely located base controller. In the stand alone operation, the AreaRAE Gamma is a rugged, weather-resistant, one-to-five sensor portable monitor that can run up to 18 hours on either rechargeable Lithium-ion or optional alkaline batteries. It is also the first "lunchbox"- type multi-sensor instrument able to include a gamma sensor for measurement of gamma radiation, a photoionization detector (PID) for parts per-million measurement of volatile organic compounds (VOCs), as well as an LEL combustible gas sensor, oxygen sensor, and a selectable electrochemical toxic sensor. Key Features:

- Up to four gas sensors (PID, LEL, O2 and selectable toxic gas)
- One radiation sensor (Gamma)
- Loud buzzer and large, extra-bright warning light
- Large LCD display and keypad
- Rugged, weather-resistant housing
- Built-in sampling pump
- Interchangeable Lithium-ion or alkaline battery pack
- Continuous operation via AC source Additional Advantages
- Real-time wireless data transmission with built-in RF modem
- View real-time sensor data and alarm status at headquarters or command center
- Optional GPS provides ability to track and display readings from remote detectors
- License-free, ISM-band RF transmission with communication range up to 2 miles.

TECHNICAL DESCRIPTION:

In addition to the Scintillation Crystal Detector, the AreaRAE GAMMA has a photoionization detector (PID) which uses an ultraviolet lamp and sensor to detect volatile organic compounds (VOCs) and halocarbons.

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	Second Tier	Second Tier
MOBILE Laboratory	N/A	Third Tier	Third Tier
DIAGNOSTIC Laboratory	N/A	Bottom Tier	Fourth Tier
ANALYTICAL Laboratory	N/A	Fourth Tier	Third Tier

Survey Source

Vendor and Internet Supplied Information

CONTACT INFORMATION

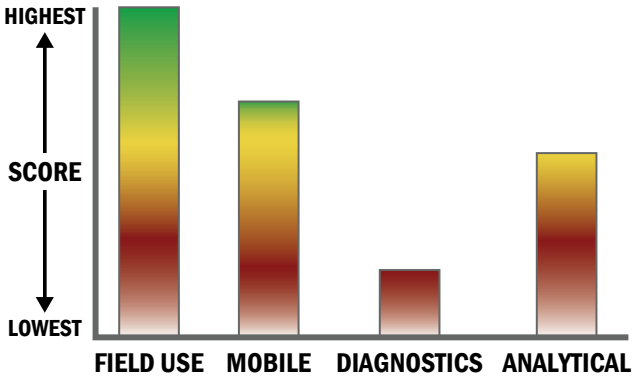
RAE Systems, Inc.
3775 N. First Street
San Jose, CA 95134
POC: Jim Kane 757-746-5554
jkane@raesystems.com

COST

- $9,594/system
- N/A/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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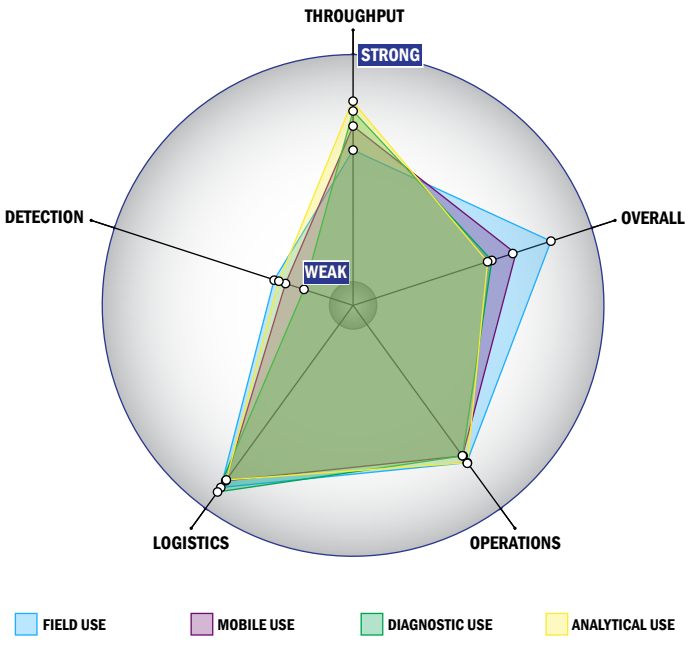


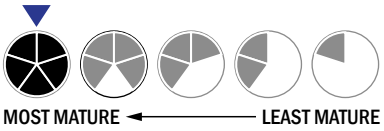
Evaluation Criteria

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
- 5 or more components
- 5-10 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
- Satellite, wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from -21°C to 41°C
- This system does not require consumable components
- Device or system has peak performance at normal relative humidity conditions
- Between 6 months and 1 year shelf life
- 5-10 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 open but modification requires licensing

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
- 1 ppm-100 ppm
- Possible the system could be adapted to identify liquid chemical agent
- Only count rate
- Down to background level radiation for count rate
- System is used for surveying

RAE Systems - GammaRAE II R

GENERAL DESCRIPTION:

The GammaRAE II R is a gamma radiation detector and full-range dosimeter in a single instrument. Designed specifically to meet the needs of first responders, it has rapid response of detection and the accurate dose measurement of a dosimeter.



TECHNICAL DESCRIPTION:

The GammaRAE II R uses a sensitive CsI scintillator for excellent search capability and fast response. It also has an energy-compensated PIN diode sensor for high dose rate range and accurate dosimeter capability.

CONTACT INFORMATION

RAE Systems
3775 North First Street
San Jose, CA 95134-1708
POC: June Wang

COST

- $1,318/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

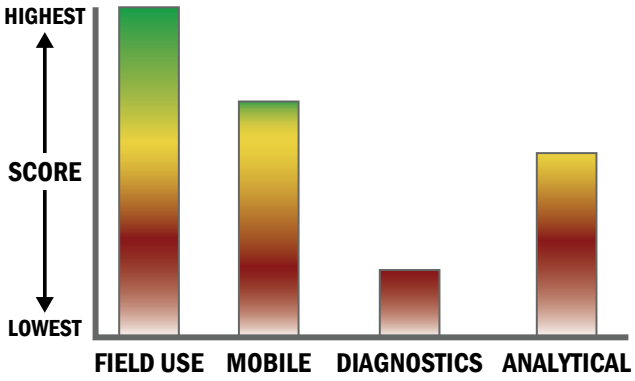
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Bottom Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Bottom Tier
ANALYTICAL Laboratory	N/A	N/A	Bottom Tier

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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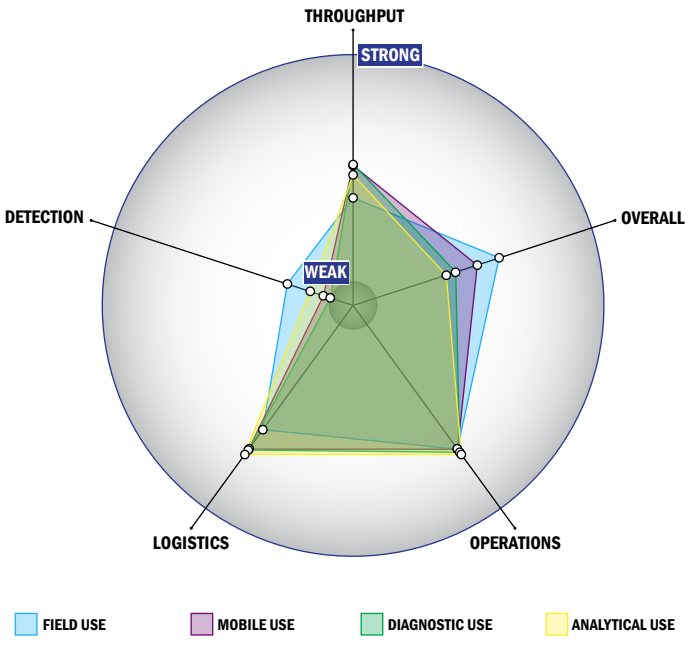


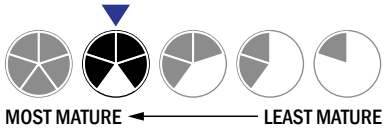
Evaluation Criteria

Throughput:

- 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
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wireless and wired connections are available
- System or device uses batteries



Operations:

- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 1-3 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose, dose rate and count rate
- System is used for surveying

RAE Systems - NeutronRAE II

GENERAL DESCRIPTION:

NeutronRAE II is a radiation detector to provide rapid detection of both gamma and neutron radiations. It was designed specifically to meet the needs of first responders.

TECHNICAL DESCRIPTION:

It uses a CsI scintillation detector for gamma detection and a LiI scintillator for neutron detection.



CONTACT INFORMATION

RAE Systems
3775 North First Street
San Jose, CA 95134-1708
POC: June Wang

COST

- $2,200/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

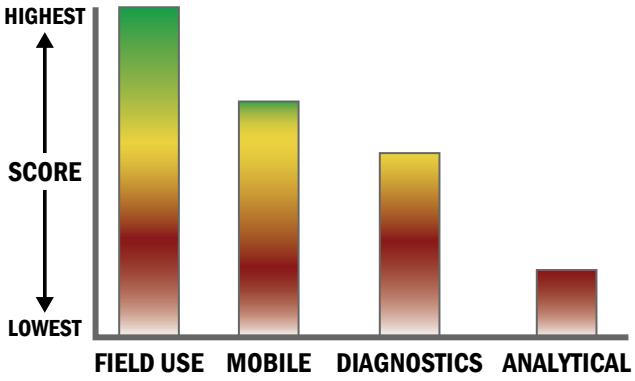
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Bottom Tier
MOBILE Laboratory	N/A	N/A	Fourth Tier
DIAGNOSTIC Laboratory	N/A	N/A	Bottom Tier
ANALYTICAL Laboratory	N/A	N/A	Bottom Tier

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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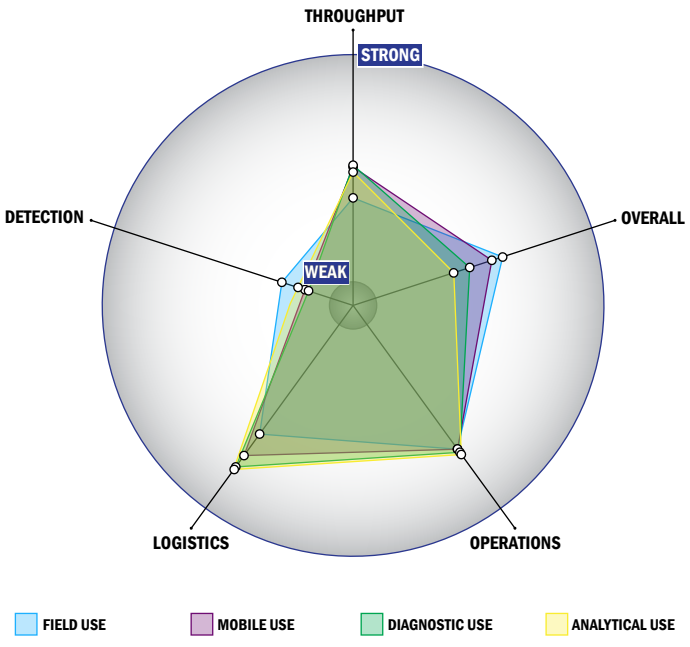


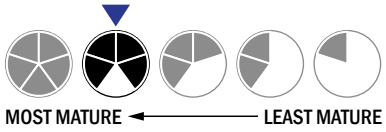
Evaluation Criteria

Throughput:

- 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
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wireless and wired connections are available
- System or device uses batteries



Operations:

- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 1-3 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Total dose, dose rate and count rate with operator selection to show the display, may differentiate between types of radiation
- System is used for personnel detection

Rapid Diagnostek, Inc. - IntelliProbe

GENERAL DESCRIPTION:



This is a highly versatile platform. The system consists of a cell phone-sized instrument that uses disposable sensors. Sensors can be for a single analyte or can be made as a multiplexed array on a single sensor. All sensor formats will be compatible with the same instrument. The system is intended for use at the point of sample collection, regardless of environment. Skills sufficient to use a cell phone are far above what is required to operate the system. While the first product will be a hand held device, the technology can also be configured as a low volume bench-top or a high throughput laboratory instrument. Test samples can be any untreated biological fluid, environmental sample, or a prepared solution or suspension of a material to be tested.

TECHNICAL DESCRIPTION:

A bulk acoustic shear-wave thin-film resonator coated with a capture ligand is operated at its fundamental resonance frequency as it is exposed to a test sample. As target analyte is captured the phase of the signal shifts. The rate of phase change is proportional to concentration of target analyte in the sample. A second identical resonator on the sensor is coated as a reference that is non-reactive with the target analyte but will undergo any non-specific changes that the capture ligand on the test resonator experiences (pH, temperature, viscosity, non-specific protein binding, etc.). The net difference between the test and reference phase shifts is due solely to target analyte binding.

CONTACT INFORMATION

Rapid Diagnostek, Inc.
1301 Gateway Circle, Suite 400
Hudson, WI 54016
POC: Richard A. Van Deusen, CTO

COST

- <$250/system
- >$3/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier · Second Tier · Third Tier · Fourth Tier · Bottom Tier

RANKINGS

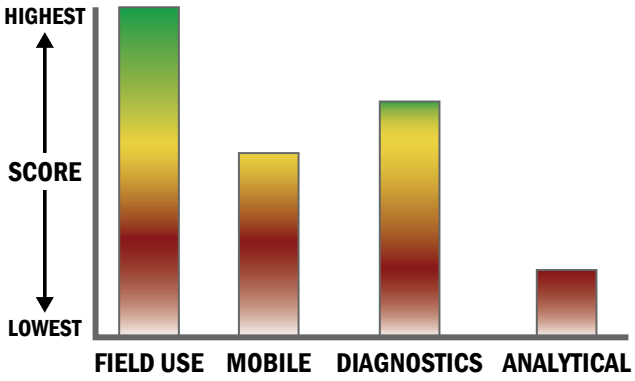
	Biological	Chemical	Radiological
FIELD USE System	Top Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Second Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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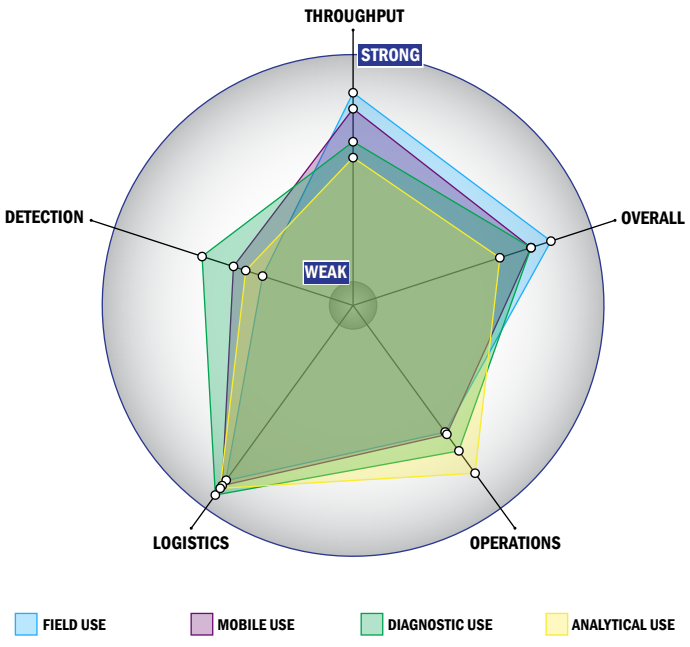


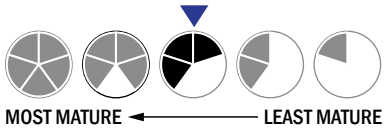
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/sample per run
- 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
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

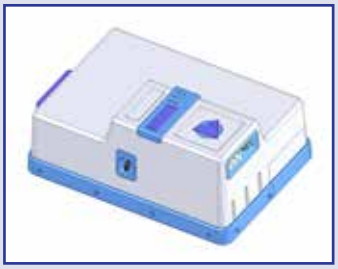
- Can be used from 4°C to 41°C
- Performance is not influenced by relative humidity
- 3-5 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- Efforts are underway to achieve 510K clearance
- Efforts are underway to achieve FDA approval
- Less than 50 µL
- 1,000-10,000 CFU per mL

Research International, Inc. - AIR (Arrayed Imaging Reflectometry) Bioassay System

GENERAL DESCRIPTION:



The AIR System performs extremely sensitive label-free, multi-analyte immunoassays (64 to several hundred array elements) on a silicon chip mounted in an injection-molded disposable cartridge. Protein assays typically have 1 pg/mL sensitivity, and a 5 to 6 log detection range. Assay protocols are completely automated and fluidic operations are controlled by an on-board microprocessor. These protocols primarily consist of incubation, wash and optical read-out steps that may be conveniently modified for specific applications or conditions using Windows software. All sample and wash fluids are stored onboard the cartridge after an assay is completed- there is no possibility of post-analysis sample contact. The hardware is currently in its fourth generation. The AIR platform is highly amendable to multiplexing, allowing for rapid, simultaneous quantification of potentially 100's of analytes with no increase in assay complexity. This robust detection platform is novel in its combination of rapid testing, highly multiplexed capacity and low assay cost. AIR has also been adapted for use in the field and at the point of need.

TECHNICAL DESCRIPTION:

AIR is a silicon chip-based label-free biosensor platform, which enables the detection and quantification of virtually any probe-target analyte pair with a high degree of sensitivity. Detection occurs via optical sensing of the binding of sub-Angstrom layers to the functionalized substrate surface. As AIR is an essentially reagentless assay, typical target analysis takes under 30 minutes of processing time (limited only by binding kinetics of the probe-target), in contrast to labeled techniques, which require further processing (usually 2-3 additional chemistries after target hybridization) and result in longer test times (>2 hrs) and substantially increased reagent costs.

CONTACT INFORMATION

Research International, Inc.
17161 Beaton Road SE
Monroe, WA 98272
POC: Jonathon Tobelmann
703-625-8381
www.resrchintl.com

COST

- $30,000/system
- ~$20/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

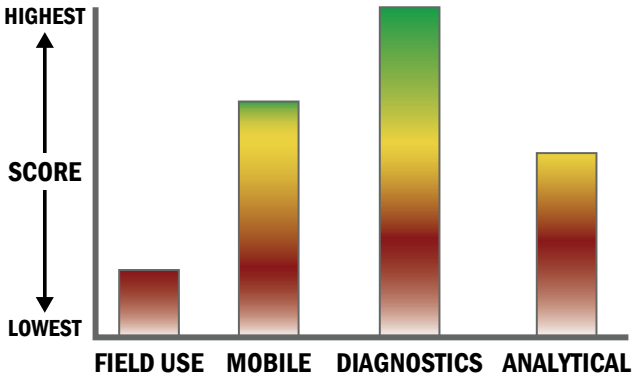
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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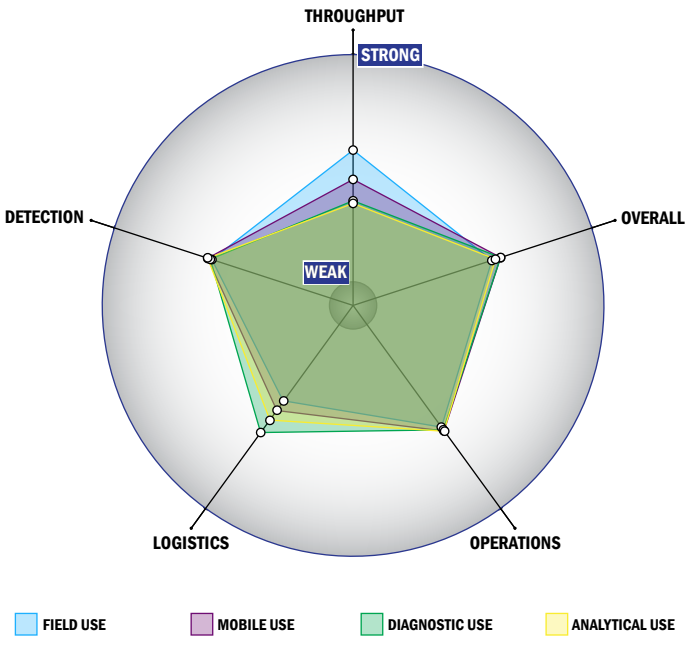


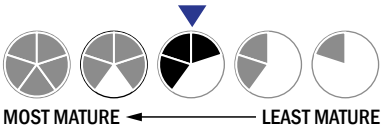
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- 1 sample, >10 tests/sample per run
- Less than 32 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 setup
- 1-2 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a toaster
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be stored at 4°C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results cannot 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:

- 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
- Less than 50 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- 10,000-100,000 CFU per mL
- 10,000-100,000 PFU per mL
- 1-10 ng per mL
- Spore lysis not necessary for detection by system

Research International, Inc. - ASAP II

GENERAL DESCRIPTION:



The ASAP II collection/detection system continuously monitors for the presence of aerosol biohazards, identifying threat agents as frequently as every 20 to 30 minutes. It is an integration of Research International's proven SASS 2300 air sampler technology and RAPTOR four-channel bioassay system. ASAP II may be provided with a small fixed-installation environmental enclosure or in component form. In operation, the SASS 2300 samples air continuously and transfers particulates into a secondary water phase. These water samples are periodically transferred to the RAPTOR. One mL is used for analysis and the remainder is saved as a confirmatory sample. The RAPTOR automatically performs analysis for up to four agents using a disposable assay coupon. Each of the assay coupons may be reused up to 30 times over a 48-hour unattended operating period, providing extremely competitive per-assay costs. A remote PC allows operating personnel to monitor the system, while an optional green/amber safety light immediately communicates system status to nearby workers.

TECHNICAL DESCRIPTION:

The ASAP II uses RI's SASS 2300 wetted-wall cyclone to concentrate particulates into a water sample. Patented technology measures the volume of water in the cyclone and continuously replenishes evaporative losses, allowing unlimited collection periods. In operation, the SASS 2300 samples air continuously and transfers particulates into a secondary water phase. Transfer of the sample from the SASS to the Raptor is fully automated as are analyses, based on 'sandwich format' fluoroimmunoassays taking place on the surface of injection molded polystyrene waveguides. The waveguide has a monolayer of capture antibody immobilized on its surface. It is incubated with sample, washed and then incubated with fluorophore-labeled antibody. Excitation light is injected into and fluorescence emission is collected from the waveguide.

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

CONTACT INFORMATION

Research International, Inc.
17161 Beaton Road SE
Monroe, WA 98272
360-805-4930

COST

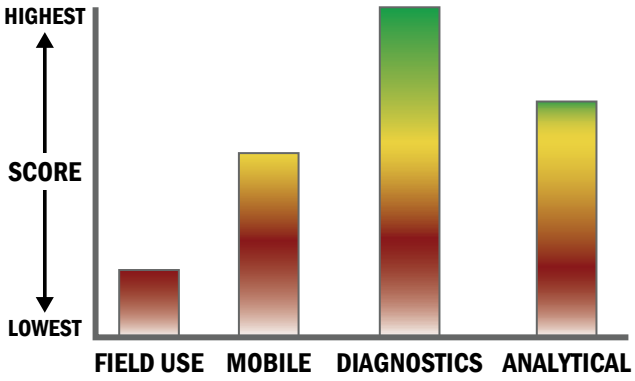
- $85,000/system
- $7/analysis

Survey Source

Vendor Supplied Information

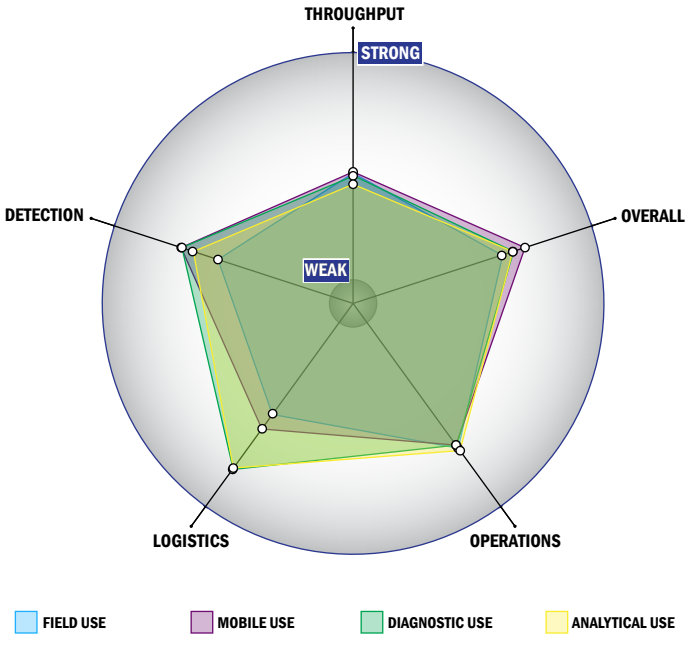
Scoring Analysis

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.



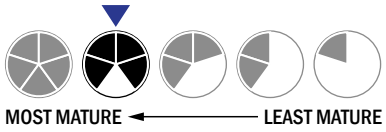
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 1 component
- 10-20 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at 4 °C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is open and 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
- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 10,000-100,000 CFU per mL
- Greater than 100,000 PFU per mL
- 1-10 ng per mL
- Spore lysis not necessary for detection by system

Research International, Inc. - ASAP V

GENERAL DESCRIPTION:



The ASAP II uses RI's SASS 2300 wetted-wall cyclone to concentrate particulates into a water sample. Patented technology measures the volume of water in the cyclone and continuously replenishes evaporative losses, allowing unlimited collection periods. In operation, the SASS 2300 samples air continuously and transfers particulates into a secondary water phase. Transfer of the sample from the SASS to the Raptor is fully automated as are analyses, based on 'sandwich format' fluoroimmunoassays taking place on the surface of injection molded polystyrene waveguides. The waveguide has a monolayer of capture antibody immobilized on its surface. It is incubated with sample, washed and then incubated with fluorophore-labeled antibody. Excitation light is injected into and fluorescence emission is collected from the waveguide.

TECHNICAL DESCRIPTION:

Airborne samples are collected using a built-in air handler that incorporates a computer-controlled centrifugal blower. Individual detectors take air from this primary sampling stream. The ASAP V currently uses an OEM version of Environic's ChemProFX for detecting chemical agents. The ASAP V uses Research International's TacBio™ biological aerosol detector to monitor changes in bio-aerosol levels. Aerosol samples are collected for later analysis using RI's SASS 4100 two-stage high volume aerosol sampler. Identification of biological threats may be done using Alexeter Technologies bioassay strips or alternatively, identification may be performed on-line using either RI's RAPTOR or BioHawk automated bio-identifiers. RI has formed a strategic partnership with the Scientific Production Center ASPECT to provide radiation detection equipment. This equipment is usually in the form of a portal monitor that detects radioactive materials being transported by individuals.

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	Fourth Tier	Bottom Tier	Bottom Tier
MOBILE Laboratory	Top Tier	Third Tier	Fourth Tier
DIAGNOSTIC Laboratory	Third Tier	Top Tier	Third Tier
ANALYTICAL Laboratory	Top Tier	Third Tier	Third Tier

CONTACT INFORMATION

Research International, Inc.
17161 Beaton Road SE
Monroe, WA 98272
POC: Jonathon Toblemann
703-625-8381

COST

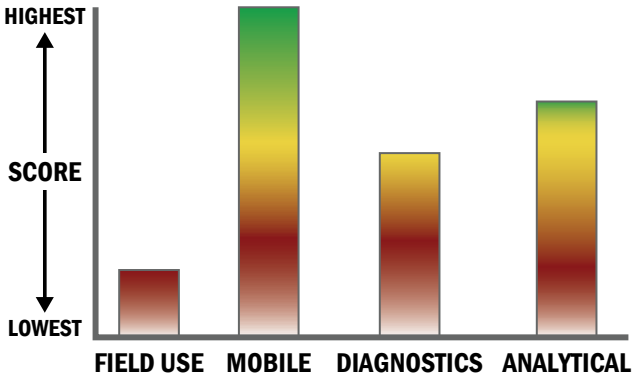
- $100,000-$250,000/system
- $25/analysis

Survey Source

Vendor Supplied Information

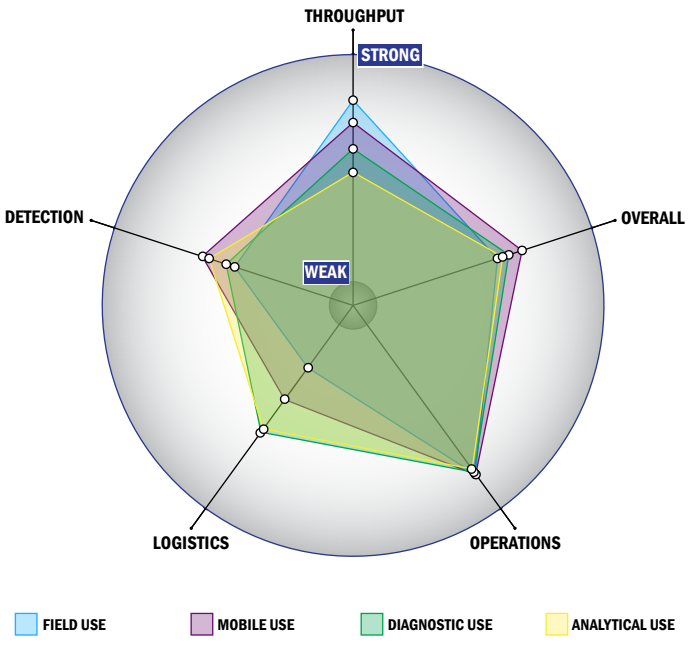
Scoring Analysis

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.



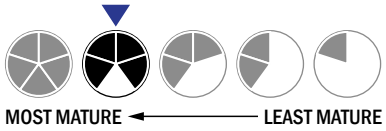
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Larger than a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 220V electrical requirement



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
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- Less than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 10,000-100,000 CFU per mL
- Greater than 100,000 PFU per mL
- 1-10 ng per mL
- > $1x10^{-3}$ mg/m^3
- > 1 ppt
- Only count rate
- Display indicates 0 until more than 1 mR/hr is detected for count rate
- System is used for area air sampling

Research International, Inc. - BioHawk

GENERAL DESCRIPTION:



The BioHawk is a portable 8-channel bioassay system with automated sample collection capability that is suitable for high-sensitivity monitoring of biological agents. BioHawk can monitor surrounding air for aerosol threats with its built-in air sampler, and periodically transfer a liquid concentrate from the air sampler to the bioidentifier.

Assay results are typically available in 20 minutes. The biodetector portion of the instrument will also accept fluids for analysis from other sample collection systems, or will process liquid samples loaded into the instrument manually. Bioassays are performed within a small disposable assay coupon that may be used for up to 10 assays. This capability can substantially reduce life cycle cost. Assay results may be transmitted to users through the touch panel LCD display, an audible alarm, by wireless or RS-232 link to personnel at a remote location. System operation may be remotely controlled in real time virtually.

TECHNICAL DESCRIPTION:

The BioHawk is an integration of Research International's proven SASS 2300 air sampler technology with an 8-channel bio-identifier. In operation, the SASS 2300 samples air continuously and transfers particulates into a secondary water phase. The water samples are periodically transferred from the air sampler to the bio-identifier. The sample is used for analysis and then may be saved as a confirmatory sample.

The BioHawk automatically performs analysis for up to eight agents on the disposable assay coupon. The coupons may be reused up to 10 times before replacement is necessary. Assays are based on 'sandwich format' fluoroimmunoassay reactions taking place on the surface of injection molded polystyrene waveguides. All fluidic and optoelectronic steps associated with the assay are performed automatically.

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	Second Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

CONTACT INFORMATION

Research International, Inc.
17161 Beaton Road SE
Monroe, WA 98272
360-805-4930

COST

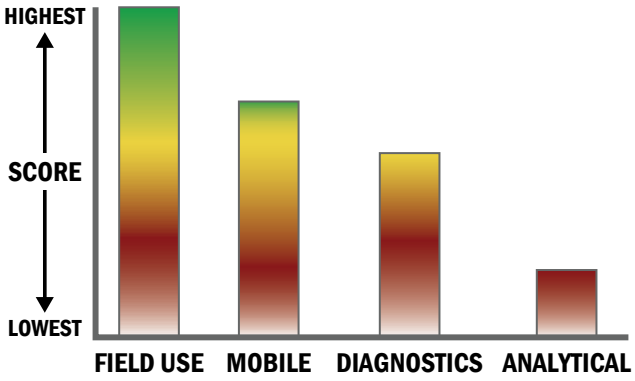
- $50,000/system
- $25-$250/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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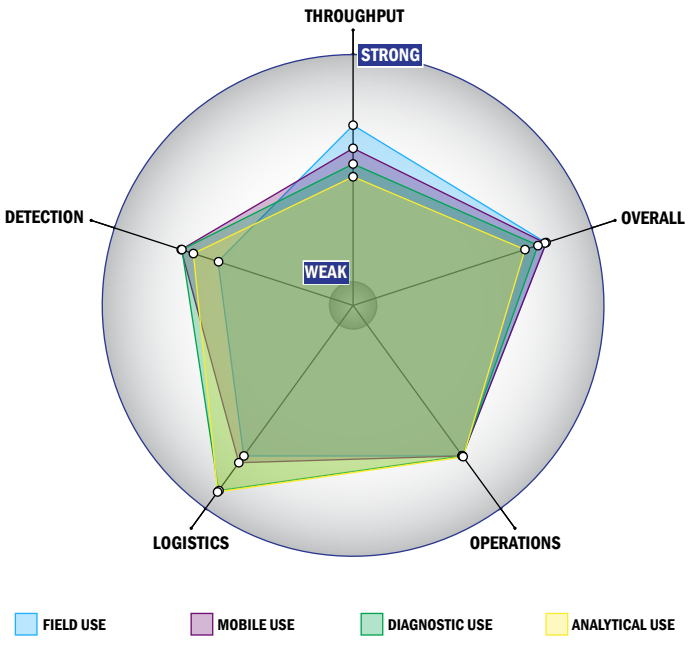


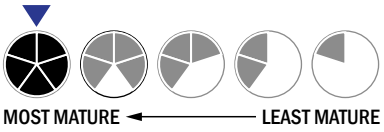
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, <10 tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 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 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- Greater than 10 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is open and 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
- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 10,000-100,000 CFU per mL
- Greater than 100,000 PFU per mL
- 1-10 ng per mL
- Spore lysis not necessary for detection by system

Research International, Inc. - Raptor

GENERAL DESCRIPTION:



This rapid, automatic fluorometric assay system is a portable (6.45 kg) 4-channel system for monitoring toxins, viruses, bacteria, spores, fungi and other diverse targets. An extremely reliable third-generation product introduced in 2000, users have found these instruments will operate for two years or more with no breakdowns or leaks, and that they will tolerate debris-laden samples (such as are produced in mailrooms and food processing facilities) - impressive feats for a fully automated wet assay system. Although designed for the military, it works well in the laboratory too.

The completely self-contained instrument is the culmination of a careful integration of optics, fluidics, electronics, and software into one compact system for laboratory and field assays. It performs user-defined, multi-step, assay protocols for monitoring fluorescently-labeled immunoassays occurring on the surface of each of the system's four disposable optical waveguide sensors. Toxins and bacteria such as ricin and *B. anthracis* have been detected at levels below <1.0 ng/mL and 100 CFU/mL, respectively.

Four sensors are mounted in a disposable plastic coupon allowing four different pathogens to be detected in a sample; or multiple channels may target the same pathogen to improve statistical certainty. Each coupon may be used for up to 30 assays if negative results are obtained. A bar code on each coupon identifies the type of assay to be run by the instrument and allows very sophisticated assays to be performed by unskilled persons. A computer embedded within the RAPTOR™ performs and controls all steps in the assay procedure.

TECHNICAL DESCRIPTION:

Research International's Raptor bio-identifier system is based on 'sandwich format' fluoroimmunoassay reactions taking place on the surface of injection molded polystyrene waveguides. All fluidic and optoelectronic steps associated with the assay are performed automatically. In a typical waveguide-based sandwich immunoassay, the waveguide has a monolayer of capture antibody immobilized on its surface. The waveguide is first incubated with sample, washed, then incubated with fluorophore-labeled antibody to form an antibody/antigen/labeled-antibody sandwich. Excitation light is injected into the waveguide and fluorescence emission is collected by a sensitive photodetector that looks down the waveguide axis. The four waveguides are mounted in a small 'coupon' that contains a bar code identifier. The onboard computer reads the bar code and automatically performs the proper assay protocol. All reagents and wastes are contained in the portable unit.

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

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

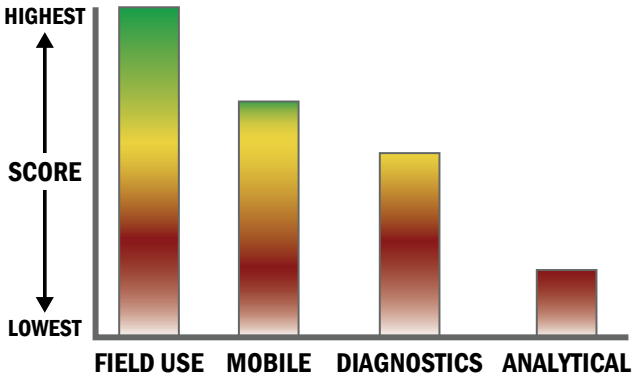
Research International, Inc.
17161 Beaton Road SE
Monroe, WA 98272
POC: Jonathon Tobelmann
703-625-8381

COST

- $49,000/system
- $7-$220/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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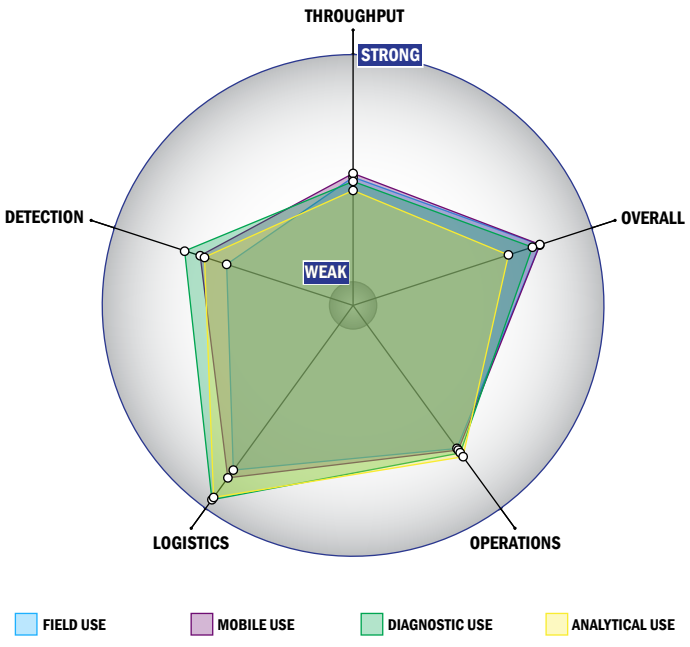


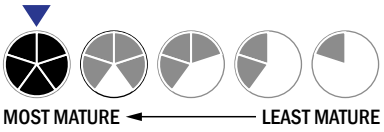
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, <10 tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 1 component
- 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 toaster
- 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 4 °C to 37 °C
- Components must be stored at 4 °C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- Greater than 10 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is open and 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
- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 10,000-100,000 CFU per mL
- Greater than 100,000 PFU per mL
- 1-10 ng per mL
- Spore lysis not necessary for detection by system

Research International, Inc. - TacBio Aerosol Detector

GENERAL DESCRIPTION:



TacBio was developed by the U.S. government for military, homeland security, and public health applications. It is a compact and rugged portable biological particle detector that uses both diffractive scattering and natural biological fluorescence to monitor aerosol particulates and classify them as being of either biological or non-biological origin. Research International, Inc. is an official licensee of the U.S. government for the TacBio, and has the right to manufacture and sell the instrument worldwide.

The TacBio is extremely useful for tracking background levels of airborne non-biological and biological materials and providing an alarm and/or digital activation command to other equipment if there is a rapid increase in the aerosol background. It cannot identify the type of biological material detected, and for that reason it is correctly characterized as an aerosol 'trigger.'

The TacBio requires little maintenance and no consumables, and is an ideal first line of defense for monitoring areas that cannot be accessed regularly or must be monitored discretely. Since no consumables are used, operating time in the field is limited only by the availability of electric power. The device accepts a range of primary and rechargeable long-lived batteries that provide in excess of 24 hours continuous operation. Additionally, there is no difficulty operating at sub-zero temperatures since no liquid-based media are required. Operation may be monitored remotely using Windows-based software provided with the unit, and changes made to its operating characteristics as needed or desired.

TECHNICAL DESCRIPTION:

TacBio operation is based on the fact that aerosolized biological materials fluoresce, in addition to scattering light when irradiated by UV light, in this case from a long-lived LED. Fluorescence emission and photon scattering events are measured with a unique "Geiger counter" high-speed photon counting method and analyzed by software to create a snapshot every 60 seconds of biological and non-biological particulates present in sampled air. These aerosol statistics are stored in a 30 minute-long 'History' file. Every 60 seconds current particle statistics are compared with this moving baseline to determine if an unusual increase in particle concentration has occurred.

CONTACT INFORMATION

Research International, Inc.
17161 Beaton Road SE
Monroe, WA 98272
POC: Jonathon Tobelmann
703-625-8381

COST

- $30,000/system
- <$0.01/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

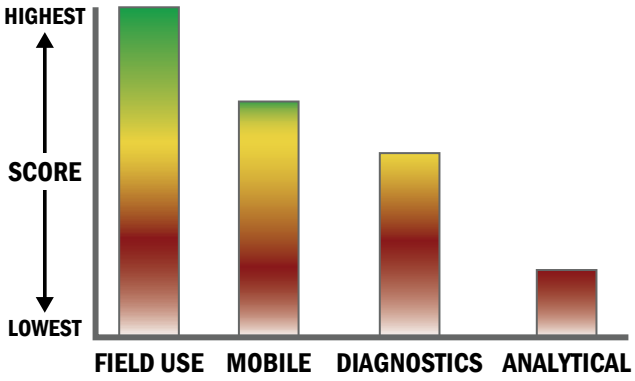
	Biological	Chemical	Radiological
FIELD USE System	Top Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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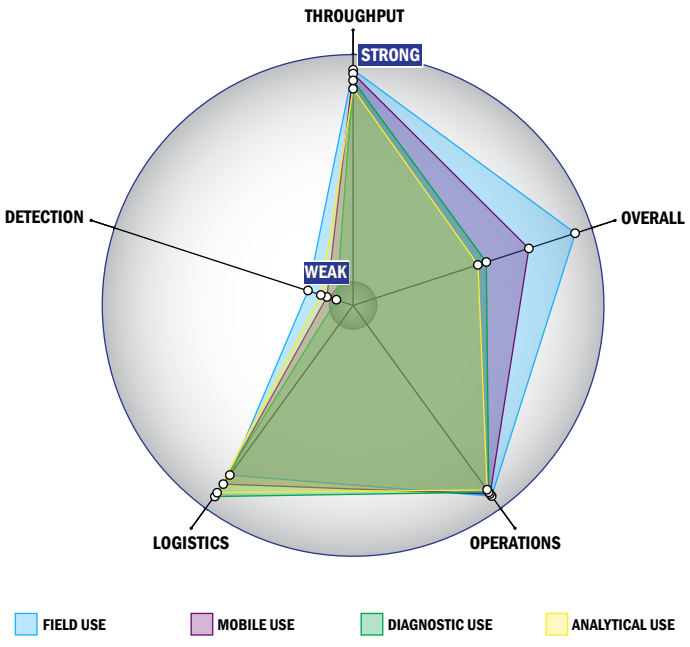


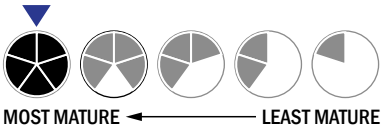
Evaluation Criteria

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
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- 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 -21°C to 41°C
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- 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
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Spore lysis not necessary for detection by system

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:

SAMPLE is highly robust due to its all fiber coupled design and leveraging of telecom fiber technologies. It uses digital detection via photon counting mode for exceedingly high sensitivity. It has very low SWaP.

CONTACT INFORMATION

Research Support Instruments, Inc.
57 Hamilton Ave., Suite 206
Hopewell, NJ 08525
POC: John Kline
609-429-0535
kline@researchsupport.com
www.rsimd.com

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

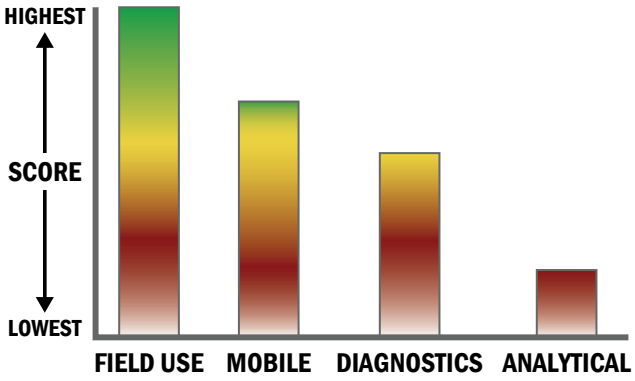
	Biological	Chemical	Radiological
FIELD USE System	N/A	Second Tier	N/A
MOBILE Laboratory	N/A	Second Tier	N/A
DIAGNOSTIC Laboratory	N/A	Second Tier	N/A
ANALYTICAL Laboratory	N/A	Third Tier	N/A

Survey Source

Vendor Supplied Information

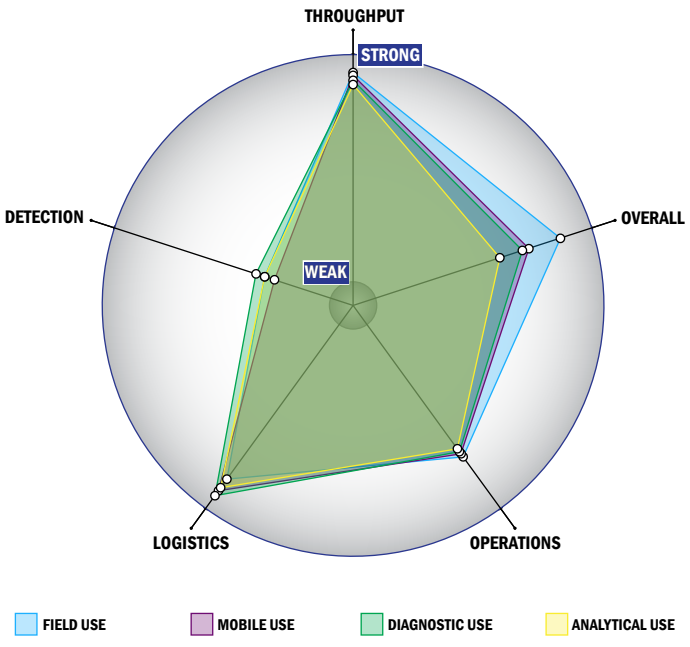
Scoring Analysis

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.



