Chanan Levin discusses the latest challenges faced by EOD operatives working in urban areas, and calls for an international IED database to share research and experience

COLLABORATIVE EOD

In recent years, improvised explosive devices (IEDs) have become more widespread. As terrorist networks grow internationally, extremists from around the world turn to the Internet to learn how to make homemade bombs. Do-it-yourself bomb manuals are becoming more prevalent and sophisticated. What can security authorities do to battle this widening phenomena?

Al-Qaeda recently published detailed instructions online on how to make what they refer to as a "hidden bomb" – a bomb made out of organic materials that could easily get by airport security. The instructions reassure that the bomb is easy to make and can be constructed from household goods without using metal. Al-Qaeda's main goal in publishing these instructions is to enable what they refer to as a "determined Muslim" to prepare the bomb and use it to blow up a passenger airplane. This was published in the same English language magazine that helped the Boston bombers create a bomb from pressure cookers. So, given that the information on how to create IEDs is easily accessible, the materials needed to create the devices can be found in most households and there are enough extremists waiting to commit terrorist attacks, security measures must be – and are being – tightened.

Whether it is the "lone-wolf" attacks of terrorists who come into public places and start shooting, as we saw in January 2015 in Paris, or a bomb placed in a subway station, as in Santiago, Chile in September 2014, terrorism in urban areas is injuring and taking the lives of innocent people and must be stopped. Unfortunately, terrorist gunmen are very difficult to stop and the only way to battle such activity is with reliance on intelligence. IEDs are also hard to combat, but with the right tools, knowhow and awareness (by the public and security officers) they can be detected and neutralised.

No method of detection is foolproof, and there is no technology that can give the ultimate solution for all kinds of terrorist attacks. Several widespread detection tools are commonly used today for bomb detection, including metal detectors, canine units and X-ray devices. Each method has its strengths and weaknesses. Metal detectors, for example, are used in almost every airport security and governmental building. They are a great way to detect metallic components in weapons and devices, but unfortunately the terrorists' bomb-making techniques have improved in recent years and they can be made without metal parts, as demonstrated al-Qaeda's manual.

Dogs are often used to sniff out explosives, but they are usually trained to sniff out only the most popular kinds of explosives. As IEDs become more sophisticated and a greater variety of materials are used to make the bombs, the dogs' explosives detection ability becomes substantially limited. While dogs are and will continue to be widely used for bomb detection, we also have to remember that they tire easily and canine errors do occur.

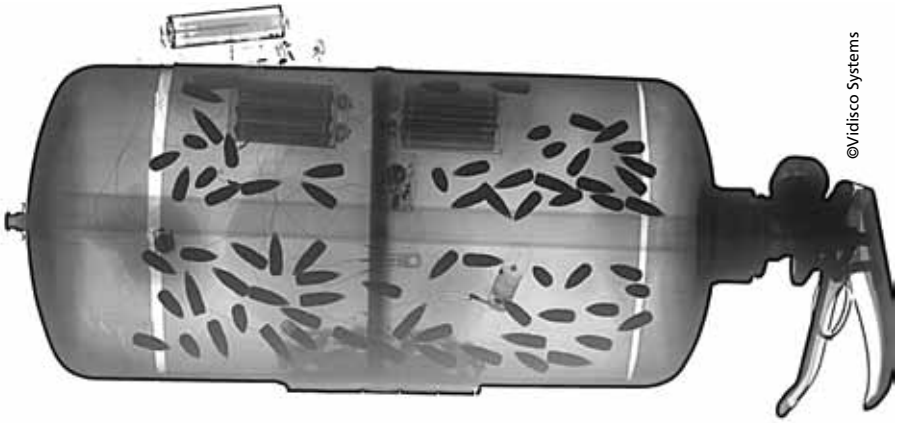
The use of X-ray devices to detect IEDs is also widespread. Today, there is a variety of X-ray systems in use, such as those that are used to scan bags at the airport are a reasonably effective way to get a good indication of what's inside the bags. This method is less than perfect, however, as it is open to human error, especially if the operator has to examine bags for hours at a time.

> **"The creation of a global IED database would greatly benefit EOD and security efforts around the world."**

Like metal detectors and dogs, X-ray systems can be portable and can therefore be used to examine suspicious articles that have made it through other security checks or are in public areas like shopping malls, cafes and subway stations. With today's technology, digital X-ray systems can also be used with a special filter to determine between organic and inorganic materials. This can increase the likelihood of detecting al-Qaeda's "hidden bomb".

In many countries, there is a big difference between how IEDs are handled in remote localities and in densely populated areas. It is important to note that explosive ordnance disposal (EOD) specialists prefer to neutralise devices in a sterile environment and from a safe distance. For example, if a suspicious bag is identified in a trash bin in an urban area, the following "detection" steps would often be taken. Firstly, canine units would be brought in to determine what is inside the bag. Next, a jammer would be deployed to prevent remote control activation of the IED. Finally, a decision has to be made on whether an EOD operative will approach the device or will use a robot. In the latter instance, the use of X-ray is also taken as a likely option.

