pBDi

GENERAL DESCRIPTION:

The Bruker pBDi is a portable detection platform for rapid and sensitive on-site identification of biothreat agents. Developed for use by non-scientific personnel, the pBDi is easily operated, even while working in protective equipment under extreme conditions. Fully portable and operating from internal batteries, pBDi can be used in the hot zone. Equally, pBDi can be integrated with various mobile platform solutions, where it can be powered from an external supply. The pBDi employs a sensitive electrochemical biochip technology for multiplex ELISA based (enzyme-linked immunosorbent assay) detection of biothreat agents. The pBDi builds on the technology of the Bruker portable Toxin Detector and offers new features such as integration with a mobile suitcase, battery operation, Bluetooth connection to a ruggedized tablet PC and assays for bacteria, viruses and toxins identification. The system allows biothreat agent detection by first responders after minimal training due to application of ready-to-use kits and a simple workflow. Beside two assay panels for detection of ten proteotoxins, an assay panel for detection of six pathogens is available allowing sensitive biothreat agents detection with a rapid and analysis time of 20 minutes. Additionally, customized assays are also available. Due to high robustness of electrochemical biochip technology towards various interferents only minimal sample preparation is required for a wide range of different sample matrices (liquids, solids, powders, culture, swabs).

TECHNICAL DESCRIPTION:

The Bruker pBDi employs a sensitive electrochemical biochip technology for multiplex ELISA (enzyme-linked immunosorbent assay) based detection of biothreat agents. Capture antibodies immobilized on gold electrodes facilitate the specific binding of corresponding biothreat agents. Detection of bound biothreat agents is realized by application of a detector-antibody-enzyme conjugate and measurement of the electrical current of an enzymatic redox reaction on interdigitated gold array electrodes. The detection event is strongly amplified in this system and allows very sensitive biothreat agent identification in approx. 20 minutes. First, the high turnover of enzymatic reaction contributes to the signal amplification and second, an efficient redox cycling procedure due to ultramicroelectrode structure built into the experimental procedure, provides a second signal amplification.

CONTACT INFORMATION

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COST

- $48,500/system
- ~$60-85/analysis

Tier Selection

Final tier assignment is based on overall product score.

Top Tier Second Tier Third Tier
Fourth Tier Bottom Tier

RANKINGS

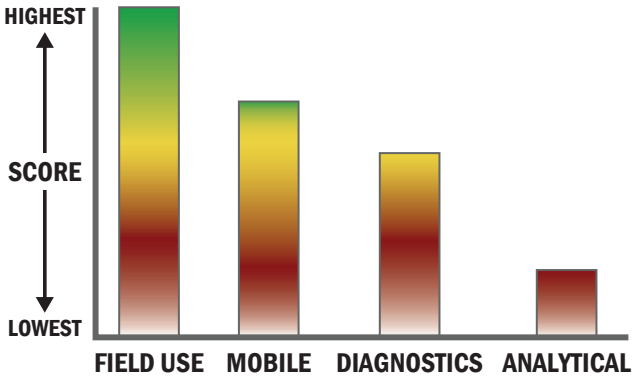
	Biological	Chemical	Radiological
FIELD USE System	Second Tier	N/A	N/A
MOBILE Laboratory	Second Tier	N/A	N/A
DIAGNOSTIC Laboratory	Second Tier	N/A	N/A
ANALYTICAL Laboratory	Second Tier	N/A	N/A

Survey Source

Vendor Supplied Information

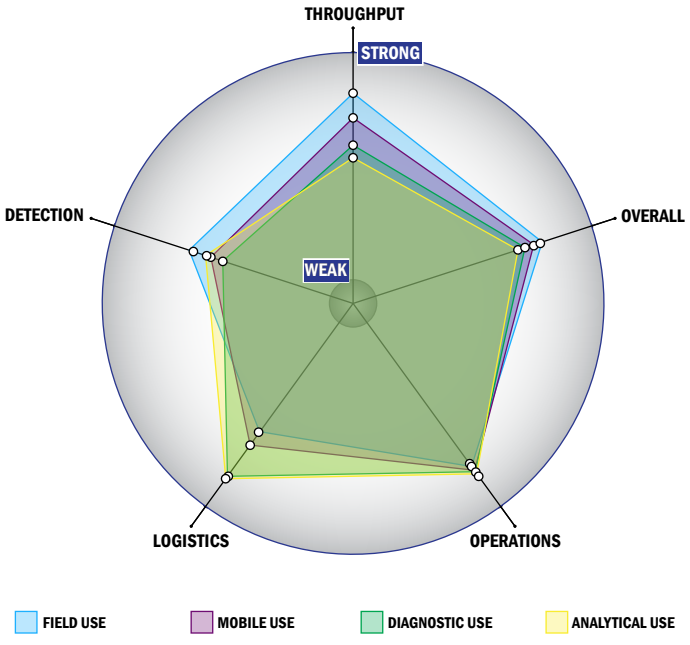
Scoring Analysis

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



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.



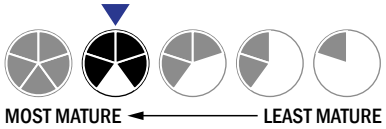
Evaluation Criteria

Throughput:

- Between 15 and 30 minutes for detection
- 1 sample, >10 tests/ sample per run
- Less than 32 samples every 2 hour
- 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 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 4 °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 closed and not available for modification
- The system hardware is closed and not available for modification

Detection:

- Possible the system could receive 510K clearance
- Less than 10 µl
- Excellent specificity. System has occasional false alarms
- mg/m^3