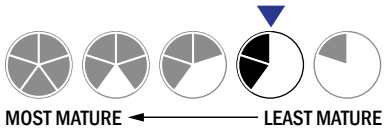
Evaluation Criteria

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



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%)
- >1x10^{-3} mg/m^3
- 1 ppm-100 ppm
- Possible system could identify aerosolized chemical agent
- Possible system could identify liquid chemical agent

Resonant Sensors Incorporated - Bioassay Sensor System

GENERAL DESCRIPTION:



Resonant Sensors Incorporated (RSI) has developed a new class of label-free biosensor systems for rapid biochemical detection. Our products include disposable sensor plates (in 96-well or 384-well formats) and associated benchtop reader systems that quantify biochemical reactions in real time with outstanding accuracy and repeatability. This differentiating technology provides new assay tools for laboratories that will dramatically reduce the labor time and cost of biochemical tests. The system is fully controlled through advanced software, which includes data analysis features to provide either kinetic or end-point information.

Our sensor platform can be applied to monitor virtually any bio- or chemical reaction. Selectivity can be imparted on the sensor element using standard surface chemistries (such as silane) to covalently attach commercially available and validated specific antibody, aptamer, or DNA layers. As the binding assay 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 the chemical binding dynamics, and is typically less than 15 minutes. Qualitative data is available immediately after sample introduction.

The RSI sensor plates are readily adaptable to standard immunoassay, cell-based, DNA, or microbial testing methods. The sensors are integrated into standard microwell formats so that laboratories may still use existing automated sample handling equipment. RSI sensor plates are available in a variety of reactive surfaces (bare dielectric, silane or others). They may also be purchased pre-sensitized for specific assays, such as S. aureus, S. enterotoxin A and B, and others.

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 broadband light source, a specific wavelength of light is reflected. Interaction of a target analyte with a biochemical layer on the sensor surface yields measurable spectral 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 within a single test.

CONTACT INFORMATION

Resonant Sensors Incorporated
416 Yates Street, NH518, Box 19016
Arlington, TX 76010

COST

- $65,000/system
- $4-$18/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

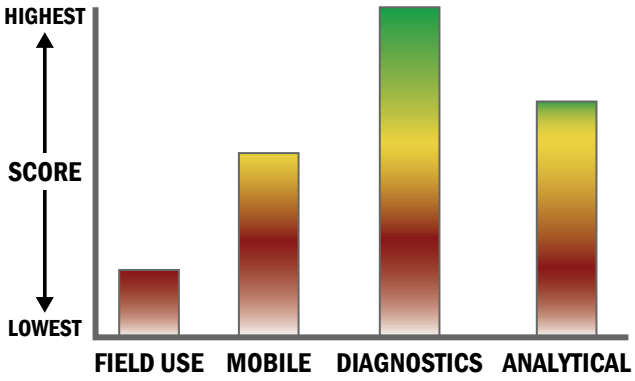
	Biological	Chemical	Radiological
FIELD USE System	Third Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Survey Source

Vendor Supplied Information

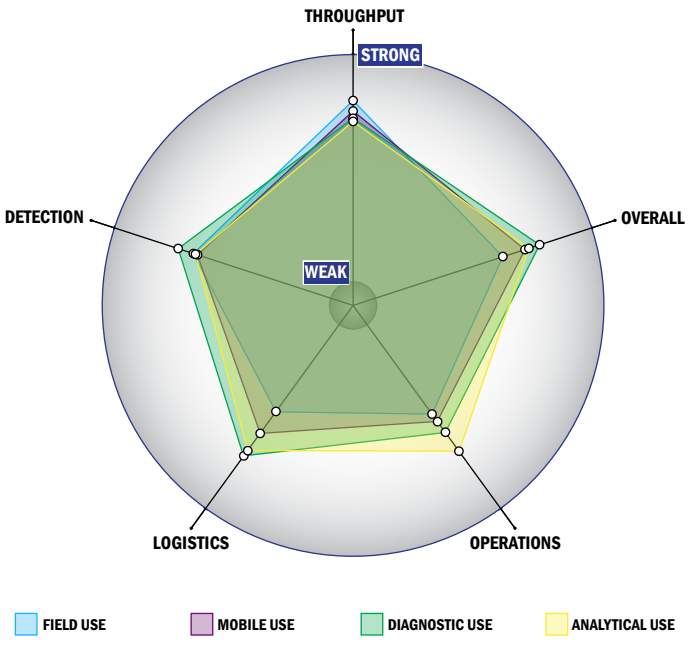
Scoring Analysis

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.



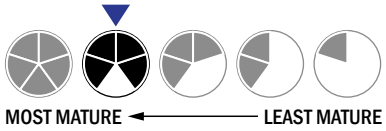
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 749-350 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 carry-on luggage suitcase
- Between 25 and 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at 4°C
- Between 1 to 6 months shelf life
- 5-10 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
- 1,000-10,000 PFU per mL
- 100-1,000 ng per mL
- Manual kit not integrated with the system handles spore lysis

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

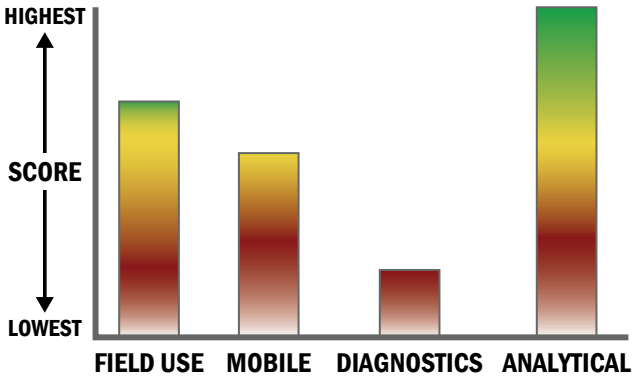
Resonant Sensors Incorporated
416 Yates Street, NH518, Box 19016
Arlington, TX 76010

COST

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

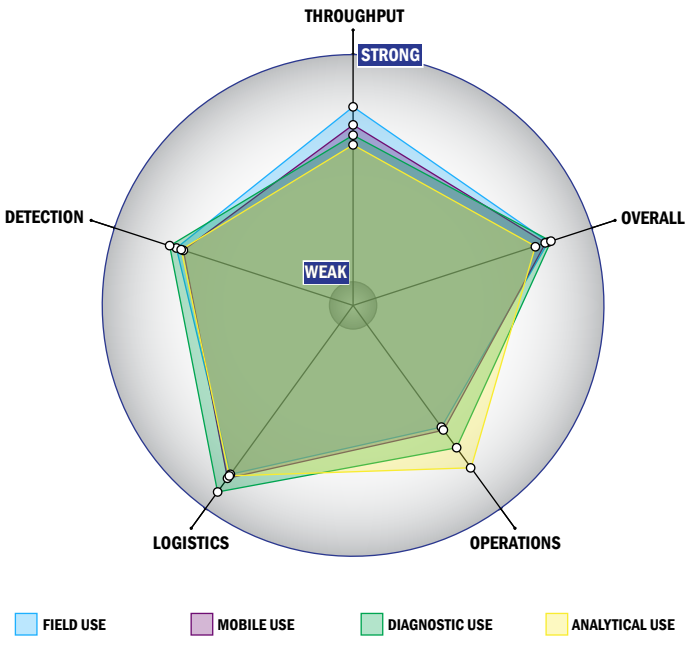
Scoring Analysis

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.



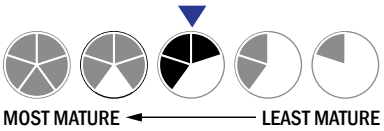
Evaluation Criteria

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

Resonant Sensors Incorporated - Compact Diagnostic System (model CDS-100)

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 Optical Technologies 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		N/A	N/A
MOBILE Laboratory		N/A	N/A
DIAGNOSTIC Laboratory		N/A	N/A
ANALYTICAL Laboratory		N/A	N/A

CONTACT INFORMATION

Resonant Sensors Incorporated
416 Yates Street, NH518, Box 19016
Arlington, TX 76010
817-272-3450
resonantsensors.com

COST

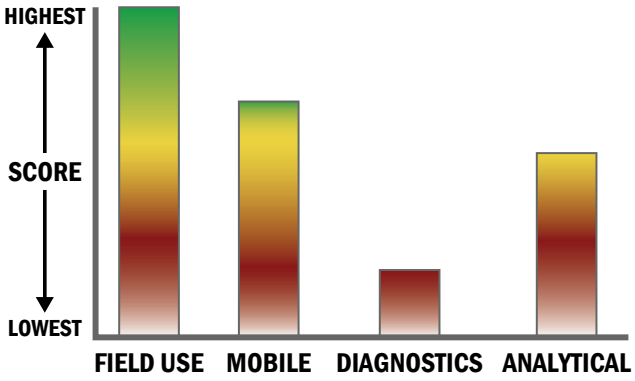
- $9,000/system
- $30/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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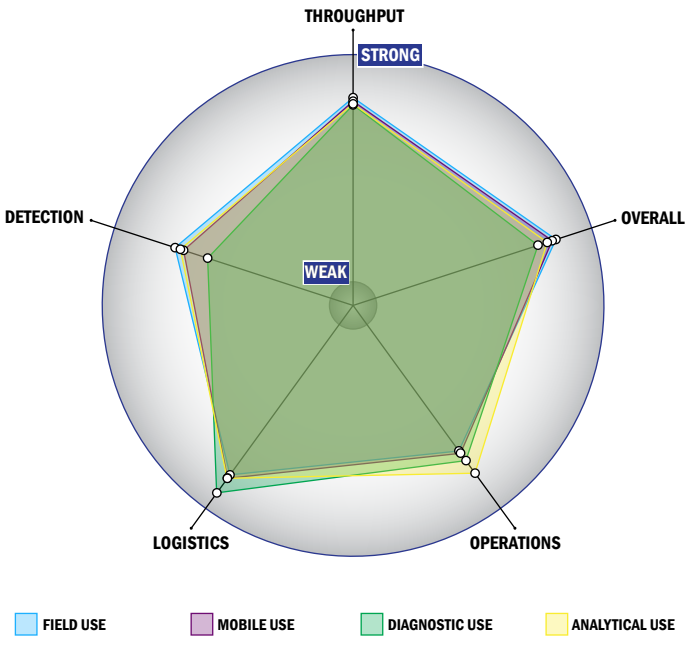


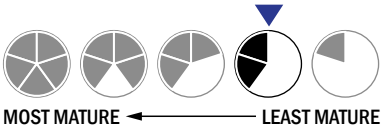
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 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:

- Very brief (minutes-hours) training and minimal technical skills
- 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
- Performance is not influenced by relative humidity
- 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:

- 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
- Less than 50 µL
- Excellent specificity. System has occasional false alarms (<2%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- 100-1,000 ng per mL
- Manual kit not integrated with the system handles spore lysis

Resonant Sensors Incorporated - Vides Bioassay System

GENERAL DESCRIPTION:



Resonant Sensors Incorporated (RSI) has developed a new class of photonic label-free biosensor systems for rapid biochemical detection. Our products include disposable sensor plates and associated benchtop reader systems that quantify biochemical reactions in real time with outstanding accuracy and repeatability. This differentiating technology provides new assay tools for laboratories that will dramatically reduce the labor time and cost of biochemical tests. The system is fully controlled through advanced software, which includes data analysis features to provide either kinetic or end-point information. Our sensor platform can be applied to monitor virtually any bio- or chemical reaction 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 selective layers. As a test begins, the analyte binds to the detection-layer target, and the system monitors instantaneous changes at the sensor surface. Test time is limited only by chemical binding dynamics, and is typically less than 15 minutes. Qualitative data is available immediately after sample introduction. The RSI sensor plates are readily adaptable to standard immunoassay, cell-based, DNA, or microbial testing methods. The sensors are integrated into standard microwell formats so that laboratories may still use existing automated sample handling equipment. RSI sensor plates are available in a variety of reactive surfaces (silane or custom). They may also be purchased pre-sensitized for specific assays, such as S. aureus, S. enterotoxin A and B, and others.

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 broadband light source, a specific wavelength of light is reflected. Interaction of a target analyte with a biochemical layer on the sensor surface yields measurable spectral 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 variety of matrices.

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

CONTACT INFORMATION

Resonant Sensors Incorporated
416 Yates Street, NH518, Box 19016
Arlington, TX 76010
817-272-3450
resonantsensors.com

COST

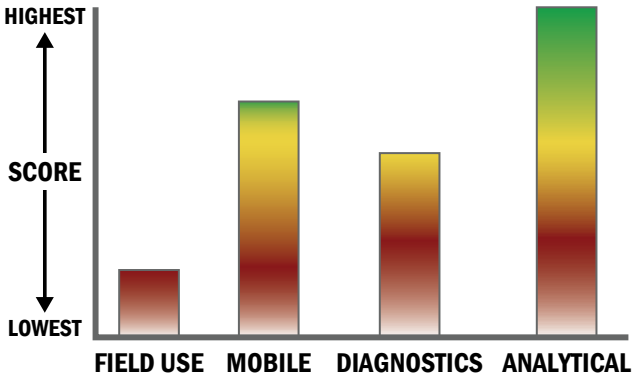
- $75,000/system
- N/A/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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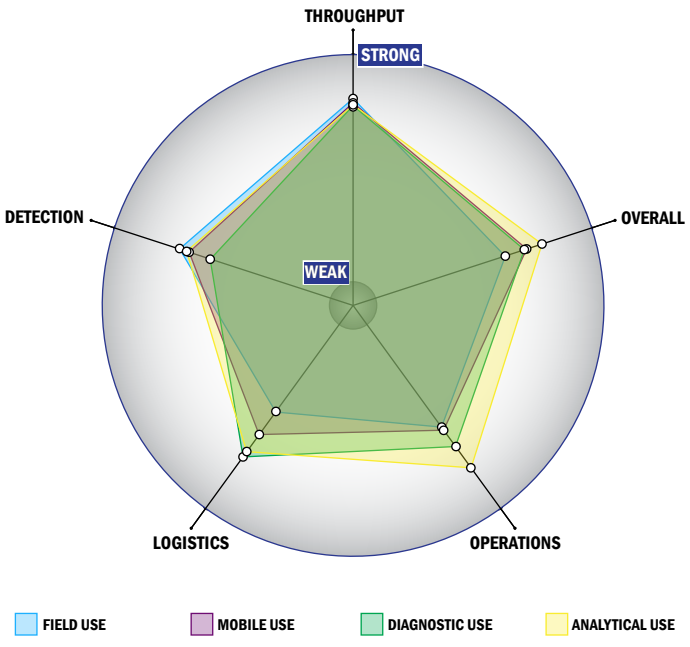


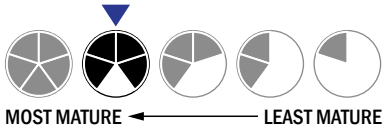
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 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 carry-on luggage suitcase
- Between 25 and 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at 4°C
- Between 1 to 6 months shelf life
- 5-10 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:

- 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
- Less than 50 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 CFU per mL
- 100-1,000 PFU per mL
- 100-1,000 ng per mL
- Manual kit not integrated with the system handles spore lysis

Response Biomedical - RAMP Reader System

GENERAL DESCRIPTION:



The RAMP System is designed to provide First Responders, Military Personnel, and Public Safety Workers with rapid, on-site, reliable diagnostic information for biological testing. The RAMP System is utilized by First Responder Teams world-wide. The RAMP System consists of a portable scanning fluorescence Reader and single-use, disposable test cartridges. To use, a small sample is added to the test cartridge and then inserted into the Reader. RAMP provides a positive or negative result in minutes, with no additional user intervention. Tests are available for anthrax, ricin, botulinum and pox. RAMP is used for testing liquid, powder or invisible surface samples. A suspect surface, powder or liquid is sampled using a swab and then added to the supplied sample buffer. Then a portion of the sample is placed into the Test Cartridge that is then inserted into the RAMP Reader. There is no regular calibration or maintenance required with the RAMP system and the cartridges have an internal standard system that runs concurrently with every assay to eliminate environmental and assay-to-assay variability. This internal standard system is not available in earlier generation flow assays and is unique to the RAMP system. The system has consistently demonstrated to be 100% reliable in detecting anthrax at or above 4,000 spores and does not cross-react with interfering substances, such as baking powder, or with non-pathogenic strains of anthrax.

TECHNICAL DESCRIPTION:

RAMP is a system for testing the presence of *B. anthracis* spores, ricin, botulinum toxin and orthopox viruses. The Reader is a scanning immunoassay and data analysis system measuring fluorescence in RAMP cartridges. The Reader can be operated on battery power or AC. The RAMP Test Cartridge is a single-use analyte-specific test used to detect the presence of analyte in a sample. The operator prepares the sample, places an aliquot into the sample well of the Test Cartridge, inserts Cartridge into the RAMP Reader, which analyzes the sample and provides a result.

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	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

CONTACT INFORMATION

Response Biomedical
POC: Lindsey Cowan
604-456-6010 ext 6076
lcowan@responsebio.com

COST

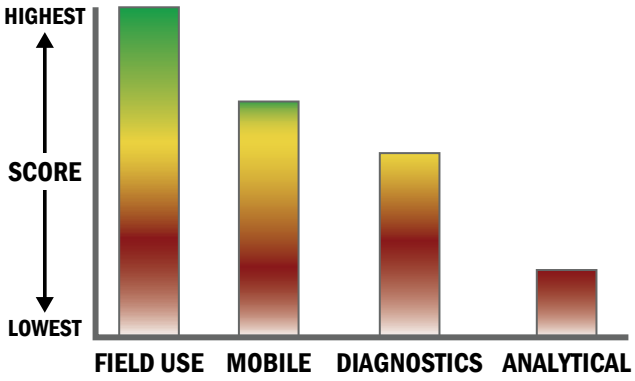
- $11,333/system
- $21-$27/analysis

Survey Source

Vendor Supplied Information

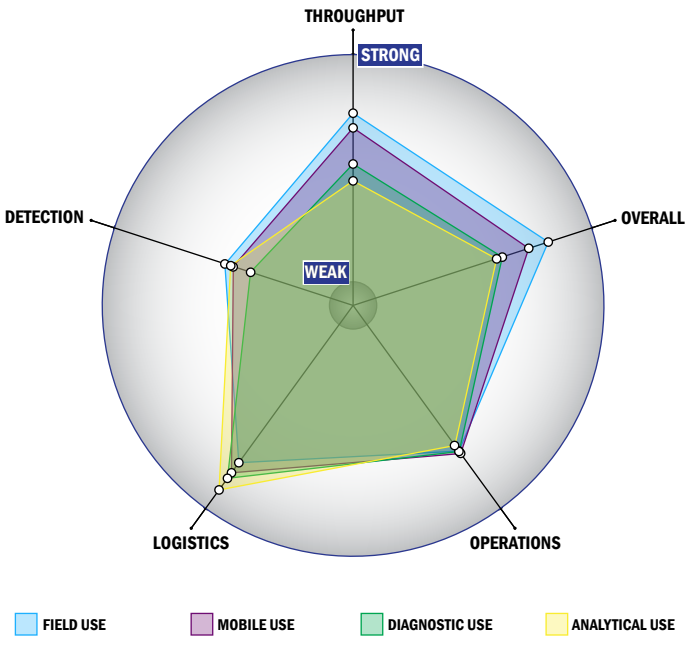
Scoring Analysis

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.



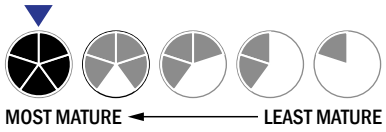
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, single test/sample per run
- Less than 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
- 2 components
- No set-up of the system is required
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

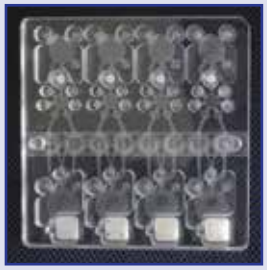
- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Less than 100 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1,000-10,000 CFU per mL
- 10,000-100,000 PFU per mL
- 10-100 ng per mL
- Spore lysis not necessary for detection by system

Rheonix, Inc. - CARD Device

GENERAL DESCRIPTION:



The Rheonix CARD™ device and EncompassMDx™ instrumentation system were developed to perform fully automated molecular and/or immunoassays. The unique design of the Rheonix CARD™ device allows up to four assays to be simultaneously run on a single disposable device. The Rheonix CARD™ contains all microfluidic channels, reservoirs, pumps, and valves required to perform sophisticated molecular analysis and/or immunoassays at the push of a button. Under the control of our intuitive Encompass MDx™ software, all assay steps are performed automatically once the "raw" sample is applied. No preanalytical steps are required. Due to the ability to perform sophisticated molecular and/or immunoassays without any user intervention, the Rheonix CARD™ platform is well suited for a broad spectrum of applications in either "point-of-care" or central laboratory settings. Thus far, "raw" clinical samples including whole blood, serum plasma, buccal swabs, vaginal swabs and saliva have been successfully tested. Nonclinical samples have included finished drinking water and raw recreational water. Some of the assays that have already been developed include a 20-plex PCR assay that can detect and distinguish 20 clinically relevant HPV subtypes in vaginal swabs, a SNP-based assay that can detect SNPs that are associated with increased sensitivity to warfarin, and a simultaneous immunoassay/PCR-based assay for the direct detection of HIV-1 in human saliva samples. Other assays currently under development include multiplex PCR assays for the detection of sexually transmitted infections, sepsis detection directly from whole blood, EPA-funded efforts to detect Cryptosporidium parvum in drinking water and NSF-funded efforts to detect E. coli and various enterococci in recreational water samples.

TECHNICAL DESCRIPTION:

Our proprietary and patented lamination process permits us to produce a low cost, plastic CARD™ (Chemistry and Reagent Device) that contains all functionality required to perform a up to four fully automated molecular and/or immunoassays. The portable EncompassMDx™ controller processes one CARD™ (i.e., 4 assays) and the EncompassMDx™ workstation processes up to six CARD™ devices (i.e., 24 assays) per run. In either case, once a raw specimen is introduced into the CARD™ all steps are automatically and seamlessly performed under software control: cell lysis, DNA isolation/purification, multiple-PCR, endpoint detection via an integrated reverse dot blot, and finally output of results. Where necessary, we can also magnetically concentrate either cells or nucleic acids.

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

CONTACT INFORMATION

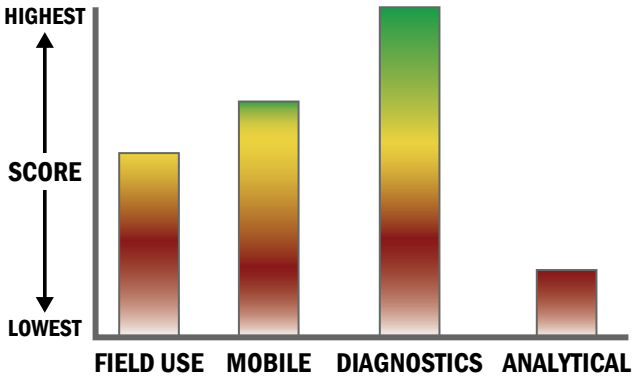
Rheonix, Inc.
22 Thornwood Drive
Ithaca, NY 14850
POC: Tony Eisenhut, President
607-257-1242, Ext 160
Teisenhut@rheonix.com
www.rheonix.com

COST

N/A

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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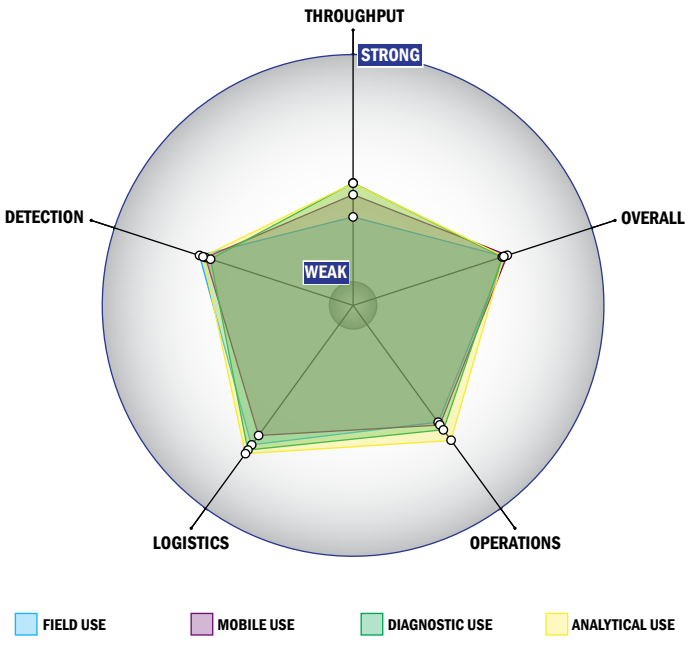


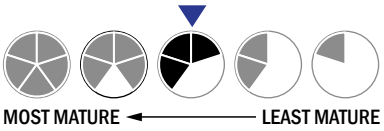
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- The system or device is currently fully automated
- Device or system is designed for a single use
- 5 or more solutions, buffer, eluents, and/or reagents
- 4 components
- 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
- Between 5 and 25 kg
- Satellite and wired connections are available
- System or device has 110V electrical requirement
- 2-4 hours battery life



Operations:

- Can be used from 25 °C to 37 °C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Add on capability that is full or semi-automated for spore lysis

Rheonix, Inc. - EncompassMDx

GENERAL DESCRIPTION:



The EncompassMDx™ is a fully-automated, modular, molecular analytical system designed to perform a broad range of molecular tests on a wide variety of sample types. The instrument can run up to 24 samples through a fully integrated molecular assay with no user intervention, automatically manipulating reagents internally on the Rheonix CARD® cartridge. The system is well suited for in vitro diagnostic (IVD) assays, industrial and environmental applications, and user-defined protocols for life science research applications. Key features and benefits of the EncompassMDx system include:

- Scalable sample throughput to enable work in small clinics or large labs
- • A sample-to-result platform that consolidates multiple pieces of equipment
- Simple interface requiring only minimal training for all skill levels
- Ability to sample liquid volume between 5 µl to 5 mL and tissue mass up to 20 mg
- Highly multiplexed detection to screen many targets in one test
- Configurable design for operating many purification and detection methodologies on a single instrument

TECHNICAL DESCRIPTION:

The EncompassMDx™ fully-automated molecular platform can detect the nucleic acid sequences from a wide variety of samples. Once a sample is applied to the cartridge, all assay steps are automatically performed. Within the purification portion of the CARD cartridge, cells are lysed and DNA is extracted and purified. The purified DNA sample is directed into PCR reaction chambers where targets are amplified. Amplified products are denatured and flow into the microarray portion of the CARD cartridge. Hybridization is detected using a streptavidin-conjugated horseradish peroxidase (HRP)-mediated color development system. The EncompassMDx™ detects the precipitated reaction products and reports a result.

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	Bottom Tier	N/A	N/A
MOBILE Laboratory	Fourth Tier	N/A	N/A
DIAGNOSTIC Laboratory	Second Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

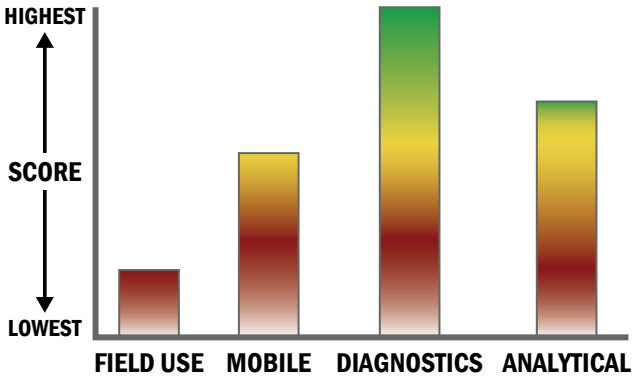
Rheonix, Inc.
22 Thornwood Drive
Ithaca, NY 14850
607-257-1242
www.rheonix.com

COST

- <$100,000/system
- $50/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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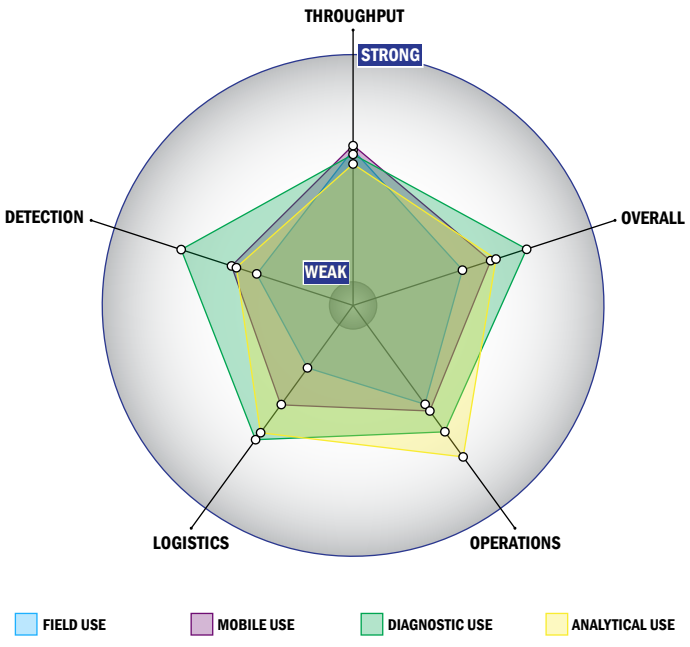


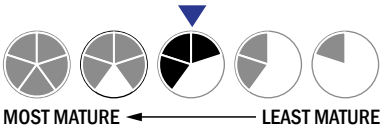
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is designed for a single use
- 2 solutions, buffer, eluents, and/or reagents
- 4 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a home dishwasher
- More than 50 kg
- This system is not capable of transmitting data
- System or device has 110V electrical requirement



Operations:

- Can be used from 25 °C to 37 °C
- Components must be stored at 4 °C
- 3-5 years expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is open and 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 100 µL
- 1-100 CFU per mL
- Fully automated spore lysis

Roche Applied Science - LightCycler 480

GENERAL DESCRIPTION:



The LightCycler 480 Real-Time PCR System is a fully integrated multiwell-plate based real-time PCR platform for highly accurate qualitative and quantitative detection of nucleic acids. Building on the benefits of Roche's capillary-based LightCycler® Systems, it goes one step further in offering enhanced throughput, compatibility with automation equipment and maximum flexibility regarding hard- and software. Providing novel ways to combine speed and accuracy without compromises, the LightCycler® 480 Real-Time PCR System meets the needs of a broad range of applications in research fields such as gene expression studies, discovery and analysis of genetic variation or array data validation.

TECHNICAL DESCRIPTION:

The LightCycler 480 Real-Time PCR System is a fully integrated multiwell-plate based real-time PCR platform. Benefit from novel thermal cycling and data capture technologies to achieve outstanding temperature homogeneity and assay reproducibility. Increase the sensitivity and yield of your real-time PCR applications, with robust LightCycler® 480 reagents and specially engineered clear or white consumables. Analyze true raw data, breaking free from the need to use passive reference dyes or normalization plates to get accurate results. Flexibly switch between 96- or 384-well plate formats. Select from numerous assay formats and detection dyes, expanding the range of real-time PCR applications in your lab.

CONTACT INFORMATION

Roche Applied Science
9115 Hague Rd.
Indianapolis, IN 46250

COST

- $50,000/system
- $0.68/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

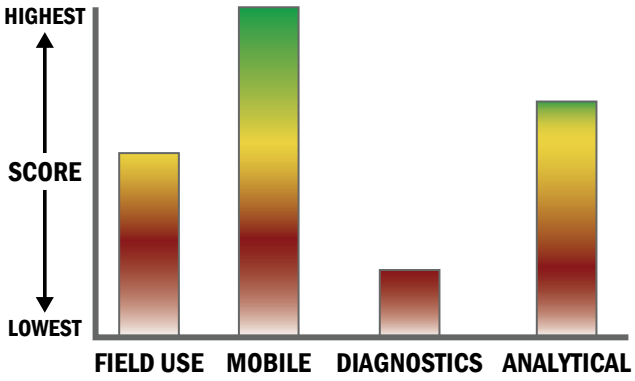
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Top Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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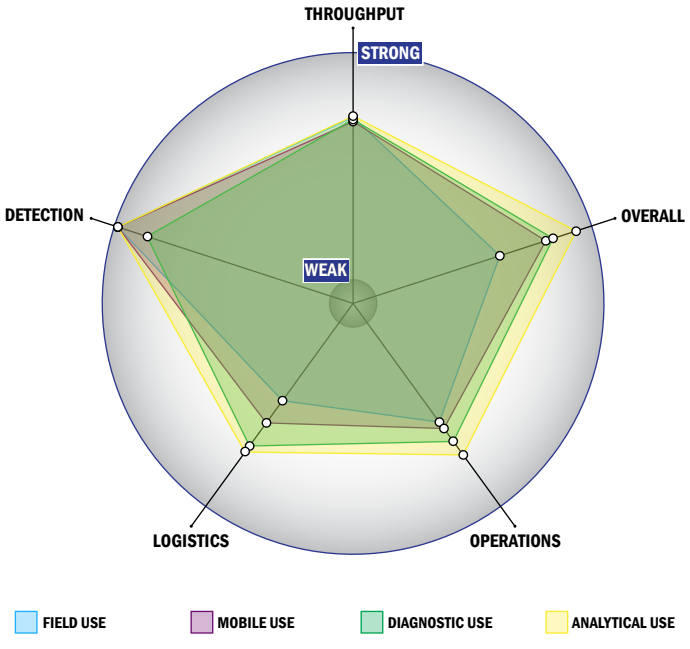


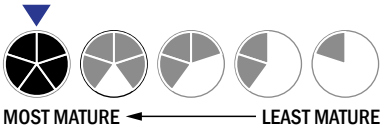
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 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
- 2 components
- 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 home dishwasher
- More than 50 kg
- Satellite, wireless and wired connections are available
- System or device has 220V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- Components must be frozen (-20 °C)
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL
- Spore lysis not necessary for detection by system

RTI International - MicroPEM Personal Exposure Monitor

GENERAL DESCRIPTION:



A miniature low burden (240g; adds < 2 dBA noise) personal exposure monitor for sized aerosols that is worn near the breathing zone to capture particles on a Teflon filter for post analyses and simultaneously provides estimates of real-time mass concentration using nephelometry. Sizing for either PM2.5 (deep lung) or PM10 (thoracic) fractions are possible. Enhanced power management allows the unit to operate continuously for up to 40 hrs on a set of 3 AA alkaline batteries, or cycle ON/OFF to extend the sampling period to up to 1 week. Post analyses for the filter collections provide referee particle mass (PM), black carbon, and SHS levels, plus a wide range of chemical and biological species. An extremely wide aerosol concentration response range extends to 10,000 micrograms/cubic meter, with a detection limit of < 5 micrograms/cubic meter. An on-board accelerometer is provides both wearing compliance and estimated ventilation rate from which potential dose is computed. QC data needed to validate the filter and real-time data is stored on-board and downloaded simultaneously with the aerosol data. A low turbulence flow system design results in minimal internal deposition, providing extended optical bench performance with long servicing intervals (30+ days). Very low face velocity filtration provides minimal loss of volatiles prior to post analyses. Robust user interface software and self-contained operation allows simple setup and deployments by modestly trained personnel to provide high data capture rates. A smaller, cellphone-like version is under development for demanding personal applications.

TECHNICAL DESCRIPTION:

Aerosol sizing is by dual-sequential impaction onto oil wicking surface to provide sharp EPA-comparable cut points for extended sampling with minimal servicing. Real-time aerosol detection in the model v3.2 is by light scattering (side-only) at 780 nm (laser diode), with sensing by a tiny high-sensitivity Optidiode photometer that includes its own pre-amplifier to minimize the possibility of stray signal interferences. A new v4.0 version currently under development will add a UV laser wavelength plus forward scattering to better sense black carbon and biological aerosol content.

CONTACT INFORMATION

RTI International
POC: Charles E. Rodes, PhD
919-541-6749
charlesr@rti.org

COST

- $1,990/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

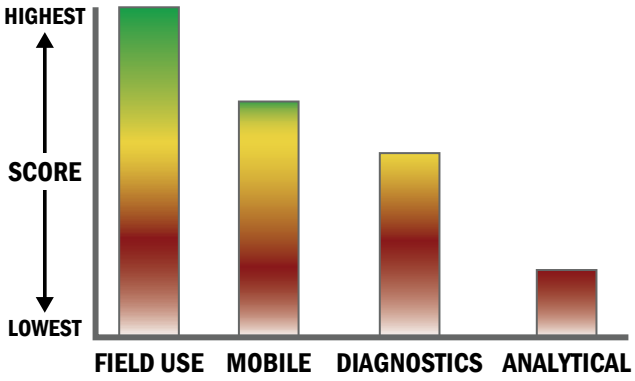
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	Third Tier	Third Tier
MOBILE Laboratory	Bottom Tier	Bottom Tier	Bottom Tier
DIAGNOSTIC Laboratory	Bottom Tier	Bottom Tier	Bottom Tier
ANALYTICAL Laboratory	Bottom Tier	Bottom Tier	Bottom Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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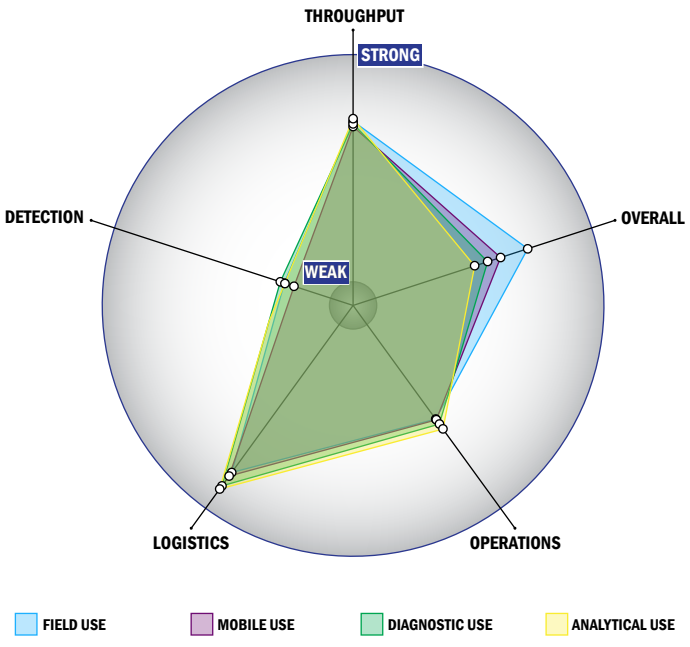


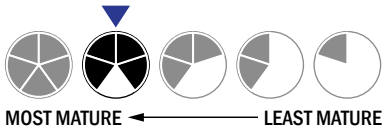
Evaluation Criteria

Throughput:

- Detection is instantaneous
- 1 sample, >10 tests/sample per run
- System is continuous and provides real time analysis with no defined tests/samples
- 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
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- This system is not capable of transmitting data
- 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
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 6 months shelf life
- 3-5 years expected life
- Results cannot 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 open but modification requires licensing

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
- Good specificity. System has a consistently low level of false alarms (2-5%)
- Manual kit not integrated with the system handles spore lysis System currently can identify aerosolized chemical agent
- System is used for personnel detection

S.E. International, Inc. - Radiation Alert Inspector

GENERAL DESCRIPTION:

The Inspector is a small, handheld, microprocessor-based instrument which offers excellent sensitivity to low levels of alpha, beta, gamma, and x-rays. The digital readout is displayed with a red count light and a beeper sounds with each count detected. Other features include an adjustable timer, external calibration controls and adjustable alert.



TECHNICAL DESCRIPTION:

Gieger Mueller Tube based hand held radiation detector for alpha, beta, gamma, and x-ray.

CONTACT INFORMATION

S.E. International, Inc.
PO Box 39
Summertown, TN 38483, USA
931-964-3561
www.seintl.com

COST

- $540/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

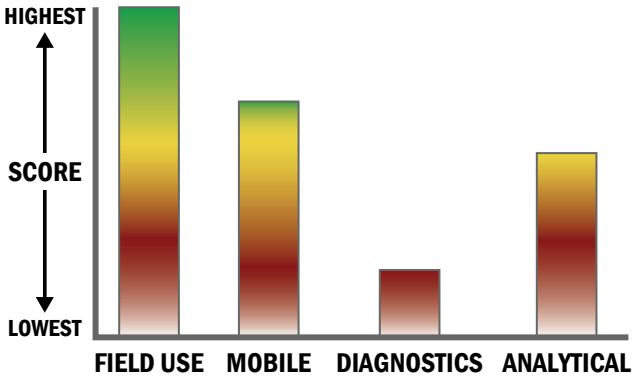
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Third Tier
MOBILE Laboratory	N/A	N/A	Third Tier
DIAGNOSTIC Laboratory	N/A	N/A	Fourth Tier
ANALYTICAL Laboratory	N/A	N/A	Fourth Tier

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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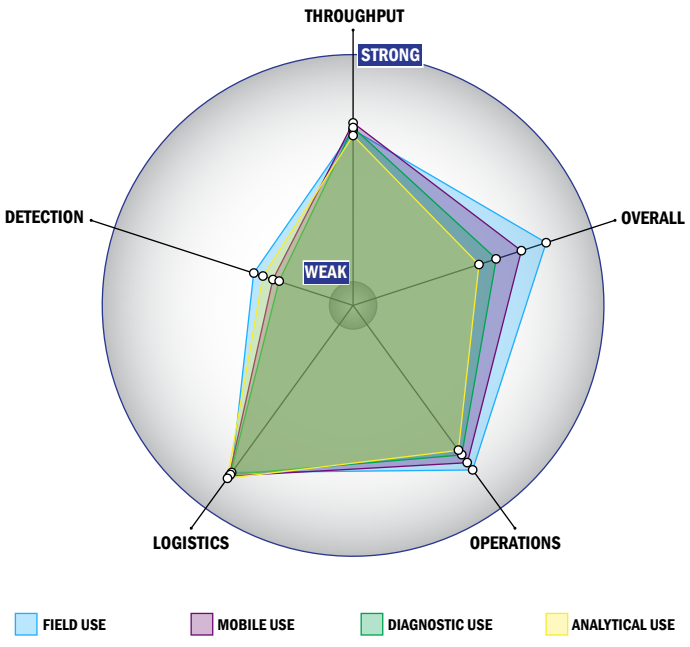


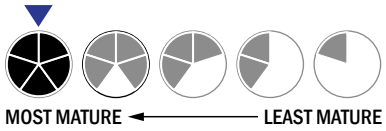
Evaluation Criteria

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 approach is not amenable to full or semi-automation
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

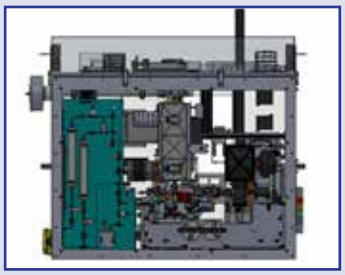
- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with some effort
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Only total dose and dose rate
- Down to background level radiation for dose rate
- System is used for personnel detection

Science & Engineering Services, Inc. - Chemical-Biological Detection System (CBDS)

GENERAL DESCRIPTION:



The Chemical-Biological Detection System (CBDS) is sized and designed to deliver next generation capabilities beyond the current CBMS Block II. CBDS utilizes an integrated mass analyzer for analysis and identification of CWA, TIC and BWA materials; with collection of CWA, TIC and BWA hazards accomplished via air-stack as well as collection of CWA and TIC hazards via ground probe and/or direct injection. A key attribute of CBDS is the ability to create and transfer library updates of new hazards and/or unknowns within a few hours. In terms of logistics, the consumables cost per sample is less than one dollar and train-up for non-technical users is one day.

TECHNICAL DESCRIPTION:

The Chemical-Biological Detection System (CBDS) uses a hexapole ion-trap mass spectrometer in which MS/MS is conducted either via AP-MALDI of biological samples or via chemical ionization of chemical samples. Biological materials undergo automated single-spot proteomic processing and MS/MS targeted bio-marker analysis to sift rapidly thru clutter against specialized-onboard and/or commercial internet-accessible databases. Chemical materials undergo similar steps, less single-spot proteomics processing.

