



*Available for licensing, PNNL's VitalTag technology will keep first responders connected to their patients in a mass casualty incident via a disposable sensor suite that communicates wirelessly to a mobile app and the command center. The fielded prototype has not been approved by the FDA.*

## VITALTAG

*Wearable health monitor wirelessly sends patient's vital signs in mass casualty incidents*

### NEXT-GENERATION PATIENT MONITORING

First responders can easily be overwhelmed by the sheer number of victims when mass casualty incidents occur—such as shootings, earthquakes, or multiple car pile-ups. When every second counts, monitoring all victims in chaotic situations like these can be difficult. Researchers at Pacific Northwest National Laboratory developed a stick-on sensor suite that measures and tracks a patient's vital signs to help first responders quickly triage, treat, and transport the injured.

The patent-pending VitalTag is a low-cost disposable sensor suite that detects, monitors, and wirelessly transmits systolic blood pressure, heart rate, respiration rate, pulse oximetry, and single lead electrocardiogram to a mobile app or the command center. VitalTag can also determine the patient's shock index.

What makes VitalTag such a beneficial technology is that it allows first responders to see each patient's medical status and location throughout the scene. If a patient's status changes, the system alerts

### TECHNOLOGY FEATURES

- Securely detects and communicates electrocardiogram, body temperature, respiratory rates, pulse-oximeter, and blood pressure
- More patients can be monitored simultaneously and continuously
- Emergency personnel can better monitor patients at the scene and during transport
- Incident commanders have a better “big picture” view of the scene
- Hospitals can better determine where to send patients
- Ambulance operators can more easily monitor patients simultaneously



*With VitalTag, more patients can be monitored simultaneously and continuously.*

responders so they can quickly locate the patient and provide care.

## AN EMERGING TECHNOLOGY CRITICAL TO FIRST RESPONDERS

VitalTag—developed with funding from the Department of Homeland Security Science and Technology Directorate program called the Responder Technology Alliance—was engineered with the first responder in mind. Using machine learning algorithms to interact with sensor hardware, PNNL researchers created an intuitive user interface that helps first responders do more.

The technology includes these components:

- The patient monitoring sticker—an embedded system device comprised of multiple sensors
- Algorithms, firmware, and an embedded operating system
- A data-acquisition system, including database and webserver
- Monitoring devices, which can be any internet-enabled mobile device.

VitalTag consolidates expensive and bulky emergency response equipment into a wearable medical device that allows simultaneous monitoring of multiple patients, enhancing responders' situational awareness and improving resource management.

VitalTag offers benefits to the first responder, the hospital staff, and everyone in between.

- **Emergency medical technicians:** Responders connect wirelessly to each patient to prioritize the

most severe cases and monitor others. Once tags are affixed and transmitting data, new responders coming on scene will be prepared and ready to respond. During transport, VitalTag keeps working, helping medics manage multiple patients.

- **Incident commanders:** VitalTag provides a “big picture” view of the status and location of patients at a scene, enhancing situational awareness, and improving resource management.
- **Hospitals:** With the data from VitalTag, hospital staff can determine where to send patients, mobilize the right personnel, and prepare resources before patients arrive.
- **Ambulance operators:** Incorporating the cost-effective VitalTag with on-board, life-support equipment will give the capability to simultaneously monitor more patients than ever before.

## INDUSTRY APPLICATIONS

In addition to emergency situations, VitalTag is versatile and adaptable to a range of applications, including monitoring the following.

- Military warfighters
- Medically vulnerable populations during evacuations of health care facilities
- Veterinary medicine

## AVAILABLE FOR LICENSING

VitalTag is available for licensing in all industry applications. Researchers also are looking for partners to participate in a pilot to further test the technology in real-world applications.

## LET'S CONNECT

If you have questions, regarding this technology, please send inquiries to [commercialization@pnnl.gov](mailto:commercialization@pnnl.gov). You can view all PNNL technologies available for licensing at [www.pnnl.gov/available-technologies](http://www.pnnl.gov/available-technologies).