

# DHS Science and Technology Directorate

## ChemTag—Personal Chemical Warning Device

### Too many firefighters lose their lives or are seriously injured due to toxic chemical exposure

In 2010, more than 25 firefighters lost their lives as a result of toxic chemical exposure. More than 25,000 additional responders suffered serious injury, requiring medical attention and rehabilitation. Firefighters and emergency medical services personnel regularly encounter chemical threats when responding to everyday incidents. Sometimes the threats are obvious or are due to the nature of the response location, as is the case in commercial or industrial fires. Other times, toxic chemicals disperse as materials burn or as chemical containers breach without warning. Numerous encounters can occur during clean-up operations or service calls. Regardless of the situation, the detection of toxic chemicals can save lives.

Certified and reliable personal single- and multi-gas detectors can be used for many applications; however, they are expensive and cumbersome to deploy, making it difficult to cover many response scenarios.

### ChemTag provides the response community with a personal chemical warning device

With guidance from the Department of Homeland Security (DHS) First Responder Resource Group (FRRG), the Science and Technology Directorate's (S&T) First Responders Group and the Homeland Security Advanced Research Projects Agency (HSARPA) initiated the ChemTag program to provide responders with a personal chemical warning device. The device will be ruggedized to operate in the harsh environments faced by responders without hindering the life-saving support they provide. ChemTags will be low-cost, user-friendly devices that notify the responder of a dangerous chemical environment by alarming on standard National Institute for Occupational Safety and Health Permissible Exposure Limits. First-generation products will detect carbon monoxide, oxygen, hydrogen cyanide and methane.

### Critical partnerships have been formed to pilot and evaluate

HSARPA funded early work in miniaturized, low-power chemical detection through S&T's Small Business Innovation Research (SBIR) program, resulting in the

development of ChemTag. The Los Angeles Fire Department, the Los Angeles Police Department, and the Chicago Fire Department (members of the FRRG) will participate in a pilot evaluation of cellular phone-based chemical detectors as part of the DHS Cell-All program, which will include ChemTag. The ChemTag pilots are critical to ensuring product functionality and on-the-scene effectiveness.

### Low-cost device to be developed

Synkera Technologies, Inc. will use S&T's SBIR technology in conjunction with a first responder safety technology



ChemTag Device Concept Model

to develop a low-cost device. Synkera's MikroKera™ Ultra sensors (developed with SBIR funding) will be repackaged into a smaller form that leads to new low-cost commercial devices. These devices will enhance responders' situational awareness by identifying potentially dangerous chemical situations, saving lives and preventing injuries.

Beta-prototype devices are expected to be available in late 2014. In parallel with field deployment and performance testing, certification testing will be carried out in the second half of 2014. Upon completion of field performance testing and certification testing, commercial ChemTags will be made available for purchase.



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To learn more about ChemTag, contact [SandTFRG@hq.dhs.gov](mailto:SandTFRG@hq.dhs.gov).