

CASE STUDY

The Evolving Threat Landscape First Responders Encounter: How New Technology Enhances Downrange Capabilities

The Rise of Kitchen Menace

The unfortunate onset of extremist activity both domestically and abroad presents an increasing need for CBRNE detection tools that can adapt and evolve with modern threats. One example of the changing threat landscape is the rapid uptick in what the industry refers to as “kitchen menace,” where individuals combine supplies commonly available at hardware stores to create weapons of mass destruction. While many chemicals found in stores are traditionally used for industrial purposes, some perform double-duty as household cleaning agents and – when introduced to the perfect mate – can become explosives, poisons or intoxicants. The combination of these chemicals can produce dangerous and sometimes deadly reactions. The internet offers access to a world of how-to information on making homemade explosives, poisons and worse. As a result, law enforcement and emergency response organizations have their work cut out for them as they try to stay one step ahead of the threats. In many cases, they have fallen behind the threat because they lack the technology required for specific hazard detection and identification.

Changing Geopolitical Climate Poses a Threat to Communities

There are a number of real world scenarios which demonstrate this uptick in “kitchen menace” such as the Boston Marathon bombing in 2013, when two pressure cooker bombs exploded at the finish line. Both of the improvised explosive devices were manufactured by the bombers, who found instructions in an online magazine. In 1995, cult members released a deadly sarin nerve gas in Tokyo’s subway system during rush hour. Dubbed the worst incident in modern Japanese history, it was later determined that the cult had not only created the sarin gas used in the subway attacks, but had also committed previous chemical and biological weapons attacks.

In recent years, criminals have also been using a white crystalline powder with a strong chemical odor called triacetone triperoxide (TATP) much more frequently to create these weapons. Whether it’s a hobbyist looking to create fireworks or a fascination with the chemical process, the creation of TATP is no accident. TATP is attractive to terrorists for a number of reasons. Not only is it easy to make and hard to detect, but it is also incredibly unstable. TATP can be manufactured quickly with products found in local pharmacies, even by someone with little bomb-making experience.

The Brussels attack in March 2016 is the most recent example of criminals using TATP as their weapon of choice. On the morning of March 22, 2016, three suicide bombers coordinated nail bombings throughout the city, leaving 33 people dead and more than 300 injured. Belgian officials later discovered 15 kilos of TATP explosives at the house allegedly used by the suspected attackers at the airport in Brussels. What these incidents signify is the imminent need to equip first responders with modern advanced analytical capabilities that provide actionable answers at the scene.

The Need for Something New

First responder communities recognize that presently deployed technologies for threat detection and identification struggle to keep pace with the increasing range of chemical threats that can be employed. For example, one reason TATP is so difficult to detect is because it does not contain nitrogen, a key component of homemade fertilizer bombs that security scanners are now very good at detecting. Widely deployed technologies traditionally used to detect or identify these threats – such as Ion Mobility Spectrometry (IMS), Raman, and Fourier Transform Infrared Spectroscopy (FTIR) – fulfill their purposes, but no single technique or approach can handle the wide array of challenges faced today. Although the responder toolkit is robust, gaps remain for downrange chemical identification. This is why a combination that mixes legacy tools with newer, innovative ones that are designed to keep pace with the expanding and evolving list of chemicals, is so vital.



Photo courtesy of The Patriot Ledger.

“M908’s trace capabilities and ability to identify priority threats, or rule them out at the scene, made it a critical tool for our downrange operations”

- Sgt. William P. Qualls
Bomb Squad Commander of Massachusetts

CASE STUDY

The Evolving Threat Landscape First Responders Encounter: How New Technology Enhances Downrange Capabilities

One example of a community taking action in response to this dramatic change can be found in the State of Massachusetts. The Boston Marathon bombing was a catalyst for the State of Massachusetts' Hazardous Materials Emergency Response Division altering their response strategy and purchasing a total of eleven M908™ devices. With this purchase, the devices are now being used for routine response and large-scale events throughout the state such as Fourth of July celebrations, Patriot's Day events and the last two Boston Marathons, arming response teams with enhanced chemical threat detection capabilities.

"In recent years, there has definitely been an increase in the number of homemade bombs the teams are encountering right here in the State of Massachusetts," said Sgt. William P. Qualls, Bomb Squad Commander of Massachusetts. "With this change, it was clear that we needed to incorporate new tools into our responder's toolkits that expanded their capabilities while in the field. M908's trace capabilities and ability to identify priority threats, or rule them out at the scene, made it a critical tool for our downrange operations."

"With the help of M908, responders were able to positively identify TATP at the scene, of this Quincy, MA residence in 2015"

Shortly after the units were deployed, the team had the opportunity to put M908 to use when a 2002 Toyota Camry exploded in Quincy – a town just 10 miles south of Boston. Investigators later removed 14 liquids and powders from the car. At first glance, the items in the car appeared to be a collection of potential precursor materials. Upon further investigation of the driver's home, squad members identified a series of precursor components, detonators, and multiple destructive devices. With the help of M908, responders were able to make a positive TATP identification at the scene, determining that the components and ingredients found in the house and the car were likely intended for nefarious use.

Putting Together the Puzzle Pieces

The need for more diverse and innovative technologies in the field is being driven by the increased risk and varying degree of CBRNE threats that require immediate and accurate detection. New technologies that can keep pace with the homemade, off-the-shelf chemicals that are beyond what responders have historically encountered are no longer simply nice to have—they are a must. Together the right tools enable responders to quickly and safely identify harmful substances and continue to conduct analysis on seen and unseen targets to discern threats and protect lives. The State of Massachusetts Hazardous Materials Emergency Response Division is just one example. They knew that they needed a stronger combination of technologies to help them put together seemingly disparate and harmless puzzle pieces at the scene. What the team was looking for was a reliable, handheld mass spec device. What they received was a device that is selective and sensitive enough to help the team solve the puzzle faster, safer and smarter than ever before.

908 Devices

+1.857.254.1500 | M908@908devices.com

www.908devices.com

M908 is subject to export controls including those of the Export Administration Regulations of the U.S. Department of Commerce, which may restrict or require licenses for the export of product from the United States and their re-export to and from other countries. Patented technology www.908devices.com/patents
© 2016 908 Devices



M908 allows for continuous monitoring of potential hazards.

Why M908 is a Game Changer

M908 was purpose-built to fill technology gaps and meet the needs of today's response mission. Mass spectrometry's ability to continually detect new threat targets enables agencies like the State of Massachusetts' Hazardous Materials Emergency Response Division to evolve with new threats. M908 adds the ability to detect and identify threat materials that were previously undetectable with legacy technologies. Additionally, the ability to see threat targets at trace or near-trace levels, and in the presence of interferents, allows M908 to work in the complicated, real-world environments that responders regularly face. All of this is done with impressive speed and ease-of-use. For state, local, federal and foreign government agencies as well as civilian and military organizations worldwide who are responsible for CBRNE threat detection and HazMat response, M908 gets them in and out faster. Additional benefits offered by M908 include:

- **Expanding the Toolkit** - M908 complements the capabilities of other fielded tools such as IMS, Raman and FTIR devices by adding focused chemical analysis capabilities to the survey mission.
- **Multiphase. Multimode. Multimission.** - M908 uses a targeted threat list to enable rapid analysis of priority chemical agents, toxic industrial chemicals, precursors and more.
- **Easy to Use** - Unlike conventional mass spectrometry devices, M908 is simple-to-use and requires little to no training. The software interface was designed with clarity and simplicity in mind.

