



## AROUND THE REGION IN HOMELAND SECURITY

The Northwest Regional Technology Center (NWRTC) is a virtual resource center, operated by the Pacific Northwest National Laboratory (PNNL), to support regional preparedness, resiliency, response, and recovery. The center enables homeland security solutions for emergency responder communities and federal, state, and local stakeholders in the Northwest.

### UPCOMING EVENTS

- Sept. 21, 2015 – [Washington Emergency Public Information Network 2015 Fall Workshop](#), Vancouver, WA
- Sept. 26-Oct. 2, 2015 – [National Safety Council Congress & EXPO](#), Atlanta, GA
- Sept. 29-30, 2015 – [International City, County, Managers Association \(ICMA\) Annual Meeting 2015](#), Seattle, WA
- Oct. 7-9, 2015 – [10<sup>th</sup> Annual Homeland Security Week](#), Arlington, VA

### CONTACT

- Want to know more? Visit us on the web at <http://nwrtp.pnnl.gov>
- Contact the NWRTC with questions and comments at [nwrtp@pnnl.gov](mailto:nwrtp@pnnl.gov).

## REPORT HIGHLIGHTS WEARABLE SENSORS IN RESPONDER HEALTH MONITORING

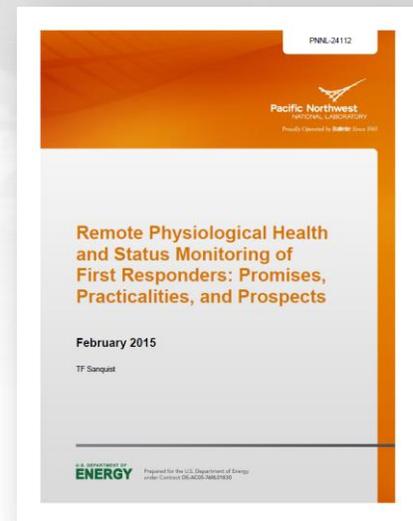
Wearable devices seem to measure everything these days—heart rate, breathing rate, blood pressure, hydration, and so on. But what do we do with all of that information? PNNL is exploring how data from wearable physiological sensors can translate into solutions for first responders.

PNNL Scientist Dr. Thomas Sanquist is researching the state of the art in wearable physiological health sensors and how analytics capabilities can use the resulting data to benefit first responder operations. The ability to record and transmit physiological variables from first responders has been available for a considerable period of time but has yet to be incorporated as a routine aspect of the job.

“Given the recent advances in sensors and wearables devices, we are exploring how to use the data to draw reliable inferences about an individual’s health status or performance and how that translates into practical solutions that transform responders’ health and safety in the field.”

Dr. Sanquist’s research explores several areas of interest regarding

*(continued on pg. 2)*



remote physiological monitoring for first responders including:

- Remote monitoring of cardiac parameters, heat stress, and dehydration
- Software algorithms and outcome measures for physiological signals
- Conditions routinely encountered in firefighting operations (i.e., near- or supra-maximal heart rate, increased core temperature, and dehydration)
- Operational personnel's awareness of levels of exertion, heat stress, and dehydration when measured by self-report
- Physiological impacts of operational demands on workers' cognitive functioning
- Awareness-based models of physiological and cognitive performance

This research is part of the [Responder Technology Alliance \(RTA\)](#), established by Department of Homeland Security (DHS) Science and Technology Directorate's (S&T) First Responders Group to bring together first responders, industry, federal agencies, research institutions, investors, and academia to focus resources on difficult long-term technology challenges and develop a practical vision of the Responder of the Future. PNNL is conducting the initial visioning, research, and development for an integrated responder system to include body-worn electronics, advanced sensors, integrated voice and data communications, and multi-threat personal protective equipment.

The results of Dr. Sanquist's research are reported in "[Remote Physiological Health and Status Monitoring of First Responders: Promises, Practicalities, and Prospects](#)," available on the [NWRTC web site](#). Dr. Sanquist and his team are now preparing a report about the impact of wearables on attention and decision making, to be published later this year.

## WORKSHOPS INVITE RESPONDER FEEDBACK ON TECH PROTOTYPES

In July, the RTA hosted a series of technology workshops in Boston and New York. The workshops brought together first responders to invite their

feedback on prototype protective garments, sensors, automated systems, and communication technologies.

The workshops are a follow-up to the technology visioning workshops the RTA held earlier this year.

"It is almost revolutionary to include the actual end users this early in the process. We are very pleased to participate in the workshops," said John Esposito, Deputy Chief, New York City Fire Department.

The RTA will incorporate the first responders' feedback into its next iteration of technology prototypes and outreach materials to be developed later this year.

"We are relying on users' feedback to drive the design of next-generation solutions to ensure that resulting products make them be safer and more efficient in the field," said Steve Stein, PNNL RTA Program Manager.

## PILOT EXPLORES INTERNET OF THINGS FOR FIRST RESPONDERS

DHS S&T recently launched the Incident Management Information Sharing (IMIS) Internet of Things Pilot to apply the Internet of Things (IoT) to improve first responders' situational awareness during emergencies. The IoT refers to the growing sensing and data sharing capabilities available over a network. The IMIS IoT Pilot is aimed at harnessing the potential of the IoT as part of the [DHS Next Generation First Responder \(NGFR\) Apex program](#), with a goal to develop and demonstrate a prototype IMIS IoT architecture tailored to the real-world requirements of the emergency response community by the end of December 2015. To learn more, visit "[Harnessing the Internet of Things for First Responder](#)" on the [FirstResponder.gov blog](#).

