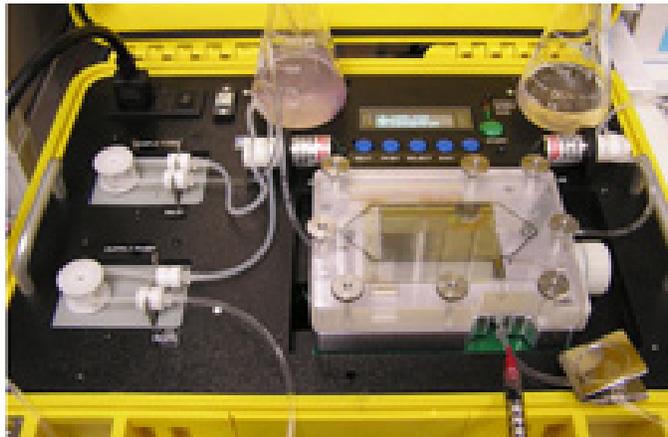


U.S. Army: Turning a bio-agent detection concept into a field-ready prototype



OVERVIEW:

Situation Analysis

The U.S. Army required methods for detecting anthrax (*Bacillus anthracis*) and other life-threatening bioagents in fluids, and had developed highly sensitive detection technologies that worked well in the laboratory. However, these novel technologies did not work well with real-world field samples such as river water, since particles of interest usually are dispersed well below detection limits. To meet the U.S. Government's water-safety standard, particles had to be sampled from at least 1000 liters of source water at a concentration factor of 1 million. By filtering organic debris, the Government was able to concentrate dilute fluid samples to a factor of 10,000 – but still needed to concentrate the samples by at least one hundred times.

Solution

The U.S. Government funded PARC scientists to develop a portable bioagent concentrator device that could close this sample-concentration gap (10,000x to 1,000,000x). With deep roots in the translation of abstract physics concepts into real-world industry applications, PARC already possessed core expertise in particle manipulation, microfluidics, and MEMS – honed through years of controlling and transporting toner particles for Xerox printers.



Process

Within an accelerated timeframe, PARC completed the project, which comprised three phases:

1. Feasibility – designing the traveling-wave chip and transport mechanisms, developing anti-fouling techniques to prevent particle loss from adhesion to surfaces, and demonstrating proof of concept;
2. Scalability – expanding a single chip into an array, and integrating it into a system;
3. Prototyping & Fabrication – configuring and assembling the device for field testing, including a single-button user interface, key system extensions, and packaging.

Results

The U.S. Army received a set of fully functional, field-ready prototype units. PARC designed, fabricated, assembled, and tested the complete bio-agent concentration kits and included all necessary hardware, software, electronics, operator interfaces, and waterproof, hard cases for portability.

By using PARC's bioagent concentration technology, the U.S. Government was able to achieve the required 100x concentration factor for detecting waterborne particles in the threat range of 1-10 microns (while building on the existing, novel particle-detection technology). PARC's portable, low-power, compact bioagent concentrator technology was practical for field use, provided increased sensitivity, and allowed test samples to exceed the limit of detection (LOD) – resulting in lower false positives.

More Information

Business Development
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A global center for commercial innovation, PARC (Palo Alto Research Center, Inc.) works closely with enterprises, entrepreneurs, government program partners and other clients to discover, develop, and deliver new business opportunities. Previously known as "Xerox PARC," PARC was incorporated in 2002 as a wholly owned subsidiary of Xerox Corporation (NYSE: XRX).