A Dogged Approach to Bomb Detection
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Explosives detection technology is making headway with regard to cost, speed, and capabilities. But one no-tech approach to the problem--the use of explosives detection canines--remains an effective alternative for security professionals for certain applications.

Canines are easy to work with and have extraordinary olfactory systems. As noted by Patricia Curtis in her book *Dogs on the Case,* dogs possess anywhere from 125 million to 220 million olfactory cells as compared to only 5 million for humans. According to *Scent, Training to Track* by Pearsall Verburggen, dogs can smell one part per million. They also have a special chamber in their nose that traps and collects the air so it can be examined more closely. In addition, dogs possess a gland that moistens the air causing the odor to strengthen.

A dog's nose is so adapted to its work that it can smell objects under water. Dogs don't become accustomed to surrounding odors. They can search for a long period of time and still distinguish between different odors. Canines are capable of retaining the learning of upwards of twenty different odors.

Dogs do not need to be in the immediate proximity of a substance to detect it. According to *Dogs on the Case,* a canine can detect the odor of an explosive or drug from several hundred yards away.

In an incident with the New York Bomb Squad during the author's tenure there, a dog used in a raid on a motorcycle gang picked up a scent from approximately twelve feet across a room. In another case, during a Bomb Squad demonstration in which the handler was unaware that the spectators were attempting to mislead him, the canine located an odor from a target hidden eight feet up in the ceiling.

Detection dogs can also be surprisingly fast workers. According to a report from the U.S. Customs Service, a dog can search 400 to 500 packages per half hour.

Another report from the U.S. Navy Naval Explosive Ordinance Division, in Indian Head, Maryland, compared the accuracy and speed of detection dogs to that of detection machines or human visual and physical searches. Each time, the dog was the fastest and most accurate.

Dogs are also mobile. In some cases, a dog can get to a suspicious package in an inconvenient location where it could not easily be checked by equipment. For example, in another NYC Bomb Squad incident involving a large public event, officials checked forty-seven suspicious packages in various locations. The dogs were able to get to the packages more efficiently than could a person carrying a hand-held x-ray machine, and they were more quickly able to determine that the packages presented no risk.

Similarly, dogs can easily go to a temporary location or to an outside site. For example, dogs can be used to check delivery trucks before they enter the loading area.

In addition, canines do not malfunction. Some locations, for that reason, use dogs to supplement x-ray equipment. When an x-ray machine breaks down, the canine can serve as a readily available backup.

Selection criteria. The ideal explosives detection canine candidate is a field or working dog with a retriever instinct. Labrador retrievers, German shepherds, beagles, and German shorthaired pointers are among some of the breeds used. The author prefers to work with Labradors because they are friendly and most people are not intimidated by them. The dogs can be trained as young as six months and up to two years. In some cases, for example, the author's company selects older canines that have already been partially trained as seeing-eye dogs but weren't quite appropriate for that delicate task for reasons unrelated to search and retrieval capabilities.

Training. Detection dogs undergo extensive training. They are typically worked daily for eight to fourteen weeks. The dog and handler are usually trained as a team. A company would then hire the dog and handler as a team. That might cost somewhere in the range of $150 to $250 per hour.

Alternatively, a company can purchase a trained dog for its own security department. Prices vary widely. On average a company can expect to spend about $20,000 for a canine and quality training.

If a company chooses to purchase a canine, it could also furnish a handler to be trained with the dog. If possible the person being trained should accompany the trainer on actual security sweeps. The work required to maintain a high quality dog is extensive; companies and handlers should not take on the responsibility lightly.

Two of the major training procedures are discrimination and room search simulation. Dogs are typically trained in a combination of both methods.

Discrimination is when the canine is commanded to search a number of identical items in a line or circle. One of the items contains the target odor (explosives), and the other items contain distracting odors such as dog food. The dog sniffs the item and sits when he finds the positive odor. The training process is long and tedious but it works. This method gives the dog basic training under a much more controlled environment than the second, more life-like method of room search simulation.

The room search simulation training is conducted by setting up life-like scenarios under which the dog and human handler search for the target odor. The person working the dog does not know the location of the hidden explosive.

