

# 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 warfare continues to be a primary concern and challenge for the nation. However, this is a challenge that conventional solutions have been unable to meet, for a number of reasons—most notably, limited ability to identify more than a handful of pathogens, unacceptably high false-positive rates, and need for costly consumables that make continuous monitoring unaffordable.

## THE SOLUTION: REBS

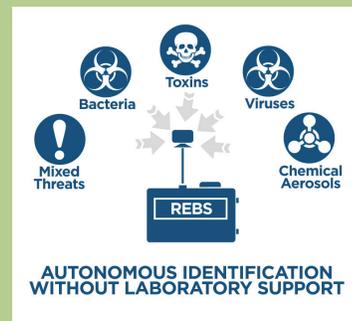
REBS is a fully automated solution that overcomes these challenges and more, all without expensive liquid reagents requiring cold storage logistics. With leapfrog improvements in technology, REBS is able to detect, identify and quantify hundreds of biological pathogens.

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

By combining patented aerosol collection and optical spectroscopy technologies, 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 operational environments including an extended operation in mass transit systems. A government test with selected biological agents reported an average REBS probability of identification of 150 PPL for bacteria, 130 PPL for toxins, and 190 PPL for viruses, with a 22-minute average time to alarm for all targets.

- **Fast and flexible:** Out of the box, REBS is capable of identifying hundreds of pathogens. 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.



## REBS delivers

- Rapid and autonomous identification of an ever-expanding list of pathogens
- Near zero false positive rate
- Operation in a wide range of temperatures with no liquid consumables and no perishable reagents
- Dramatically reduced life-cycle cost through reduction of operational and sustainment expense



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 ready for virtually any environment. For instance, it can be used in reconnaissance, fixed-site applications, or both. REBS can serve as a single-point identification 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 operation for missions lasting up to 24 days. And its ruggedized design will withstand the most austere environments.

- **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 500 times less per day (compared to currently fielded system operating costs) and assay costs of pennies per sample. With its very low life cycle cost, protection zones can be expanded over larger areas because the operational expense is scaleable and affordable.

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.



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## SPECIFICATIONS

### Performance

- Continuously samples and autonomously analyzes aerosolized bacteria, viruses, toxins and persistent chemical aerosols from the ambient environment
- Takes spectral measurements of individual 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:  $<1 \times 10^{-5}$
- Time to alarm: 20–30 minutes

### Biological materials detected

100+, including most of the CDC's Biohazard Tier A and B pathogens.

### Physical characteristics

- Man-portable
- Size (1.5' x 1.5' x 2'), volume 0.45 x 0.31 x 0.31 M, 0.04 M<sup>3</sup>
- Weight 19 kg lb
- Batteries BA-2590 (internal), BA-5590 (external) for 18 hours of autonomous battery powered 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 -12°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)