CONTACT INFORMATION

Science & Engineering Services, Inc.
6992 Columbia Gateway Drive
Columbia, MD 21046
POC: Robert M. Serino, Ph.D
443-539-0139
www.sesius.com

COST

- $350,000/system
- <$1/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

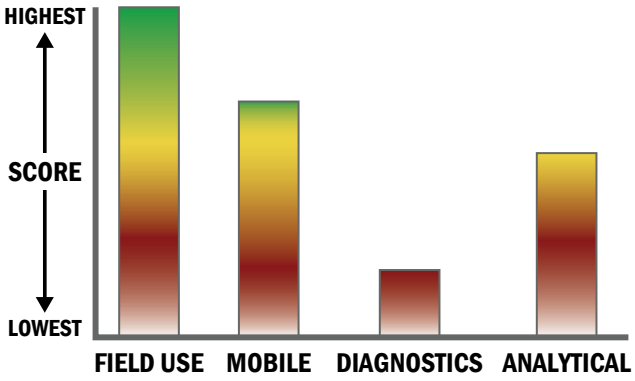
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	Bottom Tier	N/A
MOBILE Laboratory	Third Tier	Third Tier	N/A
DIAGNOSTIC Laboratory	Third Tier	Second Tier	N/A
ANALYTICAL Laboratory	Second Tier	Second Tier	N/A

Survey Source

Vendor Supplied Information

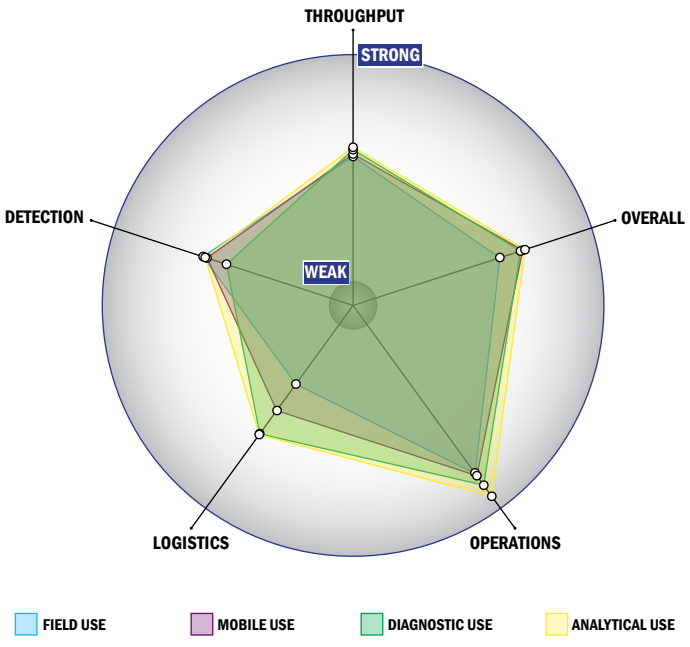
Scoring Analysis

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.



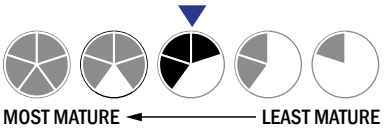
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 3 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 home dishwasher
- More than 50 kg
- Satellite and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at 4 °C
- Performance is not influenced by relative humidity
- 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:

- Not possible for the system to achieve 510K clearance
- Possible the system could receive FDA approval, no current efforts at this time
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1,000-10,000 CFU per mL
- 1,000-10,000 PFU per mL
- 10-100 ng per mL
- Fully automated spore lysis
- $1x10^{-4}$–$1x10^{-3}$ mg/m^3
- 1 ppb–1 ppm
- System can currently identify aerosolized chemical agent
- System can currently identify liquid chemical agent

Science & Engineering Services, Inc. - Food Safety Security Module

GENERAL DESCRIPTION:



The Food-Safety Security Module (FSSM) is a scalable, integrated package that utilizes a commercial mass spectrometer, commercial AP-MALDI, and commercial databases to detect and identify food-borne pathogens in less than 24-hours total time; including enrichment. Processing can be either manual or automated with use of the supplemental auto-processing module. In terms of logistics, the consumables cost per sample is less than one dollar and train-up for non-technical users is one day.

TECHNICAL DESCRIPTION:

The Food-Safety Security Module (FSSM) builds on our Wide-Spectrum Bio-ID technologies and uses a commercial ion-trap mass spectrometer in which MS/MS is conducted via AP-MALDI of biological samples after enrichment. Biological materials undergo single-spot proteomic processing and MS/MS targeted bio-marker analysis to sift rapidly thru clutter against a commercial internet-accessible database such as MASCOT.

CONTACT INFORMATION

Science & Engineering Services, Inc.
6992 Columbia Gateway Drive
Columbia, Maryland 21046
POC: Robert M. Serino, Ph.D
443-539-0139
www.sesius.com

COST

- $60,000/manual system; $150,000/automated 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

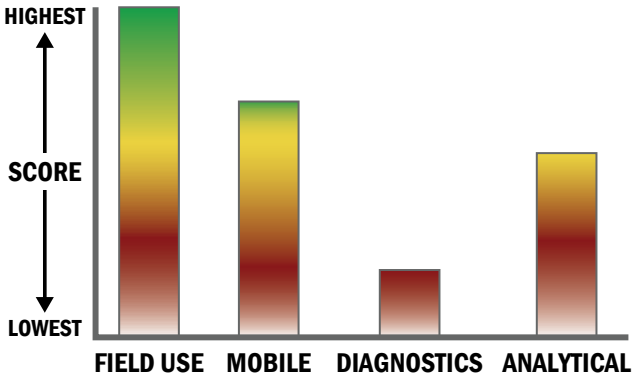
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

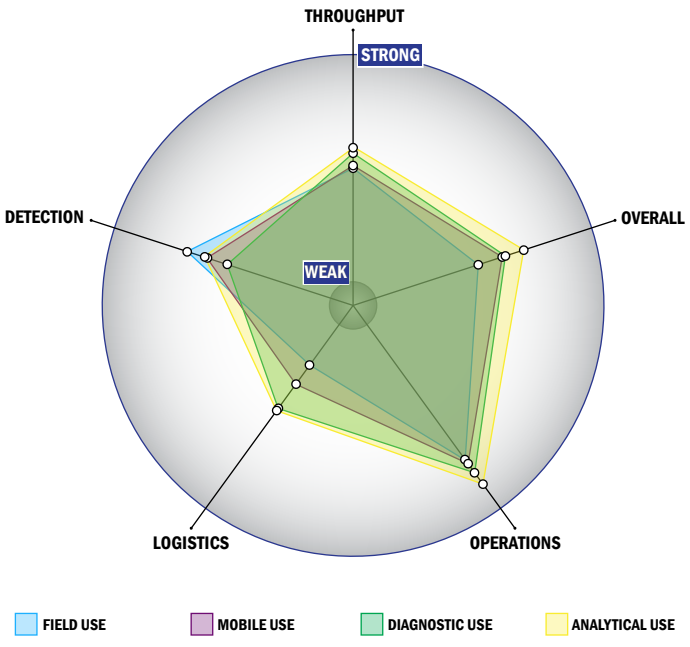
Scoring Analysis

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.



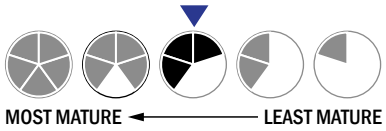
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 3 solutions, buffer, eluents, and/or reagents
- 1 component
- 10-20 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

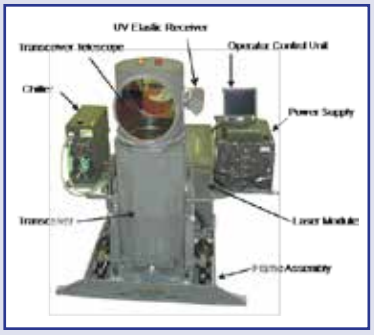
- Can be used from 25 °C to 37 °C
- Components must be stored at 4 °C
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1,000-10,000 CFU per mL
- 1,000-10,000 PFU per mL
- 10-100 ng per mL
- Fully automated spore lysis

Science & Engineering Services, Inc. - Joint Biological Standoff Detection System, Increment 1

GENERAL DESCRIPTION:



The Joint Biological Standoff Detection System (JBSDS) is considered by JPEO-CBD to be a major technology revolution and capability that responds to a validated DOD requirement. JBSDS is an eye-safe militarized Lidar that provides standoff detection of airborne Agents of Biological Origin to 3+ miles away and fits within a HMMWV. JBSDS is network-capable and has some ability for detecting chemical aerosols. In terms of logistics, the only daily-use consumable is electricity and train-up for non-technical users is within 2-3 days.

TECHNICAL DESCRIPTION:

The Joint Biological Standoff Detection System (JBSDS) started as a DARPA SBIR using a COTS-based Fluorescence Portable Digital Lidar open architecture via integrated transmitter-receiver with 355nm and 1067nm low-energy/high pulse-rate lasers. The output is eye-safe and all data processing is digital, with the discrimination algorithm based on pioneering work by MIT-LL using two orthogonal parameters: backscatter and fluorescence. The validated DOD requirement for operation is low-light conditions only, though JBSDS can be readily upgraded to 24/7 operations thru its open architecture.

CONTACT INFORMATION

Science & Engineering Services, Inc.
6992 Columbia Gateway Drive
Columbia, Maryland 21046
POC: Robert M. Serino, Ph.D
443-539-0139
www.sesius.com

COST

- $700,000/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

Notes

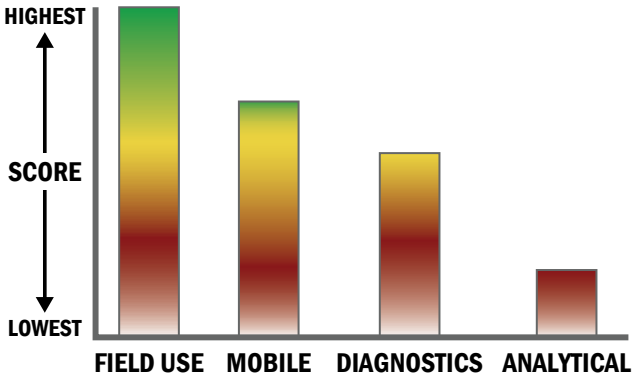
This standoff sensor is being tested in South Korea as part of a multi-year JPEO-CBD advanced technology demonstration through 2015.

Survey Source

Vendor Supplied Information

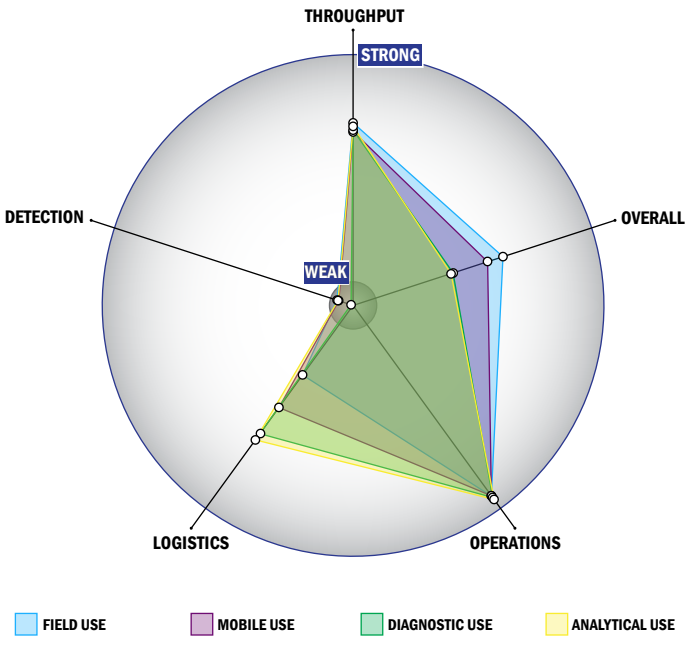
Scoring Analysis

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.



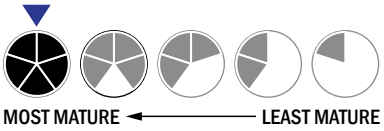
Evaluation Criteria

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 fully 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
- Larger than a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from -21°C to 41°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
- Poor specificity. System has a consistently high level of false alarms (>10%)
- Spore lysis not necessary for detection by system

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.
6992 Columbia Gateway Drive
Columbia, MD 21046
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

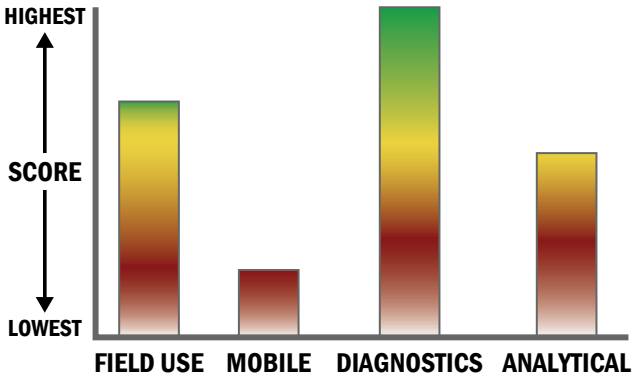
	Biological	Chemical	Radiological
FIELD USE System	N/A	Bottom Tier	N/A
MOBILE Laboratory	N/A	Third Tier	N/A
DIAGNOSTIC Laboratory	N/A	Third Tier	N/A
ANALYTICAL Laboratory	N/A	Third Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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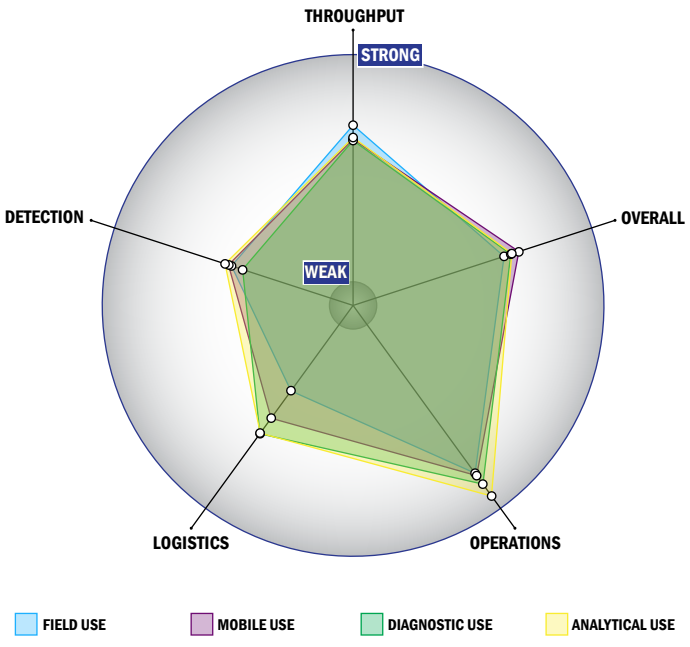


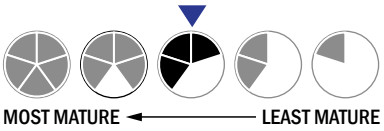
Evaluation Criteria

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



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%)
- $1x10^{-4}$–$1x10^{-3}$ mg/m^3
- <1 ppb
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Science & Engineering Services, Inc. - Low-Cost Biological Standoff Detection System

GENERAL DESCRIPTION:



The Low-Cost Biological Standoff Detection System (LC-BSDS) is a lower-costing, modified commercial product that provides JBSDS-like standoff detection capabilities without the military-rugged package at a smaller SWAP footprint. This open architecture, commercial approach results in a lower baseline price starting below 1/4th that of JBSDS, with scalable capabilities via insertion of custom modules. In terms of logistics, the only daily-use consumable is electricity and train-up for non-technical users is within 2-3 days.

TECHNICAL DESCRIPTION:

The Low-Cost Biological Standoff Detection System (LC-BSDS) is a commercial lidar that uses an integrated transmitter-receiver with a 1067nm low-energy/high pulse-rate laser as a baseline capability. In support of customer needs, the scalable open architecture system can accept other laser wavelengths and/or software capabilities for added performance.

CONTACT INFORMATION

Science & Engineering Services, Inc.
6992 Columbia Gateway Drive
Columbia, MD 21046
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

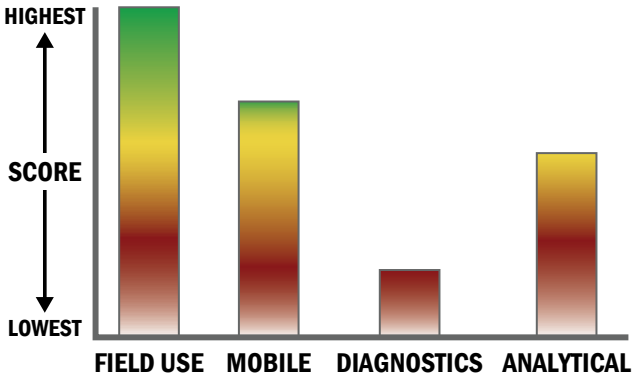
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	Third Tier	N/A	N/A
MOBILE Laboratory	Fourth Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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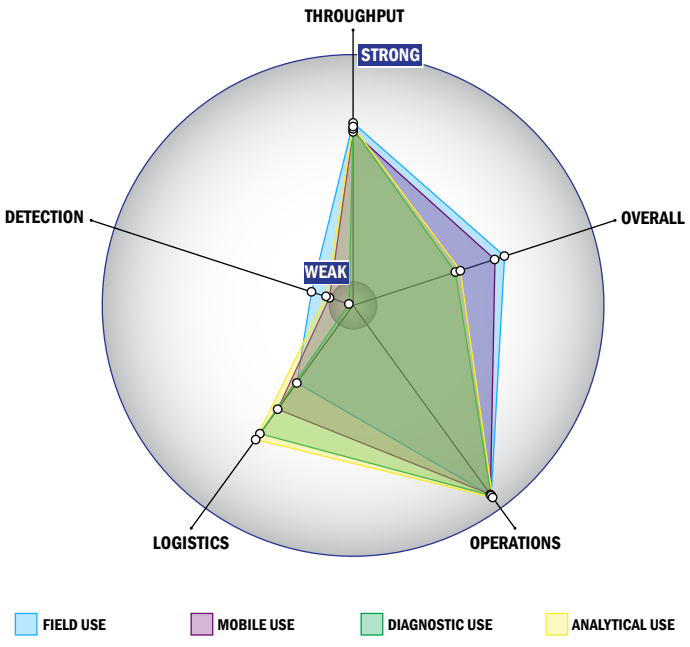


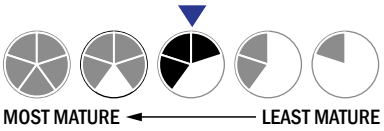
Evaluation Criteria

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 fully 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 home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

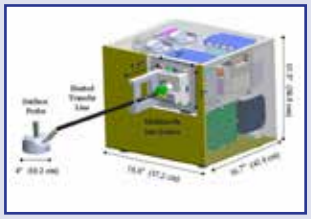
- Can be used from -21°C to 41°C
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Spore lysis not necessary for detection by system

Science & Engineering Services, Inc. - Universal Mass Spectrometer Sensor

GENERAL DESCRIPTION:



The Universal Mass Spec Sensor (UMSS) is sized and designed to deliver a next generation portable Mass Spec capability for both biological and chemical (Explosives, Narcotics, CWA and TIC) materials. Sample inlet is via heated probe and/or direct injection. A key attribute of UMSS is rapid sample processing in clutter and the ability to enable (create/transfer) library updates of new hazards and/or unknowns within a few hours. In terms of logistics, the consumables cost per sample is less than one dollar and train-up for non-technical users is two days.

TECHNICAL DESCRIPTION:

The Universal Mass Spec Sensor (UMSS) uses a hexapole ion-trap mass spectrometer in which MS/MS is conducted either via secondary electro-spray ionization (SESI) of chemical samples or via supplemental AP-MALDI module for biological samples. Sample materials undergo rapid ionization and MS/MS of targeted markers to sift rapidly thru clutter against specialized-onboard and/or commercial internet-accessible databases..

CONTACT INFORMATION

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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

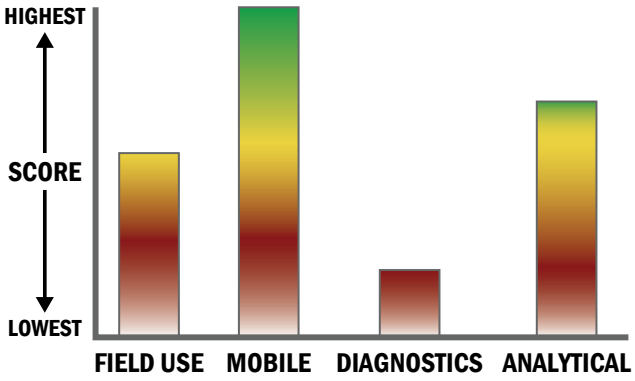
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	Second Tier	Bottom Tier	N/A
MOBILE Laboratory	Second Tier	Third Tier	N/A
DIAGNOSTIC Laboratory	Second Tier	Second Tier	N/A
ANALYTICAL Laboratory	Second Tier	Third Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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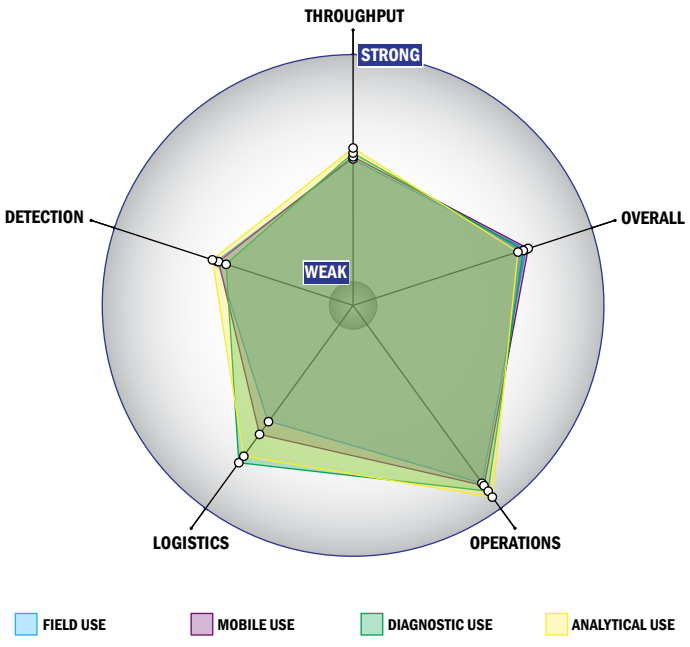


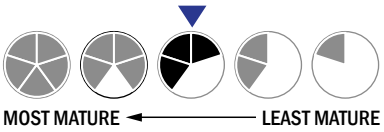
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 samples every 2 hours
- The system or device is currently semi-automated
- Device or system is intended for multiple detection assays
- 3 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
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1,000-10,000 CFU per mL
- 1,000-10,000 PFU per mL
- 10-100 ng per mL
- Semi-automated spore lysis
- 1 ppb-1 ppm
- System currently can identify liquid chemical agent

Sensor Technology Engineering, Inc. - Radiation Pager

GENERAL DESCRIPTION:
Handheld gamma detector for interdiction.

TECHNICAL DESCRIPTION:
CsI scintillator with PMT.



CONTACT INFORMATION

Sensor Technology Engineering, Inc.
70 S. Kellogg Ave
Goleta, CA 93117
805-964-9507
sb_sensor_tech@email.msn.com
www.radiationpager.com

COST

- $1,300/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

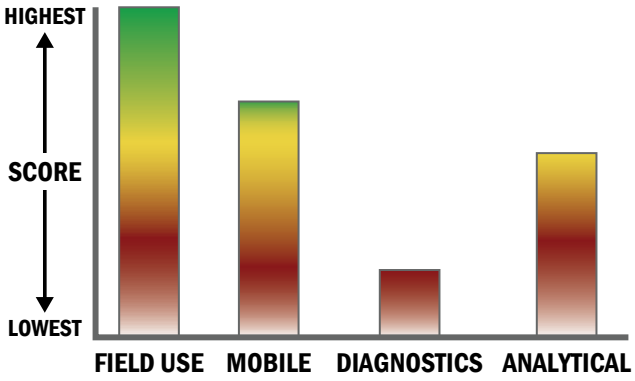
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Top Tier
MOBILE Laboratory	N/A	N/A	Top Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Second Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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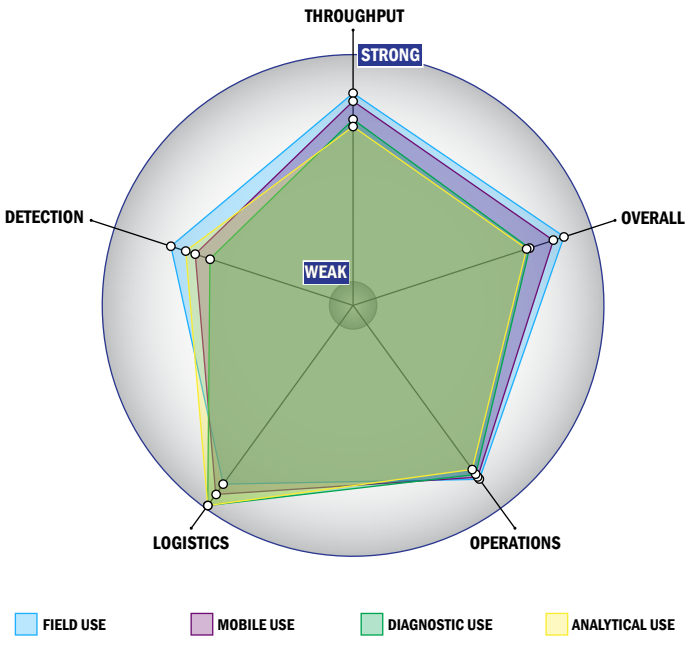


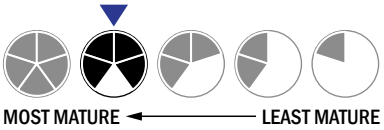
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 samples every 2 hours
- The system or approach is not amenable to full or semi-automation
- 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:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- This system is not capable of transmitting data
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Only dose rate
- Down to background level radiation for dose rate
- System is used for surveying

Siemens Healthcare Diagnostics - IMMULITE 2000 Immunoassay System

GENERAL DESCRIPTION:



The IMMULITE 2000 immunoassay system has been designed specifically for optimum efficiency and consolidation in medium and high-volume laboratories. The IMMULITE 2000 intuitive software, and graphical user interface, offers streamlined information management, from remote test ordering to sophisticated analysis of results. Throughput of up to 200 tests/ hour User-defined automatic dilution protocols Five hours of usable walk away time Third-generation assays for excellent sensitivity Comprehensive menu of more than 100* assays Easily automate through VersaCell™ or other ADVIA Automation Systems The IMMULITE 2000 analyzer combines allergy and specialty immunoassay testing on one platform with many features that provide greater efficiency in the lab. The IMMULITE sample types include serum, plasma, urine, and amniotic fluid but are assay specific.

TECHNICAL DESCRIPTION:

The IMMULITE 2000 employs chemiluminescent technology.

CONTACT INFORMATION

Siemens Healthcare Diagnostics
1717 Deerfield Road
Deerfield, IL 60015
847-267-5300

COST

- $157,200/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

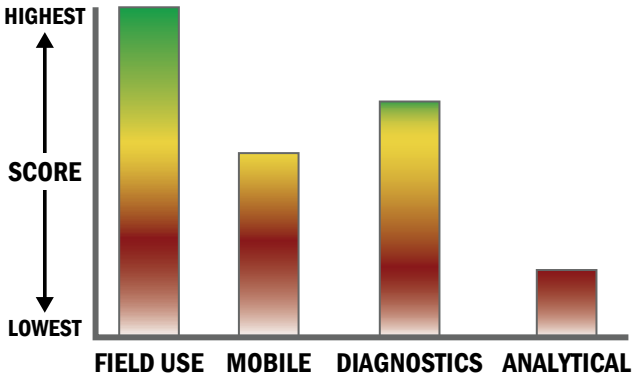
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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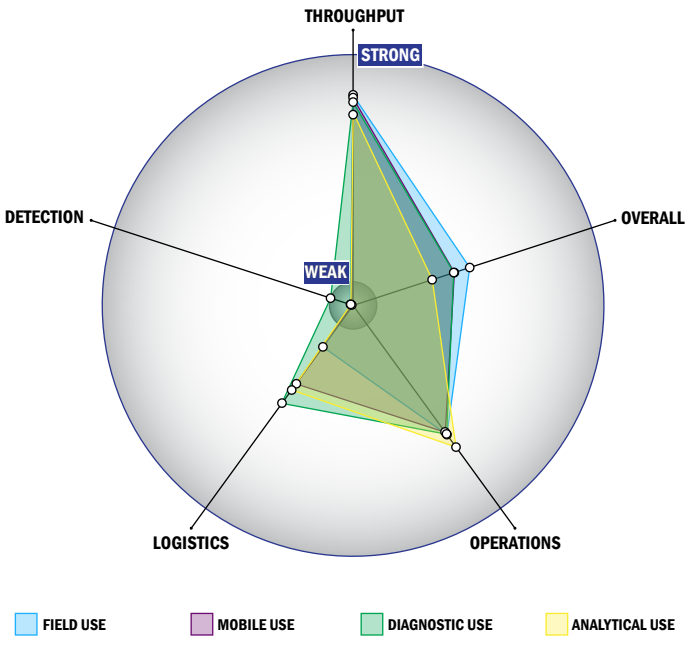


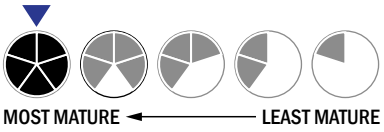
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- Multiple samples, multiple tests/sample per run
- 749-350 samples every 2 hours
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 2 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:

- More than a day of training and significant technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wired connections are available
- System or device has 220V electrical requirement



Operations:

- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- System currently has 510k clearance
- Less than 250 µL

Smiths Detection - Bio-Seeq PLUS Biological Agent Identifier

GENERAL DESCRIPTION:



The Bio-Seeq PLUS is a field portable high precision PCR instrument that detects and identifies trace levels of high threat biological agents, both bacterial and viral, through DNA replication. The instrument is designed for use in the hot zone by an operator wearing PPE. It is exceptionally easy to learn to operate and utilize effectively. The instrument has 6 fully independent Thermocycler Optics Modules that each operate separate assay analyses. The instrument software is designed for users with limited experience with biological agent testing, providing easy to follow prompts to guide the user through the entire analysis process. The instrument has been commercially available since 2008 and has an excellent reliability track record and very long Mean Time Between Failure period.

Newly formulated assays and instrument parameters introduced in 2012 increase MDL sensitivity by ~1000X while increasing shelf life to 18 months and making the assays easier to use.

New assays have recently been introduced as well. Assays are now available to identify Bio Agents that cause Anthrax (separate pX01 and pX02 assays), Plague, Tularemia, Brucellosis, Q Fever and Pan Orthopox as well as a Training Assay and simulant powders.

TECHNICAL DESCRIPTION:

The Bio-Seeq PLUS utilizes Linear After The Exponential Polymerase Chain Reaction (LATE-PCR) technology. It operates by replicating a segment of the target agent DNA and incorporating fluorescent tags to each successive replicate. In this way it is able to detect and amplify very small quantities of target agent DNA, down to as low as 10s to 100s of copies, and provide a high response when the target agent is present. Each assay incorporates an internal control to assure that the amplification results are valid.

CONTACT INFORMATION

Smiths Detection
21 Commerce Dr.
Danbury, CT 06810
www.smithsdetection.com

COST

- $35,000/system
- $29/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier
Fourth Tier Bottom Tier

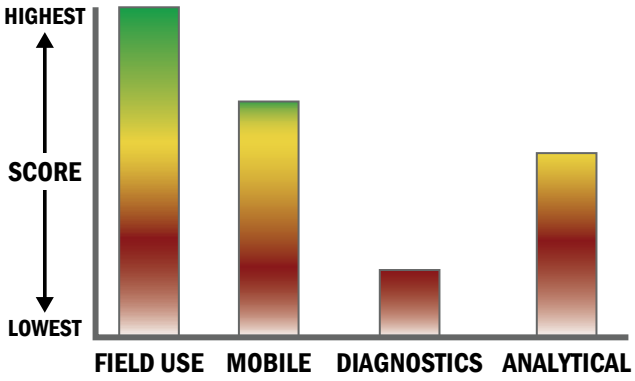
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Third Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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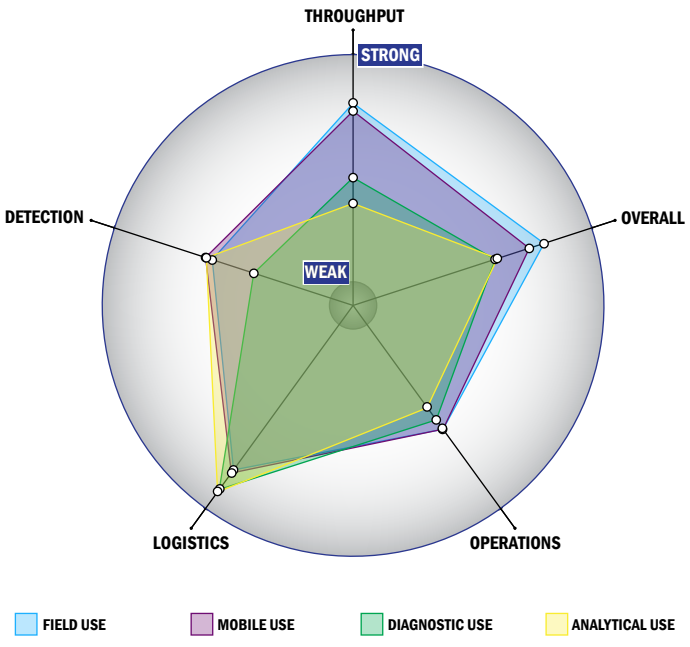


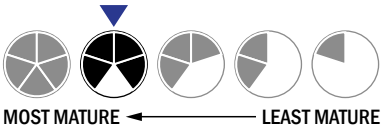
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- Multiple samples, single tests/sample per run
- Less than 32 samples every 2 hours
- The system or approach is not amenable to full or semi-automation
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- Wireless and wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Less than 50 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1,000-10,000 CFU per mL
- 1,000-10,000 PFU per mL
- Spore lysis not necessary for detection by system

Smiths Detection - GasID

GENERAL DESCRIPTION:



The GasID uses the same interferometer and outer enclosure as the HazMatID, but replaces the ATR interface with a gas cell and includes a handheld gas and vapor collection device that interfaces to that cell. The external packaging of the GasID includes a hardened plastic enclosure measuring 44.4 x 30.5 x 19 cm (17.5" x 12" x 7.5") with a mass of 11.3 kg (25 lbs.). When the lid is open, the exposed system components include the computer screen and the chemical sampling interface. The sampling interface consists of two ports (inlet and exhaust) leading to the 44 cm path length transmission cell and accommodates either of two sample collection devices provided with the system. Because the GasID has exposed ports, the instrument is not recommended for use in the hot zone, rather, the sample collection devices are decon-able and permitted for use in the contaminated area of interest.

With non-technical users in mind, the software interface on the GasID is simple and easily viewed and controlled when wearing personal protective equipment. A list of the best library matches found out of a database of 5500 spectra is shown in rank order along with the correlation values with respect to the library. The user can then highlight one of the library hits and display the library spectrum versus the unknown sample spectrum for visual confirmation of the match. Advanced software controls also allow users to add measured spectra to the instrument library, perform mixture analysis functions, and access the NIOSH database to determine chemical toxicities.

TECHNICAL DESCRIPTION:

Infrared (IR) spectroscopy can be used to interrogate the structures of molecules by measuring the resonant frequencies of vibrational modes within the molecule. These frequencies are identified by measuring the transmission of IR light through a sample. Those vibrational modes that can experience a change in dipole moment upon the absorption of IR light will be IR active and will produce a peak in the IR spectrum. Therefore, molecules that contain highly polar chemical bonds, such as water (H2O), carbon dioxide (CO2), and acetone ((CH3)2CO)), will produce strong IR spectra. Notably, linear diatomic molecules, such as nitrogen (N2), oxygen (O2), and hydrogen (H2), have no transition dipole moment and thus, do not absorb IR light and do not interfere with the IR measurement of other components of air samples.

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

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

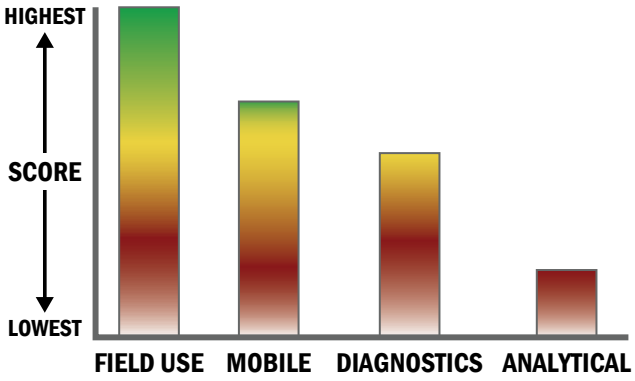
Smiths Detection
21 Commerce Drive
Danbury, CT 06810
203-207-9700

COST

- >$50,000/system
- $0/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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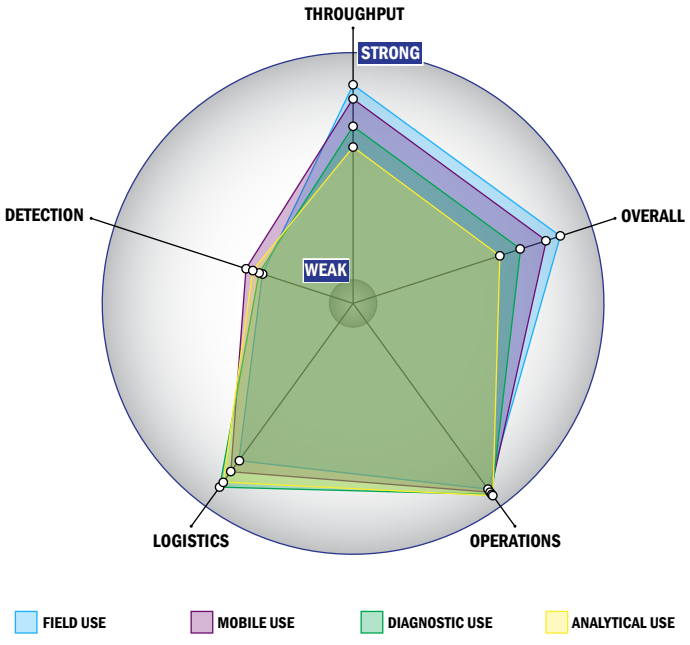


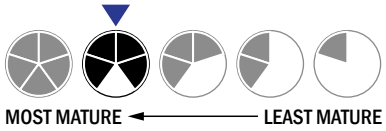
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, >10 tests/sample per run
- Less than 32 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
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a toaster
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4 °C to 41 °C
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Greater than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- > $1x10^{-3}$ mg/m^3
- 100 ppm-1 ppt
- System currently can identify aerosolized chemical agent
- Possible system could identify liquid chemical agent

Smiths Detection - GID-3

GENERAL DESCRIPTION:

GID-3 is highly portable, easy to use and rapidly deployed. As well as point detection, it can monitor the integrity of collective protective systems in vehicles, command bunkers and small ships. GID-3 detects, identifies and measures the concentration levels of Chemical Warfare agents and Toxic Industrial Chemicals (TICs). Operated remotely, the GID-3 provides perimeter protection either as a stand-alone unit, or networked together using hardwired or wireless systems. Vehicle-or ship-mounted, it can monitor contamination of the outside air or alert personnel to the presence of a chemical agent in the vehicle interior.



TECHNICAL DESCRIPTION:

GID-3 employs ion mobility spectrometry technology.

CONTACT INFORMATION

Smiths Detection
459 Park Ave
Bushey Watford
WD23 2BW
globalsales@smithsdetection.com

COST

- N/A/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

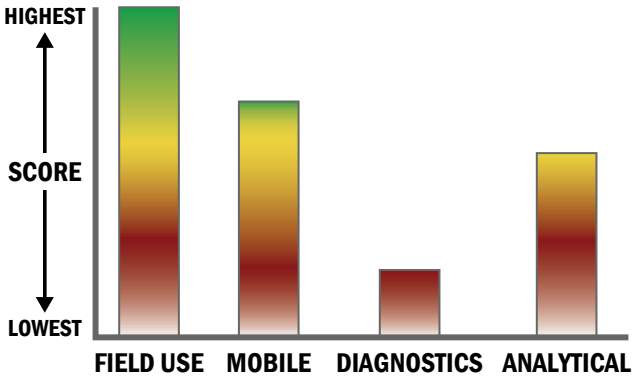
	Biological	Chemical	Radiological
FIELD USE System	N/A	Third Tier	N/A
MOBILE Laboratory	N/A	Second Tier	N/A
DIAGNOSTIC Laboratory	N/A	Top Tier	N/A
ANALYTICAL Laboratory	N/A	Top Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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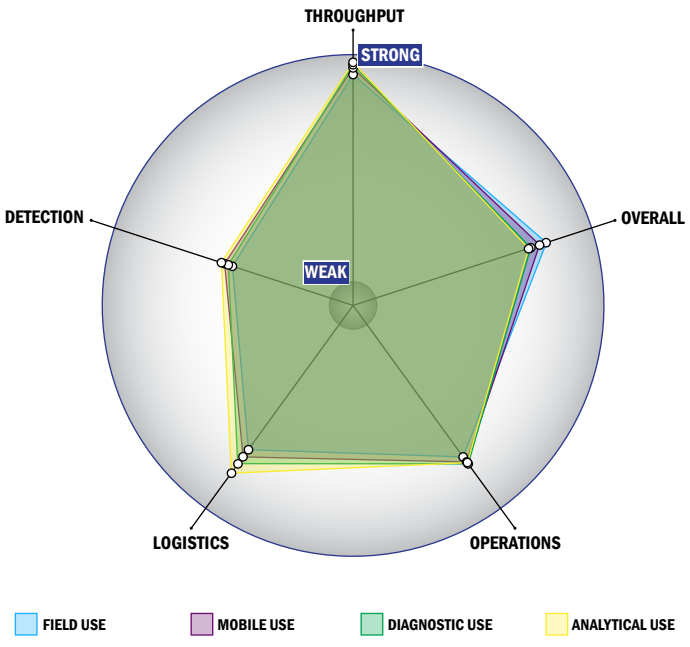


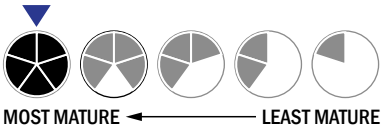
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 2 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

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



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Greater than 10 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- >1x10^{-3} mg/m^3
- 1 ppb-1 ppm
- Possible system could identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Smiths Detection - GUARDION GC/MS

GENERAL DESCRIPTION:



GUARDION utilizes high speed, high resolution gas chromatography (GC) and a revolutionary miniaturized toroidal ion trap mass spectrometer (MS) to identify volatile and semi-volatile organic compounds (VOC's and SVOC's). GUARDION is hand-portable and ruggedized. Its high speed GC combined with a miniaturized toroidal ion trap mass spectrometer redefines the size, weight, and speed for hand-portable GC/MS technology.

GUARDION is ready to operate within five minutes from a cold start. The CUSTODION™, a solid phase microextraction (SPME) fiber syringe, is used for simple sample collection and injection into the GC/MS system.

GUARDION features both a touch screen and keypad for operation. All software required for sample identification and reporting is on board. Additionally, the system can operate from a single battery charge for up to 3 hours. GUARDION is backed by first-rate service, training and 24/7/365 ReachBackID™ technical support to ensure optimum product performance.

TECHNICAL DESCRIPTION:

GC/MS is considered the “gold standard” for chemical identification. GUARDION's low-thermal mass GC column uses a heating element intertwined with a 5-meter, 100 micrometer i.d. capillary that provide very rapid heating rates as well as excellent compound separation properties.

GUARDION's unique miniaturized toroidal ion trap mass spectrometer includes an additional center electrode that produces a toroidal ion trapping field. This allows the ions to be spread out over a greater volume and reduces the space charge effects that are common to traditional ion trap designs.

GUARDION's software includes special data processing and search algorithms that compensate for the differences between mass spectra produced by ion trap and quadrupole mass spectrometers.

Sample collection and introduction are performed using a SPME (solid phase microextraction) syringe. The SPME fiber incorporated in the syringe has a polymer coating that absorbs organic molecules. The molecules are then released into the GC when the syringe is inserted into GUARDION's heated injector port.