This training method not only teaches the dog but also allows the handler to become familiar with the dog's own unique personal (primary) response--a nervous behavior such as lifting the paw or wagging the tail--that is distinct from the trained response of sitting.

In both discrimination and room search simulation training, a dog is rewarded for each find, typically with a bit of food. At some periodic interval, the trainer may also choose to provide a grand reward, such as a larger portion of food. The use of the grand reward method heightens the dog's interest by creating the potential for a larger reward for any find.

In either training method, trainers must also decide whether to use a large or small sample of the scent as the target item to be detected by the dog. Some experts disagree, but the author believes a small amount is preferable because it makes the dog's search more intense.

The Animal Behavior Laboratory of the University of Maine at Hamilton Station agrees that a small amount makes the dog's nose more acute. Large amounts should be used periodically, however, so the trainer can see the dog's reaction and the dog can experience the difference.

Another consideration during training is the integrity of the sample and the training environment. Three types of contamination can occur. The first is caused during training by the dog. After a find, a dog will try to mark the sample odor with his own odor by licking it, for example. If the trainer fails to detect the dog's behavior and to decontaminate the sample, it will be reused. But when the dog locates it in the next training exercise, he will really be finding his own scent, invalidating the training. Contaminated samples must be air dried and decontaminated with acetone.

The second type of contamination occurs when target scents are mixed. Some odors are very strong, such as dynamite, while others, such as TNT, are mild. If TNT is touched by dynamite, for example, it will be contaminated. The dog will find the TNT easily, but he will really be finding dynamite's strong scent. Samples must, therefore, be handled with care to ensure the integrity of the training exercises.

The last type of contamination is similar to the first; in this case, the trainer's odor contaminates the target scent. When the dog finds the hidden sample, he is actually finding the trainer's odor. This problem can be avoided if the trainer uses tongs when planting the target sample.

Trainers must also tailor the training to fit the personal strengths and weaknesses of each canine. Many people consider canines to be tools. Yet, each dog has his own personality and idiosyncrasies that can cause problems. During training, handlers must work with each canine to overcome these obstacles. For example, one dog may not like to go near edges of platforms. The trainer must concentrate on overcoming that fear with constant practice and reward.

Dogs at work. Private businesses can use dogs to detect explosives; some already do. The ideal procedure is for a three-member team comprising the dog, a handler, and a technician to work the site. It is not imperative to have a technician as backup, but it is preferable.

The handler is responsible for the detection dog and experienced in interpreting the animal's primary and secondary responses. The technician is familiar with booby trap possibilities, x-ray interpretation, and safety procedures.

The canine should be passive, accustomed to working in a business environment, well socialized, and able to perform the task with minimum disruption to the workings of the office staff.

Businesses facing temporary high-risk situations have sometimes called in dog teams for limited periods to screen incoming mail for possible explosives or to sweep the site itself before the start of business.

One company also has detection dogs sweep vehicles that momentarily park at the location.

No method is foolproof, and dogs are no exception to the rule. Ironically, it is their very high-level of detection capability that creates the potential for trouble in the form of false alarms. Typically, a secondary check, as with an x-ray machine, is applied to any item positively identified by a dog to determine whether the incident is real.

For example, one transatlantic steamship service was using detection dogs to sweep the vehicles transported onto the ship and to spot check the luggage. At one piece of luggage, the canine sat down, indicating the presence of a target scent.

Under the company's procedure, if a piece of luggage was suspect, it was brought to a fixed x-ray location. The x-ray showed nothing that would be associated with an explosive device. This shows the advantage of having skilled people for x-ray interpretation. investigation by ship security personnel revealed that the luggage was owned by a military person transferred to Europe; the week before he had used the luggage to transport his handguns to a shooting match. The dog was responding to the residual odor.

In another case where dogs were being used at a construction site, the dog singled out a tool box. Investigation revealed that it contained cartridges for a nail gun.

Detection dogs have proven their usefulness in a wide range of settings from airports to manufacturing operations. Companies should consider these versatile, reliable animals as an efficient and cost-effective way to safeguard their personnel and property from explosives.

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