

Finding the radioactive needle in a haystack

Law enforcement and emergency response teams tasked with public safety at large events have an array of potential security threats to consider for their concept of operations (CONOPS) – whether patrolling in and around a venue or spread across a dynamic crowd setting.

When it comes to the detection and identification of radioactive materials that could be used for malicious intent, those teams are often seeking a needle in a haystack. To do the job right, however, they need to identify where the haystack is before even considering a plan for finding the needle.

Innovative, portable radiation detection instrumentation is vital, but ensuring that on-site teams are equipped with the correct equipment requires a strategic approach. Today, a single, well-trained and well-equipped radiation technician can detect radiation, identify the source, determine the threat level and initiate a response plan, all within minutes and without creating widespread panic across the event landscape. That technician can walk the crowd with a highly sensitive radiation detection backpack and a pager-sized, belt-worn spectroscopic detector, with the goal of finding the haystack and the needle.



The Setting

A special operations technician from the local fire department patrols a parking lot with a single spectroscopic backpack intended for detection and identification of radiation. It is one hour prior to the start of a championship game expected to draw 80,000 spectators. Many of them are enjoying the lively pre-game atmosphere. Some spectators are beginning to move toward the stadium; others are tailgating close to their vehicles; a few toss a football around; cars filled with excited fans continue to enter the lot.

The Challenge

The technician is equipped with a single spectroscopic backpack designed to detect and identify dangerous radiation sources. Unfortunately, the two-in-one capability of a spectroscopic backpack can limit its sensitivity and speed.

As the technician walks around the front entrance of the stadium, the two in one backpacks slower response times result in delays while analyzing spectra for identification. Additionally, the backpack

may miss the radiation source due to higher threshold settings to reduce false alarms.

The Solution

The technician monitoring a stadium parking lot would be best prepared to detect, identify and respond rapidly by wearing a sensitive backpack tuned exclusively for detection of artificial or man-made radiation, along with a belt-worn spectroscopic radiation device for reliable identification and exact location of the source.

Here is what would happen:

- The technician gets an alarm while using the Thermo Scientific PackEye radiation detection backpack.
- Because of the energy windowing capabilities of the patented Natural Background Rejection (NBR) measurement method developed by Thermo Fisher Scientific, the alarm thresholds of the PackEye can be reduced below natural background levels. NBR technology allows the technician to detect artificial gamma radiation from greater distances even when heavily shielded or while moving rapidly. Due to NBR, the likelihood of false alarms is minimized and there is no doubt that radiation of concern is present. The haystack has been located.
- With the RadEye SPRD spectroscopic personal radiation detector attached to the duty belt, the technician can rapidly identify the radioactive material, determining that it is cesium-137, for example. The technician now knows the type of needle that exists in the haystack.
- Acting quickly but without expressing panic with the use of the handheld detector, the technician moves into closer contact with several dozen spectators within the RadEye's range. With the use of the handheld, the technician is able to conveniently determine precisely where the radiation is located. The needle in the haystack has been found.

The Results

Using two distinct tools provides significantly greater flexibility for rapid field-based radiation detection and identification than would a single device. Having two devices can be a cost-



effective solution with up to 15% savings versus a spectroscopic backpack and allows an organization to deploy flexible CONOPS to effectively and safely manage large public events. Whether the organization requires a highly trained technician to manage both detection and identification of a radiation source or deploys a CONOPS with one resource for detection and a more highly trained resource for identification, the PackEye and RadEye combination provides operational flexibility.

In this case, the technician has detected the presence of radiation from a greater distance with the larger detectors contained within the PackEye backpack and the NBR measurement method to minimize any opportunity for a false alarm. The technician has also identified the source with the spectroscopic capability of the RadEye, and determined that it is potentially threatening material. The technician is able to initiate a radiation response plan with urgency, but without alarming the crowd. Instead of allowing the spectator in question to enter the stadium, the technician has contained the situation and detained the spectator.

An additional benefit of using the detection backpack and belt-worn spectroscopic detector is improved reliability. Designed to manage shock, vibration and temperature changes more effectively than a spectroscopic backpack, the PackEye and RadEye SPRD provide longer useful life and no required factory maintenance.

Are you properly-equipped to find the needle in the haystack?

The health and safety of 80,000 spectators can be on the line if event security teams are not equipped properly with reliable, accurate and easy-to-use tools to quickly detect and identify radiation threats.