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

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

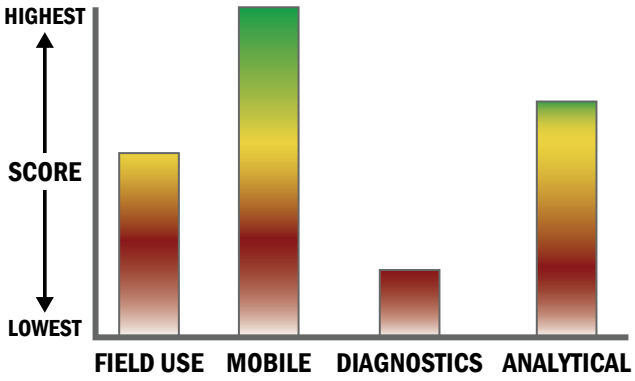
Smiths Detection
21 Commerce Dr
Danbury, CT 06810
POC: Ken Fredeen
ken.fredeen@smithsdetection.com

COST

- $153,800/system
- $9/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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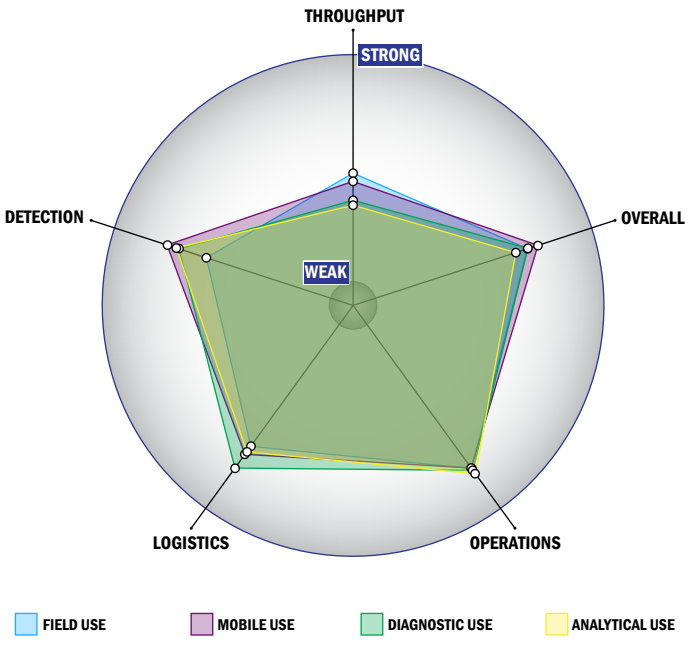


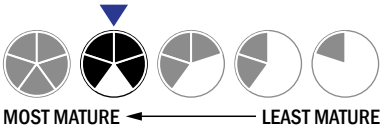
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, single test/sample per run
- Less than 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
- 3 components
- 5-10 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- A day of training and technical skills are required
- 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
- 2-4 hours battery life



Operations:

- Can be used from 4 °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
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- >$1x10^{-3}$ mg/m^3
- ppb-1 ppm
- System currently can identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Smiths Detection - HazMatID 360

GENERAL DESCRIPTION:



Extensive on-board spectral library to rapidly ID solid and liquid chemicals based on distinct molecular fingerprints. Capable of identifying over 32,000 substances including nerve & blister agents, TICs, white powders, explosives & explosive precursors, drugs & drug precursors, common chemicals, and pesticides. Features automated mixture analysis which allows effective chemical assessment of samples that may have been contaminated with more than one material, like water or dirt. Mixture analysis, combined with chemical hazard classification capabilities enables advanced data handling and comprehensive analysis using ruggedized FTIR technology in the field. Built-in Bluetooth wireless communication to allow for immediate data transmission out of the hot zone to a command center and/or ReachBackID™ support services to aid with information integration prior to decon. Also includes PEAC® decision support software, which provides users with detailed information regarding management of hazardous chemicals.

TECHNICAL DESCRIPTION:

Incorporates FTIR spectroscopy to ID a broad range of materials. In this technique, infrared (IR) optical radiation from 4000 to 650 wavenumbers (cm-1) passes through a chemical medium where it is absorbed by the oscillating electric fields of bonding electrons and lattice vibrations. As such, FTIR is applicable to virtually all covalent organic and inorganic compounds. It is particularly sensitive to polar functional groups associated with unsaturated and aromatic hydrocarbons (petroleum products), nitrates (explosives, fertilizers), organophosphates (pesticides, WMDs), hydroxyls and carbonyls (drugs, solvents), etc. Purely ionic compounds (e.g., sodium chloride) do not possess the requisite electronic structure to be identified by any FTIR system. The diamond attenuated total reflection (ATR) sample interface allows users to analyze materials with virtually no sample prep. The ATR measurement involves attenuation of the evanescent field of a totally internally-reflected IR beam emanating from the diamond sensor into a sample. Technique permits easy, reproducible measurements with minimal training. To identify a solid or liquid chemical, the user places a small portion (at least 1 mg) on to diamond sensor and cleans sensor with an alcohol swab when finished.

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

CONTACT INFORMATION

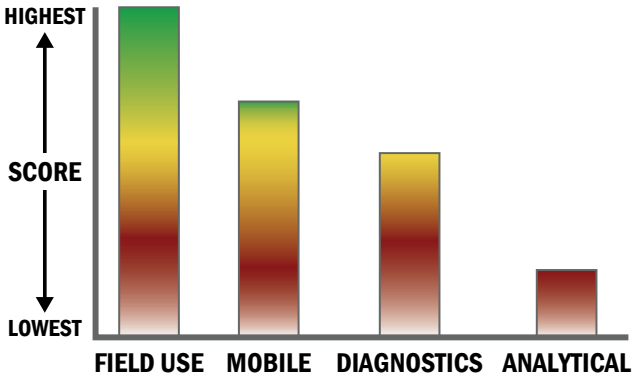
Smiths Detection
21 Commerce Drive
Danbury, CT 06810
203-207-9700
www.smithsdetection.com

COST

- >$50,000/system
- $0/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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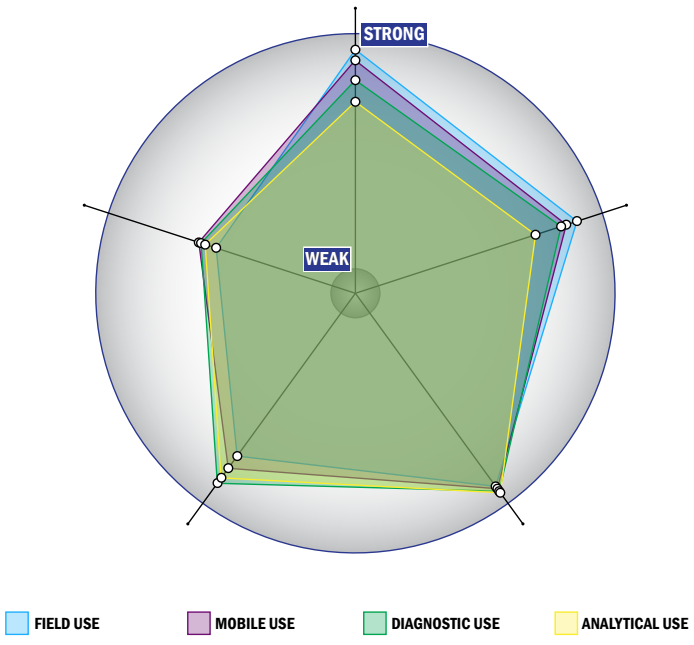


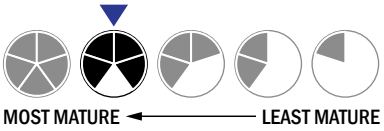
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, >10 tests/sample per run
- 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
- No set-up of the system is required
- Automatic detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a toaster
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from 4 °C to 41 °C
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100 ppm-1 ppt
- Possible system could identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Smiths Detection - HazMatID Elite

GENERAL DESCRIPTION:



HazMatID Elite is a next-generation handheld chemical identifier that combines high performance with simplicity and performs an analysis in 1 minute or less. Analysis is performed by placing a small amount of unknown substance onto the diamond ATR sensor and applying pressure with an integrated press for solid samples. The sample interface also includes an integrated well for the containment of liquid samples. A second, touch-to-sample, diamond ATR interface is available for rapid analysis of pooled liquids and surface films, and enables robotics applications.

MIL-STD-810G certified for operation in harsh conditions, HazMatID Elite has the widest thermal and solar operational range of any portable or handheld chemical identifier. The HazMatID Elite user interface contains a large display screen with a high viewing angle, large keypad, and an intuitive software workflow design.

Long-range, embedded RF wireless transmission is included for rapid communication of data and connection to Reach Back IDTM 24/7/365 support services.

TECHNICAL DESCRIPTION:

Incorporates FTIR spectroscopy to ID a broad range of materials. In this technique, infrared (IR) optical radiation from 4000 to 650 wavenumbers (cm-1) passes through a chemical medium where it is absorbed by the oscillating electric fields of bonding electrons and lattice vibrations. Purely ionic compounds (e.g., sodium chloride) do not possess the requisite electronic structure to be identified by any FTIR system. The diamond attenuated total reflection (ATR) sample interface allows users to analyze materials with virtually no sample prep. The ATR measurement involves attenuation of the evanescent field of a totally internally-reflected IR beam emanating from the diamond sensor into a sample. Technique permits easy, reproducible measurements with minimal training. To identify a solid or liquid chemical, the user places a small portion (at least 1 mg) on to diamond sensor and cleans sensor with an alcohol swab when finished.

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

CONTACT INFORMATION

Smiths Detection
21 Commerce Drive
Danbury, CT 06810
1-203-207-9700
www.smithsdetection.com

COST

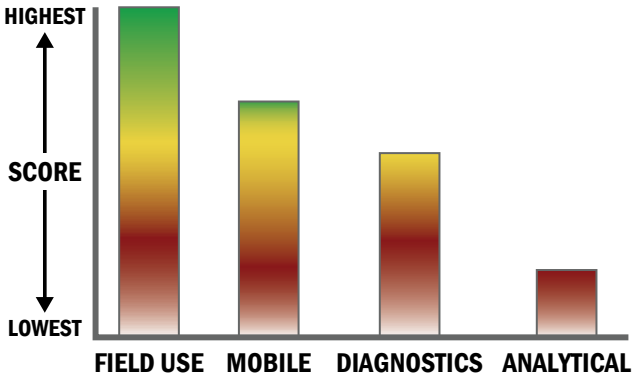
- >$50,000/system
- $0/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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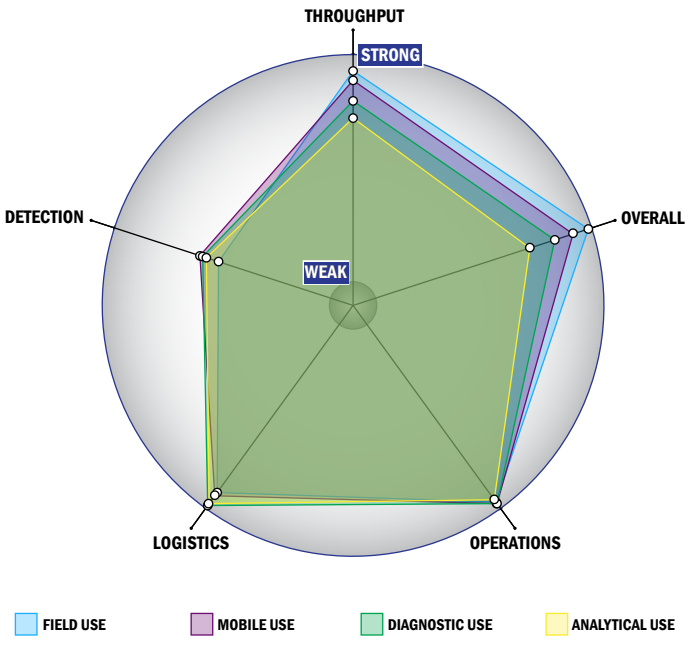


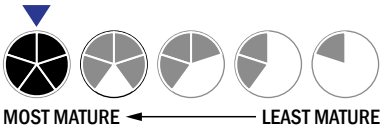
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, >10 tests/sample per run
- 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
- No set-up of the system is required
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- 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 < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100 ppm-1 ppt
- Possible system could identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Smiths Detection - Hazardous Gas and Vapor Identifier (HGVI)

GENERAL DESCRIPTION:



Incorporates FTIR spectroscopy to ID a broad range of materials. In this technique, infrared (IR) optical radiation from 4000 to 650 wavenumbers (cm-1) passes through a chemical medium where it is absorbed by the oscillating electric fields of bonding electrons and lattice vibrations. Purely ionic compounds (e.g., sodium chloride) do not possess the requisite electronic structure to be identified by any FTIR system. The diamond attenuated total reflection (ATR) sample interface allows users to analyze materials with virtually no sample prep. The ATR measurement involves attenuation of the evanescent field of a totally internally-reflected IR beam emanating from the diamond sensor into a sample. Technique permits easy, reproducible measurements with minimal training. To identify a solid or liquid chemical, the user places a small portion (at least 1 mg) on to diamond sensor and cleans sensor with an alcohol swab when finished.

TECHNICAL DESCRIPTION:

HGVI has extended the usefulness of its core IMS technology by also incorporating a Photoionization Detector (PID) and an array of Taguchi Gas Sensors (TGS) that are integrated into the system.

The IMS module in HGVI contains a non-radioactive source and parallel positive and negative ion paths. The use of a chemically doped sieve pack provides state-of-the-art interference rejection for a handheld IMS. The PID contains a 10.6-eV ionization bulb that makes it responsive to most volatile organic compounds. The array of six TGS's allows the system to detect a very broad range of gases and vapors and provides a rough chemical signature for each substance.

HGVI's H-Fusion Decision Enhancement Software combines the data from the system's three orthogonal chemical sensor modules to rapidly and automatically provide identification and quantitation. This data fusion facilitates greater discrimination of materials and reduces the number of incorrect identifications typically associated with IMS technology.

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	Top Tier	Third Tier
MOBILE Laboratory	N/A	Third Tier	Third Tier
DIAGNOSTIC Laboratory	N/A	Fourth Tier	Third Tier
ANALYTICAL Laboratory	N/A	Fourth Tier	Third Tier

CONTACT INFORMATION

Smiths Detection
21 Commerce Dr
Danbury, CT 06810

COST

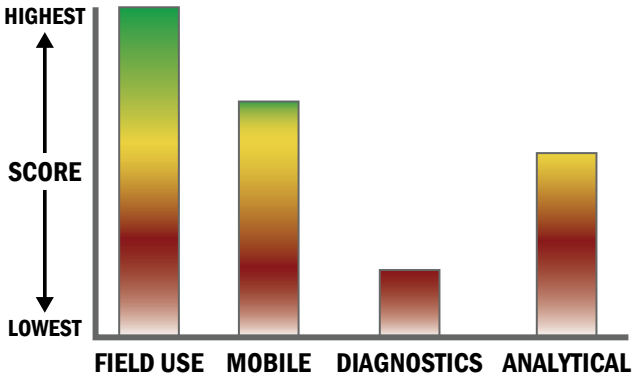
- $28,000/system
- <$1.00/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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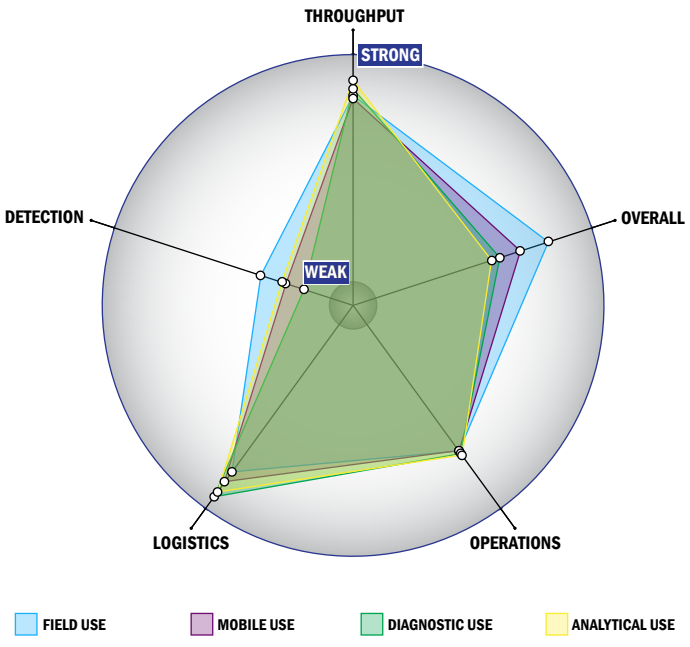


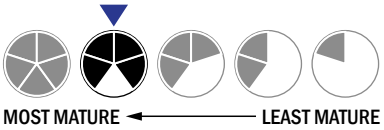
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- 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
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a toaster
- 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 4 °C to 37 °C
- Components must be stored at room temperature (27 °C)
- Device or system has peak performance at normal relative humidity conditions
- Greater than 3 years shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Good specificity. System has a consistently low level of false alarms (2-5%)
- >$1x10^{-3}$ mg/m^3
- System currently can identify aerosolized chemical agent
- Only total dose and dose rate
- Display indicates 0 until more than 1 mR/hr is detected for dose rate
- System is used for personnel detection

Smiths Detection - Lightweight Chemical Detector (LCD) 3.2e

GENERAL DESCRIPTION:



LCD (Lightweight Chemical Detector) is a sophisticated yet small and lightweight chemical warfare agent detectors, has revolutionized the soldier/squad's protection. The LCD contains no radioactive source, has a volume of less than 30in³ and weighs less than 1 lb (0.45kg).

Principally used as an unobtrusive compact detector, the LCD constantly samples the air for traces of nerve (G), blister (H), TICs (T) or blood (H) and choking (T) agents, to enable the user to take appropriate action. When used in survey mode, the unit has the capability for checking cargo, equipment, personnel or facilities. Additionally, the unit can be deployed on fixed or mobile platforms, including vehicles, ships, aircraft and fixed site installations.

Equipped with an audible and/or visual alarm the unit incorporates an LED display mounted on the top face, to show operating status and give visual alarms (when worn), and a bar display on the front of the unit indicates concentration levels. In the event of an attack, the unit has the ability to recover quickly with a rapid clear-down time.

The LCD 3.2E is user-friendly, highly reliable and field maintainable to minimize whole life cost. The only consumable items are standard commercially available AA batteries and the molecular sieve pack; both of which are replaceable in the field in less than two minutes and can be undertaken whilst wearing Individual Protective Equipment. Once deployed, the detector requires no calibration, lubrication or other scheduled maintenance

TECHNICAL DESCRIPTION:

LCD 3.2e uses Ion Mobility Spectroscopy (IMS) and analysis software to match sample spectral results to stored libraries to classify, identify and quantify chemical warfare agents (CWAs) and toxic industrial chemicals (TICs).

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

CONTACT INFORMATION

Smiths Detection - Watford Limited
459 Park Avenue
Bushey, Watford, Herts, WD23 2BW UK
+44 1923 658447
gmer.emea@smithsdetection.com

COST

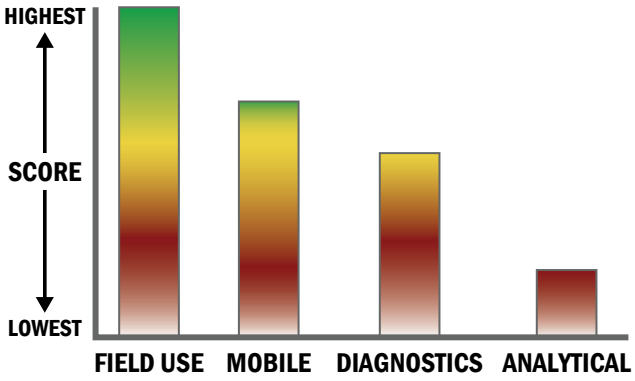
- N/A/system
- $0.003/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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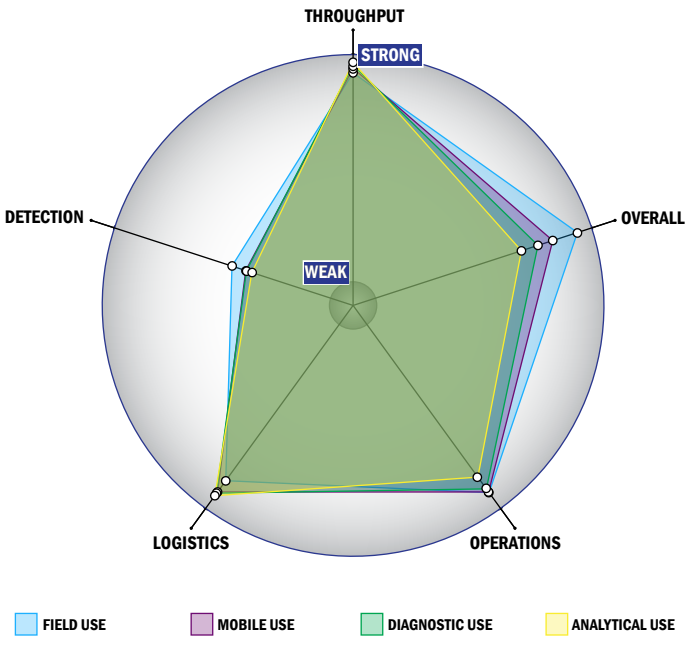


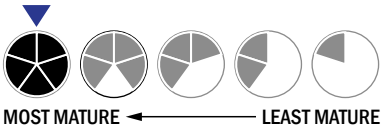
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 2 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- >$1x10^{-3}$ mg/m^3
- Possible system could identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Smiths Detection - Lightweight Chemical Detector (LCD) 3.3

GENERAL DESCRIPTION:

Based on leading IMS technology, the LCD 3.3 is a light and versatile chemical warfare agent (CWA) and toxic industrial chemical (TIC) detector. LCD 3.3 is an advanced warning device, that alarms to gas and vapour threats detected and identified at or below immediately dangerous to life and health (IDLH) levels, by determining the agent or type, class, concentration and dosage of chemical exposure. It can also be used as a screening and survey device.



TECHNICAL DESCRIPTION:

LCD 3.3 employs ion mobility spectrometry technology.

CONTACT INFORMATION

Smiths Detection
459 Park Ave
Bushey Watford WD23 2BW
globalsales@smithsdetection.com

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

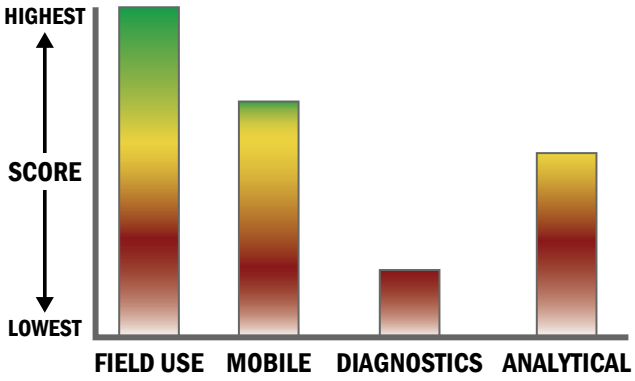
	Biological	Chemical	Radiological
FIELD USE System	N/A		N/A
MOBILE Laboratory	N/A		N/A
DIAGNOSTIC Laboratory	N/A		N/A
ANALYTICAL Laboratory	N/A		N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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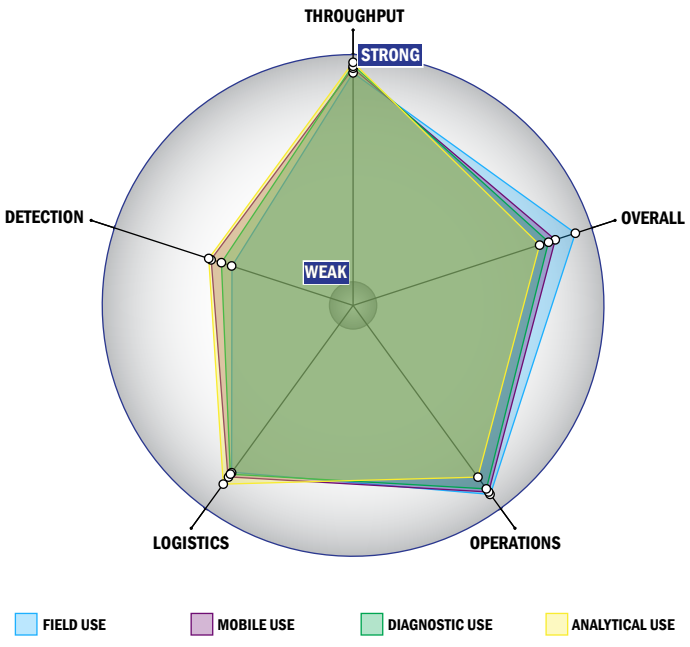


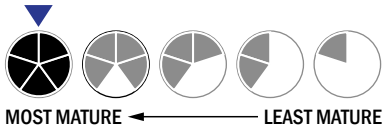
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 2 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Greater than 10 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- > $1x10^{-3}$ mg/m^3
- 1 ppb-1 ppm
- System currently can identify aerosolized chemical agent
- Possible the system could identify liquid chemical agent

Smiths Detection - Lightweight Chemical Detector (LCD)-NEXUS

GENERAL DESCRIPTION:



Based on leading IMS technology, the LCD-NEXUS is a portable, compact and rugged chemical warfare agent (CWA) and toxic industrial chemical (TIC) gas and vapour detector. Suitable for fixed or moving platforms, the LCD-NEXUS provides highly sensitive and selective detection, capable of measuring chemical concentrations down to miosis levels with accurate discrimination. The LCD-NEXUS simultaneously samples for traces of CWAs and TICs, to provide real-time warning for threats at or below immediately dangerous to life and health (IDLH) levels. It also provides chemical details including class, type, concentration and dosage as well as CWA identification.

TECHNICAL DESCRIPTION:

LCD Nexus employs dual ion mobility spectrometry technology.

CONTACT INFORMATION

Smiths Detection
459 Park Ave
Bushey Watford
WD23 2BW
globalsales@smithsdetection.com

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

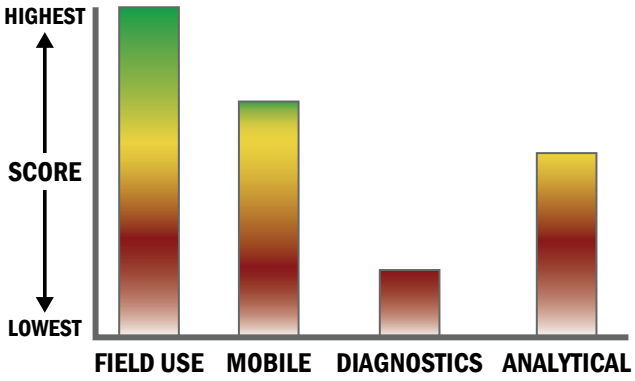
	Biological	Chemical	Radiological
FIELD USE System	N/A	Second Tier	N/A
MOBILE Laboratory	N/A	Top Tier	N/A
DIAGNOSTIC Laboratory	N/A	Top Tier	N/A
ANALYTICAL Laboratory	N/A	Top Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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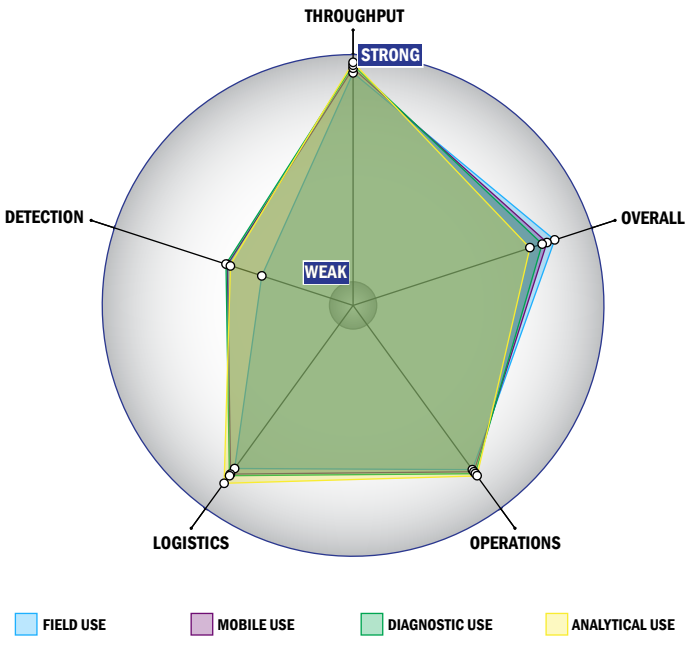


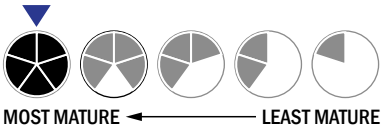
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 2 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- Wired connections are available
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Greater than 10 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- 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
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- >1x10^-3 mg/m³
- <1 ppb
- Possible system could identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Smiths Detection - RadSeeker - Handheld Radioisotope Identifier

GENERAL DESCRIPTION:



The RadSeeker is a hand-held, portable, rugged and highly accurate radioisotope detector and identifier. The RadSeeker was specifically designed to meet the Department of Homeland Security (DHS) mission requirements for a next-generation system capable of detecting and identifying nuclear threat materials. The RadSeeker offers superior identification capabilities that are based on Symetrica's Discovery Technology™. This sophisticated detector system is capable of resolving complex masking scenarios and exceeds all ANSI N42.34 (2006) requirements for the identification of bare, shielded and multiple isotopes. The RadSeeker is easy to use while supplying the operator with quick, simple, specific information for threat assessment. Applications include Customs inspection, border protection, emergency response, and radiological facilities/ personnel monitoring.

TECHNICAL DESCRIPTION:

The RadSeeker offers superior identification capabilities that are based on Symetrica's Discovery Technology™. This technology couples advanced spectrum processing and identification algorithms with a choice of highly sensitive 1.5" x 1.5" Lanthanum Bromide (LaBr3) or 2" x 2" Sodium Iodide (NaI) detectors resulting in superior accuracy which is unique and exclusive to Smiths Detection. This sophisticated detector system is capable of resolving complex masking scenarios.

CONTACT INFORMATION

Smiths Detection
21 Commerce Dr.
Danbury, CT 06810 USA
POC: Stephanie Mirabelli - Product Manager
stephanie.mirabelli@smithsdetection.com
www.smithsdetection.com

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

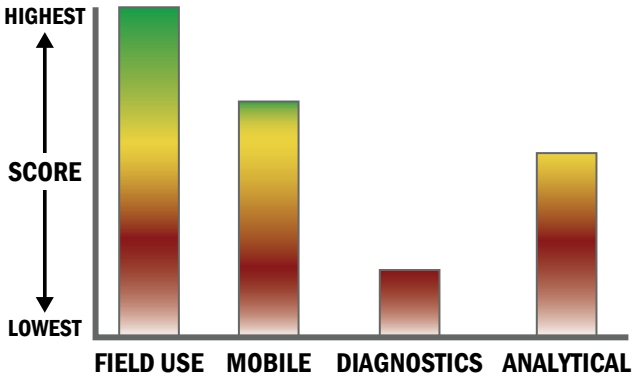
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Third Tier
MOBILE Laboratory	N/A	N/A	Third Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Second Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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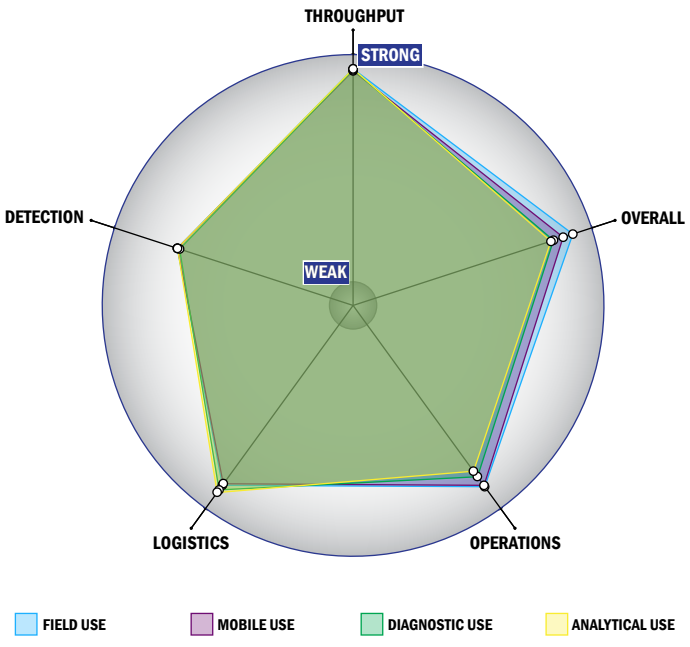


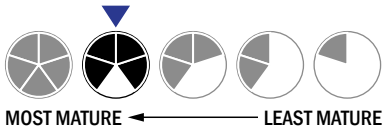
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- 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
- 0 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- Satellite, wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Device or system has peak performance at normal relative humidity conditions
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected
- Display indicates 0 until more than 1 mR/hr is detected for dose rate
- Down to background level radiation for count rate
- System is used for surveying

Smiths Detection - RespondeR RCI

GENERAL DESCRIPTION:



The RespondeR RCI (Raman Chemical Identifier) is a lightweight, portable spectrometer that identifies unknown solids and liquids such as explosives, white powders, WMDs, and toxic industrial chemicals. The device offers both an integrated sample compartment as well as external, point-and-shoot capability to eliminate direct contact with a sample. The RespondeR RCI is waterproof and ruggedized. It is simple to operate and features an integrated computer with a touch-screen interface. Raman technology is often used as a confirmatory technique with FT-IR to aid in on-scene chemical analysis. Spectra from the RespondeR RCI can be wirelessly transmitted to the HazMatID™ FT-IR chemical identifier or an external laptop to aid in user interpretation between these complementary technologies. The RespondeR RCI is backed by first rated service, training and support to ensure optimum product performance.

TECHNICAL DESCRIPTION:

Raman spectroscopy measures how a single frequency of radiation is scattered into different frequencies as it impinges upon a chemical medium. The scattered radiation is exposed onto a detector to obtain the identity of the unknown based on its chemical structure. Raman spectroscopy is well suited for analysis of aqueous solutions and liquid and solid samples through clear or translucent containers.

CONTACT INFORMATION

Smiths Detection
21 Commerce Dr.
Danbury, CT 06810
POC: Dr. Marina Kittredge
203-207-9700
Marina.Kittredge@smithsdetection.com
www.smithsdetection.com

COST

- $30,000/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

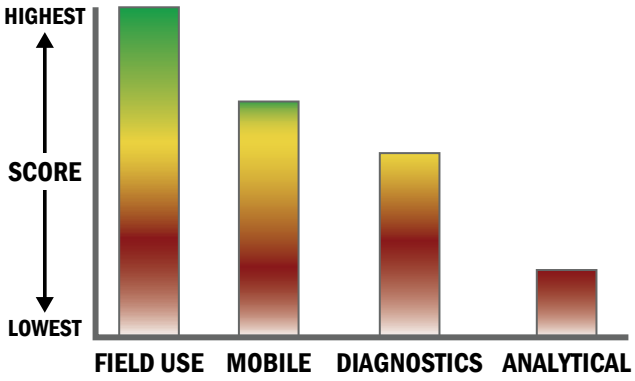
	Biological	Chemical	Radiological
FIELD USE System	N/A	Third Tier	N/A
MOBILE Laboratory	N/A	Third Tier	N/A
DIAGNOSTIC Laboratory	N/A	Fourth Tier	N/A
ANALYTICAL Laboratory	N/A	Fourth Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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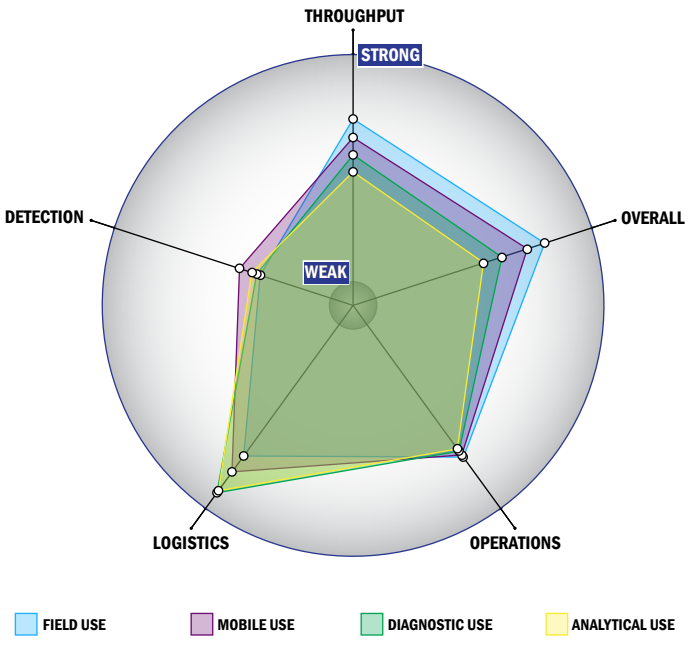


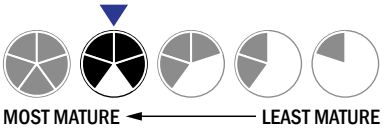
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/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:

- Very brief (minutes-hours) training and minimal technical skills
- 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
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 10 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- > 1 ppt
- Possible system could identify aerosolized chemical agent
- System currently can identify liquid chemical agent

Smiths Detection - SmartBio Sensor (SBS)

GENERAL DESCRIPTION:

SBS is a portable and ruggedized real-time bio-aerosol detector that detects and classifies bacteria, bacterial spores, virus and bio-toxins, including unanticipated or genetically modified organisms while maintaining little response to common environmental interferents. It furthermore collects particles on the sensor coupon which can be eluted and identified using PCR and toxin antibody screening technologies such as Bio-Seeq PLUS and Prime Alert Toxin Screens.



TECHNICAL DESCRIPTION:

SBS continuously samples the air and captures particles based on inertial impaction. SBS is comprised of 8 sensing films that interact with the target organism resulting in a change in fluorescence signal from those sensing films. Pattern recognition is used to detect and classify compounds, resulting in a user selectable visual and audio signal.

CONTACT INFORMATION

Smiths Detection
21 Commerce Dr.
Danbury, CT 06810
www.smithsdetection.com

COST

- $29,500/system
- $25/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

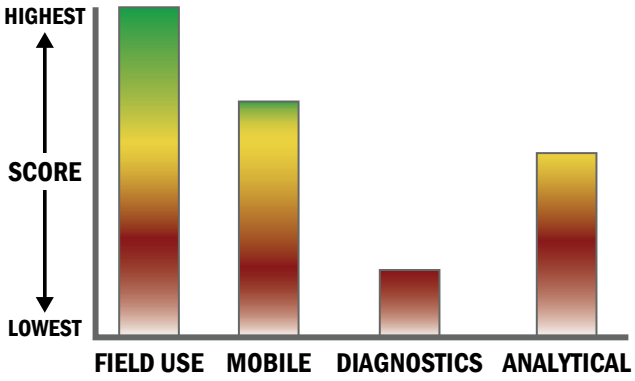
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Third Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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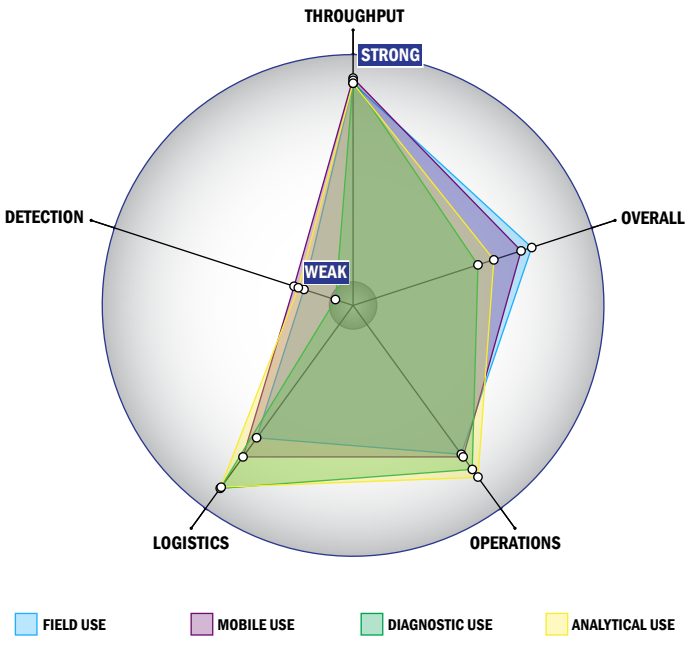


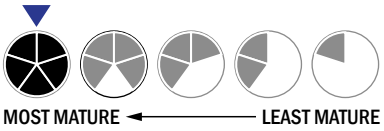
Evaluation Criteria

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 semi-automated
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 2 components
- 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
- Between 5 and 25 kg
- Wired connections are available
- System or device has 220V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Components must be stored at 4°C
- Device or system has peak performance at normal relative humidity conditions
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Spore lysis not necessary for detection by system

Smiths Detection - Watford Limited - CAM (Chemical Agent Monitor)

GENERAL DESCRIPTION:



CAM is a highly effective and easy to use CWA and TIC monitor. The auto switching feature gives CAM the added capability to continuously and automatically scan between Positive (nerve agent) and Negative (blister, blood and choking agent) modes. In applications where the threat of chemical agent is anticipated, CAM is used to monitor and confirm the type of agent used, as well as the concentration of the contamination. The unit can also be used post attached to monitor personnel, vehicles, equipment and terrain to assess the extent of cross contamination. Whether used in the military or civil environment CAM's ergonomic design and ease of use make it ideal for monitoring the effectiveness of decontamination measures. CAM can be used for Reconnaissance and search, confirmation monitoring, survey and sentry monitoring operations.

TECHNICAL DESCRIPTION:

CAM uses Ion Mobility Spectroscopy (IMS) and analysis software to match sample spectral results to stored libraries to classify, identify and quantify chemical warfare agents (CWAs) and toxic industrial chemicals (TICs).

CONTACT INFORMATION

Smiths Detection - Watford Limited
459 Park Avenue, Bushey, Watford, Herts, WD23 2BW
United Kingdom
+44 1923 658000
gmer.emea@smithsdetection.com
www.smithsdetection.com

COST

- N/A/system
- $0.48/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	Top Tier	N/A
MOBILE Laboratory	N/A	Second Tier	N/A
DIAGNOSTIC Laboratory	N/A	Second Tier	N/A
ANALYTICAL Laboratory	N/A	Second Tier	N/A

Notes

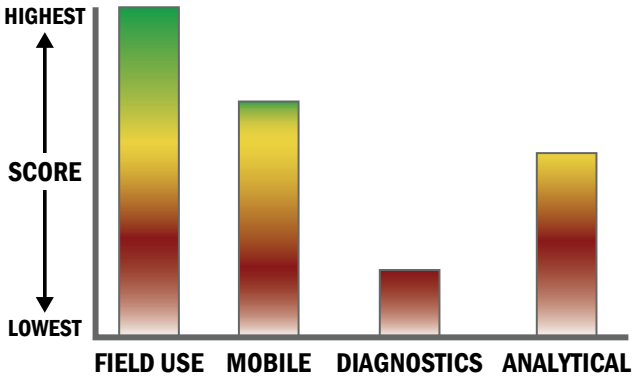
In wide spread use worldwide.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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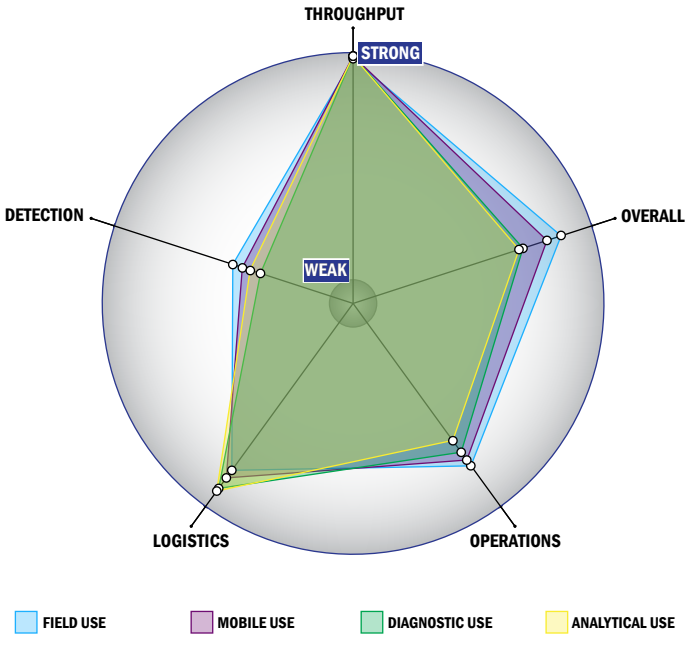


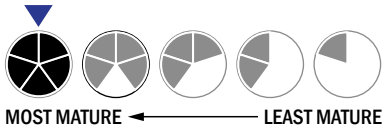
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

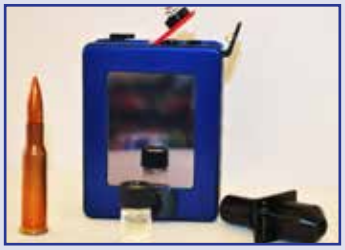
- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results cannot be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- >1x10$^{\wedge-3}$ mg/m^3
- System can currently identify aerosolized chemical agent

Snowy Range Instruments - CBEx Threat Identification System

GENERAL DESCRIPTION:



The CBEx based chemical and explosive identification system is constructed from the best components in a solid aluminum body for rugged long-lifetime usage. CBEx features short analysis times and easy to interpret results on its highly visible OLED touch screen. The resistive touch screen permits the use of the CBEx while dressed in the highest level of personal protection equipment (PPE). With a 10 hour operational time using 2 AA batteries the CBEx threat identification system offers flexibility in the field during long missions. CBEx features the unique Orbital Raster Scan (ORS™) technology developed by SnRI for the interrogation of light sensitive threat materials.

TECHNICAL DESCRIPTION:

The CBEx is a chemical and explosive identification system that employs Raman spectroscopy and spectral library matching software to identify and catalog chemical and explosives. The CBEx features the unique Orbital Raster Scan (ORS™) technology developed by SnRI for the interrogation of sensitive threat materials. The high speed movement of the laser spot in the ORS reduces the laser power density which reduces the potential of setting off explosives or destroying evidence.

