RESEARCH REPORT

Cell Phone Detection Canines for Contraband Interdiction in Correctional Settings

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Contraband cell phones in prisons and jails pose a threat to the security of those institutions and to the safety of incarcerated people, corrections staff, and members of the public. For example, incarcerated people have used cell phones to organize various criminal enterprises inside and outside of carceral facilities, facilitate escapes from custody, arrange attacks on corrections staff, and coordinate disturbances in and across facilities (Russo et al. 2019). In response, correctional leaders and policymakers have employed a variety of technological and nontechnological strategies to find and remove these devices from their facilities (Peterson et al. 2022; Russo et al. 2022).

This report examines one such contraband interdiction strategy: the use of cell phone detection canines (K9s). This strategy is used by numerous correctional agencies across the United States. The use of K9s has a long history in military and law enforcement settings, where these animals have been used for sentry duties, search and rescue, human tracking, and odor detection (e.g., for narcotics or explosives).[1] In correctional settings, agencies have adopted K9 operations for perimeter patrol, crowd control, escapee apprehension, and drug detection. More recently, several agencies have trained K9s to detect contraband cell phones and a variety of other electronic storage devices (ESDs), such as computer hard drives, thumb drives, and microSD cards.

Today, such K9 cell phone detection programs are widespread, with as many as 80 percent of states reportedly using this approach for contraband cell phone interdiction (Shukla, Peterson, and Kim 2024). They vary substantially, however, and little is known about their implementation or efficacy. To address this knowledge gap, the research team held conversations with staff in charge of cell phone K9 programs in a convenience sample of 10 state correctional agencies: the California Department of Corrections and Rehabilitation, Delaware Department of Correction, Florida Department of Corrections, Massachusetts Department of Correction, Michigan Department of Corrections, Minnesota Department of Corrections, North Carolina Department of Adult Correction, Oklahoma Department of Corrections, Tennessee Department of Correction, and Texas Department of Criminal Justice. This report discusses seven key components of cell phone detection K9 programs that agencies should consider when developing such programs, then concludes with two recommendations for advancing the field's understanding of the topic.

Components of Cell Phone Detection K9 Programs

This section summarizes information gleaned from the research team's discussions with personnel leading the cell phone detection K9 programs in 10 state correctional agencies. This information is broken into seven key components that other agencies can consider when developing or updating their own K9 programs. These components are: (1) the concept of operations; (2) implementation considerations; (3) handler selection and compensation; (4) K9 acquisition and training; (5) special duty compensation and other costs; (6) performance metrics, reporting, and evaluation; and (7) other K9 program resources.

Concept of Operations

One of the most important components of a contraband cell phone detection K9 program is its concept of operations (CONOPS). Agencies must determine when, how, and where to use the K9s. For example, will they use them to detect cell phones on incarcerated people, staff, visitors, or some combination of these individuals? Similarly, will they use them in cells, common areas, entry points, visiting rooms, and so on?

How K9 Cell Phone Detection Works

Many people believe K9s alert on the odor of cell phones' lithium batteries, but the actual scent they are trained to alert on comes from chemical compounds called triphenylphosphine oxide and hydroxycyclohexyl phenyl ketone, which coat the circuit boards on all ESDs to keep them from overheating. These chemical compounds are also present on removable ESDs, such as CDs, DVDs, Blu-rays, and floppy disks.[a] The latent scent of a cell phone will sometimes be detectable by a K9 even after the phone has been removed from a location, depending on how long it was there and other environmental factors (e.g., temperature, airflow, other ambient odors). For example, people carrying around cell phones before entering a prison will likely have enough latent scent in their pockets to alert K9s.

[a] Alison DeNisco Rayome, "Electronics-Sniffing Dogs: How K9s Became a Secret Weapon for Solving High-Tech Crimes," TechRepublic, December 9, 2016, https://www.techrepublic.com/article/electronics-sniffing-dogs-how-k9s-became-a-secret-weapon-for-solving-high-tech-crimes/.