Nowadays, EOD units are transitioning to the use of portable digital X-ray systems for on-site detection and evaluation. The major benefit of using such systems is that images can be produced in seconds at the click of a button, and reshoots can be easily conducted if needed. Only one approach is needed, which contributes to the safety of the operator. Additionally, the system's software enables manipulation of the image and quick analysis.



©Vidisco Systems

©Getty Images

COLLABORATIVE EOD

Another important advantage is that the X-ray images can be used for research and technical investigation which can also give a lead as to who is responsible for the IED. Other recent developments include the flat panel and wireless option which are more user-friendly and give the operator greater operational flexibility, as well as the dual energy filter which is ideal for distinguishing between organic and inorganic materials.

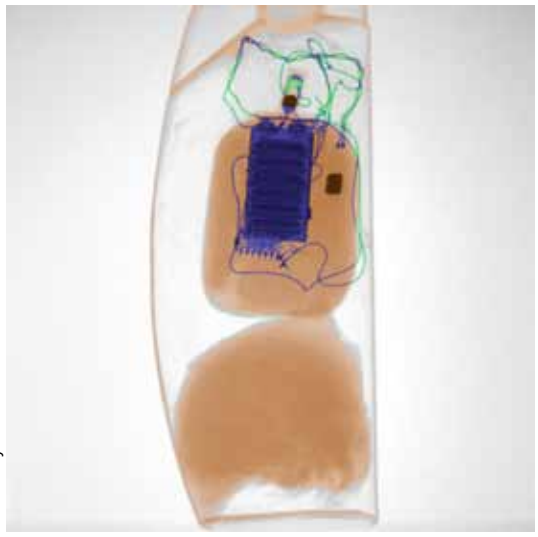
Once an IED has been identified, most EOD operators then three options for its disposal. A disruptor can be used to blast the IED apart and sever any detonating connections. This is a good means of disposal, although there is a chance of detonation. Alternatively, the operator can choose to detonate the IED in a safe manner, either on site (usually not possible in an urban area) or remove to an open, safe area in a containment vessel, where it can be disposed of. The containment vessel is used in case the IED detonates en-route, and is designed to absorb a specific magnitude of explosion depending on the type and quantity of the explosives. This manner of disposal is relatively safe, but physical limitations apply. For example, a containment vessel cannot approach an IED in a subway station. The third available options is to dismantle the IED using a robot. This procedure may be effective and can contribute to later research and technical investigation, but it can be time-consuming.

While there are several options and technologies that can be used to detect and dispose of IEDs, the best method of combating them is experience, training, and awareness. The experience and training of the EOD specialist plays a key role in the battle against IEDs as bomb-making manuals spread quickly from terrorist to terrorist due to the Internet and easy access to information. For this reason, it is also vital to stay abreast of current developments and events in other parts of the world. Using digital X-ray can also contribute to this, as the images produced are saved as an electronic file that can easily be shared and stored on a database.

Indeed, the creation of a global database would greatly benefit EOD and security efforts around the world. Following the attack in Santiago, Chilean authorities asked for foreign assistance to determine the identity of the bombers, proving that international co-operation and information sharing can benefit every country dealing with terrorism. When such data is shared, it can be used by bomb specialists in the field to make comparisons between the technology they encounter and devices that others may have previously encountered. As there is a real threat to civilian life when it comes to IEDs in urban areas, it is important that the EOD specialists use all the tools, knowledge and experience they have and handle each specific situation in whichever way they see fit.

©Getty Images

(Above) A remote operated vehicle is used to examine a suspicious device



©Vidisco Systems

(Left) Suspicions confirmed: a field X-ray reveals IED components and wiring within a package

CASE STUDY:
tracing bombers in Santiago, Chile

On 4 September 2014, an IED exploded near a shopping centre connected to a subway station, injuring 14 people. While this incident was highly publicised as the number of injuries was high, this was only one of the ten IEDs that exploded in Chile during 2014. Moreover, 29 other bombs were discovered during 2014 that luckily did not explode. These numbers are startling, but they are nothing new to Chile, where more than 200 home-made bombs exploded since 2005.

Chilean authorities first had to find out who was responsible for the bombing. The Chilean police force responded by bringing in their bomb squad and special investigators unit in order to gather evidence. In addition, the national government requested the assistance of foreign security agencies in identifying the bombers.

The explosion occurred during the lunch hour rush in the subway station. The device was built around a fire extinguisher filled with gunpowder on a timer left inside a trash can. Research revealed that similar bombs had been been placed around Chile in recent years, some of which exploded and some did not. The investigation was challenging but, through by careful examination of the devices, some conclusive results were eventually reached and arrests were made.

Chanan Levin is security sales manager for Vidisco. He is a Lieutenant and former Team Leader in the Israeli Defense Force's EOD Unit. In his last position in the IDF he served as a Deputy Commander of the unit's operational squadron. Chanan has more than 15 years' experience using Vidisco's systems in the field.