CONTACT INFORMATION

Snowy Range Instruments
628 Plaza Lane
Laramie, WY 82070

COST

- $12,000/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

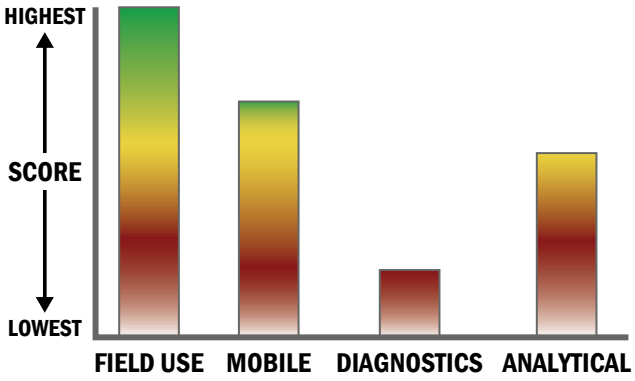
	Biological	Chemical	Radiological
FIELD USE System	N/A	●	N/A
MOBILE Laboratory	N/A	●	N/A
DIAGNOSTIC Laboratory	N/A	●	N/A
ANALYTICAL Laboratory	N/A	●	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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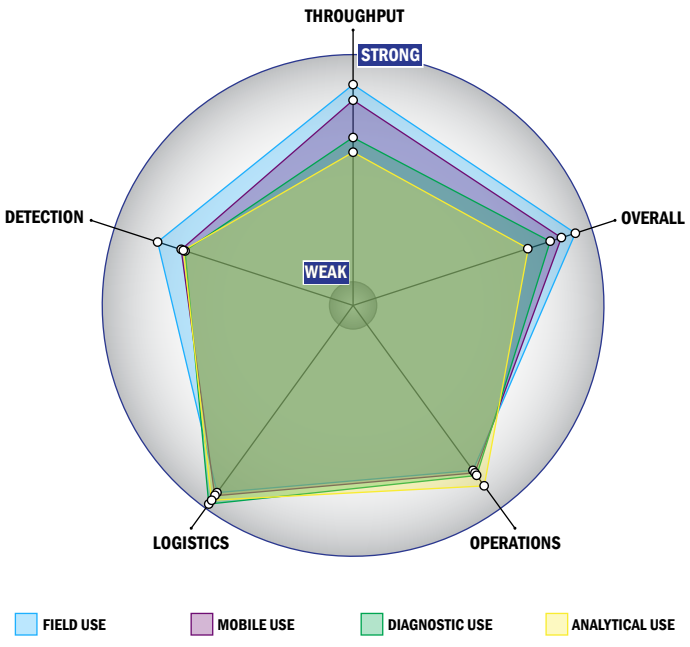


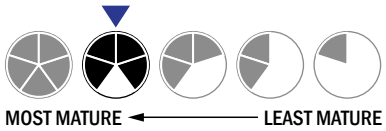
Evaluation Criteria

Throughput:

- Detection is instantaneous
- 1 sample, single test/sample per run
- 95-32 samples
- 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
- 0 components
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- 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
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 3-5 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 open but modification requires licensing

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
- Less than 50 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- $1x10^{-6}$-$3x10^{-5}$ mg/m^3
- 100 ppm–1 ppt
- Efforts underway to identify aerosolized chemical agent
- System can currently identify liquid chemical agent

Spearhead Innovations - PASS (Product Acoustic Signature System)

GENERAL DESCRIPTION:

PASS uses acoustic inspection technology to rapidly, reliably, and safely interrogate sealed, liquid-filled containers and bulk solid commodities to:



- Detect submerged contraband or hidden compartments
- Classify/Identify material contents (by name if in database)
- Expose containers/commodities that have been fraudulently labeled
- Flag containers with contents different from surrounding containers
- Determine container fill levels

Handheld and battery-operated, PASS is designed for fast and easy use on sealed containers of various sizes, including large jugs, propane tanks, 55-gallon drums, tanker trucks, and railroad cars. Since the device makes its determinations without opening containers, its handlers and the public are protected from potentially disastrous exposure to lethal or otherwise hazardous materials and vapors.

TECHNICAL DESCRIPTION:

PASS measures the speed of sound through an unknown material at a known distance and temperature. This acoustic velocity is compared with values in a database to identify or classify material. When a signal does not reach a known distance, contraband or a hidden compartment is indicated.

CONTACT INFORMATION

Spearhead Innovations
191 Main Street
Annapolis, MD 21401
POC: Debbie DeBenedictis

COST

- $32,995/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

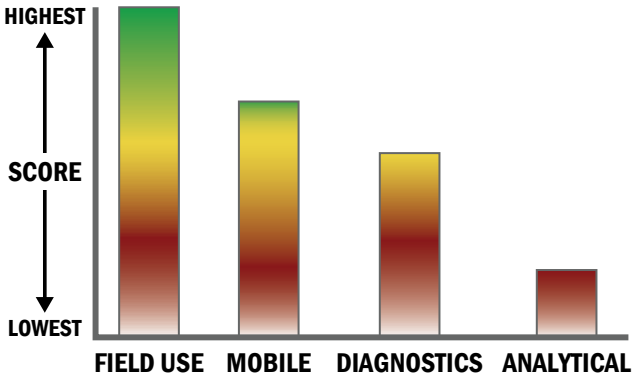
	Biological	Chemical	Radiological
FIELD USE System	N/A	Top Tier	N/A
MOBILE Laboratory	N/A	Second Tier	N/A
DIAGNOSTIC Laboratory	N/A	Fourth Tier	N/A
ANALYTICAL Laboratory	N/A	Fourth Tier	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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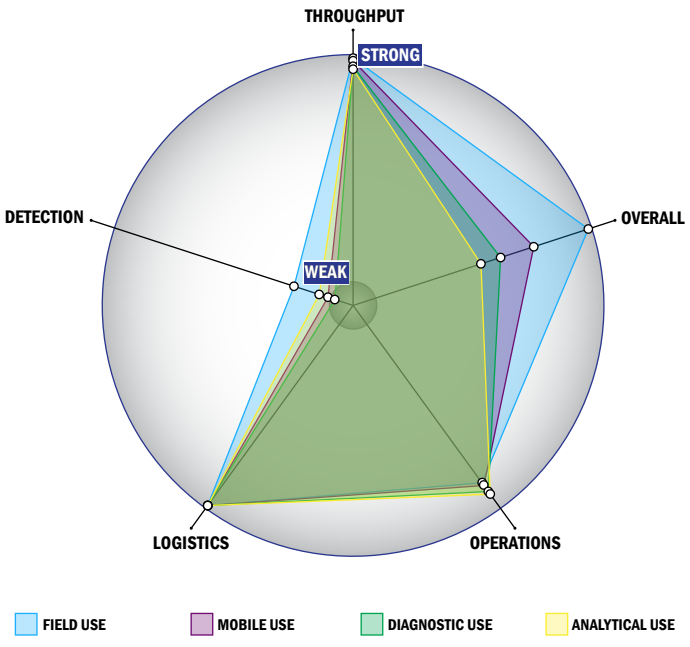


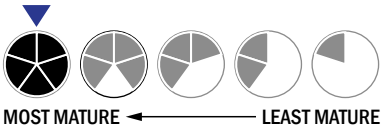
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- Greater than 750 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
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Less than 1 kg
- Satellite, 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
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- Less than 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- System currently can identify liquid chemical agent

Syft Technologies, Inc. - Voice200

GENERAL DESCRIPTION:

The Voice200 is a Selected Ion Flow Tube Mass Sprectrometer designed for both lab use and first responder use. It can measure TICs, TIMs, Explosives, CWAs, as whole air,breath and head space analysis down to parts per trillion ranges with little or no sample prep and in Real Time.



TECHNICAL DESCRIPTION:

Voice200 takes ionized air through upstream quadrupole and filters all ions (except H3O+, NO+ and O2+) which are sequentially routed to flow tube every 20 milliseconds where the ions react with the analyte in a soft chemical first order reaction. The reaction products enter a downstream quadrupole where they are filtered again before being detected by a particle counter. The results are quantified in Real Time. The system can differentiate all isobars and some isomers, based on the use of the three precursor ions. Both SIM and Scan modes are possible and system can be operated by non-scientific operator.

CONTACT INFORMATION

Syft Technologies, Inc.
1525 Park Manor Blvd, Suite 272
Pittsburgh, PA 15205
POC: Wesley Kenneweg
412-996-5915

COST

- $225,000/system
- $10-$20/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

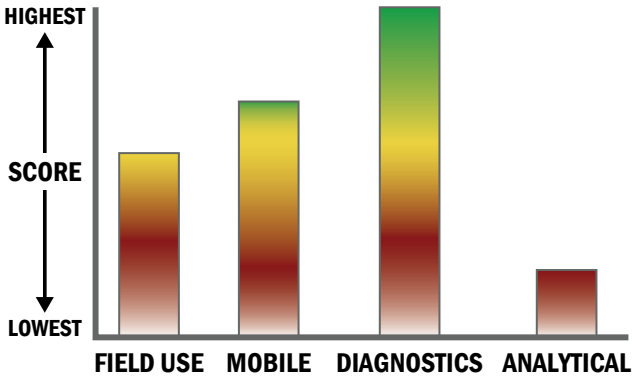
	Biological	Chemical	Radiological
FIELD USE System	N/A	Fourth Tier	N/A
MOBILE Laboratory	N/A	Third Tier	N/A
DIAGNOSTIC Laboratory	N/A	Second Tier	N/A
ANALYTICAL Laboratory	N/A	Top Tier	N/A

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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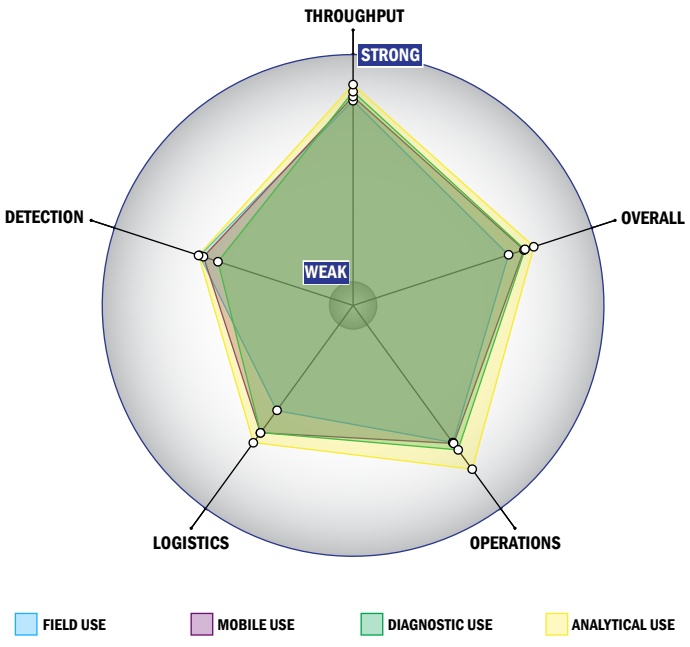


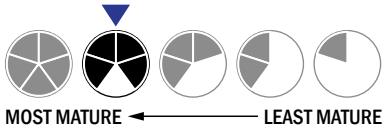
Evaluation Criteria

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 or device is currently fully automated
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 2 components
- 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 home dishwasher
- More than 50 kg
- Satellite, wireless and wired connections are available
- System or device has 220V electrical requirement



Operations:

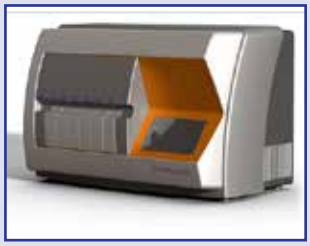
- Can be used from 4 °C to 37 °C
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

Detection:

- Less than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- $1x10^{-6}$ - $3x10^{-5}$ mg/m^3
- <1 ppb
- Possible system could identify liquid chemical agent

T2 Biosystems - T2Dx

GENERAL DESCRIPTION:



T2's revolutionary new technology is based on clinically-proven magnetic resonance MR technology, and uses nanoparticles coupled with reagents to quickly detect—within minutes—the presence of specific substances in solution using a miniaturized, portable MRI instrument. Detection of the high level magnetic resonance signal from the solution enables the detection of low concentrations of target agents or substances. Unlike most existing diagnostic detection techniques which are based on optical detection methods that require pure samples and multiple processing steps, T2's technology is not optical and therefore does not require purification of biological samples. This significant advantage allows the T2 system to perform single-step processing and rapid turnaround times without the need for trained technicians. Furthermore, the technology can accurately identify almost any specimen, including proteins, nucleic acids, or enzymes; bacterial, cancer or other cells; viruses; or small molecule drug compounds within almost any sample, including whole blood, plasma, serum and urine. T2's system is faster, more reliable, more portable and more readily accessible than any diagnostic testing system now on the market.

TECHNICAL DESCRIPTION:

Compact, rugged, non-optical detection of immunoassay and nucleic acid assay targets, directly in unprocessed samples.

CONTACT INFORMATION

T2 Biosystems
101 Hartwell Avenue
Lexington, MA 02421

COST

- $5,000 - $50,000/system
- $5/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

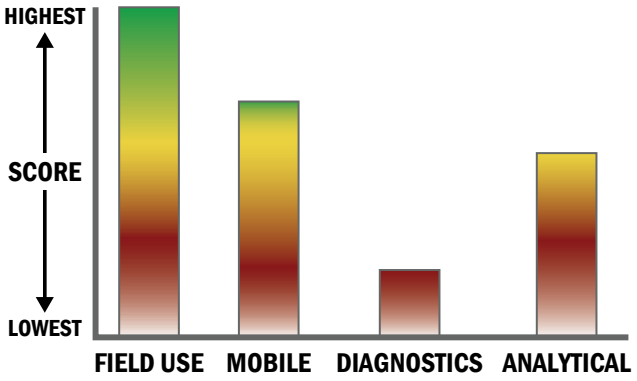
	Biological	Chemical	Radiological
FIELD USE System	Top Tier	Second Tier	N/A
MOBILE Laboratory	Top Tier	Top Tier	N/A
DIAGNOSTIC Laboratory	Second Tier	Second Tier	N/A
ANALYTICAL Laboratory	Top Tier	Second Tier	N/A

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

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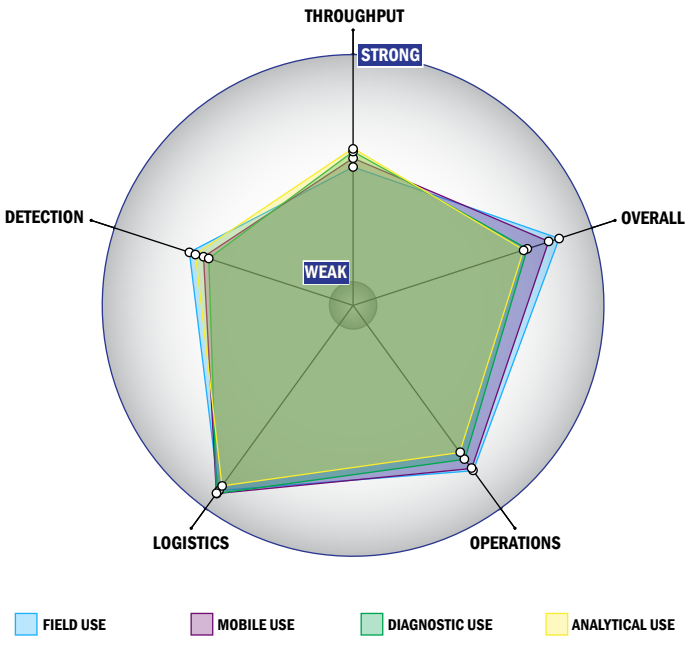


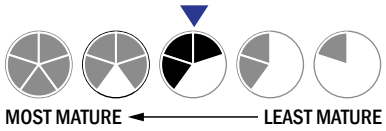
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 4 solutions, buffer, eluents, and/or reagents
- 1 component
- Greater than 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 toaster
- Between 1 and 5 kg
- Satellite, wireless and wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 1-3 years expected life
- Results cannot be viewed in real-time
- The system could be adapted to a fully autonomous system with some effort
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

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
- Less than 10 µL
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL
- Fully automated spore lysis
- < $1x10^{-6}$ mg/m^3
- < 1 ppb

Technical Associates - Carbon14 Air Monitor

GENERAL DESCRIPTION:



The Carbon14 Air Monitor is a sensitive, rugged, and portable instrument for detection and measurement of airborne C14. It is line operated with nominal 20 hour battery back-up. Optional inlet and outlet hoses allow monitoring interiors of fume hoods, exhaust stacks, etc. Features include: user settable units - uci/l or bq/m3 etc; wide range - digital accuracy; programmable digital readout; sensitive for occupational exposure dynamic background compensation; battery operation or ac operation; built-in high level alarm; built-in low flow alarm; built-in RS-232 computer interface. End Users: nuclear power plants, coal fired power plants, pharmaceutical labs, universities.

TECHNICAL DESCRIPTION:

The Carbon14 Air Monitor subtractive balanced chamber electrometer circuit decreases background effects to negligible levels and its deionized and filtered intake minimizes spurious effects from smoke, dust and existing ionization in the air. It will measure airborne C14 as CO2 gas or as volatile chemicals in concentrations as low as 1 x 10-4 uCi/l of air (3.7KBq/m^3). Electrometer circuit amplifies net difference between 0.7 liter tritium internal chamber and sealed background chamber of similar configuration. Battery Check, Set (calibration aid), Zero Adjust, Meter Programming. Internal or external calibration options.

CONTACT INFORMATION

Technical Associates
7051 Eton Ave.
Canoga Park, CA 91303
POC: Robert Goldstein, President
818-883-7043
www.tech-associates.com

COST

- $7,950/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

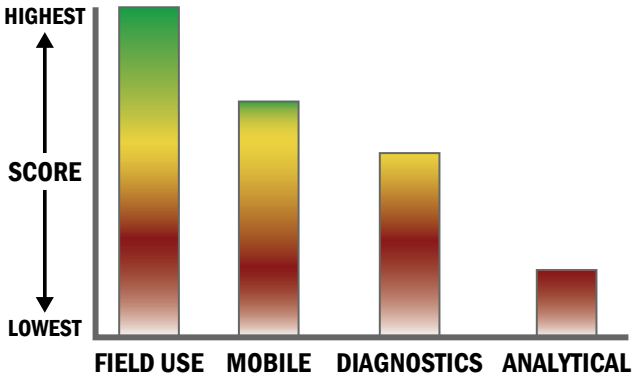
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Third Tier
MOBILE Laboratory	N/A	N/A	Third Tier
DIAGNOSTIC Laboratory	N/A	N/A	Fourth Tier
ANALYTICAL Laboratory	N/A	N/A	Fourth Tier

Survey Source

Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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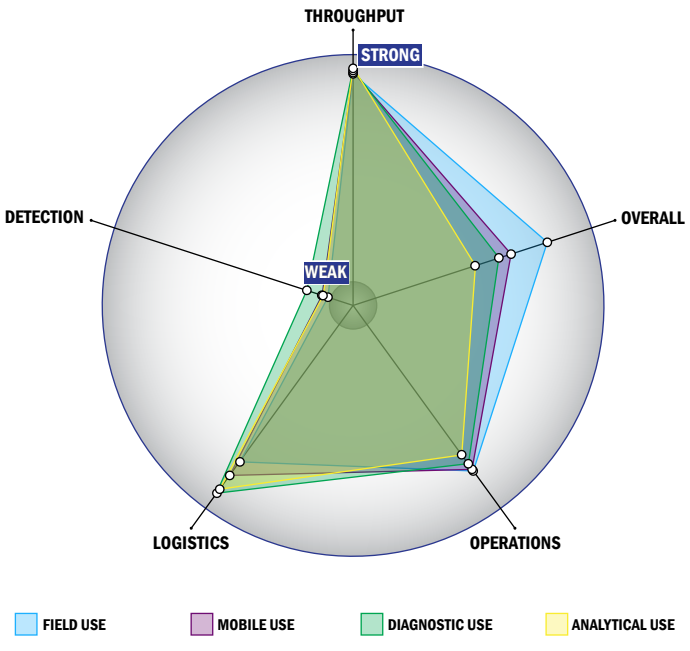


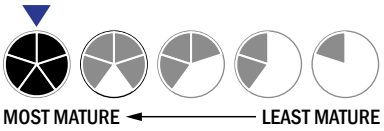
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/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
- 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 toaster
- Between 5 and 25 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Performance is not influenced by relative humidity
- 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 does not employ any software
- The system hardware is open and 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
- System is used for area air sampling

Technical Associates - Hydrofracking Radiation Portable Water Monitor

GENERAL DESCRIPTION:

Hydrofracking releases trapped radiation from underground formations into mobile water flow, including groundwater, or industry generated wastewater, sludge, or brine and surrounding soil.



The Hydrofracking Radiation Portable Water Monitor, Meda-SP, is a small light weight field monitor for on the spot measurement of water or soil samples.

Quick detection of radiation contamination in water and soil generated by the hydrofracking process:

- Alpha, Beta, and Gamma emitters; Uranium, Radium, Potassium, and Thorium in water samples
- Hydrofracking wastewater, sludge and brine; Roadside Chemical Spill; Industrial Accident; Improper Dumping of Industrial Waste.
- Easy detection of surface contamination-alpha, beta, gamma; hands, boots, clothing and equipment
- Identify personnel needing decontamination

End Users: Oil and Gs Industry, First Responders, state and federal health agencies, citizen groups, municipal utilities.

TECHNICAL DESCRIPTION:

The Hydrofracking Radiation Portable Water Monitor features an internally mounted 2 inch pancake GM detector with window looking downward from bottom of case and an external crystal scintillation probe for detection of low energy gammas. Alpha, beta, and gamma emitters are detected. A sliding shield protects pancake detector when not in use. This system is half the weight of other systems. Submersible sensor probes for reservoir, stream or sump provide additional diversity.

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

CONTACT INFORMATION

Technical Associates
7051 Eton Ave.
Canoga Park, CA 91303
POC: Robert Goldstein, President
818-883-7043
tagold@nwc.net
www.tech-associates.com

COST

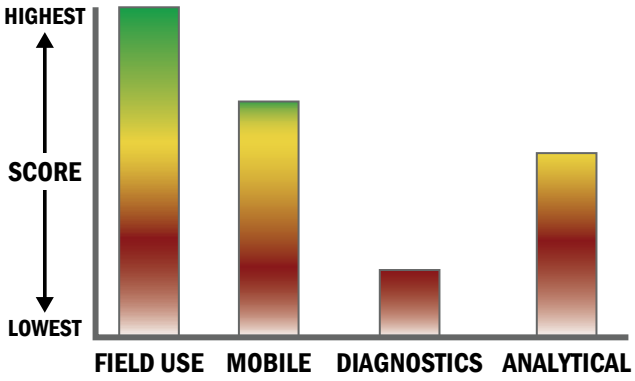
- $3,720/system
- <$1/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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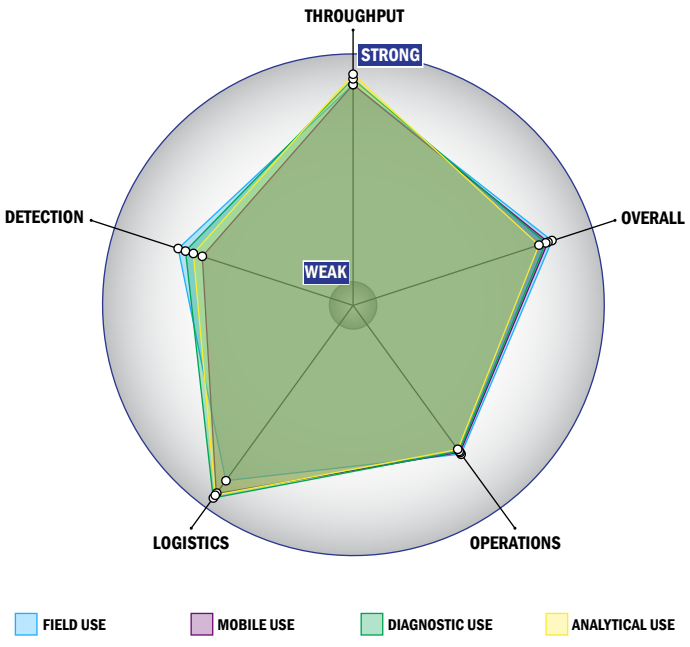


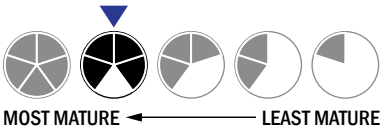
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- 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
- No set-up of the system is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Less than 1 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- 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 does not employ any software
- The system hardware is open and available for modification

Detection:

- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Only total dose and dose rate
- Down to background level radiation for dose rate
- System is used for surveying

Technical Associates - Hydrofracking Radium Portable Water Monitor System

GENERAL DESCRIPTION:

Many communities already face high levels of Radium in their well water. Hydrofracking releases trapped radiation, including Radium, from underground formations into mobile water flow, including groundwater, or industry generated wastewater, sludge, or brine. With current trends for hydrofracking the urgency for testing Radium levels has increased.



The Hydrofracking Radium Portable Water Monitor System, Radium-TA, provides quick on-site detection of Radium generated by the hydrofracking process, in groundwater, well water and in hydrofracking wastewater, sludge and brine.

- Also detects Alpha emitters in water samples
- In situ testing prevents the expense and lag time of sending in samples for laboratory testing.
- Roadside Chemical Spill; Industrial Accident; Improper Dumping of Industrial Waste.

End Users: Oil and Gas Industry, First Responders, state and federal health agencies, citizen groups, municipal utilities.

TECHNICAL DESCRIPTION:

The Hydrofracking Radium Portable Water Monitor System includes multiple components: a pump with a radium collection cell, and a scintillation detector with a scaler. A two-step process is involved:

- Water is pulled through the collection cell for a standard period of time.
- The scintillator/scaler receives the sample and counts the activity.

Note: A longer pull time increases sensitivity and gives a sensitivity measurement down to 1 picoCi/liter.

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	Third Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Bottom Tier
ANALYTICAL Laboratory	N/A	N/A	Bottom Tier

CONTACT INFORMATION

Technical Associates
7051 Eton Ave.
Canoga Park, CA 91303
POC: Robert Goldstein, President
818-883-7043
tagold@nwc.net
www.tech-associates.com

COST

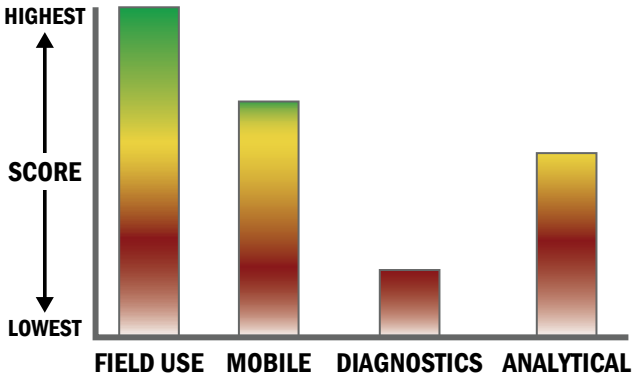
- $30,540/system
- $10/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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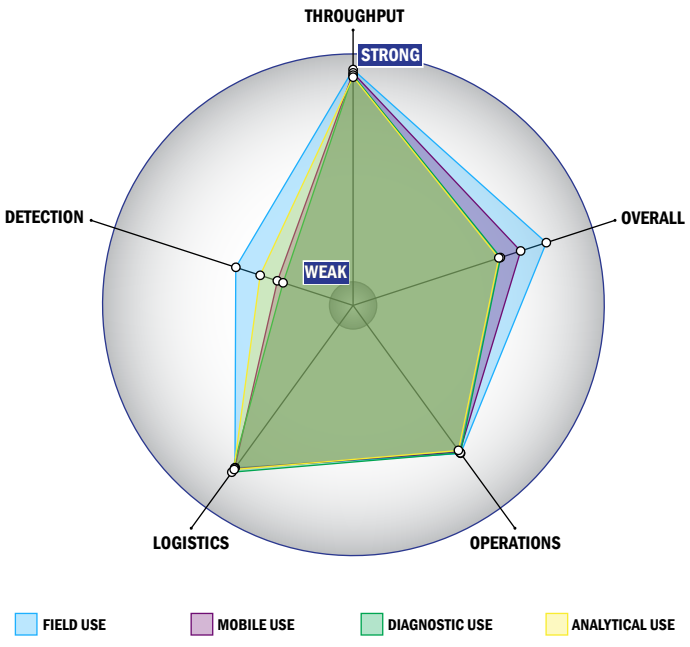


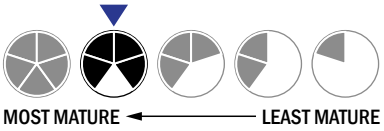
Evaluation Criteria

Throughput:

- Greater than 8 hours for detection
- 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
- 0 components
- 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
- Between 5 and 25 kg
- Satellite and wired connections are available
- System or device has 110V electrical requirement
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- 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 does not employ any software
- The system hardware is open and available for modification

Detection:

- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Only count rate
- Down to background level radiation for count rate
- System is used for surveying

Technical Associates - Hydrofracking Radon Portable Air & Gas Monitor

GENERAL DESCRIPTION:



Radon gas is a common problem especially in closed places. Hydrofracking releases Radon gas which then works its way to the soil surface and then into basements and buildings. Additionally Radon gas finds its way into the gas pipeline. These avenues of escaping Radon gas cause hazardous conditions for people and animals. The need for testing has increased with the advent of hydrofracking technology. The Hydrofracking Radon Portable Air & Gas Monitor, PTG-9-RN, is a sensitive rugged, portable instrument for quick and immediate detection and measurement of airborne Radon.

End Users: Oil and Gas Industry, Building Inspectors, state and federal health agencies, small labs, citizen groups, municipal utilities.

TECHNICAL DESCRIPTION:

The Hydrofracking Radon Portable Air & Gas Monitor utilizes a subtractive balanced chamber electro - meter circuit decreasing background effects to negligible levels. Its ionized and filtered intake reduces to negligible levels spurious effects from smoke, dust and existing ionization in the air. Inlet and outlet hoses allow monitoring interiors of fume hoods, exhaust stacks, etc. The PTG-9-A-RN will measure airborne radon as free Radon gas (with or without Radon Daughters at users option) as low as 1 pCi/l.

CONTACT INFORMATION

Technical Associates
7051 Eton Ave.
Canoga Park, CA 91303
POC: Robert Goldstein, President
818-883-7043
tagold@nwc.net
www.tech-associates.com

COST

- $9,211/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

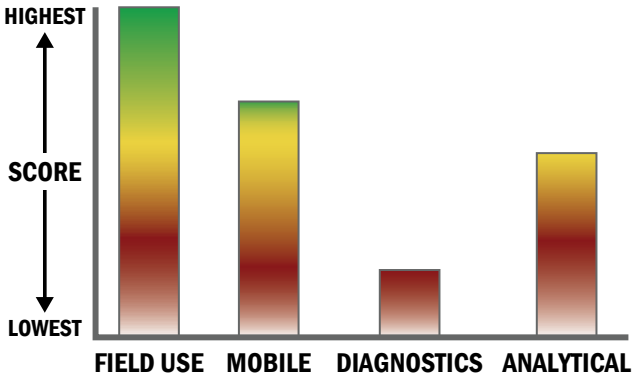
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Top Tier
MOBILE Laboratory	N/A	N/A	Second Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Second Tier

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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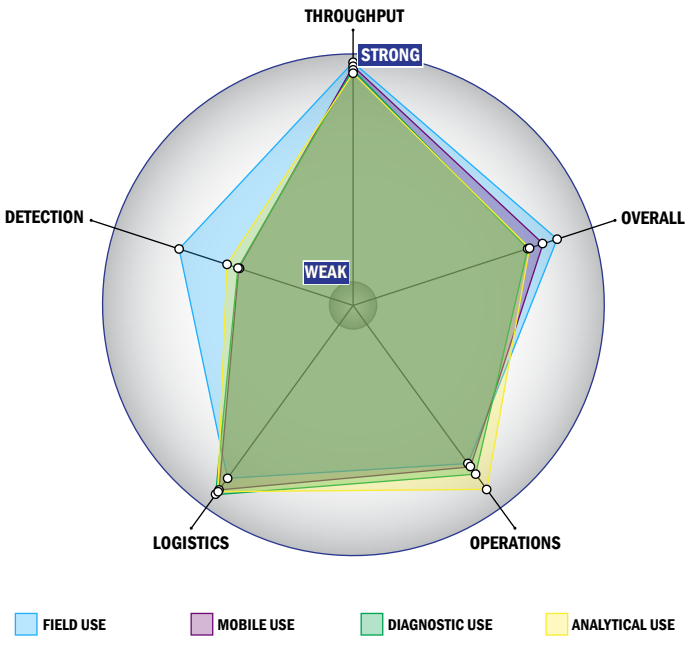


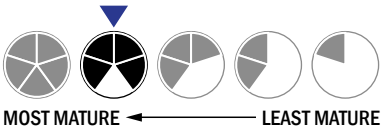
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- 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
- 0 components
- No set-up of the system 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 1 and 5 kg
- Satellite 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
- 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 and available for modification
- The system hardware is open and available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Only total dose and dose rate
- Down to background level radiation for dose rate
- System is used for area air sampling

Technical Associates - Hydrofracking Radon Portable Water Monitor System

GENERAL DESCRIPTION:



Hydrofracking releases trapped radiation, including Radon, from underground formations into mobile water flow, including groundwater, or industry generated wastewater, sludge, or brine.

Hydrofracking Radon Portable Water Monitor System, Radon-7, provides quick detection on site of Radon contamination generated by the hydrofracking process in groundwater, wastewater, sludge, and brine:

- Also detects Alpha emitters and Thorium in water samples
- Portable instrumentation provides quick response for: Roadside /Chemical Spill; Industrial Accident; Improper Dumping of Industrial Waste.

End Users: Oil and Gas Industry, First Responders, state and federal health agencies, citizen groups, municipal utilities.

TECHNICAL DESCRIPTION:

The Hydrofracking Radon Portable Water Monitor System operates with a continuous water flow through the lower section of the sample head. Some of the suspended Radon gas escapes from the water due to its vapor pressure. If desired, the amount of, Radon escaping can be increased by heating, agitating, bubbling, etc. The resulting radon gas is detected by the alpha scintillation in the upper chamber. The count rate from the alpha scintillator detector is displayed on the alarming AC-DC Ratemeter. Alarm levels are user specified.

The Hydrofracking Radon Portable Water Monitor System includes:

- Sample Head, FLO-9
- Alpha Scintillator, PAS-8
- Alarming Ratemeter, LAM-10

CONTACT INFORMATION

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818-883-7043
tagold@nwc.net
www.tech-associates.com

COST

- $9,636/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

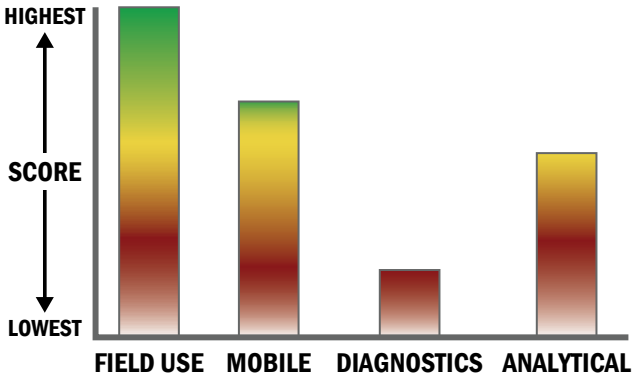
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	
MOBILE Laboratory	N/A	N/A	
DIAGNOSTIC Laboratory	N/A	N/A	
ANALYTICAL Laboratory	N/A	N/A	

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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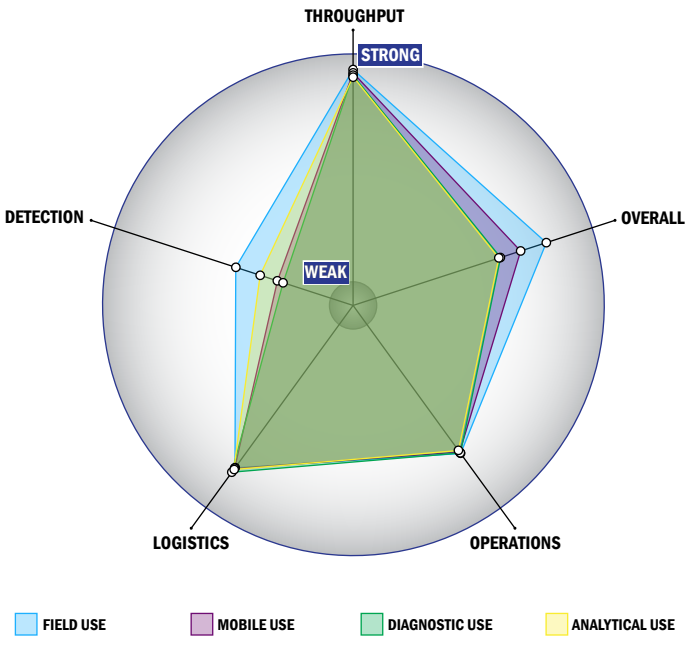


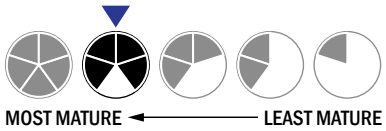
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Continuous operation with no defined runs
- 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
- 0 components
- No set-up of the system is required for set-up
- Automatic detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a toaster
- Between 1 and 5 kg
- This system is not capable of transmitting data
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Performance is not influenced by relative humidity
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system does not employ any software
- The system hardware is open and available for modification

Detection:

- Greater than 250 µL
- Fair specificity. System has a consistent level of false alarms (5-10%)
- Only dose rate
- Down to background level radiation for dose rate
- System is used for surveying

Technical Associates - Military Water Safety Test System - Portable

GENERAL DESCRIPTION:



Military personnel endure dangerous conditions including drinking water during deployment. The armed services have strict rules for testing water to ensure portability. The radiation tests are rigorous. The Military Water Safety Test System –Portable, SSS-22RLX, measures water to these requirements as proven in U.S. Army testing conducted at White Sands Missile Base.

The portable Military Water Safety Test System has on-board data log capability for easy export and PC interface with hard copy printer are optional. The Military Water Safety Test System has a 3 Vial capacity for faster thru-put and easy comparison sample to calibration standard or to background. This is an all-in-one unit thus enhancing portability.

End Users: U.S. military drinking water quality units, state and federal health agencies, small labs.

TECHNICAL DESCRIPTION:

The Military Water Safety Test System accurately quantitatively measures all Beta emitters, including Tritium below 10,000pC/L andCarbon-14 and low energy Gamma and Alpha emitters. The most sensitive method of detecting and quantitating beta emitting isotopes is to mix the sample with liquid scintillation fluor and count each individual scintillation event with a photomultplier counter. Scintillation counts detected by PM tubes are processed by a fully adjustable single channel analyzer centered on the energy peak of the isotope being measured. Followed by an energy analyzer which further selects the pulses and delivers the true signal. Detection cell optically coupled to selected photomultiplier tube. A 3 Vial capacity provides a faster thru-put and easy comparison sample to calibration standard or to background.

The Military Water Safety Test System deletes both higher energy pulses from background radiation and lower energy counts from the PM tube or circuit noise. The pulses are then fed to a digital scaler and optional digital printer. (Thus allowing long count times for measurement of very minute samples as well as completely eliminating artifacts caused by rate meter time constants.) Optional USB interface to most scientific or personal computers or data stations.

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

Survey Source

N/A

CONTACT INFORMATION

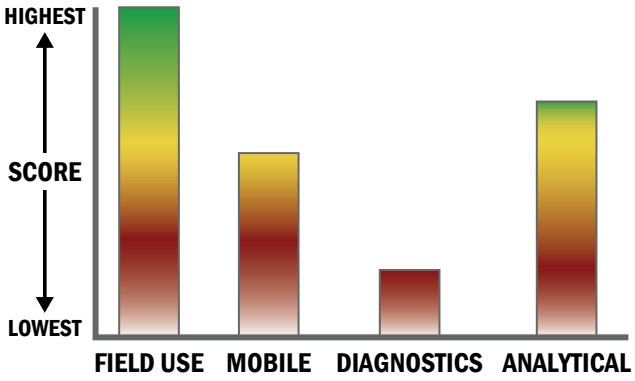
Technical Associates
7051 Eton Ave.
Canoga Park, CA 91303
POC: Robert Goldstein, President
tagold@nwc.net 818-883-7043

COST

- $23,400/system
- $5/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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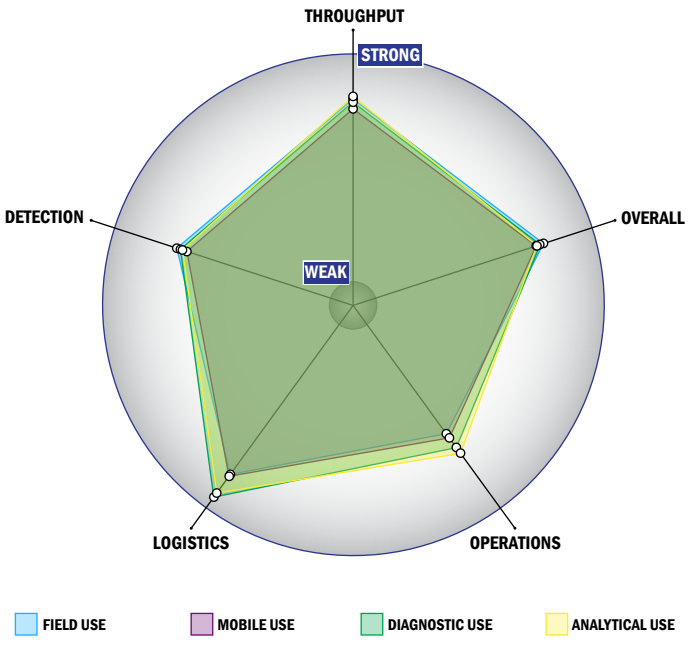


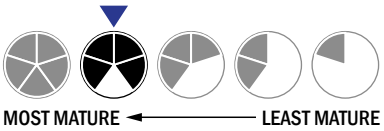
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple 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
- 0 components
- Less than 5 minutes is required for set-up
- 3-5 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 1 and 5 kg
- Satellite and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Only total dose and dose rate
- Down to background level radiation for dose rate
- System is used for surveying

Technical Associates - Nanosecond X-Ray Detector

GENERAL DESCRIPTION:



The Nanosecond X-Ray Detector will accurately measure the integrated total dose from pulsed x-ray machines over a wide range of pulse widths and repetition rates. This monitor also measures low energies and short pulses that other survey meters ignore to the detriment of worker health. Digital readout: 6 digit-rate, 8 digits integrate dose rate and total dose read out, flat response. Sealed air ion chamber sees axially below 5 KeV gamma or x-ray. Detects beta, gamma, x-ray, positrons with a fast response and wide range. Especially useful in Non-Destructive Testing or other Industrial or Medical applications where pulsed x-rays are used. End Users: US Military, Hospitals, Aircraft and Other Manufacturing.

TECHNICAL DESCRIPTION:

The Nanosecond X-Ray Detector consists of a 2" diameter air ion chamber coupled to a stable solid state MOSFET input electrometer with built in A to D converter to read out directly in mR/h or total mR. Rate range is 0.01 R/h to 100 R/h in a single range. Dose range is 0.001R - 100R in a single range. Other Ranges are also available. Options include: Other Rate or Integrated Ranges; Other Readout Units such as Si units: Sv and Sv/h.

CONTACT INFORMATION

Technical Associates
7051 Eton Ave.
Canoga Park, CA 91303
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818-883-7043
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www.tech-associates.com

COST

- $3,500/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

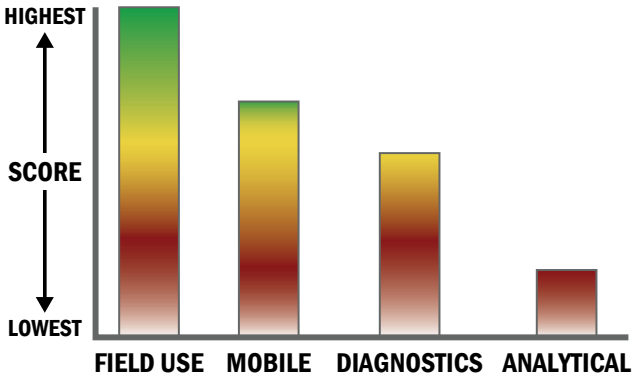
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Second Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Bottom Tier
ANALYTICAL Laboratory	N/A	N/A	Bottom Tier

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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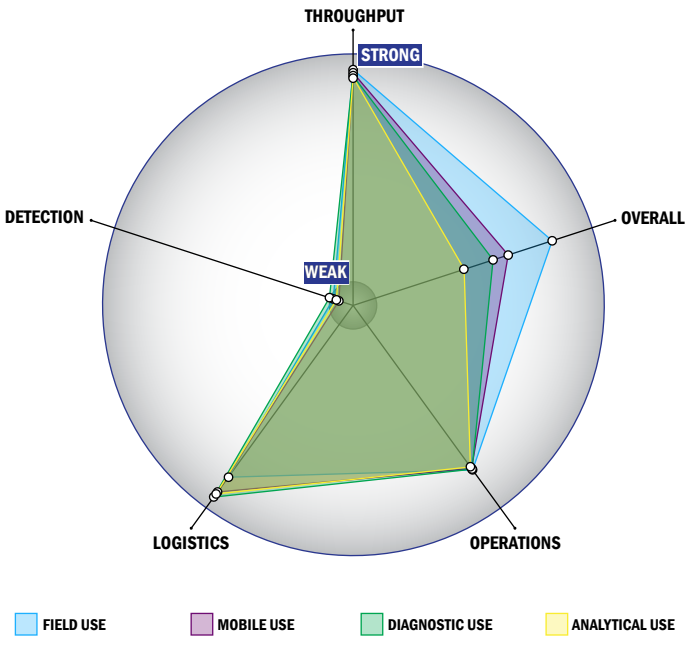


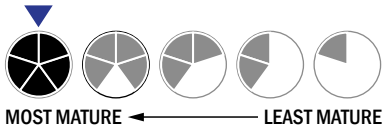
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- 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 intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Between 1 and 5 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system does not employ any software
- 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
- System is used for surveying

Technical Associates - Portable Liquid Scintillation Counter

GENERAL DESCRIPTION:



The Portable Liquid Scintillation Counting System accurately quantitatively measures Carbon-14, Tritium and most other radioactive materials. Gamma ray counting is optional. PC interface and hard copy printer are optional. The Portable Liquid Scintillation Counter has a 3 Vial capacity for faster thru-put and easy comparison sample to calibration standard or to background. This is an all-in-one unit thus enhancing portability. End Users: state and federal health agencies, nuclear power plants, small labs, us military drinking water quality units, citizen groups, municipal utilities.

