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

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COST

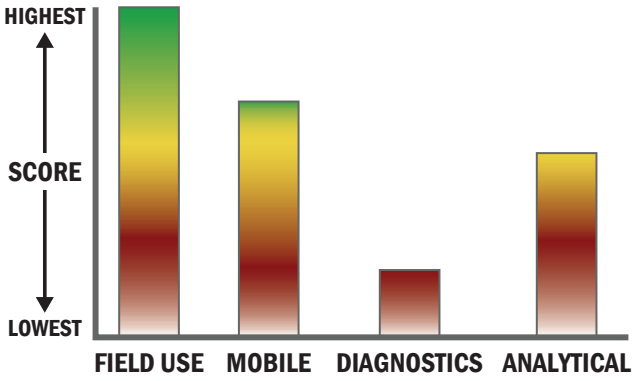
- $120,000/system
- $2.50/analysis

Survey Source

Vendor Supplied Information

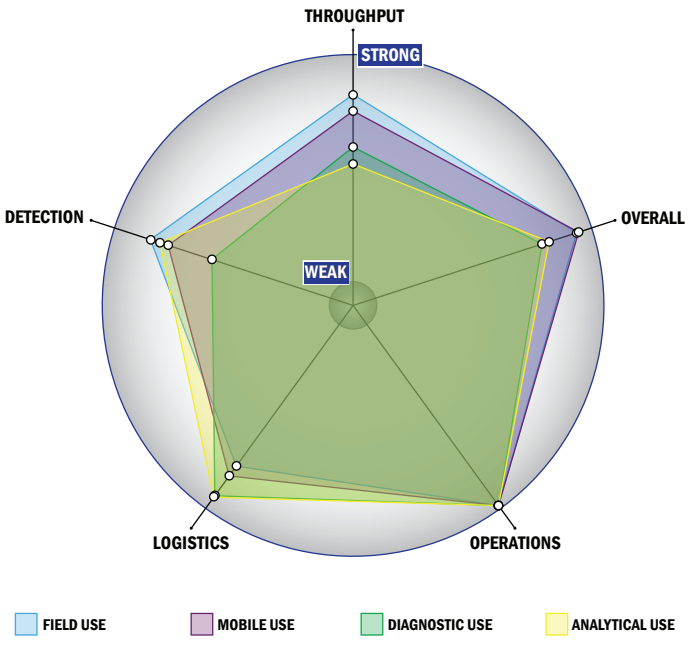
Scoring Analysis

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



Impact Chart

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.



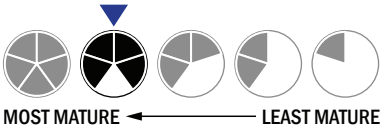
Evaluation Criteria

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
- 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