Proactive Radiological Monitoring Capabilities
Concept Briefing Paper
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Background

The public security environment has changed significantly since September 11, 2001. After the cold war, a new classification of threat has emerged. The new enemies of society are small, insular cells of individuals relying on guerilla and suicide tactics on highly visible and vulnerable targets to achieve their objectives of terror in western society. These terrorist organizations tend to use low cost weapons (box cutters as an example) in very focused attacks on specific targets. The nature of this new threat requires fresh thinking and approaches to anticipating possible threat scenarios and monitoring for those possibilities.

Threat Overview

One of the more worrisome threats known to be contemplated by terrorist organizations is the detonation of a "dirty bomb" in a highly populated area or during a public gathering. In this scenario, a relatively small amount of radiologically active material would be disseminated with the use of traditional high explosives. In such an attack, while the physical destruction would be relatively small and focused in area, the resulting dust and debris plume could potentially contaminate an area of many square miles. The resulting disruption and costs of cleanup could be potentially immense.

As with any threat, the best defensive position is to prevent the attack from taking place in the first place. In the case of a "dirty bomb" attack, prevention may be the only form of defense. In order to prevent this specific type of attack, a system of controls and monitoring devices must be put into place to monitor the movement of radiological materials through access control points (customs, cargo ports, etc.) and to proactively monitor for any concentrations of potentially threatening materials near potential target areas. Fortunately, new technologies have become available the past few months that make it possible to field very sensitive real-time monitoring and detection systems for radiological threats, and incorporate the monitoring platforms into modern command and control dispatch systems.

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System Overview

A radiological monitoring and detection system is comprised of several inter-related components:

- Radiological detection device
- Location tracking device
- Location tracking, visualization, and recording software
- Remote communications platform
- Central dispatch, routing, and incident management software.
- Post event analysis and visualization software

We will review each of these components in turn:

Radiological Monitoring Devices

Radiation monitoring devices are portable units capable of detecting Gamma radiation and distinguishing man made Gamma radiation sources from background radiation because of the particular signature of common man made radiological sources. Typical man made radiological sources include Cs137, Co60, Ir-192, I-125. A radiation monitoring device outputs a data stream of radiation levels to a recording device (typically a laptop PC) at intervals of one second.

Automated Vehicle Location

Automated Vehicle Location (AVL) platforms couple a GPS device with a number of other configurable sensors and communicate packets of location and vehicle analytics back to a control center through radio, cell phone, satellite, or pager communications technology.

In Vehicle Decision Support

In Vehicle Decision Support systems are becoming more common in emergency response deployments. These systems typically consist of a touch screen interactive map interface on a hardened laptop that communicates back to a dispatch center. Locations of situational elements, hazards, traffic impediments, and the locations of other response vehicles can be visualized on a mapping interface in the response vehicle.

Location tracking, visualization, and recording software

Software available in the office or command center to analyze collections of sensor inputs and replay sensor inputs for post situation analysis. These applications can be used to visualize "hot spots" from a vehicle sensor grid pattern, replay situational responses in a compressed time frame, etc.

Remote communications platform

In order to leverage real time AVL technologies and In Vehicle Decision Support, there must be a secure wireless communications platform available. The choice of communications platform will depend on the organization and the operational area that the system must be supported within.

Real Time GIS in the Dispatch Center

When communications platforms and remote sensors have been deployed, it is possible to enable real time situation awareness tools within the dispatch center. These tools can augment existing Computer Aided Dispatch software by providing an interactive map visualization of situation response including positions of situational elements, security elements, response assets, and real time routing capabilities.

Post event analysis and visualization software

By recording all of the sensor inputs into a database, situations can be played back at a later time for analysis. This playback may include a replay of response timing and effectiveness, and may also include the generation of a hazard surface indicating concentrations of radiological exposure or other sensed hazards.

The Implementation Team:

SGCi Penobscot Bay Media is a team of experienced GIS application developers and system integrators that have proven experience deploying remote GIS applications to the response community. We can design a system for your organization that will integrate components from several partner companies:

ESRI – the world's leading GIS technology providers.

Thermo Electron – developers of remote radiological detectors.

Hawkeye Global – developers of highly secure AVL platforms

Creating a vulnerability detection grid

Cities, seaports, airports, large corporate or government complexes and even college and university campuses stand to benefit greatly from the kind of system described in this brief. Utilizing an array of detection devises and customized software in combination with existing security and emergency response personnel, these organizations can create a "detection grid" for threat activity that will greatly enhance their ability to respond swiftly to a terrorist attack or even prevent such an event before it happens.

Attacks are not the only kind of threats such organizations face. An additional benefit of such a system is that it will provide valuable detection capabilities and response information in the event of even accidental occurrences.

Contact

For more information about this paper or other customized emergency response solutions, please contact Penobscot Bay Media, LLC.

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