TECHNICAL DESCRIPTION:

Using the most sensitive method of detecting and quantitating beta emitting isotopes mixing the sample with liquid scintillation fluor and counting each individual scintillation event with a photomultplier counter. An energy analyzer further selects the pulses and delivers the true signal. Optionally, gamma ray counting is achieved by inserting and optically coupling an NaI(Tl) scintillation well crystal on the PM tube. Scintillation counts which are detected by PM tubes are processed by a fully adjustable single channel analyzer which is centered on the energy peak of the isotope being measured.

CONTACT INFORMATION

Technical Associates
7051 Eton Ave.
Canoga Park, CA 91303
POC: Robert Goldstein, President
818-883-7043

COST

- $11,500/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

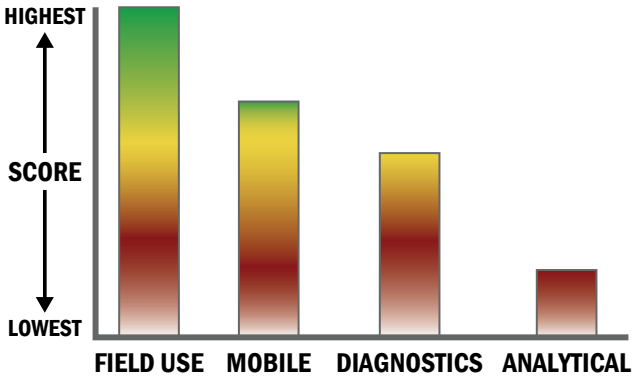
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Bottom Tier
MOBILE Laboratory	N/A	N/A	Bottom Tier
DIAGNOSTIC Laboratory	N/A	N/A	Third Tier
ANALYTICAL Laboratory	N/A	N/A	Bottom Tier

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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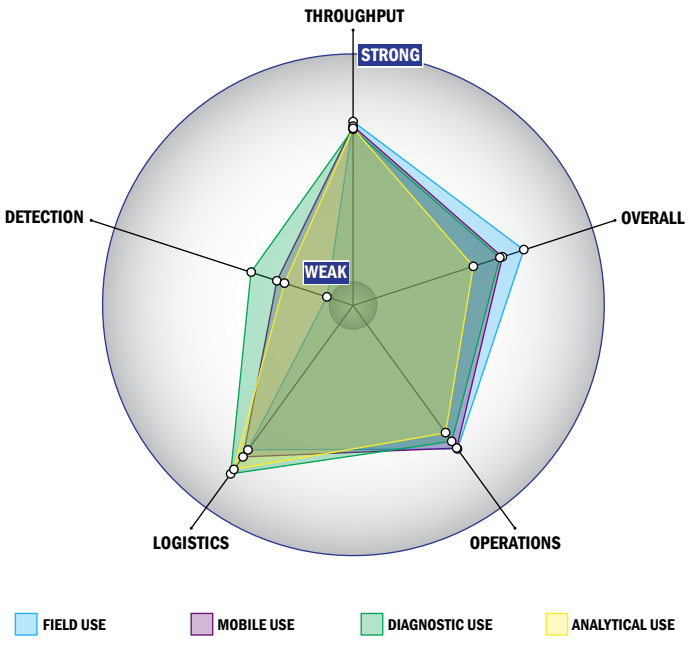


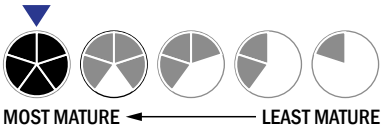
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- 349-96 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
- Less than 5 minutes is required for set-up
- 3-5 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 5 and 25 kg
- 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 room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system hardware is open and 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
- Greater than 250 µL
- Only count rate
- System is used for surveying

Technical Associates - Radiation Control Monitor

GENERAL DESCRIPTION:

The Radiation Control Monitor can be tailored to at least 50 configurations meeting a variety of objectives in monitoring radioactivity including:



- Exit/doorway monitor
- Package/mail monitor
- Vehicle monitor
- Laundry monitor

To maintain control of radioactive materials it is absolutely essential to control and to know when and where radioactivity is entering or leaving the area where it is used. The Radiation Control Monitor consists of:

- Multi-channel systems
- Highly sensitive (50 detector models)
- Alarms with detection of radiation
- Relay control can lock doors and trigger a Siren or autodialer or e-mail

Two of the many radiation control monitor systems are high sensitivity monitors which are easily placed at entrance and exits and other strategic locations.

TECHNICAL DESCRIPTION:

The Radiation Control Monitor includes:

- Engineering Units: User can input correct conversion factor and change to any units.
- Controls: Front Panel: On-Off, Alarm-mute, Rate, Integrate, Reset.
- Recessed or Internal: Discriminator level, high voltage.
- Detectors: Any GM or alpha, beta, gamma or neutron scintillator. Over 50 probes and sample detectors to choose from.
- Input Sensitivity: Adjustable from less than 1 millivolt to 100 millivolt
- Anti-saturation and Dead-time Corrections are available.
- Power: 105-125 volts, 50-60 Hz (220 V optional)

CONTACT INFORMATION

Technical Associates
7051 Eton Ave.
Canoga Park, CA 91303
POC: Robert Goldstein, President
818-883-7043

COST

- $9,500-$60,000/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

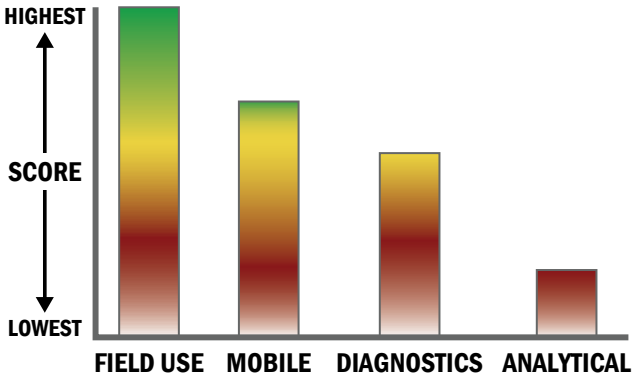
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Fourth Tier
MOBILE Laboratory	N/A	N/A	Third Tier
DIAGNOSTIC Laboratory	N/A	N/A	Third Tier
ANALYTICAL Laboratory	N/A	N/A	Fourth Tier

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

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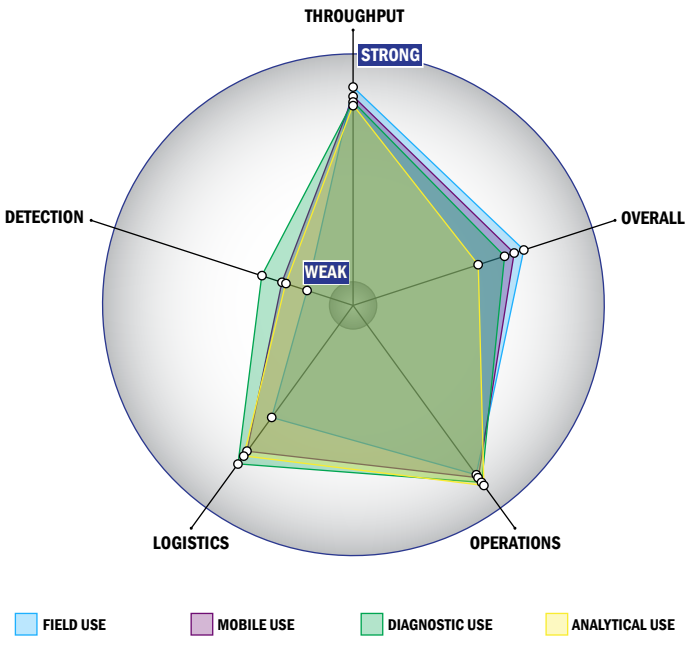


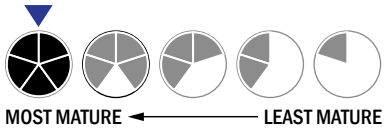
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, <10 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
- 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 carry-on luggage suitcase
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °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
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- System is used for area air sampling

Technical Associates - Radiation Survey Meter and Surface Monitor

GENERAL DESCRIPTION:



The Radiation Survey Meter and Surface Monitor's small size, light weight, one hand operation, digital display, built in speaker, and large detector area make this a very useful monitor for surveying bench tops or checking hands and clothes for almost any radioactive contamination. It is also available with the mR/hour Scale, uSv/hscale Counts Per Minute Scale or Both Scalers (upon request). End Users: Fire Department, Ambulance, Police, First Responders and U.S Custom Personnel use for surveying people, cars, luggage, surface of room, etc.

TECHNICAL DESCRIPTION:

The Radiation Survey Meter and Surface Monitor is a Small Digital Ratemeter with built in 2" diameter pancake tube and speaker. Reads out in mR/hr (or counts per minute). Thin window recessed and protected by sturdy grill. Additionally TBM-3SR-D has sliding methacrylate beta shield which also acts as additional protection for thin GM tube window. Instrument will see alpha, beta and gamma radiation. Anti-saturation circuit will not fall below full scale in high fields. Tested to 100R/h. It is also available with the mR/hour Scale, uSv/hscale Counts Per Minute Scale or Both Scalers (upon request).

CONTACT INFORMATION

Technical Associates
7051 Eton Ave.
Canoga Park, CA 91303
POC: Robert Goldstein, President
tagold@nwc.net 818-883-7043

COST

- $585/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

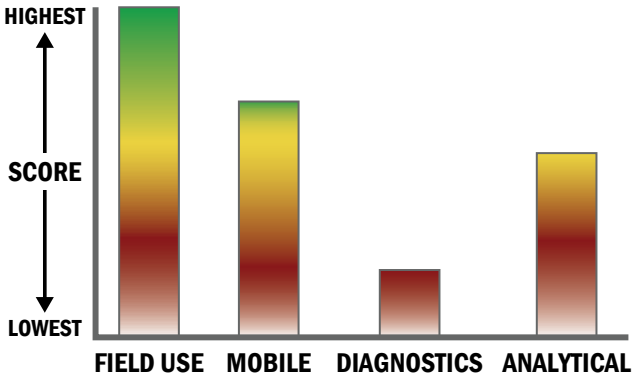
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Second Tier
MOBILE Laboratory	N/A	N/A	Second Tier
DIAGNOSTIC Laboratory	N/A	N/A	Second Tier
ANALYTICAL Laboratory	N/A	N/A	Third Tier

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

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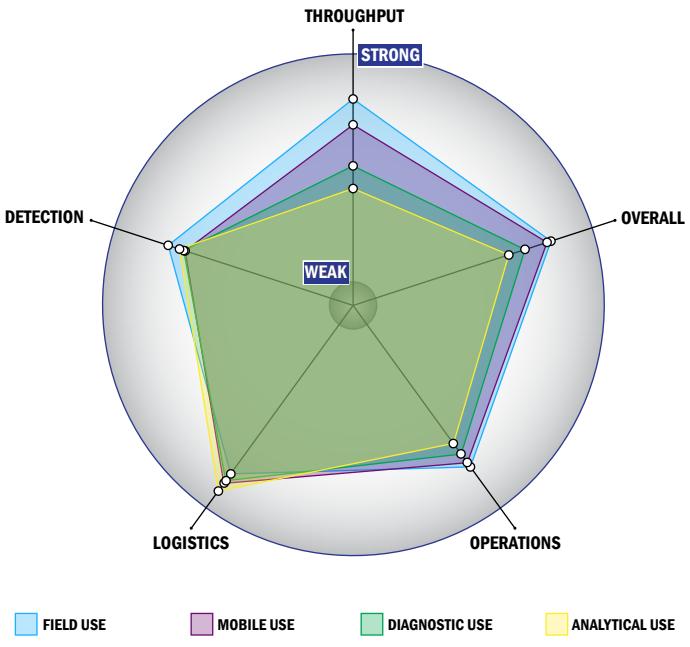


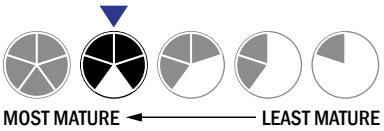
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, <10 tests/sample per run
- 95 - 32 samples every 2 hours
- The system or approach is not amenable to full or semi-automation
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from -21°C to 41°C
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Total dose, dose rate and count rate with operator selection to show the display, may differentiate between types of radiation
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for area air sampling

Technical Associates - Ship Ballast CBRN Solar Powered Water Monitor - Portable

GENERAL DESCRIPTION:



Contamination of oceans and freshwater ports is a worldwide problem. Ships take on ballast water, including local microorganisms and other pollutants native to the departure location. Ballast release takes place during the voyage or at the destination port releasing these transplanted microorganisms and toxins into a new environment.

The Ship Ballast CBRN Solar Powered Water Monitor – Portable, MiniTect, contains 20 sensors detecting radiation, microorganisms, and chemicals.

- All in one system - portable, solar powered system – suitcase or backpack models.
- Measures down to military drinking water standards.
- 4-10 radiation tests provided
- 7 major chemical tests provided
- Large number of microbes detected
- Real time, in-line, continuous, true fail safe design with alarm to alert operator to manually shut the ballast release valve.
- No reagents required
- Portable, easy installation and use

End Users:

- Ship board use: Military/Civilian/Commercial

TECHNICAL DESCRIPTION:

Technical Description The Ship Ballast CBRN Solar Powered Water Monitor - Portable.

A fully automated proprietary system. Detects/measures: alphas, betas and gammas; Tritium; Radon; Radium; and Uranium. Detects chlorine, nitrogen, TOC, microbes, and chemicals.

Portable inlet pipe for use in various locations. Included pump pulls the sample into the specific measurement cells, and then ejects the sample back to the source or to drain or storage tank. Frequency of sampling is operator's discretion. Sample size is 1 liter per minute. Data inputs directly to built-in computer with special application software and digital readout. Suitcase model is built into water tight shock proof pelican case.

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	Top Tier	Second Tier	Second Tier
MOBILE Laboratory	Fourth Tier	Fourth Tier	Third Tier
DIAGNOSTIC Laboratory	Fourth Tier	Bottom Tier	Third Tier
ANALYTICAL Laboratory	Fourth Tier	Bottom Tier	Third Tier

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

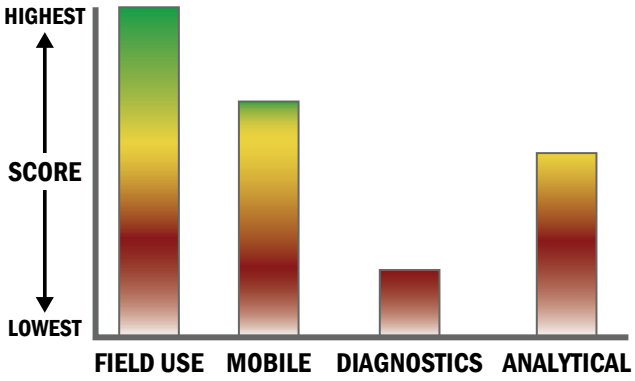
Technical Associates
7051 Eton Ave.
Canoga Park, CA 91303
POC: Robert Goldstein, President
818-883-7043
tagold@nwc.net

COST

- $272,800/system
- <$1.00/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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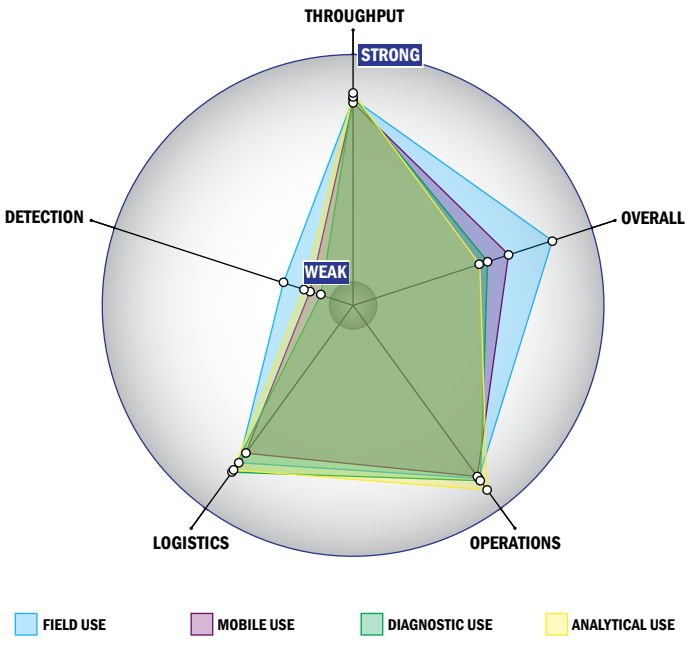


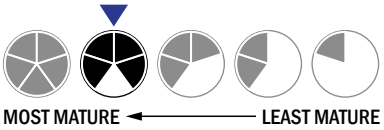
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Continuous operation with no defined runs
- 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
- 0 components
- Less than 5 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
- Satellite and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from 4 °C to 37 °C
- 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 and available for modification
- The system hardware is open and available for modification

Detection:

- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 ng per mL
- >1 ppt
- Efforts underway to identify liquid chemical agent
- Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

Technical Associates - Ship Ballast CBRN Water Monitor

GENERAL DESCRIPTION:



Ships take on ballast water, including local microorganisms and other pollutants native to the departure location. Ballast release takes place during the voyage or at the destination port releasing these transplanted microorganisms and toxins into a new environment. The Ship Ballast CBRN Water Monitor, UniTect, contains 20 sensors detecting radiation, microorganisms, and chemicals.

Ballast water monitor is a state of the art integrated chemical, biological, & radiation continuous real-time water monitoring system. It combines several detection goals in one continuous, real-time, on-line monitor.

- 7 Major Chemical Tests
- Detects Alpha, Beta, Gamma, Tritium, Radon, Radium.
- Detects More Than 12 Microbes
- Customer Controlled Alarm Threshold
- Calibration Can be Customized for Specific Contaminants
- SCADA compatible
- Remote Control & Communications

The Ship Ballast CBRN Water Monitor is a multi-detector water monitor for simultaneous measuring of alpha, beta and gamma-emitting radio nuclides, chemical and biological contaminants. The pre-amps are plug in modules for easy maintenance. Additional monitoring is available tailored to specific needs upon request. Measurements are logged 24 hr/day - 7 day/week, with alarm capability and a universal read out adaptable to mainframe infrastructure computers.

TECHNICAL DESCRIPTION:

The Ship Ballast CBRN Water Monitor combines several detection goals into a single monitor. It continuously monitors radionuclides with crushed scintillation crystals and NaI Gamma Spec scintillation crystals, ion exchange resin beads and charcoal filter and performs isotope identification. Chemical sensors include amperametric electrodes, UV spectrometer, and solid state detector. Laser based technology is the sensor method for biological particle counting and analyses. Chlorine, TOC, and Nitrogen are also monitored with detectors integrated within the Ship Ballast CBRN Water Monitor system.

- Measures at or below EPA/DHS/PAG levels
- Protective action guideline levels and military drinking water limits
- Real time, in-line, continuous
- No reagent tanks to fill
- No waste stream
- Easy calibration.

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	Third Tier	Fourth Tier	Fourth Tier
MOBILE Laboratory	Fourth Tier	Bottom Tier	Fourth Tier
DIAGNOSTIC Laboratory	Bottom Tier	Bottom Tier	Third Tier
ANALYTICAL Laboratory	Bottom Tier	Bottom Tier	Third Tier

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

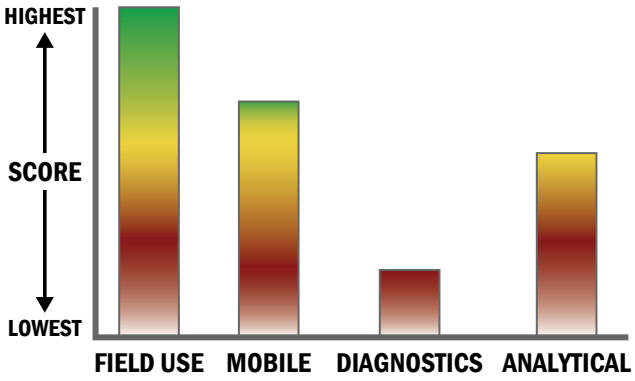
Technical Associates
7051 Eton Ave.
Canoga Park, CA 91303
POC: Robert Goldstein, President
818-883-7043
tagold@nwc.net

COST

- $379,440/system
- <$1.00/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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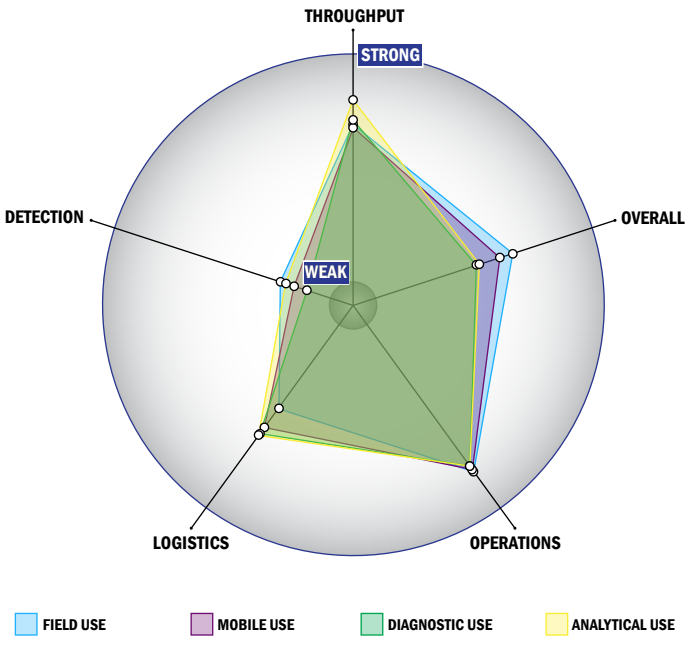


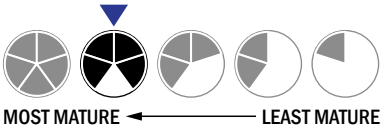
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Continuous operation with no defined runs
- 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
- 0 components
- 10-20 minutes is required for set-up
- Automatic detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a home dishwasher
- More than 50 kg
- Satellite and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 37 °C
- 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 and available for modification
- The system hardware is open and available for modification

Detection:

- Greater than 250 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 100-1,000 ng per mL
- >1 ppt
- Efforts underway to identify liquid chemical agent
- Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for surveying

TessArae, LLC - TessArray RPM-Flu Respiratory Pathogen Assay

GENERAL DESCRIPTION:

The TessArray® RPM-Flu assay simultaneously detects and definitively identifies more than 35 distinct classes of respiratory agents, both viral and bacterial, in a single assay in less than 24 hours. The assay generates agent-specific genomic sequence information as the output, and can easily discriminate between known, unknown, emerging, and deliberately altered pathogens to the subtype and/or strain level. The assay is designed for use by centralized testing laboratories to detect respiratory agents in throat swabs, nasal washes, Broncho alveolar lavages, and other clinical matrices.



TECHNICAL DESCRIPTION:

The TessArray RPM-Flu assay is based on resequencing microarray technology that runs on an Affymetrix® GeneChip® 3000 System. Genomic material (both RNA and DNA) extracted from the sample is amplified using locus-specific primers in highly multiplexed reactions (30-40 primer pairs/reaction) using a relaxed amplification strategy to maximize assay sensitivity. Amplified material is hybridized to the resequencing microarray under stringent conditions to maximize assay specificity. The TessArae Gene Cipher algorithm analyzes the resulting sequence data to detect and identify the agents present in the sample. RPM-Flu is the only assay that simultaneously maximizes both sensitivity and specificity.

CONTACT INFORMATION

TessArae, LLC
46090 Lake Center Plaza Suite 304
Potomac Falls, VA 20165
703-444-7188
info@tessarae.com

COST

- $219,000/system
- $300/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

RANKINGS

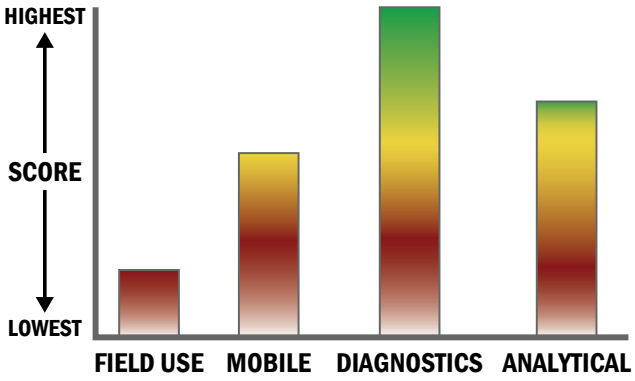
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Third Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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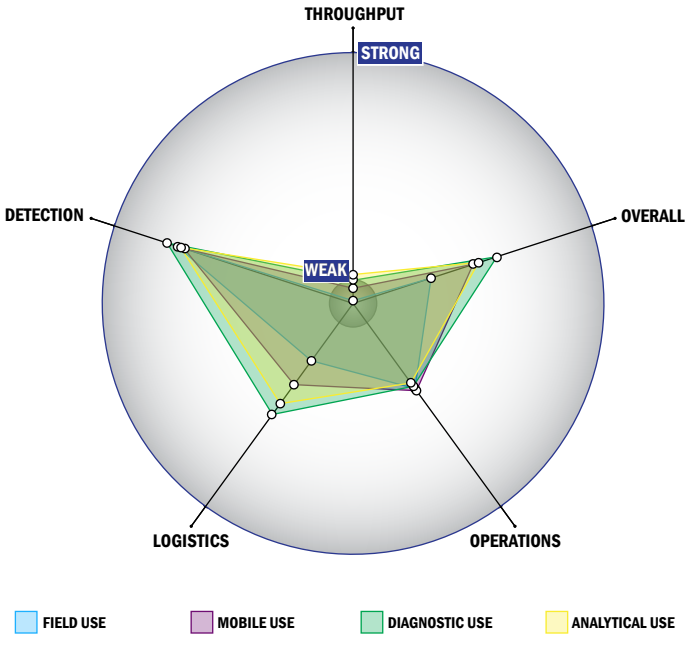


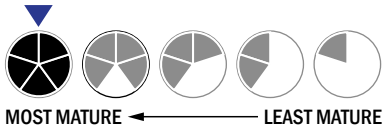
Evaluation Criteria

Throughput:

- Greater than 8 hours for detection
- Multiple samples, single tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is designed for a single use
- 5 or more solutions, buffer, eluents, and/or reagents
- 5 or more components
- 10-20 minutes is required for set-up
- Greater than 12 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be frozen (-20°C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- 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
- System currently has FDA approval
- Less than 50 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Manual kit not integrated with the system handles spore lysis

TessArae, LLC - TessArray RPM-TEI Tropical and Emerging Infections Assay

GENERAL DESCRIPTION:



The TessArray® RPM-TEI (Tropical and Emerging Infections) assay simultaneously detects and definitively identifies more than 40 distinct classes of Category A, B, C and zoonotic biothreat agents, both viral and bacterial, as well as seven bacterial toxin genes, in a single assay in less than 24 hours. The assay generates agent-specific genomic sequence information as the output, and can easily discriminate between known, unknown, emerging, and deliberately altered pathogens to the subtype and/or strain level. The assay is designed for use by centralized testing laboratories to detect biothreat agents in clinical and environmental matrices, including whole blood, throat swabs, surfaces, air, and dirt.

TECHNICAL DESCRIPTION:

The TessArray RPM-TEI assay is based on resequencing microarray technology that runs on an Affymetrix® GeneChip® 3000 System. Genomic material (both RNA and DNA) extracted from the sample is amplified using locus-specific primers in highly multiplexed reactions (30-40 primer pairs/reaction) using a relaxed amplification strategy to maximize assay sensitivity. Amplified material is hybridized to the resequencing microarray under stringent conditions to maximize assay specificity. The TessArae Gene Cipher algorithm analyzes the resulting sequence data to detect and identify the agents present in the sample. RPM-TEI is the only assay that simultaneously maximizes both sensitivity and specificity.

CONTACT INFORMATION

TessArae, LLC
46090 Lake Center Plaza Suite 304
Potomac Falls, VA 20165
703-444-7188
info@tessarae.com

COST

- $219,000/system
- $300/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

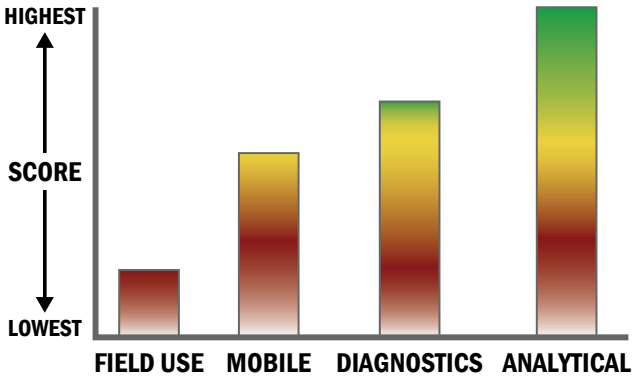
	Biological	Chemical	Radiological
FIELD USE System	Bottom Tier	N/A	N/A
MOBILE Laboratory	Bottom Tier	N/A	N/A
DIAGNOSTIC Laboratory	Fourth Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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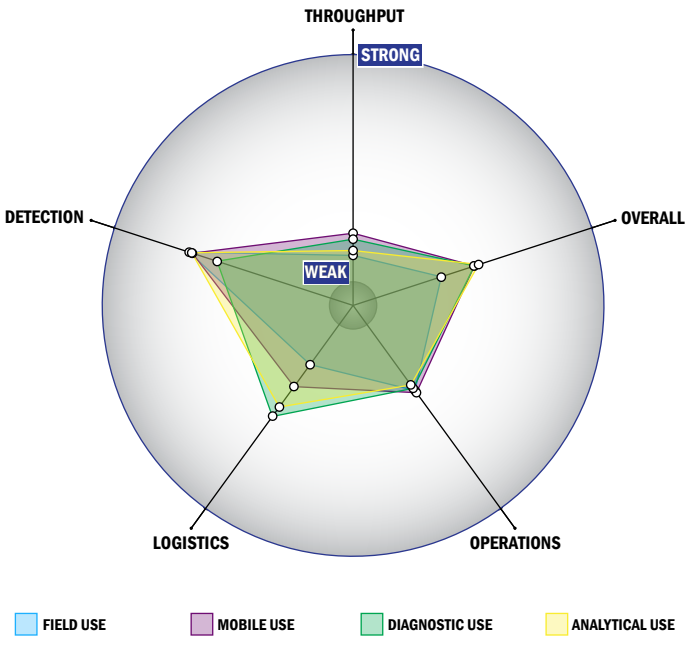


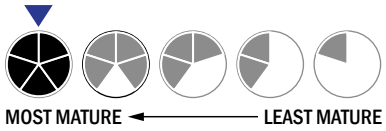
Evaluation Criteria

Throughput:

- Greater than 8 hours for detection
- Multiple samples, single tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 5 or more solutions, buffer, eluents, and/or reagents
- 5 or more components
- Less than 5 minutes is required for set-up
- Greater than 12 steps are required for detection

Logistics:

- More than a day of training and significant technical skills are required
- Larger than a home dishwasher
- More than 50 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be frozen (-20°C)
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 50 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Manual kit not integrated with the system handles spore lysis

Tetracore, Inc. - BioThreat Alert ELISA Kit(s)

GENERAL DESCRIPTION:

Antigen Capture ELISA kit for detection of biothreat agents; designed to be performed in the lab using a plate washer/reader for quantitative analysis. The kit can be adapted for field use for qualitative analysis with some effort. The kit is designed for environmental samples and the like, and can test samples in many matrices.



TECHNICAL DESCRIPTION:

ELISA: antigen capture employing capture and detector antibodies; most kits use monoclonal antibodies for detection.

CONTACT INFORMATION

Tetracore, Inc.
9901 Belward Campus Drive Suite 300
Rockville, MD 20850
POC: Pete Pillay
240-268-5400
ppillay@tetracore.com
www.tetracore.com

COST

- $575-$625/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

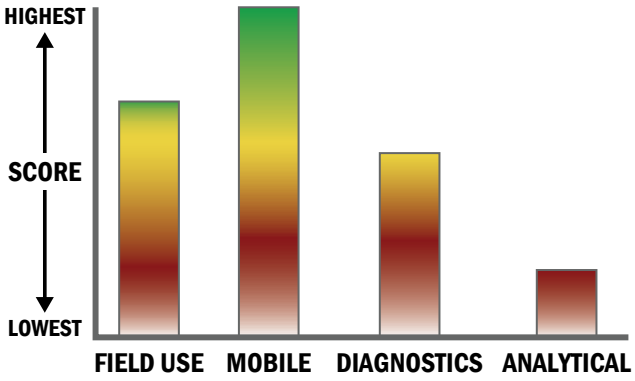
	Biological	Chemical	Radiological
FIELD USE System	Fourth Tier	N/A	N/A
MOBILE Laboratory	Fourth Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Survey Source

Vendor Supplied Information

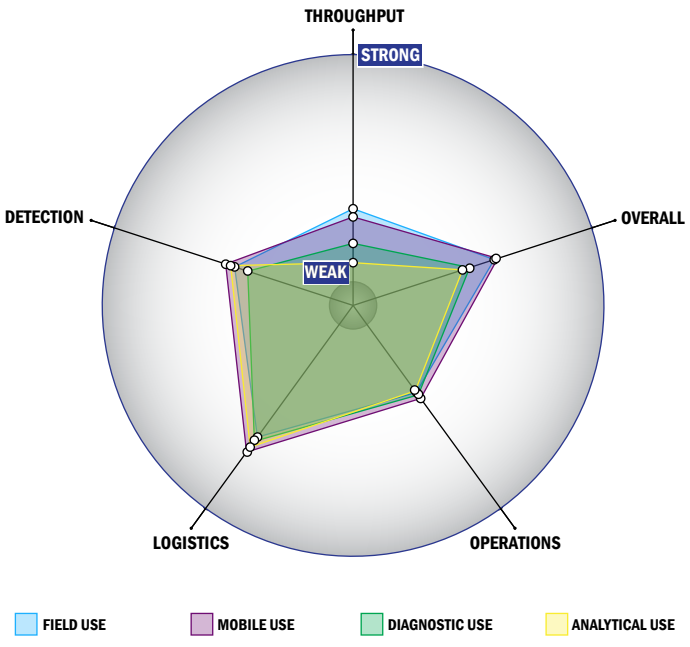
Scoring Analysis

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.



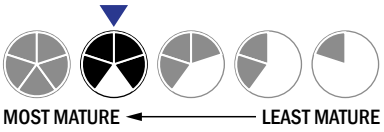
Evaluation Criteria

Throughput:

- Between 60 minutes and 8 hours for detection
- 1 sample, single test/sample per run
- 95-32 samples every 2 hours
- The system or approach is not amenable to full or semi-automation
- Device or system is designed for a single use
- 5 or more solutions, buffer, eluents, and/or reagents
- 2 components
- No set-up of the system is required
- Greater than 12 steps are required for detection

Logistics:

- A day of training and technical skills are required
- Approximately the size of a soda can
- Less than 1 kg
- This system is not capable of transmitting data
- There is no electrical requirement



Operations:

- Can be used from 25°C to 37°C
- Components must be stored at 4°C
- Performance is not influenced by relative humidity
- Between 1 to 6 months shelf life
- The system could be adapted to a fully autonomous system\
- The system does not employ any software

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- Possible the system could receive FDA approval, no current Less than 100 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 10,000-100,000 CFU per mL
- 1-10 ng per mL
- Spore lysis not necessary for detection by system

Tetracore, Inc. - BioThreat Alert Reader and BioThreat Alert Strips

GENERAL DESCRIPTION:



This new reader boasts many features designed to enhance the speed and the ease of testing for biological warfare agents. The BioThreat Alert® Reader is a fully functional ultra-mobile PC (UMPC), running Windows and capable of connecting to WiFi and Bluetooth signals. Users can interact with the reader with its touch screen or by connecting via USB with a keyboard/mouse. The user interface has been designed to be large and simple in order to aid First Responders who may be using various forms of PPE. Coupling this new reader with Tetracore's BioThreat Alert® strips creates a quick, reliable system for biodetection. BioThreat Alert® strips have been on the market for over 10 years and offer assays to detect Abrin, Anthrax, Bot Tox, Brucella, Orthopox, Plague, Ricin, SEB, and Tularemia. These robust handheld assays are capable of testing samples from a variety of matrices (soil, air, liquid, powder) in a matter of 15 minutes. Upon the completion of an assay, the BioThreat Alert® Reader can perform and record an accurate and objective analysis in merely 20 seconds. The software is also capable of generating a detailed report for each sample tested, which includes numerical output and a graphical representation of the results. The report can also be printed directly from the unit.

TECHNICAL DESCRIPTION:

This detection system consists of two separate parts. The BioThreat Alert® strips are handheld lateral-flow immunochromatographic assays that use colloidal gold labeled antibodies for detection. The BioThreat Alert® Reader is a handheld PC coupled with additional hardware and software to allow for the analysis of the aforementioned strips. A camera attached to the rear of the device analyzes the strips' surface, measuring the optical density (reflection) and then determining a positive/negative result. The tray attached to the unit is capable of being modified to suit new assay types and designs in the future.

CONTACT INFORMATION

Tetracore, Inc.
9901 Belward Campus Drive Suite 300
Rockville, MD 20850
POC: Tom O'Brien
240-268-5400
tobrien@tetracore.com
www.tetracore.com

COST

- $5,500/system
- $25/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	Top Tier	N/A	N/A
MOBILE Laboratory	Top Tier	N/A	N/A
DIAGNOSTIC Laboratory	Second Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

Notes

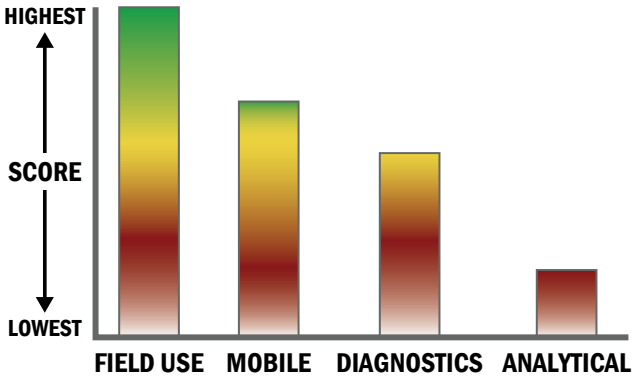
The Defender TSR System reads Tetracore BioThreat Alert Strips.

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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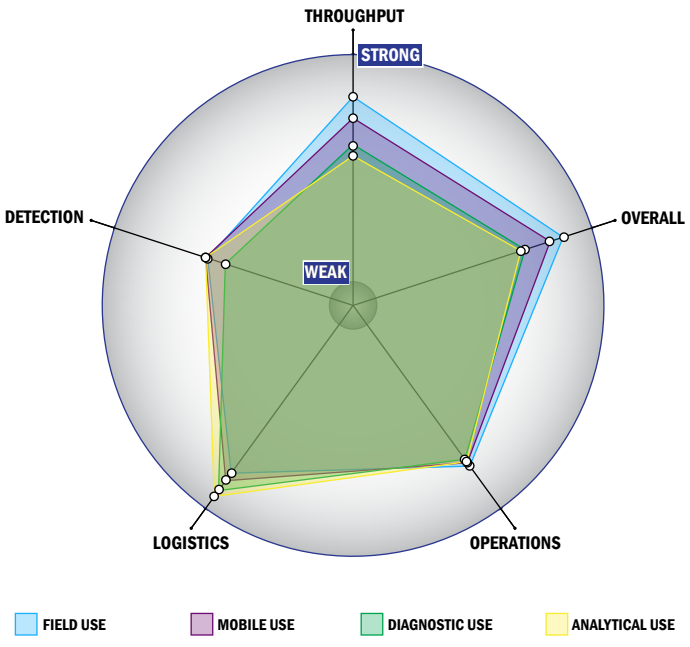


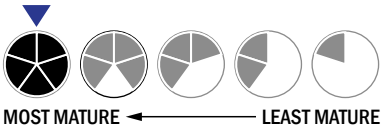
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, single test/sample per run
- 95-32 samples every 2 hours
- The system or device is currently fully automated
- 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 toaster
- Less than 1 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 room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

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
- Less than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 10,000-100,000 CFU per mL
- 10,000-100,000 PFU per mL
- Spore lysis not necessary for detection by system

Tetracore, Inc. - BioThreat Integrated Detection System

GENERAL DESCRIPTION:



BioThreat Integrated Detection System provides quick, reliable screening and confirmatory analysis of biothreats for both biologists in the laboratory and First Responders in the field. The BioThreat Alert® Reader and BioThreat Alert® strips provide a screening test for 9 different assays (Abrin, Anthrax, Bot Tox, Brucella, Orthopox, Plague, Ricin, SEB, and Tularemia) in less than 20 minutes. The reader is a fully functional ultra-mobile PC designed to enhance the speed and ease of testing. The interface has been designed to be large and simple, accommodating for various PPE worn by First Responders. Tetracore's T-COR 4TM Handheld Real-Time PCR Thermocycler provides superior confirmatory analysis for samples tested with BioThreat Alert® assays. The device operates connected to the BioThreat Alert® Reader via USB and runs either standard TaqMan® real-time PCR or Isothermal real-time fluorescence based amplification, which delivers confirmatory analysis in 10 minutes. It can process four independent samples and is capable of analyzing two targets per sample. Tetracore produces 18 dry real-time PCR and 4 dry Isothermal Assays for the T-COR 4TM with shelf lives exceeding 18 months at room temperature. The T-COR 4TM is an open system capable of running any customer's assay in either a wet or dry formulation. Identification of agents in powder samples, agents in environmental samples, bacteria, and viruses has been demonstrated in both devices.

TECHNICAL DESCRIPTION:

Provides screening and confirmation of biothreat samples. BioThreat Alert® strips are handheld lateral-flow immunochromatographic assays that use colloidal gold labeled antibodies. BioThreat Alert® Reader is a handheld PC coupled with additional hardware and software to allow analysis of the strips. T-COR 4TM is a handheld, battery-powered, peltier-based thermocycler designed for TaqMan® real-time PCR amplification and Isothermal real-time fluorescence based amplification. Designed with a proprietary, modular optical system, it can be modified to suit future requirements. The developed optical technology enables support of nucleic acid detection, polypeptide detection, and environmental sensing.

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

CONTACT INFORMATION

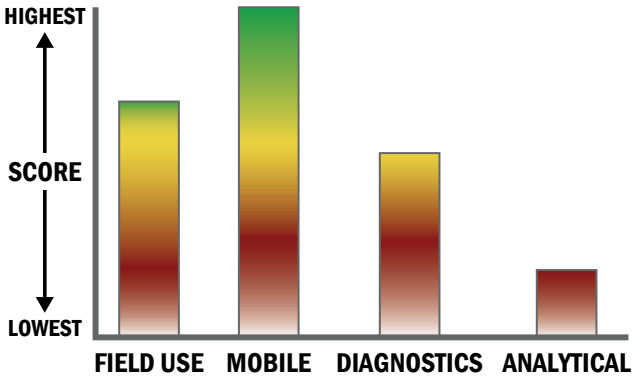
Tetracore, Inc.
9901 Belward Campus Drive Suite 300
Rockville, MD 20850
POC: Pete Pillay
240-268-5400
ppillay@tetracore.com
www.tetracore.com

COST

- $21,500/system
- $37/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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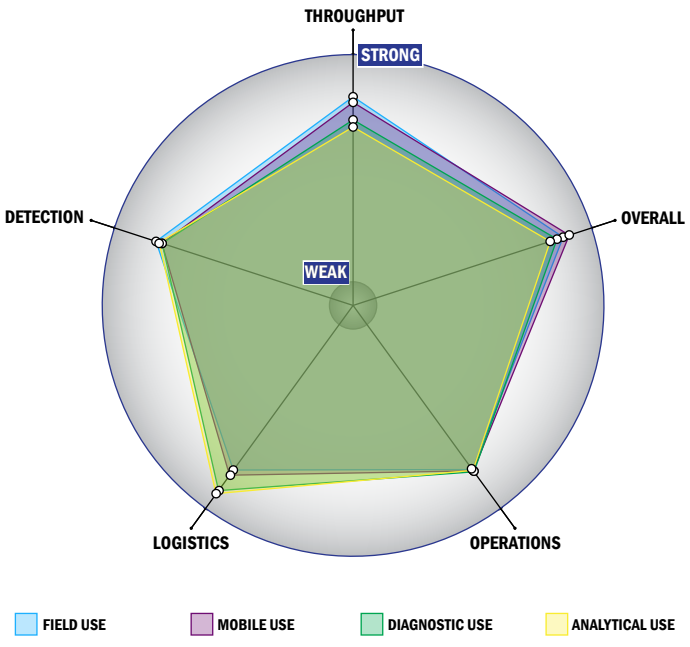


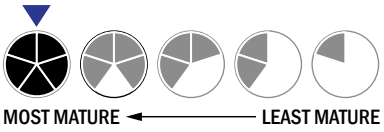
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- 95-32 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
- 2 components
- No set-up of the system is required
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- 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 room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system is not capable of autonomy
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

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
- Less than 250 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- 1-10 ng per mL
- Spore lysis not necessary for detection by system

Tetracore, Inc. - T-COR 4 Handheld Real-Time PCR Thermocycler

GENERAL DESCRIPTION:



Tetracore's T-COR 4 Handheld Real-Time PCR Thermocycler can process four independent samples and is capable of analyzing two targets per sample. The T-COR 4 has a footprint of 9" x 7.5" x 3", weighs 6 pounds, and runs continuously off battery power for 8 hours. The system is capable of running both standard TaqMan® real-time PCR and Isothermal real-time fluorescence based amplification. Isothermal real-time fluorescence based amplification allows for confirmatory analysis in 10 minutes. The user can choose to run the device in either stand-alone mode or connected to a PC. Intuitive software allows the user to set up, run, and analyze an experiment. Easy to learn and simple to use, the T-COR 4 is designed for use by both first responders in the field and biologists in the laboratory. We have demonstrated the identification of agents in powder samples, agents in environmental samples, bacteria, and viruses. Tetracore produces 18 dry real-time PCR and 4 dry Isothermal Assays for the T-COR 4. Dry assays developed for the system are subject to accelerated stability testing at 55 degrees Celsius and 45 degrees Celsius, and to real-time stability testing at room temperature. We have data supporting a shelf life of more than 18 months at room temperature. The T-COR 4 is an open system capable of running any customer's assay, in either a wet or dry formulation. A handheld, battery powered centrifuge is included with the system.

