NEXT GENERATION BIOLOGICAL IDENTIFICATION SYSTEM

Battelle's REBS (Resource Effective Bioidentification System) represents a major breakthrough in biological defense. It's a highly cost-efficient system providing unprecedented accuracy, reliability, and flexibility across applications.

THE CHALLENGE

The ever-evolving threat of biological pathogens warfare continues to be a primary concern for military – and security personnel.

The first and most critical step is detecting and identifying such pathogens. But this is a challenge that conventional solutions have been unable to meet, for a number of reasons – most notably, their inability to identify more than a handful of pathogens, their unacceptably high false-positive rates, and their need for costly consumables that make continuous monitoring unaffordable.

THE SOLUTION: REBS

REBS is a fully automated solution that overcomes these challenges and more, all without expensive liquid reagents requiring cold storage logistics. With leapfrog improvements in technology, it's able to detect, identify and enumerate hundreds of biological and pathogens.

- **Accurate:** REBS continuously collects samples and automatically analyses the environment for pathogens ranging from bacteria, viruses and toxins and even mixed threats.

By combining patented aerosol collection and optical spectroscopy, REBS accomplishes this with new levels of accuracy, sensitivity, and speed, as well as near-zero false alarms.

The REBS performance has been demonstrated in multiple government and independent trials with "live" biological-agents and with agent simulants in realistic environments including an extended operation in the Boston subway. A government test with selected biological agents reported an average REBS probability of identification of 150 PPL for bacteria, 130 PPL for toxins, 190 PPL for viruses, with a 22 minute average time to alarm for all targets. Similar results have been obtained for other threats.

- **Fast and flexible:** Out of the box, REBS is capable of identifying over 100 pathogens in less than 30 minutes. Its architecture accommodates remote addition of new threats via simple software updates – achievable within 24 hours of initial sample capture and analysis. And an optional liquid-sample processing mode is available for analysis of aqueous solutions.

AUTONOMOUS IDENTIFICATION WITHOUT LABORATORY SUPPORT
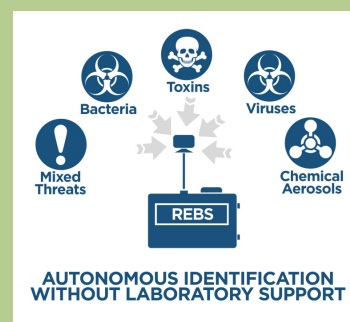
REBS delivers

- Rapid and autonomous identification of an ever-expanding list of pathogens
- Low false positive rate
- Operation in a wide range of temperatures with no liquid consumables and no perishable reagents
- Dramatically reduced consumable costs of about $20/month and analyses completed at about $.04 per assay

REBS also offers flexibility even after it has identified a pathogen. Its non-destructive analysis and automatic archiving capabilities support seamless integration into high-level biosurveillance operations for confirmatory, diagnostic and attribution analyses. This means that the samples it collects can be further analyzed to support attribution and medical diagnostic efforts.

- **Practical:** Compact enough for one-person portability and handling, this battery-powered system is practical in virtually any environment. For instance, it can be used in reconnaissance, fixed-site applications, or both. REBS can serve as a single-point ID device, or as part of a sensor array in networks of hundreds of systems per command post.

Whatever the application, REBS provides autonomous and continuous, battery powered operation for missions lasting up to 18 hours. And its ruggedized design will withstand dirt, dust and rain.

- **Cost-effective:** REBS is also exceptionally cost-effective compared to other current technologies. REBS does not require expensive reagents, special handling, refrigeration, or laboratory support. Its operating costs are about $1 per day (compared to currently fielded system operating costs that can range from $500 - $3,000 per day), and assay costs of just $.04 cents per sample (compared to current systems at over $100 per sample). With its very low life cycle cost, protection can be improved through utilization of additional units.

Moreover, REBS is a one-box solution that is simple to set up, operate, and maintain. It takes only a few hours to train personnel to provide whatever service this system could ever require.

SPECIFICATIONS

Performance
- Continuously samples and autonomously analyzes liquid, solid and aerosolized bacteria, viruses, toxins, and persistent chemical aerosols in ambient conditions.
- Takes spectral measurements of individual micron-sized cells/particles
- Identifies threats via spectral comparisons to threat databases, rapidly upgradeable within 24 hours for identifying emerging pathogens
- Non-destructively archives analyzed samples for confirmatory analysis (PCR compatible)
- Demonstrated sensitivity: 150–200 PPL
- Identification false positive rate: ≤ 0.001%
- Time to alarm: 20–30 minutes

Biological materials detected
100+, including most of the Center for Disease Control's Biohazard Tier A and B pathogens.

Physical characteristics
- Man-portable
- Size (w × d × h), volume 18" × 12" × 12", 1.5 ft^3
- Weight 35 lb
- Batteries BA-2590 (internal) provides up to 18 hours of operation,
- Voltage input 24–28 VDC, 110–240 VAC 50–60 Hz
- Facility 108-240 VAC 47/63 Hz
- User interface wireless remote command and control
- Keypad with LED indicators, Audible alarm
- Operating temperature 0°C to 50°C
- Storage temperature -40°C to 70°C

External communications
- RJ-45 Ethernet 900MHz RF wireless
- Ethernet bridge frequency hopping
- 903.xx MHz
- 128-bit AES encryption
- GPS (MGRS, Lat/Long optional)
- Meteorological sensor (wind speed, temperature, humidity)