TECHNICAL DESCRIPTION:

A handheld, battery powered, peltier-based thermocycler designed for use with TaqMan® real-time PCR amplification and Isothermal real-time fluorescence based amplification. Isothermal real-time fluorescence based amplification allows for confirmatory analysis in 10 minutes. Tetracore has designed a proprietary, modular optical system such that the instrument can be modified to suit future end users requirements. The developed optical technology enables Tetracore to support the fields of biotechnology, such as nucleic acid detection, polypeptide detection, and environmental sensing.

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

CONTACT INFORMATION

Tetracore, Inc.
9901 Belward Campus Drive Suite 300
Rockville, MD 20850
POC: Pete Pillay
240-268-5400
ppillay@tetracore.com
www.tetracore.com

COST

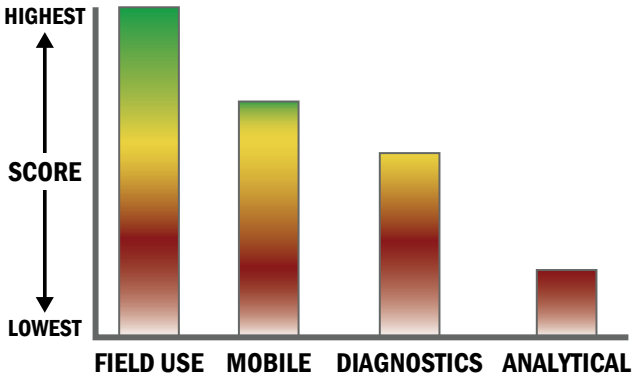
- $16,000/system
- $12/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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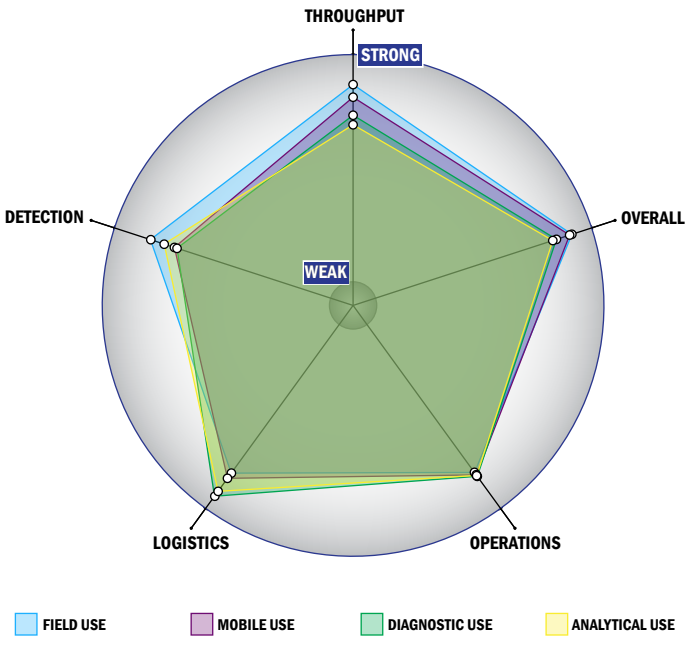


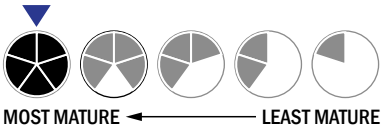
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, multiple tests/sample per run
- Less than 32 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
- 1 component
- No set-up of the system is required
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- 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 room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could be adapted to a fully autonomous system with significant effort
- The system software is closed and not available for modification
- 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL
- Manual kit not integrated with the system handles spore lysis

THALES Defense&Security - BIOWARD

GENERAL DESCRIPTION:

The BIOWARD is a portable aerosol dosimeter. It is designed to be carried by a non-specialist soldier or a first responder all along his mission, even several days, to record a sample of the aerosols he is breathing. The device can be used for any kind a threat, be it biological, chemical or radiological, as long as it is present as aerosol.



TECHNICAL DESCRIPTION:

The BIOWARD use a filter sampling principal, with a flow rate mirroring human breath. It can achieve a operational autonomy of several days. The filter itself can be adapted to the threat.

CONTACT INFORMATION

THALES Defense&Security
C4I systems Division
20-22 rue Grange Dame Rose CS
90519 78141 Velizy Cedex
POC: Jerome Louat
jerome.louat@Thalesgroup.com
www.thalesgroup.com/uk

COST

N/A

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier Fourth Tier Bottom Tier

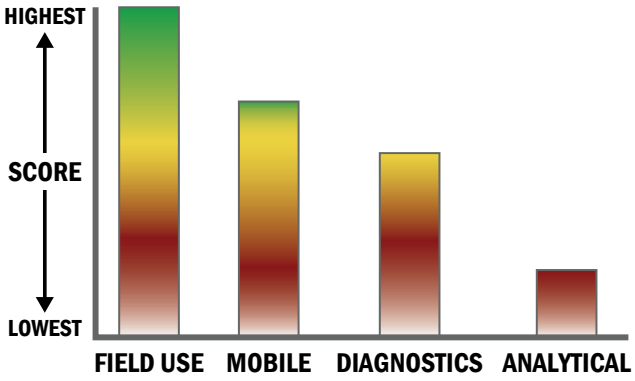
RANKINGS	Biological	Chemical	Radiological
FIELD USE System	Third Tier	Fourth Tier	Fourth Tier
MOBILE Laboratory	Bottom Tier	Bottom Tier	Bottom Tier
DIAGNOSTIC Laboratory	Bottom Tier	Bottom Tier	Bottom Tier
ANALYTICAL Laboratory	Bottom Tier	Bottom Tier	Bottom Tier

Survey Source

Vendor and Internet Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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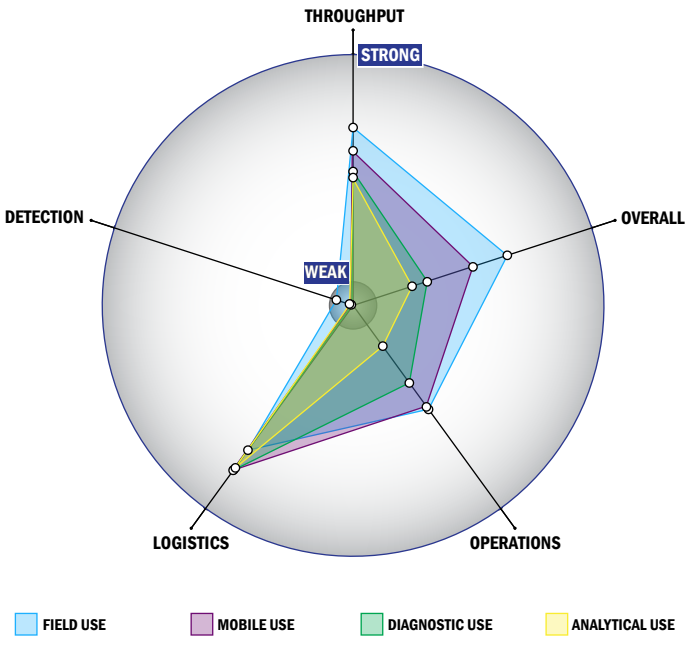


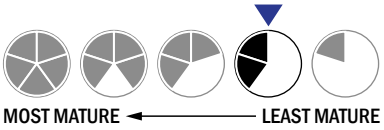
Evaluation Criteria

Throughput:

- 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
- 1 component
- No set-up of the system is required

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- This system is not capable of transmitting data
- System or device uses batteries



Operations:

- Can be used from 25°C to 37°C
- Can be used from < -21°C to > 42°C (All temperatures)
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 3-5 years expected life
- Results cannot be viewed in real-time
- The system or device is currently fully autonomous
- The system hardware is closed and not available for modification

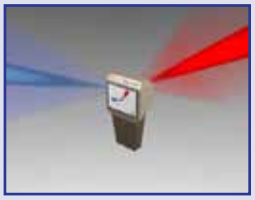
Detection:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- This system does not test liquids
- Not possible for the system to identify aerosolized chemical agent
- Not possible for the system to identify liquid chemical agent

Thales Group UK - RADIR

GENERAL DESCRIPTION:

A handheld system for the military or first responder which allows the rapid detection, identification and geo-location of multiple radiation sources (Gamma). The system works with gamma radiation predominantly although a neutron module is available. The system uses an innovative processing system that allows the rapid discrimination, location and tracking of multiple sources simultaneously.



TECHNICAL DESCRIPTION:

The system uses a multiple chipset of CZT crystals (exact configuration and numbers is proprietary) which have been bonded in such a way to allow cell discrimination - in a similar manner to the medical imaging industry. This is combined with highly advanced processing software used in advanced sonar systems for detecting and tracking multiple sources.

CONTACT INFORMATION

Thales UK
Wookey Hole Road
Wells, Somerset, BA5 1AA, United Kingdom
POC: Thane Hall CBRN Business Lead
+44 (0)1749 682247 or +44 (0) 7971 679537
thane.hall@uk.thalesgroup.com
www.thalesgroup.com/uk

COST

- $20,000 - $25,000/system
- $0/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

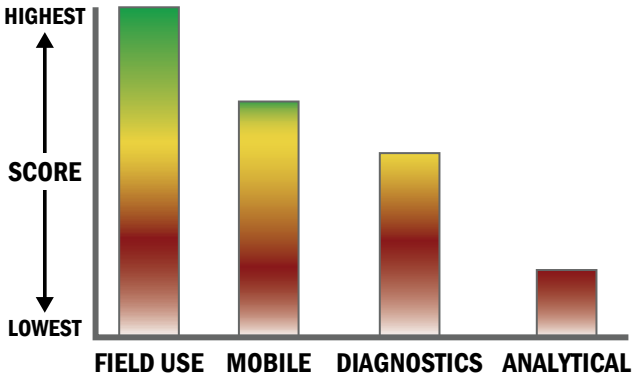
	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Second Tier
MOBILE Laboratory	N/A	N/A	Third Tier
DIAGNOSTIC Laboratory	N/A	N/A	Fourth Tier
ANALYTICAL Laboratory	N/A	N/A	Bottom Tier

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

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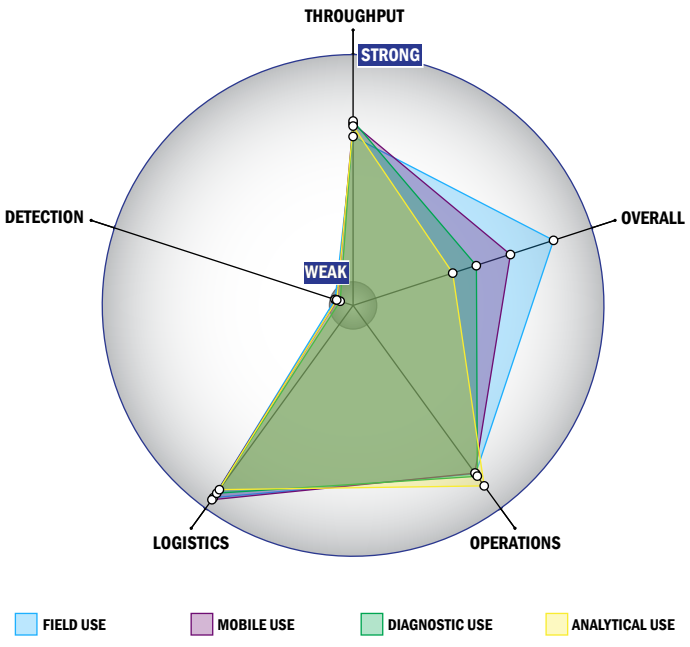


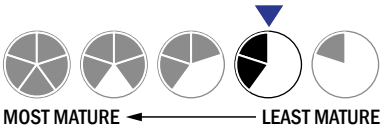
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- Continuous operation with no defined runs
- 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
- 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 soda can
- Less than 1 kg
- Satellite, wireless and wired connections are available
- System or device uses batteries
- 2-4 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- 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
- System is used for surveying

Thales UK - Blacklight

GENERAL DESCRIPTION:



The Thales BLACKLIGHT is an innovative multi-species real time gas and vapor detector that can be used in a wide variety of environments and operational modes, from incident response through to chemical surveillance and pre-event profiling. BLACKLIGHT employs a unique implementation of ultraviolet absorption spectroscopy to offer significant improvements in chemical detection over current systems. Cutting edge sensing technologies and air sampling techniques are combined to provide superior detection performance in static, portable and vehicle mounted configurations. The key product differentiator is concurrent and continuous real-time detection, identification and quantification of a wide range of threat chemicals, including their precursors, by-products and breakdown components. Threat chemicals include TIC's, CWA's, explosives and narcotics. Mutli-species detection, identification and quantification can be done at very low concentrations (single-figure ppb) which when combined with the sensors high volume sampling rate (>100 litres/min) make the unit ideal for mobile search and on 'on the move' applications. Tangible user benefits include; more rapid incident response; significantly reduced search times; and covert chemical surveillance by detecting trace levels of raw products and by-products from illicit manufacturing processes.

TECHNICAL DESCRIPTION:

The system uses differential Ultra Violet absorption spectroscopy in combination with advanced signal processing routines to detect, identify and quantify species. Ultra-Violet spectroscopy is an area largely overlooked in recent decades but modern techniques and a new approach have yielded exciting results. The species enter the system through a high-capacity air inlet to an optical cell where the sample is analyzed. The sensor is able to recognize the chemical compounds in the air, untangle them and quantify their presence in real time (<1 sec). The use of differentials rather than pure absorption allows simultaneous detection of multiple species, avoiding the usual masking.

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

CONTACT INFORMATION

Thales UK National Security & Resilience
Building 230 The Close Bristol Business Park Coldharbour Lane
Bristol BS16 1FJ United Kingdom
POC: Matthew Hart
+44(0)117 931 3900
matthew.hart@uk.thalesgroup.com
www.thalesgroup.com/uk

COST

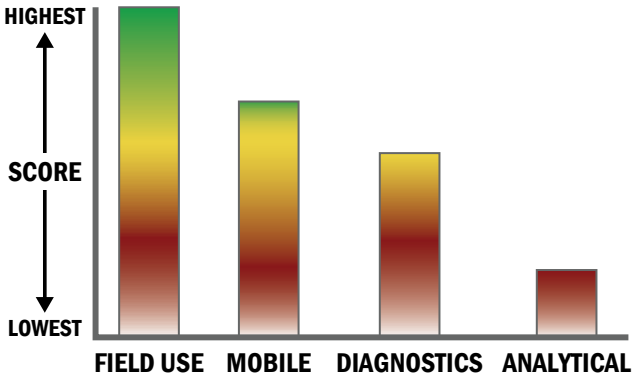
N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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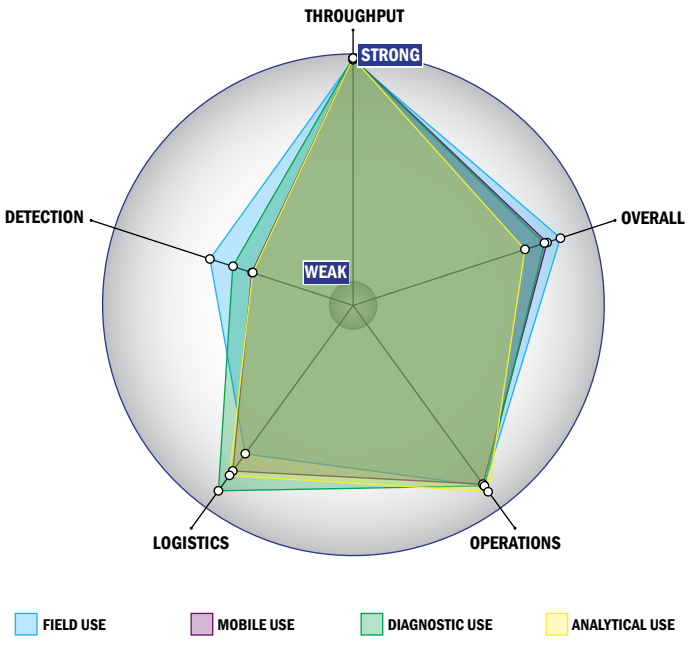


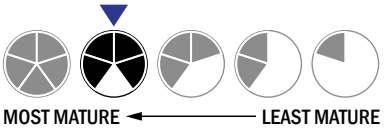
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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
- 0 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- An afternoon of training and some technical skills required
- 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
- 2-4 hours battery life



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 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%)
- $1x10^{-4}$–$1x10^{-3}$ mg/m^3
- System can identify aerosolized chemical agent
- Possible system could be adapted to identify liquid chemical agent

Thermo Fisher Scientific - FirstDefender RMX

GENERAL DESCRIPTION:

Thermo Scientific FirstDefender RMX is a Raman spectrometer for rapid, accurate identification of unknown chemicals directly in the field. Building on prior generation technology, enhancements have been made in speed, performance, mixture analysis and user interface incorporating extensive user feedback and the latest technical advances.



At 2.0 pounds (919g), the FirstDefender RMX unit is lightweight and portable, with a large, vivid display for ease of use in bulky protective gear. It is designed to meet the demanding requirements of elite military personnel and civilian first responders.

Key Benefits:

- Fast, accurate identification. Based on Raman spectroscopy, quickly identifies unknown solid and liquid chemicals. Unit stores all data and can export in multiple formats.
- Built for field use. MIL-STD-810G and IP67 tested and certified.
- Improved automatic mixture analysis. Sophisticated chemometric algorithms automatically determine presence of mixed and contaminated chemicals.
- Point-and-shoot™ identification. Operates directly through sealed glass or plastic containers, avoiding exposure to potentially harmful substances.
- Extensive substance library. Identifies explosives, toxic industrial chemicals (TICs), chemical warfare agents (CWAs), narcotics, precursors, white powders and more.
- Fixed flex probe and optional tactical robot integration

TECHNICAL DESCRIPTION:

Raman Spectroscopy is a vibrational spectroscopy technique, where an intense single wavelength laser is focused on a sample. The laser energy excites the bonds of a molecule and generates or scatters measurable light to identify the material in question. Raman is highly effective at extracting a reliable and accurate identification of an unknown substance based on its underlying chemistry. Raman spectroscopy is best used as a primary analysis technique for sampling aqueous solutions and white or light colored powders and scanning through sealed containers.

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

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

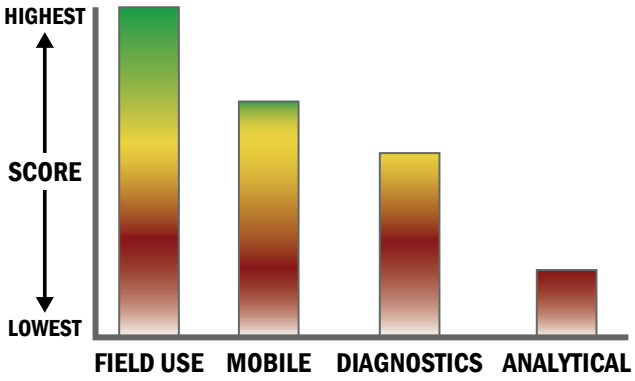
Thermo Fisher Scientific Portable Analytical Instruments
2 Radcliff Road
Tewksbury, MA 01876
POC: John Kenneweg Director, Federal Government Programs
301-447-2331
john.kenneweg@thermofisher.com
www.thermoscientific.com/safety-chemid

COST

- $55,000/system
- N/A/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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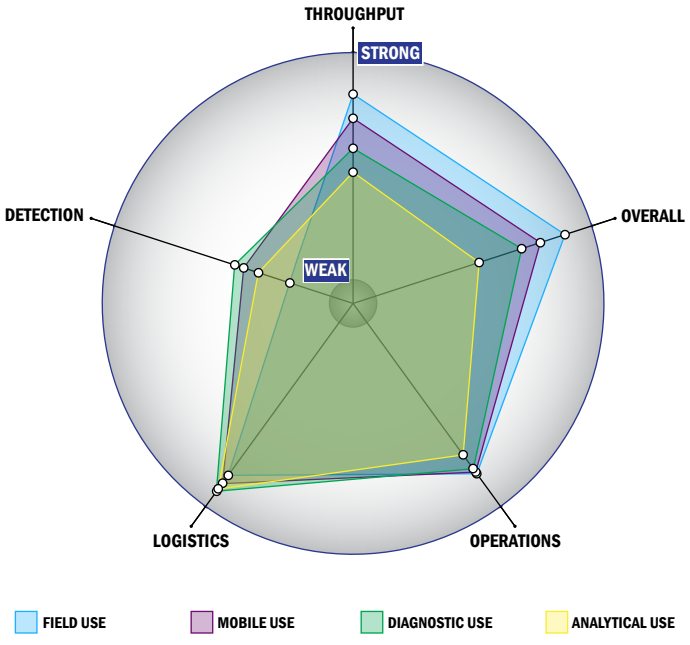


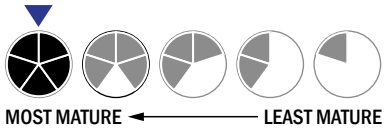
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, >10 tests/sample per run
- 95-32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- 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 soda can
- Less than 1 kg
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- 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
- Greater than 250 µL
- Good specificity. System has a consistently low level of false alarms (2-5%)
- >1 ppt
- System currently can identify liquid chemical agent

Thermo Fisher Scientific - Thermo Scientific TruDefender FTi

GENERAL DESCRIPTION:

Thermo Scientific TruDefender FTi analyzer is a rugged, handheld FTIR system for rapid, in-the-field identification of unknown chemicals including explosives, narcotics, toxic industrial chemicals, precursors and more. The instrument brings the power of FTIR directly into the hazard zone, enabling the responder to analyze—and act—faster than ever before. The TruDefender® FTi device was built to meet the needs of first responders. It is ergonomically designed for easy use in Level A gear and rugged enough to withstand the rigors of field use.



Key Benefits:

- Fast, accurate identification. Returns results in seconds. Onboard hazard database provides full safety and treatment information, further speeding appropriate response.
- Easy to use. Intuitive, menu-driven interface is consistent across instruments for fast training and proficiency.
- Built for field use. Certified to MIL-STD 810G for ruggedness including drop, shock, vibration and operation in extreme temperatures.
- Automatic mixture analysis. Enhances substance identification capability and eliminates the need for subtraction of spectra.
- Easy maintenance. Self-contained and requires no scheduled maintenance, calibration, warm up time or mirror alignment, and uses no consumables. -Embedded mobile phone technology allows users to send results directly from the hot zone via SMS text or email.

TECHNICAL DESCRIPTION:

Fourier Transform Infrared (FTIR) Spectroscopy FTIR is an absorption spectroscopy technique where an infrared light is passed through the sample. Some wavelengths may be absorbed, while others merely pass through the sample unaffected. Specific molecular bonds absorb a specific amount of energy and these losses of energy correspond to the peaks returned in an analysis. FTIR absorptions are strong and provide outstanding and easily interpretable results for substances which contain polar covalent bonds. FTIR spectroscopy is best used as a primary analysis technique for identifying colored substances such as industrial dyes, pigments and oils, and fluorescent materials.

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	Top Tier	N/A
MOBILE Laboratory	N/A	Third Tier	N/A
DIAGNOSTIC Laboratory	N/A	Bottom Tier	N/A
ANALYTICAL Laboratory	N/A	Bottom Tier	N/A

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

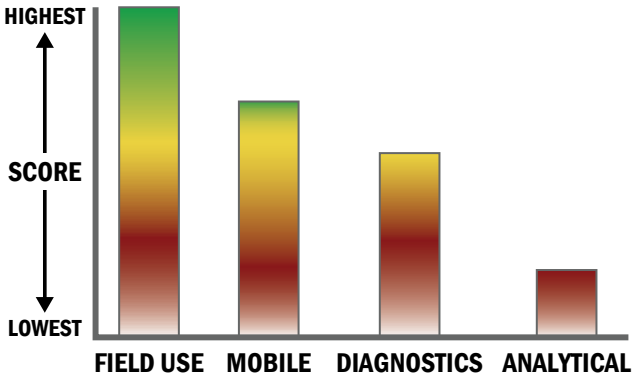
Thermo Fisher Scientific Portable Analytical Instruments
2 Radcliff Road
Tewksbury, MA 01876
POC: John Kenneweg Director, Federal Government Programs
301-447-2331
john.kenneweg@thermofisher.com
www.thermoscientific.com/safety-chemid

COST

- $46,500/system
- N/A/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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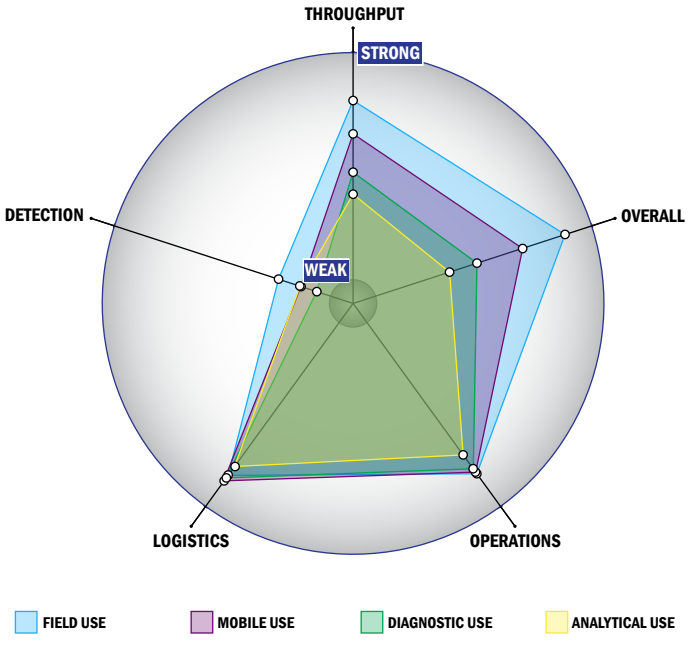


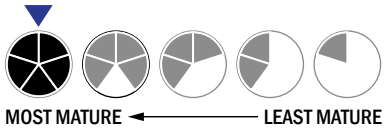
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- 1 sample, single test/sample per run
- 95-32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Approximately the size of a soda can
- 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 < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results cannot be viewed in real-time
- The system is not capable of autonomy
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- System currently can identify liquid chemical agent

TIRF Technologies, Inc. - FluoroGazer

GENERAL DESCRIPTION:



FluoroGazer is a multipurpose chem-bio sensor instrument designed for use in analytical laboratory. FluoroGazer uses advanced fluorescence optics, electrochemical system, microfluidics, electronics, software, and nanoengineered bioassays integrated into one bench top instrument. FluoroGazer performs analysis in the format of real-time microarrays that are capable of parallel detecting up to thousands of nucleic acids, proteins, toxins, metabolites, and chemical agents. FluoroGazer detects unlabeled molecular markers using reagentless bioassays based on DNA molecular beacons and aptamer- or antibody-based beacons. The bioassays are equipped with embedded luminescence reporters that change their luminescence upon binding to target molecules. FluoroGazer requires no or minimal sample preparation and is capable of analyzing complex biological fluids. In contrast to traditional microarrays that detect only end-point results, FluoroGazer monitors the entire course of association and dissociation kinetics for each spot of the microarray.

TECHNICAL DESCRIPTION:

FluoroGazer employs synergistic combination of Total Internal Reflection Fluorescence (TIRF) with Electric field Control (TIRF-EC). TIRF-EC sensor chip represents a glass or plastic slide coated with a thin electroconducting transparent layer of indium tin oxide (ITO). TIRF-EC chips are incorporated into cartridges that are available in disposable or reusable formats. TIRF-EC chip carries a microarray of reagentless bioassays printed on the ITO surface. TIRF provides real-time monitoring of the interactions between target molecules and bioassays, while the electric field enables several advantageous functions in TIRF system: accelerated transport of target molecules to their detection sites, discrimination between close homologs of target molecules, and moving fluids in microchannels. TIRF-EC microarray may contain from a few spots of bioassays in a single flow channel to thousands of chem-bio assays in four separate flow channels. FluoroGazer supports fluorescence assays, Electro-Chemi-Luminescence (ECL), other luminescence assays, as well as luminescence assays immobilized in a hydrogel layer printed at the TIRF-EC surface. TIRF-EC microarray is a rapid real-time detection system.

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

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

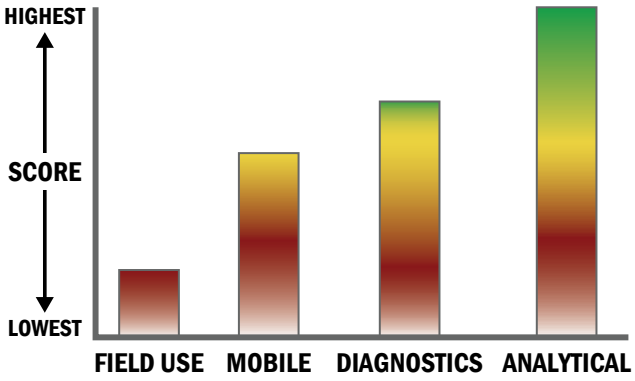
TIRF Technologies, Inc.
951 Aviation Parkway, Suite 700
Morrisville, NC 27560-9225
POC: Alexander N. Asanov, Ph.D., CEO
919-463-9545
info@tirftechnologies.com
www.tirftechnologies.com

COST

- $95,000/system
- $4.80/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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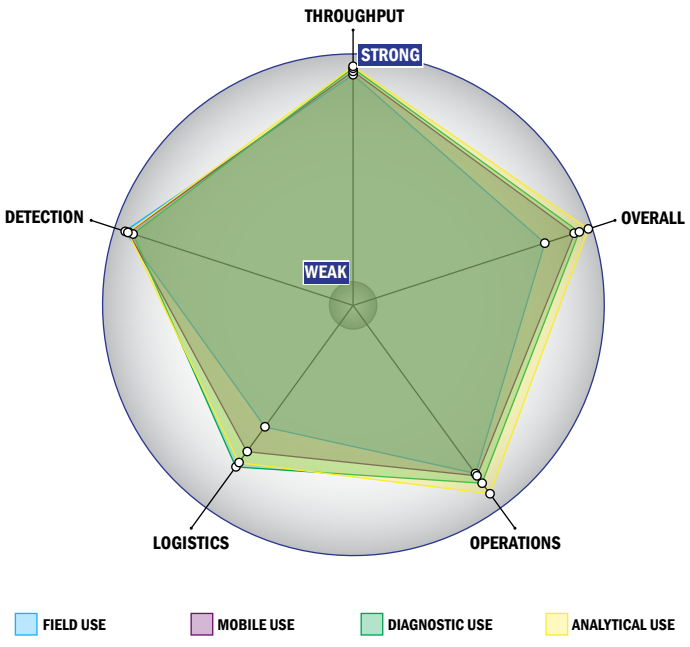


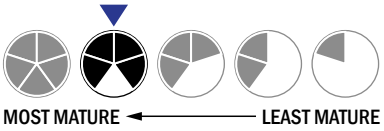
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- 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
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a carry-on luggage suitcase
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)

TIRF Technologies, Inc. - TIRF Sense Handheld Chem-Biosensor

GENERAL DESCRIPTION:



TIRF Sense Handheld chem-bio sensor is designed for use by first responders and for point-of-care diagnostics. TIRF Sense Handheld integrates fluorescence optics, electrochemical system, microfluidics, electronics, software, and nanoengineered bioassays into one handheld device. Analyses are performed in the format of real-time microarrays that are capable of parallel detecting up to targets. TIRF Sense Handheld requires no or minimal sample preparation and is capable of analyzing complex biological fluids. The sensor is equipped with Wi-Fi, BlueTooth, USB, and cellular connectivity, and a GPS system. In contrast to traditional microarrays that detect only end-point results, TIRF Sense Handheld monitors the entire course of association and dissociation kinetics and its dependence on electrochemical polarization, which allows for discriminating between perfect targets and their close homologs that may be present in the matrix.

TECHNICAL DESCRIPTION:

TIRF Sense Handheld chem-bio sensor employs synergistic combination of Total Internal Reflection Fluorescence (TIRF) with Electric field Control (TIRF-EC). TIRF-EC sensor chip represents a glass or plastic slide coated with a thin electroconducting transparent layer of indium tin oxide (ITO). TIRF-EC chips are incorporated into cartridges that are available in disposable or reusable formats. TIRF-EC chip carries a microarray of reagentless bioassays printed on the ITO surface. TIRF provides real-time monitoring of the interactions between target molecules and bioassays, while the electric field enables several advantageous functions in TIRF system, including accelerated transport of target molecules to their detection sites and disintegrating cell membranes. TIRF-EC microarrays detect unlabeled, unmodified targets, including DNA, RNA, protein, and metabolite molecular markers, biological and chemical toxins, and chemical agents. Depending on the application, TIRF-EC microarray may contain from a few spots of bioassays in a single flow channel to hundreds of chem-bio assays in two or three separate flow channels.

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
MOBILE Laboratory	●	●	N/A
DIAGNOSTIC Laboratory	●	●	N/A
ANALYTICAL Laboratory	●	●	N/A

CONTACT INFORMATION

TIRF Technologies, Inc.
951 Aviation Parkway, Suite 700
Morrisville, North Carolina 27560-9225
POC: Alexander N. Asanov, Ph.D., CEO
919-463-9545
info@tirftechnologies.com

COST

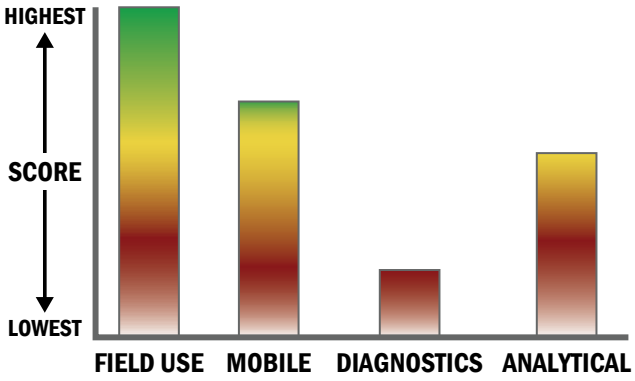
- $18,000/system
- ~$.070/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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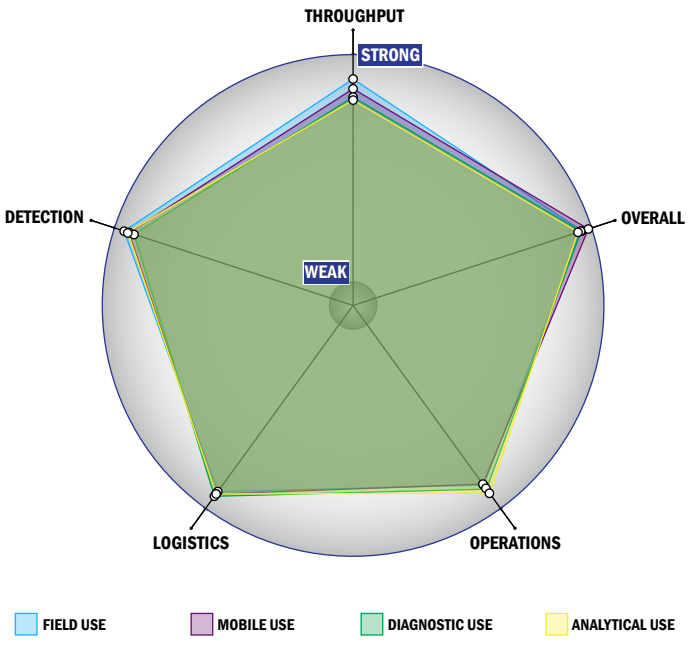


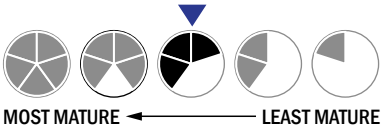
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Multiple samples, multiple tests/sample per run
- 349-96 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
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from -21°C to 41°C
- Components must be stored at room temperature (27°C)
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- 3-5 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL
- $< 1x10^{-6}$ mg/m^3
- < 1 ppb

TIRF Technologies, Inc. - TIRF Sense Portable Chem-Biosensor

GENERAL DESCRIPTION:



TIRF Sense is a portable multipurpose chem-bio sensor designed for use in the field and mobile labs. TIRF Sense integrates fluorescence optics, electrochemical system, microfluidics, electronics, software, and nanoengineered bioassays into one portable device. Analyses are performed in the format of real-time microarrays that are capable of parallel detecting up to hundreds of targets. TIRF Sense requires no or minimal sample preparation and is capable of analyzing complex biological fluids. In contrast to traditional microarrays that detect only end-point results, TIRF Sense monitors the entire course of association and dissociation kinetics. Additionally, the sensor measures the dependence of association and dissociation kinetics on electrochemical polarization, which allows for discriminating between perfect targets and their close homologs.

TECHNICAL DESCRIPTION:

TIRF Sense chem-bio sensor employs synergistic combination of Total Internal Reflection Fluorescence (TIRF) with Electric field Control (TIRF-EC). TIRF-EC sensor chip represents a glass or plastic slide coated with a thin electroconducting transparent layer of indium tin oxide (ITO). TIRF-EC chips are incorporated into cartridges that are available in disposable or reusable formats. TIRF-EC chip carries a microarray of reagentless bioassays printed on the ITO surface. TIRF-EC sensor cartridge is engaged into optical, fluidic, and electrochemical subsystems that allow for performing supersensitive TIRF-EC analysis. TIRF provides real-time monitoring of the interactions between target molecules and bioassays, while the electric field enables several advantageous functions in TIRF system, including accelerated transport of target molecules to their detection sites and discrimination between close homologs of target molecules. TIRF-EC microarrays detect unlabeled, unmodified targets. TIRF-EC microarray may contain from a few spots of bioassays in a single flow channel to hundreds of chem-bio assays in two or three separate flow channels. TIRF Sense supports fluorescence assays, Electro-Chemi-Luminescence (ECL), other luminescence assays, as well as luminescence assays immobilized in a hydrogel layer printed at the TIRF-EC surface.

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
MOBILE Laboratory	●	●	N/A
DIAGNOSTIC Laboratory	●	●	N/A
ANALYTICAL Laboratory	●	●	N/A

Survey Source

Vendor Supplied Information

CONTACT INFORMATION

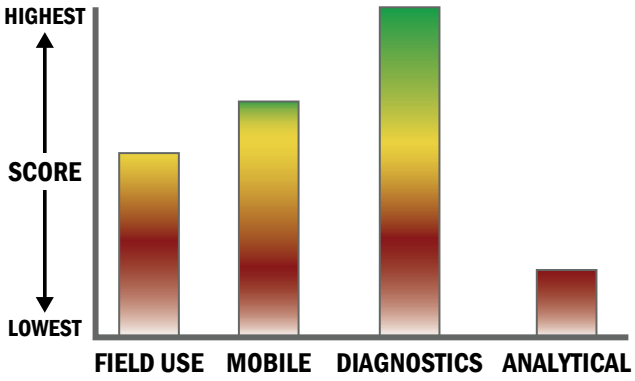
TIRF Technologies, Inc.
951 Aviation Parkway, Suite 700
Morrisville, North Carolina 27560-9225
POC: Alexander N. Asanov, Ph.D., CEO
919-463-9545
info@tirftechnologies.com

COST

- $34,000/system
- ~$.70/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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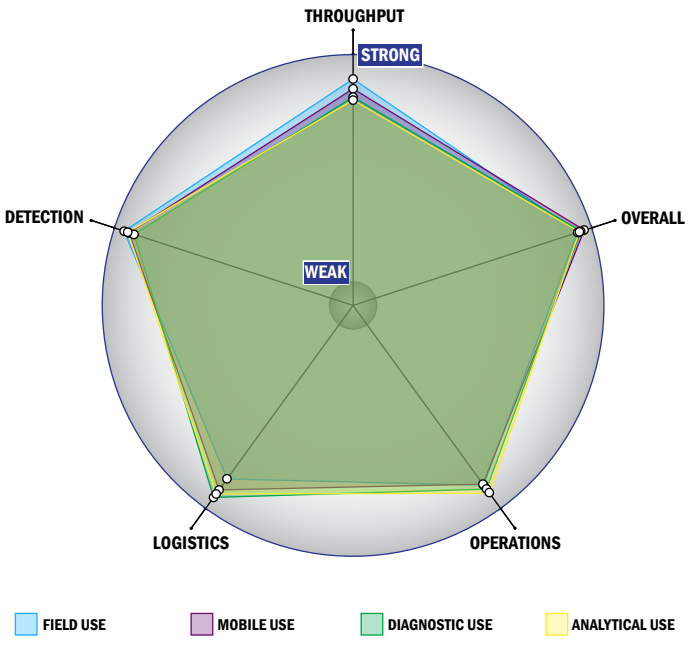


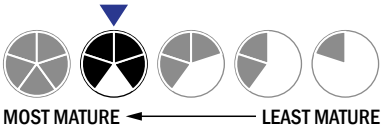
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Multiple samples, multiple tests/sample per run
- 349-96 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
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- 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 -21°C to 41°C
- Components must be stored at room temperature (27°C)
- Device or system has peak performance at normal relative humidity conditions
- Between 1 to 3 years shelf life
- 3-5 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open and available for modification
- The system hardware is open and 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
- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL
- $< 1x10^{-6}$ mg/m^3
- < 1 ppb

Trojan Defense, LLC - Carnyx Neutron Sensor

GENERAL DESCRIPTION:
Low power, low cost solid-state neutron radiation sensor.

TECHNICAL DESCRIPTION:
Carnyx combines high-sensitivity detection with low-power event logging.

CONTACT INFORMATION
Trojan Defense, LLC
2465 Centreville Rd Suite J17
Herndon, VA 20171

COST
- $1,000/system
- N/A/analysis

Tier Selection

Final tier assignment is based on overall product score.

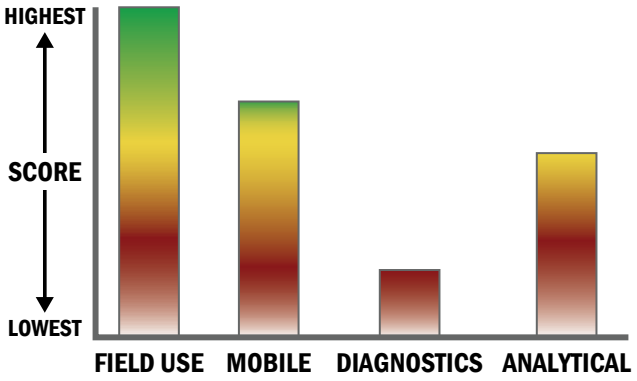
Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS	Biological	Chemical	Radiological
FIELD USE System	N/A	N/A	Top Tier
MOBILE Laboratory	N/A	N/A	Top Tier
DIAGNOSTIC Laboratory	N/A	N/A	Top Tier
ANALYTICAL Laboratory	N/A	N/A	Top Tier

Survey Source
Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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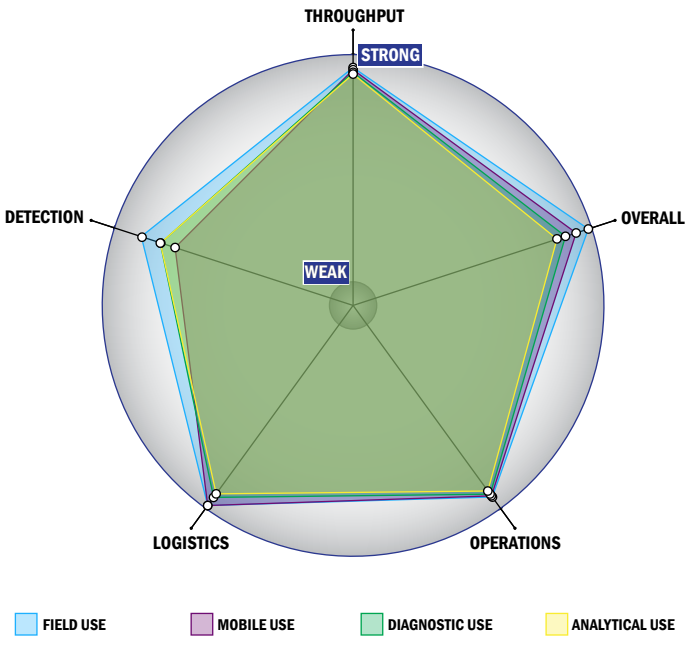


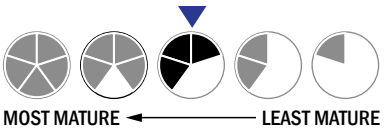
Evaluation Criteria

Throughput:

- Detection is instantaneous
- Continuous operation with no defined runs
- 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 intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 0 components
- Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- Satellite, wireless and wired connections are available
- System or device uses batteries
- 4-8 hours battery life



Operations:

- Can be used from < -21°C to > 42°C (All temperatures)
- Performance is not influenced by relative humidity
- 5-10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for area air sampling

TSI Incorporated - Fluorescence Aerosol Particle Sensor (FLAPS III™) Model 3317

GENERAL DESCRIPTION:



TSI Fluorescence Aerosol Particle Sensor (FLAPS III™) Model 3317 The TSI FLAPS III™ Model 3317 employs fluorescence measurements on individual airborne particles for rapid biological threat detection (under one minute response time) in military and homeland defense applications where a trigger detector is required for biological point detection systems. The instrument delivers exceptional threat discrimination and interference rejection using real-time processing of the data with advanced alarm algorithms. It has been tested with standard simulants for bio-threat agents (spore & vegetative bacteria, viruses and toxins), and has undergone significant field testing to verify its performance. The instrument is designed for field operation in terms of reliability, maintainability, and serviceability. (A predecessor instrument, the TSI UVAPS Model 3312A, has been fielded in the US Army P3I-BIDS enclosure.) The TSI FLAPS III™ Model 3317 system simultaneously measures for each individual airborne particle, the scattered-light intensity and the fluorescence emissions in two wavelength regions. These single particle measurements provide a robust data set for the rapid detection of airborne biological threat agents under various background environments. The instrument is generally used with a front-end aerosol concentrator to optimize performance, and is available in a stand-alone environmental enclosure with radio communications for remote operation. It has been in production since early 2004. The TSI FLAPS III™ Model 3317 is developed under sole license of U.S. patent numbers 5701012, 5895922 , and 6831279 from the Canadian Department of Defense.

TECHNICAL DESCRIPTION:

The detection of biological aerosols by the TSI FLAPS III™ Model 3317 is based on UV laser-induced fluorescence. The instrument uses a simplified optical train with a single, commercially available 405nm CW laser diode for both excitation and optical sizing (nominal lifetime of 10,000 hours of continuous operation). An opposed nozzle design, consisting of an inlet nozzle and an outlet nozzle, prevents particle recirculation in the optical chamber, and is used together with HEPA-filtered sheath air flow to eliminate fouling of the optical components. Measurements are taken on individual particles in the aerosol stream.

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 and Internet Supplied Information

CONTACT INFORMATION

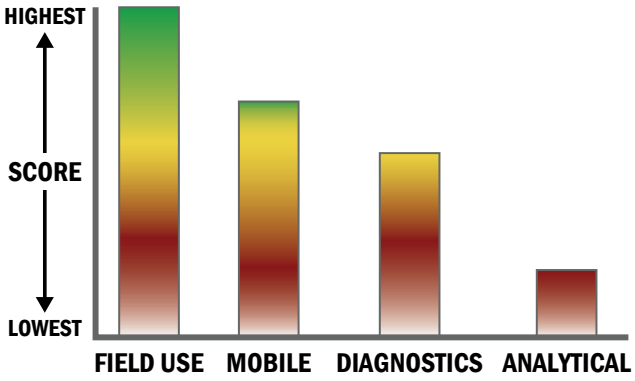
TSI Incorporated
500 Cardigan Road
Shoreview, MN 55126
POC: Richard Remiarz
651-490-2773
richard.remiarz@tsi.com
www.tsi.com

COST

- $100,000/system
- $0/analysis

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

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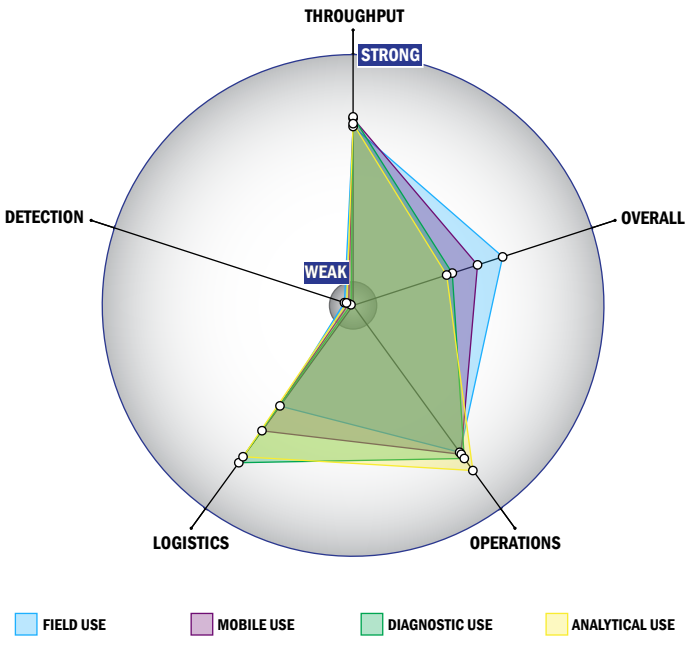


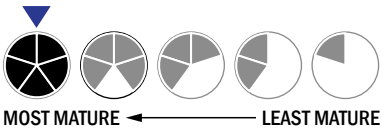
Evaluation Criteria

Throughput:

- 2 minutes or less for detection
- System is continuous and provides real time analysis with no defined tests/samples
- The system or device is currently fully automated
- 0-1 solutions, buffer, eluents, and/or reagents
- 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
- Larger than a home dishwasher
- Between 5 and 25 kg
- Wired connections are available
- System or device has 110V electrical requirement



Operations:

- Can be used from 4°C to 41°C
- 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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- This system does not test liquids

Universal Detection Technology - RadSmart

GENERAL DESCRIPTION:



The aftermath of the Fukushima Daaichi disaster in Japan exposed two major flaws in the radiation detection technology industry:

1. The industry could not ramp up production fast enough to meet the demand for radiation detection systems from customers in Japan.

2. The systems were designed for use by first responders and nuclear industry professionals and not everyday users.

Universal Detection Technology, through a partnership with Honeywell International and Hamamatsu has set out to design a first of its kind smartphone compatible survey meter. The unique feature of this survey meter is that the device will measure elevated levels of gamma radiation and transmit that data to a Bluetooth-ready smartphone. The dedicated smartphone app in development by Universal Detection Technology will give the user the ability to use simple menu-driven features to test for radiation in food, surfaces or clothing and subsequently share the accumulated data with other users through mapping and social networking features.

User's will also have the option to share and store readings on a safe and secure cloud which they have access to at anyplace at any time. Additional features will allow the user to: visually analyze data, keep track of cumulative dose, set automatic alerts (email, SMS, and other) and export data in different formats with timestamps and geo-tags.

The device will be easy enough to use for the everyday user but also sophisticated enough for the first responder market.

TECHNICAL DESCRIPTION:

RadSmart is a portable battery-powered instrument which includes a Cs(I) Tl scintillation detector with photodiode for detection of gamma rays. It works in conjunction with a smartphone allowing the user to take advantage of the computing power of the phone to receive and analyze data related to radiation exposure.

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	

CONTACT INFORMATION

Universal Detection Technology
340 North Camden Drive, Suite 302
Beverly Hills, CA 90210
POC: Vimel Patel
www.udetection.com

COST

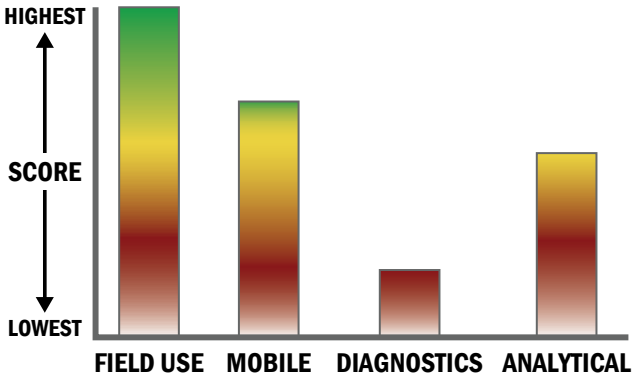
- $1,200/system
- N/A/analysis

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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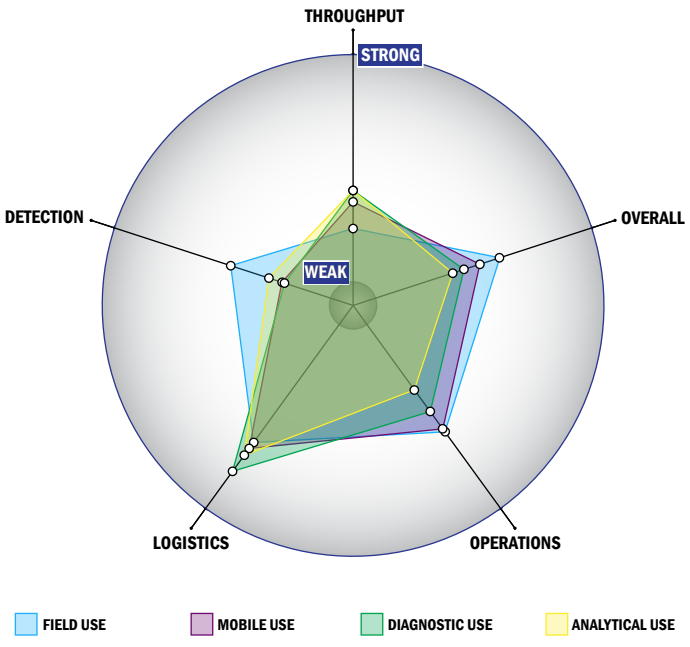


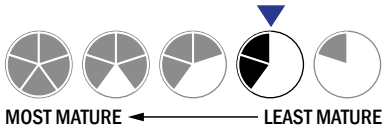
Evaluation Criteria

Throughput:

- Detection is instantaneous
- System is continuous and provides real time analysis with no defined tests/samples
- No set-up of the system is required

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- 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 -21°C to 41°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system

Detection:

- Total dose, dose rate and count rate with operator selection to show the display, may differentiate between types of radiation
- Down to background level radiation for dose rate
- Down to background level radiation for count rate
- System is used for personnel detection

Veritide - Ceeker

GENERAL DESCRIPTION:

Designed for first responders, the Veritide Ceeker is a portable, hand-held biological spore detector that is one-button simple, requires no special training, requires 10 minutes for the analysis, gives a simple yes or no answer, does not destroy the sample and is fully decontaminable. There are no reagents or wet chemistry involved.



TECHNICAL DESCRIPTION:

The Veritide optical detection platform employs non-invasive and non-contact optical methods to detect and identify biological particles. Specially tailored light is used to optically probe the particles and their unique fluorescence signatures are recorded, using a photomultiplier tube (PMT) and optical filters. The sample is exposed to shorter ultraviolet wavelengths that photolyze the dipicolinic acid (pyridine--2,6--dicarboxylic acid) (DPA), unique to bacterial spores, to picolinic acid (pyridine carboxylic acid). The fluorescence signature is again measured. The absolute as well as the difference optical signatures are then carefully analyzed using proprietary optical recognition protocols.

CONTACT INFORMATION

Veritide
1610 7th Ave. NE
Jacksonville, AL 36265
POC: Lou Reinisch

COST

- $25,000/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

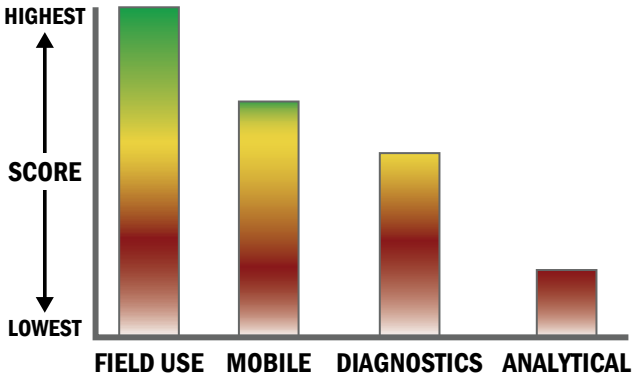
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Fourth Tier	N/A	N/A

Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



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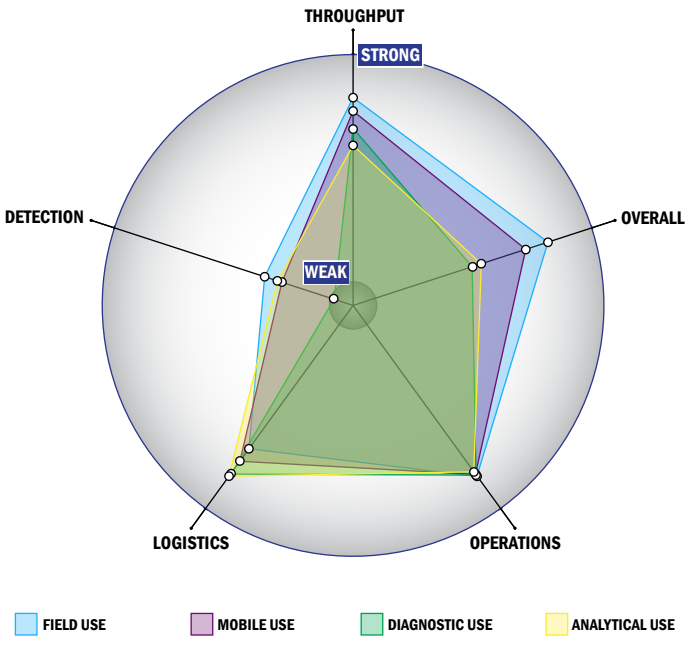


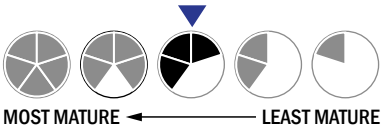
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- Multiple samples, single tests/sample per run
- Less than 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
- Less than 5 minutes is required for set-up
- 3-5 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 1 and 5 kg
- System or device uses batteries
- 1-2 hours battery life



Operations:

- Can be used from 4°C to 41°C
- Performance is not influenced by relative humidity
- Greater than 3 years shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Less than 10 µL
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 100-1,000 CFU per mL
- Spore lysis not necessary for detection by system

20/20 BioResponse - BioCheck

GENERAL DESCRIPTION:



BioCheck® is a field deployable test to screen unknown powders for the presence of biological material. Designed for ease of use, high sensitivity and fast result delivery, BioCheck functions as presumptive test for an initial biological screen and can deliver a result in under five minutes. Normally, the BioCheck test will be performed prior to any pathogen specific tests are undertaken to determine whether there is justification for the time and cost for other tests to be performed. As a highly sensitive field test for positive protein identification, BioCheck was designed specifically to quickly rule out the presence of any biological pathogen and quickly allow decisions to be made confidently regarding the next steps for additional testing in a white powder / suspicious powder decision matrix or SOP. BioCheck test kits do not require any instrumentation, have no power requirements, and are rugged. Each kit is individually packaged with a very small form factor and are completely disposable after use. Extensively tested and validated, BioCheck has been shown to detect minute amounts of biological material when testing unknown powders. Recent US Army ECBC testing showed sensitivity to as little as 100 µg of Ricin and 1 x 107 cfu of *B. anthracis* spores.

TECHNICAL DESCRIPTION:

BioCheck is a patented field test that functions as a colormetric assay that detects protein in solid materials and gives a color change when even minute amounts of protein are present. Specifically optimized in sensitivity and specificity its LOD is calibrated to give a high positive predictive value.

CONTACT INFORMATION

20/20 BioResponse
9430 Key West Avenue, Suite 100
Rockville, MD 20850
Attn: Barry Cohen, Director of Sales
240-453-6339 ext 103
sales@2020gene.com

COST

- $26.20/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	Top Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Bottom Tier	N/A	N/A
ANALYTICAL Laboratory	Bottom Tier	N/A	N/A

Notes

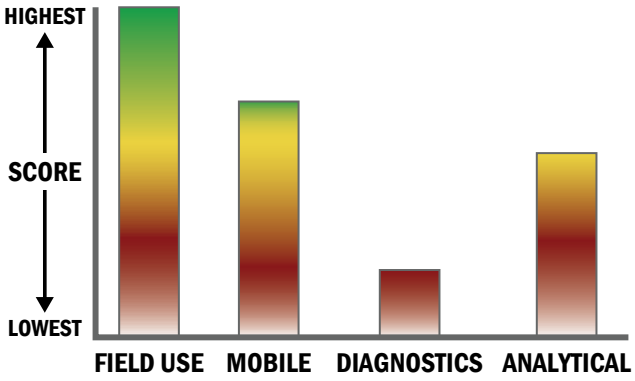
General suspicious powder test kit used by first responders.

Survey Source

Vendor Supplied Information

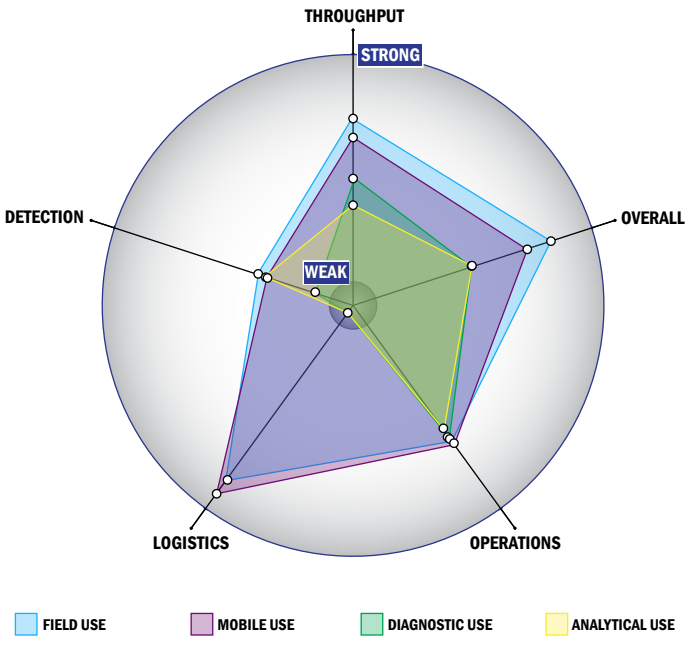
Scoring Analysis

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.



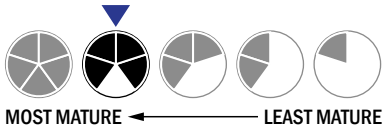
Evaluation Criteria

Throughput:

- Between 2 and 15 minutes for detection
- 1 sample, single test/sample per run
- 95-32 samples every 2 hours
- The system or approach is not amenable to full or semi-automation
- Device or system is designed for a single use
- 2 solutions, buffer, eluents, and/or reagents
- 1 component
- No set-up of the system is required
- 1-2 steps are required for detection

Logistics:

- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a soda can
- Less than 1 kg
- This system is not capable of transmitting data
- 4–8 Hours battery life



Operations:

- Can be used from 4 °C to 41 °C
- Components must be stored at room temperature (27 °C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Results can be viewed in real-time
- The system is not capable of autonomy

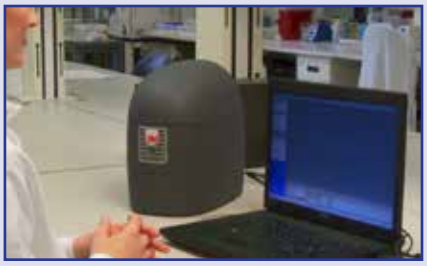
Detection:

- Not possible for the system to achieve 510K clearance
- Not possible for the system to achieve FDA approval
- This system does not test liquids
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- Greater than 100,000 CFU per mL
- Greater than 100,000 PFU per mL
- 1,000-10,000 ng per mL
- Spore lysis not necessary for detection by system

3M - Integrated Cycler

GENERAL DESCRIPTION:

Disc-based molecular diagnostic real-time thermocycler intended for use in clinical laboratories. Currently the system utilizes common laboratory specimens, but can be adapted to a wide variety of sample matrices.



TECHNICAL DESCRIPTION:

Thermocycler with 4-channel detection for use with real-time PCR assays.

CONTACT INFORMATION

3M
3M Center
St. Paul, MN 55144

COST

- $60,000/system
- $35-$50/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier | Second Tier | Third Tier | Fourth Tier | Bottom Tier

RANKINGS

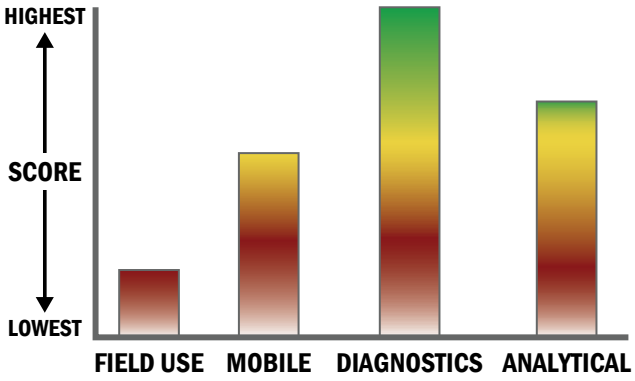
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Top Tier	N/A	N/A
DIAGNOSTIC Laboratory	Top Tier	N/A	N/A
ANALYTICAL Laboratory	Top Tier	N/A	N/A

Survey Source

Vendor Supplied Information

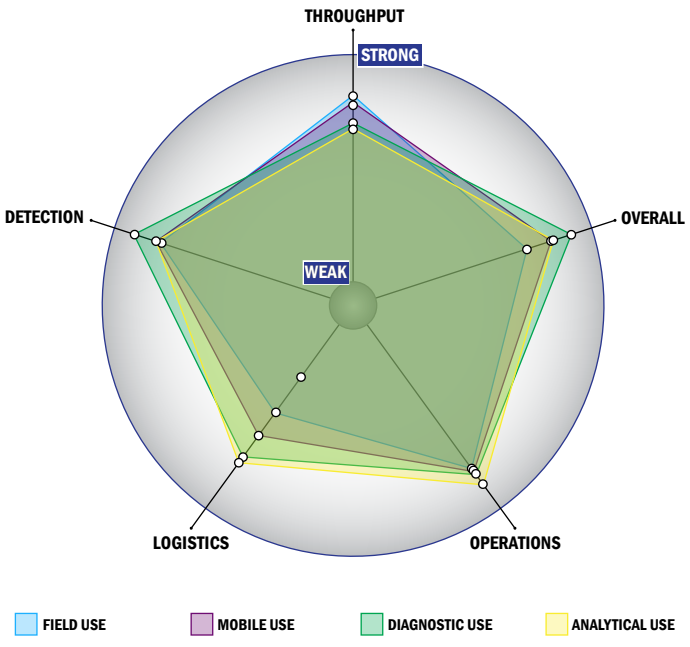
Scoring Analysis

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.



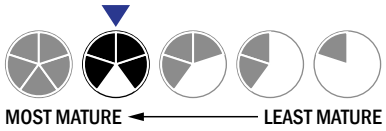
Evaluation Criteria

Throughput:

- Between 30 and 60 minutes per assay
- Multiple samples, multiple tests/sample per run
- 349-96 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
- 0 components
- Less than 5 minutes is required for set-up
- 1-2 steps are required for analysis

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 has 110V electrical requirement
- The device is not intended for portable use
- Is commercially available



Operations:

- Can be used from 4°C to 41°C
- Components must be frozen (-20°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years life expectancy
- Results can be viewed in real-time
- System could be adapted to fully autonomous with some effort
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- System currently has 510k clearance
- System currently has FDA approval
- Less than 50 µL per analysis
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU/mL of original sample
- 1-100 PFU/mL of original sample
- Fully automated spore lysis

APPENDIX A - WEIGHTED SURVEY QUESTIONS

WEIGHTED SURVEY QUESTIONS

1. THROUGHPUT OF PRODUCT

1.1. Given a test sample that has not undergone refinement or unique sample preparation, how many minutes would it take to perform a detection assay from start to finish on that sample?

a. Detection is instantaneous
b. 2 minutes or less
c. Between 2 and 15 minutes
d. Between 15 and 30 minutes
e. Between 30 and 60 minutes
f. Between 60 minutes and 8 hours
g. Greater than 8 hours

1.2. What best describes the maximum number of detection assays or individual tests the system or device can analyze per run with a single operator?

a. Continuous operation with no defined runs
b. Multiple samples, multiple tests/sample per run
c. Multiple samples, single tests/sample per run
d. 1 sample, >10 tests/sample per run
e. 1 sample, <10 tests/sample per run
f. 1 sample, single test/sample per run

1.3. Given a collected sample that has not undergone any sample preparation, what is the most appropriate statement concerning the level of automation of the system or the potential for automation? (Full automation assumes no human interface once the sample run has been initiated while semi-automated assumes that a limited amount human interface is necessary during the sample testing.)

a. The system or device is currently fully automated
b. The system or device is currently semi-automated
c. The system could easily be adapted into a fully automated system
d. The system could be adapted to a fully automated system with some effort
e. The system could be adapted to a semi-automated system with some effort
f. The system or approach is not amenable to full or semi-automation

1.4. Over a 2 hours period, choose the most appropriate answer for the maximum number of samples that your system or device can analyze:

a. System is continuous and provides real time analysis with no defined tests/samples
b. Greater than 750 samples
c. 749-350 samples
d. 349-96 samples
e. 95-32 samples
f. Less than 32 samples

2. RE-USE

2.1. Is the detection device or system disposable or designed for single use? (Answers not scored because this question did not factor into the analysis.)

a. Device or system is designed for a single use.
b. Device or system is intended for multiple detection assays.

2.2. What is the total number of solutions, buffers, eluents, or reagents (NOT INCLUDING WATER) that are used in the detection device or system? If the system currently has freeze-dried assays or can combine master mixes, score your system as though it has been done in that manner (such that each master mix constitutes one solution or buffer.)

a. 0-1 solutions, buffer, eluents, and/or reagents
b. 2 solutions, buffer, eluents, and/or reagents
c. 3 solutions, buffer, eluents, and/or reagents
d. 4 solutions, buffer, eluents, and/or reagents
e. 5 or more solutions, buffer, eluents, and/or reagents

2.3. Not including the buffers, solutions, reagents or eluents, what is the total number of additional consumables (such as tubes, lids, gases etc.) required per assay in your device or system? This includes all the consumables required for sample preparation and analysis.

a. 0 components
b. 1 component
c. 2 components
d. 3 components
e. 4 components
f. 5 or more components

3. SENSITIVITY AND DETECTION

3.1. Have any of the devices or system assays sought or received 510K clearance?

a. System currently has 510k clearance
b. Efforts are underway to achieve clearance
c. Possible the system could receive clearance, no current efforts at this time
d. Not possible for the system to achieve clearance

3.2. Have any of the system assays received FDA approval?

a. System currently has 510k clearance
b. Efforts are underway to achieve clearance
c. Possible the system could receive clearance, no current efforts at this time
d. Not possible for the system to achieve clearance

3.3. Given a collected liquid sample that has not undergone any sample preparation, what is the volume of the sample required to run an individual test for the detection device or system?

a. This system does not test liquids
b. Less than 10 µL
c. Less than 50 µL
d. Less than 100 µL
e. Less than 250 µL
f. Greater than 250 µL

3.4. When using the system under conditions consistent with manufacturer's specifications, please choose the most appropriate statement in regards to the false positive and false negative rate of the detection system:

a. Superior specificity. System has a false alarm rate approaching zero (~0%)
b. Excellent specificity. System has occasional false alarms under certain conditions (<2%)
c. Good specificity. System has a consistently low level of false alarms (25%)
d. Fair specificity. System has a consistent level of false alarms (510%)
e. Poor specificity. System has a consistently high level of false alarms (>10%)

3.5. Does your system currently detect, or can it be adapted to detect, markers of human exposure to agent?

a. System currently detects markers for human exposure to agent
b. System can easily be adapted (within 1 year) to detect markers of human exposure to agent
c. System will require some effort (12 years) to be adapted to detect markets of human exposure
d. System will require significant effort (more than 2 years) to be adapted to detect markers of human exposure
e. System is not capable of detecting markers of human exposure to agent

4. VERSATILITY OF SAMPLE INPUT

4.1. Can the system identify agents in environmental air matrices?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

4.2. Can the system identify agents in environmental water samples?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

4.3. Can the system identify agents in environmental soil samples?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

4.4. Can the system identify agents in food samples?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

4.5. Can the system identify agents directly from powder samples, without resuspension into liquid or aerosolization?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

5. BIOLOGICAL SENSITIVITY AND DETECTION

5.1. Given a sample of bacterial agent in phosphate buffered saline, please choose the approximate sensitivity or limit of detection of your system.

a. 1-100 colony forming units (CFU) per mL of original sample
b. 100-1,000 CFU per mL of original sample
c. 1,000-10,000 CFU per mL of original sample
d. 10,000-100,000 CFU per mL of original sample
e. Greater than 100,000 CFU per mL of original sample
f. Not applicable to this system

5.2. Given a sample of viral agent in phosphate buffered saline, please choose the approximate sensitivity or limit of detection of your system.

a. 1-100 plaque forming units (PFU) per mL of original sample
b. 100-1,000 PFU per mL of original sample
c. 1,000-10,000 PFU per mL of original sample
d. 10,000-100,000 PFU per mL of original sample
e. Greater than 100,000 PFU per mL of original sample
f. Not applicable to this system

5.3. Given a sample of toxin in phosphate buffered saline, please choose the approximate sensitivity or limit of detection of your system.

a. Less than 1 nanogram (ng) per mL
b. 1-100 nanograms (ng) per mL
c. 100-1,000 ng per mL
d. 1,000-10,000 ng per mL
e. 10,000-100,000 ng per mL
f. Greater than 100,000 ng per mL
g. Not applicable to this system

5.4. Can the system identify agents in blood samples?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d Not possible for the system to achieve the capability

5.5. Can the system identify agents in nasal and throat swab samples?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

5.6. Can the system identify agents in stool samples?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

5.7. Can the system identify agents in urine samples?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

5.8. Can the system identify agents in patient wound samples?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

5.9. Please choose the best response in regards to the lysis of spores by the device or system?

a. Spore lysis not necessary for detection by system
b. Fully automated spore lysis
c. Semi-automated spore lysis
d. Add on capability that is full or semi-automated for spore lysis
e. Manual kit not integrated with the system handles spore lysis
f. System does not detect spores

5.10. Can the system identify agents in insect, and other arthropod vector samples?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

5.11. Can the system identify bacteria?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

5.12. Can the system identify viruses?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

5.13. Can the system identify toxins?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

6. CHEMICAL SENSITIVITY AND DETECTION

6.1. Given a sample of vaporous chemical agent in air, please choose the approximate sensitivity or limit of detection of your system.

a. < 0.000001 mg/m^3
b. 0.000001-0.00003 mg/m^3
c. 0.00003-0.0001 mg/m^3
d. 0.0001 – 0.001 mg/m^3
e. 0.001 – 0.1 mg/mg^3
f. Not applicable to this system or device

6.2. Given a liquid sample of chemical agent, please choose the approximate sensitivity or limit of detection of your system.

a. < 1 part per billion (ppb)
b. 1 ppb – 1 part per million (ppm)
c. 1 ppm – 100 ppm
d. 100 ppm – 1 part per thousand (ppt)
e. > 1 ppt
f. Not applicable to this system or device

6.3. Can the system identify aerosolized chemical agent?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

6.4. Can the system identify liquid chemical agent?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

6.5. Can the system identify chemical agents in human samples, such as blood, saliva and urine?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

7. RADIOLOGICAL SENSITIVITY AND DETECTION

7.1. For radiation detection systems, what will the system display as radiation readings?

a. Total dose, dose rate and count rate with simultaneous display readout and automatic differentiation between types of radiation detected (e.g., gamma vs. neutrons)
b. Total dose, dose rate and count rate with operator selection to show the display, may differentiate between types of radiation
c. Only total dose and dose rate
d. Only total dose and count rate
e. Only dose rate
f. Only count rate

7.2. For dose rate detection systems, how sensitive is the detector?

a. Down to background level radiation (i.e., gamma 1 uR/hr)
b. Display indicates 0 until more than 1 mR/hr is detected
c. Display indicates 0 until more than 1 R/hr is detected
d. This system does not measure dose rate

7.3. For count rate detection systems, how sensitive is the detector?

a. Down to background level radiation, expressed in cpm or similar units
b. Display indicates 0 until more than 1 mR/hr is detected, expressed in cpm or similar units
c. Display indicates 0 until more than 1 R/hr is detected, expressed in cpm or similar units
d. This system does not measure count rate

7.4. Which answer best describes the intended use of your system:

a. System is used for personnel detection
b. System is used for area air sampling
c. System is used for surveying

7.5. Can the system identify radioisotopes in tissue or biological damage caused by radioisotopes?

a. System currently has the capability
b. Efforts are underway to achieve the capability
c. Possible the system could be adapted to achieve capability, with no current efforts at this time
d. Not possible for the system to achieve the capability

7.6. Does the system discriminate between radiation types (e.g. alpha, beta, gamma, neutron, etc)?

a. Alpha, beta, gamma, and neutrons (may require changing probes)
b. Alpha, beta, gamma, but not neutrons (may require changing probes)
c. Gamma and neutrons using internal detectors
d. Beta and gamma only, using internal detectors
e. Gamma only or neutrons only using internal detector

7.7. Does the system identify specific radioisotopes?

a. Yes, with a large library of radioisotopes
b. Yes, with a field library of common radioisotopes
c. No, the system only detects radiation without identifying the radioisotopes

8. SIGNATURE

8.1. Are there sounds, alert tones, or alarms that the detection device or system produces that cannot be deactivated?

a. No
b. Yes

8.2. Is the visualization screen able to be dimmed or turned off?

a. Yes
b. No
c. There is no screen on this device

8.3. What is the thermal output of the system in British Thermal Units (BTU)/hour?

a. Less than 200 BTU/hour
b. Between 200-500 BTU/hour
c. Greater than 500 BTU/hour

9. TRAINING

9.1. What best describes the training necessary for operation of the detection device or system?

a. Very brief (minutes-hours) training and minimal technical skills
b. An afternoon of training and some technical skills required
c. A day of training and technical skills are required
d. More than a day of training and significant technical skills are required

9.2. Please indicate which methods are currently available for training users on the operation of this device: (Answers not scored because this question did not factor into the analysis.)

a. Compact disk or DVD
b. Web-based video
c. Customer site training
d. Manufacturer site training
e. Hard-copy operators manual manuscript
f. Web-based operators manual manuscript

10. MOBILITY

10.1. What are the dimensions (footprint) of the detection device or system? This includes associated computers or other devices required to enable the system to function.

a. Approximately the size of a soda can
b. Approximately the size of a toaster
c. Approximately the size of a carry-on luggage suitcase
d. Approximately the size of a home dishwasher
e. Larger than a home dishwasher

10.2. Select all that apply. Please choose the best response(s) in regards to the ability of the system to withstand transportation when properly packaged according to manufacturer's instructions. If desired, feel free to identify transportation (shock, vibration, dust, water resistance) compliance testing in the Additional Comments section (below).

a. Suitable for transport via commercial carrier such as tractor trailer on paved roads
b. Suitable for transport via tactical military wheeled and tracked vehicle
c. Suitable for transport via fixed wing military aircraft
d. Suitable for transport via rotary wing aircraft
e. Suitable for transport via ship transport

10.3. What is the weight of the detection device or system? (Including any necessary equipment such as adapters, computers, controllers, cables and carrying cases required for transportation.)

a. Less than 1 kg
b. Between 1 and 5 kg
c. Between 5 and 25 kg
d. Between 25 and 50 kg
e. More than 50 kg

10.4. Choose the answer that best represents the system's ability to connect with and transmit data to DoD data networks.

a. Satellite, wireless and wired connections are available
b. Satellite and wired connections are available
c. Wireless and wired connections are available
d. Wired connections are available
e. This system is not capable of transmitting data

10.5. Please describe the computing power necessary to operate and return a response for the system:

a. High end desktop computer
b. Basic desktop computer
c. Laptop computer
d. On board computer chip in the system
e. No computational power needed

11. PHYSICAL SYSTEM REQUIREMENTS

11.1. What is the electrical requirement for the detection device or system NOT including other equipment needed (e.g., centrifuge, shaker, laptop)?

a. There is no electrical requirement
b. System or device uses batteries
c. System or device has 110V electrical requirement
d. System or device has 220V electrical requirement
e. System or device has a greater than 220V electrical requirement
f. System or device requires multiple outlets or a dedicated circuit breaker

11.2. If the system is designed for portable use, how long can it operate on battery power while performing analyses?

a. Not intended for portable use
b. <1 Hour
c. 1–2 Hours
d. 2–4 Hours
e. 4–8 Hours

11.3. Are there water requirements for the device or system?

a. The device or system does not require water
b. The device or system requires water aliquots
c. The device or system requires a continual supply of water

11.4. Are there air or gas requirements of the device or system?

a. The device or system does not require an external air or gas source
b. The device or system requires an external air source
c. The device or system requires an external gas source
d. The device or system requires both an external air and gas source

11.5. Is an external vacuum source required for the operation of the device or system?

a. No
b. Yes

12. SYSTEM MATURITY

12.1. What best describes the maturity of the detection device or system?

a. Is commercially available and meets military specifications
b. Is commercially available
c. A few devices or systems exist (brass board)
d. Only one incomplete device or system exist (bread board)
e. Only a concept on paper exists (white board)

12.2. Has your detection system or device been featured in any peer reviewed scientific publication or independent evaluation?

a. Government testing, third party independent testing and scientific publication
b. Government testing and third party independent testing
c. Government testing and scientific publication
d. Third party independent testing and scientific publication
e. Government testing alone
f. Third party independent testing alone
g. Scientific publication alone

12.3. Please choose the best response in regards to the technology ownership and intellectual property of the device or system?

a. The technology ownership and intellectual property is owned
b. The technology ownership and intellectual property is fully licensed
c. The technology ownership and intellectual property licensing is pending
d. The technology ownership and intellectual property licensing is not possible
e. There is no technology ownership and intellectual property involved

13. SYSTEM MATURITY - COMMERCIALIZATION

13.1. If you answered question 68 with c, d, or e, please estimate the detection system's timeframe to commercialization (release to the commercial market)?

a. Is expected to be ready for commercialization within one calendar year
b. Is expected to be ready for commercialization within two calendar years
c. Is expected to be ready for commercialization within three or more calendar years

13.2. If you answered question 68 with c, d, or e, please estimate the level of further investment required to advance the system or device to the point where it is ready for commercialization.

a. None – it is ready for commercialization
b. < $1,000,000
c. $1,000,000 - $2,000,000
d. > $2,000,000

14. SPEED

14.1. What is the average time to set-up, perform instrument warm-up, or allow the system to auto-calibrate (if required) before the device or system is ready to begin testing?

a. No set-up of the system is required
b. Less than 5 minutes is required
c. 5-10 minutes is required
d. 10-20 minutes is required
e. Greater than 20 minutes is required

14.2. During system operation, what is the down time (clear and reboot time) between the end of an analytical run and the beginning of the next analytical run?

a. Almost instantaneously
b. < 1 minute
c. 1-3 minutes
d. 3-5 minutes
e. < 5 minutes

14.3. Given a sample, which of the following is an appropriate statement regarding the number of manual steps required to perform a single detection assay of one sample (e.g., air sampling, vortexing, heating, washing, degassing etc.)?

a. No steps (automatic)
b. 1-2 steps are required
c. 3-5 steps are required
d. 6-8 steps are required
e. 9-12 steps are required
f. Greater than 12 steps are required

15. OPERATIONAL CONDITIONS

15.1. What is the suggested temperature range that the detection device or system be operated within?

a. Can be used from < -21°C to > 42°C (All temperatures)
b. Can be used from -21°C to 41°C
c. Can be used from 4°C to 41°C
d. Can be used from 4°C to 37°C
e. Can be used from 25°C to 37°C

15.2. What is the minimal level of temperature storage required for the consumable components? (For example, if your system has three components and component A is stored at room temperature, component B is stored at 4°C, and component C must be frozen, you would choose: (d) components must be frozen.)

a. This system does not require consumable components
b. Components must be stored at room temperature (27°C)
c. Components must be stored at 4°C
d. Components must be frozen (20°C)
e. Components must be frozen below 20°C (cryostorage)

15.3. Assuming that the average relative humidity of an indoor laboratory is between 35 to 40 percent, would deviations outside of that range impact the performance of the detection device or system?

a. No, performance is not influenced by relative humidity
b. Yes, device or system has peak performance at normal relative humidity conditions
c. Device must be used in a temperature stable, dry environment for optimum performance
d. Unknown

15.4. When stored at the recommended storage conditions, what is the shelf life of the system reagents or test kits?

a. Greater than 3 years
b. Between 1 to 3 years
c. Between 6 months and 1 year
d. Between 1 to 6 months
e. Less than 1 month
f. There are no system reagents or test kits

16. MAINTENANCE

16.1. How often does the device or system need to be serviced, including scheduled preventive maintenance?

a. Never
b. Less than once a year
c. Once a year
d. Every 6 months
e. More often than every 6 months

16.2. Please choose the most appropriate response in regards to preventative maintenance:

a. Preventive maintenance is not required for this system
b. Preventive maintenance serviceable by customer
c. Preventive maintenance serviceable by service technician only

16.3. Is preventive maintenance included in the warranty by the manufacturer or is a service agreement required?

a. Preventive maintenance is not required for this system
b. Yes it is included
c. No it is not included

16.4. If not disposable or single use, what is the expected life of the device or system? (Assuming the regular manufacturer suggested maintenance is performed.)

a. This system or device is single use and does not have an expected life
b. Greater than 10 years
c. 5-10 years
d. 3-5 years
e. 1-3 years
f. Less than 1 year
g. Unknown

16.5. What is the average time for performing daily quality assurance procedures on the device or system?

a. No daily quality assurance procedures necessary
b. Less than 5 minutes required
c. 5 to 10 minutes required
d. 10 to 20 minutes required
e. Greater than 20 minutes required

16.6. Consider a situation in which during analysis of a test sample an accident occurs resulting in minor contamination of the area where sample is introduced into the device. Choose the best response in regards to the ability to decontaminate the device following that exposure to hazardous agent?

a. The device is single use and disposable so no decontamination is needed
b. Hazardous agent is isolated to discrete elements and/or decontamination requires up to one hour
c. Exposure to hazardous agent would require up to 4 hours to decontaminate
d. Exposure to hazardous agent would require up to 1 day to decontaminate
e. Exposure to hazardous agent would require greater than 2 days to decontaminate
f. It likely that exposure to hazardous agent cannot be decontaminated

17. EASE OF USE

17.1. Can the operator view results during a run in "real-time"?

a. Yes
b. No
c. Not applicable

17.2. If the answer to the above is "yes", can the operator process data from an analysis that is currently in progress?

a. The answer to the above was "no" and this question does not apply
b. Yes
c. No

17.3. Given a raw sample, are there any centrifugation steps during sample preparation which are required for detection?

a. There are no centrifugation steps required
b. There is a single centrifugation step required
c. There are multiple centrifugation steps required

17.4. Given a sample, are there any shaking or vortexing, mixing, degassing, or filtering steps required in sample preparation?

a. There are no shaking or vortexing, mixing, degassing or filtering steps required
b. There is a single shaking or vortexing, mixing, degassing or filtering step required
c. There are multiple shaking or vortexing, mixing, degassing or filtering steps required

17.5. Will the system interpret raw data or call a positive or a negative result through internal software?

a. This capability is currently available
b. This capability could be developed in the future
c. This system is not amenable to his capability

18. INTEROPERABILITY AND SYSTEM COMPLEXITY

18.1. Please choose the appropriate response in the amount of raw data generated from a single analytical run when fully loaded to capacity:

a. > 250 GB
b. 200-249 GB
c. 150-199 GB
d. 100-149 GB
e. < 100 GB or single positive or negative response generated

18.2. Network readiness: is the system designed to be a part of a network and share data among other systems?

a. Yes
b. No

18.3. Can the system be autonomous, run remotely with no direct contact?

a. The system or device is currently fully autonomous
b. The system could easily be adapted into a fully autonomous system
c. The system could be adapted to a fully autonomous system with some effort
d. The system could be adapted to a fully autonomous system with significant effort
e. The system is not capable of autonomy

18.4. Can the system store and record data output from the device or system?

a. The system automatically stores and archives data outputs and creates an electronic record
b. The system will store and archive data outputs but not create an electronic record
c. The system will not store and archive data outputs but will create an electronic record
d. The system could be adapted to store and archive data outputs and create an electronic record
e. The system does not contain internal memory for data storage or electronic record keeping.

18.5. Please choose the most appropriate response in regards to whether your system software is open or closed:

a. The system software is open and available for modification
b. The system software is open but modification requires licensing
c. The system software is closed and not available for modification
d. The system does not employ any software

18.6. Please choose the most appropriate response in regards to whether your system hardware is open or closed:

a. The system hardware is open and available for modification
b. The system hardware is open but modification requires licensing
c. The system hardware is closed and not available for modification
d. The system is single use or this question does not apply to this device

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