A key CONOPS consideration is whether the K9s will be single-purpose-trained (trained to detect cell phones only), dual-purpose-trained (trained to detect cell phones and drugs), or multi-purpose-trained (trained to detect cell phones and drugs and given other duties, such as tracking or explosives

detection). There are pros and cons to consider when making this determination. The Oklahoma Department of Corrections, for example, advocates for dual- and multi-purpose training. It believes multi-purpose-trained K9s enable it to detect various forms of contraband in single sweeps, whereas programs using single-purpose-trained K9s have to sweep cells twice—once for drugs and a second time for cell phones. It can also be more cost-efficient for agencies to have dual-/multi-purpose trained dogs as opposed to separate single-purpose-trained units.

Most of the other agencies we spoke with believe single-purpose training is the more effective approach. The Massachusetts Department of Correction, for example, has two cell-phone-detection-only K9s, six drug-detection-only K9s, and eight ballistics-detection-only K9s. It contends that cross-training cell phone detection K9s as dual-purpose drug-detection K9s makes those dogs inefficient for searching correctional staff, contractors, or visitors for drugs or cell phones because of the latent cell phone scent phenomenon (see the How K9 Cell Phone Detection Works box above). The Massachusetts Department of Correction contends that dual-purpose dogs do not know the difference between drugs and cell phones, just that either scent alert will get them fed. Because correctional staff, contractors, and visitors routinely carry cell phones on their person, the dogs will alert on them, even if their pockets are empty and they leave their cell phones in their cars or lockers. A K9's alert on an empty pocket that held a cell phone will trigger additional search procedures that will be not only unnecessary but also overly intrusive and operationally cumbersome. A drug-detection-only dog, for example, will ignore the latent odor of cell phones on staff, contractors, and visitors.

Therefore, if the CONOPS is to only search incarcerated people, dual-purpose K9s may be the more effective method. Because incarcerated people are not permitted to have drugs or cell phones, an alert for either scent would warrant further investigation (a pat search or strip search). That said, now that many correctional facilities provide their resident populations with e-tablets, there is likely to be an increase in nuisance alerts (alerts in which K9s detect the scent of authorized electronic devices).

The Massachusetts, Minnesota, and North Carolina corrections departments' K9 personnel noted that they had issues with nuisance alerts after they began issuing e-tablets to incarcerated people. They reported that nuisance alerts added to the time it took to search for contraband. They have since adapted their K9 cell search procedures to require incarcerated people to declare or divest any authorized electronic devices when they exit their cells before searches. Generally, this just means that they are required to place their e-tablets and any other authorized electronic devices on a desk or table in plain view of the corrections officers to search. The K9 handler then directs the dog as it

searches the rest of the environment. The latent scent of an ESD in the cell (e.g., on a mattress or desk) can still be an issue that adds time to the search. The Florida Department of Corrections, for example, reported that its cell-phone-trained K9s were ineffective after e-tablets were authorized and that it eliminated the K9 program.

Once the CONOPS for a cell phone detection K9 unit is established, an agency can begin considering policy development and other aspects of program implementation.

Implementation Considerations

There are different philosophies on how to implement a cell phone detection K9 unit, and which one an agency uses will be driven largely by the available resources, CONOPS, policy, and training curriculum. One consideration is how to integrate cell phone detection K9s into other existing K9 programs (e.g., programs using tracking K9s or K9s trained for narcotics or explosives detection). Most K9 handlers subscribe to the one-dog-to-one-handler (1:1) team configuration. There are others (e.g., the Oklahoma Department of Corrections) who believe that the dogs are "just like any other tool" and K9 handlers should be expected to deploy with any dog in the kennel. The Tennessee Department of Correction tried assigning two single-purpose K9s (one drug detection dog and one cell phone detection dog) to a single K9 handler, but the canine coordinator reported that, in his experience, a single handler could not dedicate sufficient time to maintain two deployment-ready K9s, which involves daily training/retraining and general upkeep (feeding, veterinary visits, etc.).

Another consideration is where to board the K9s. Most correctional agencies expect their 1:1 K9/handler teams to be maintained by the handlers at their residences during off-duty hours. These handlers deploy the K9s from their residences to designated facilities each working day as directed. Other correctional agencies base their specialized K9 teams in regional or centralized boarding configurations to facilitate multisite operational deployment. For example, the Oklahoma Department of Corrections maintains all its K9s at agency-operated kennels, where it expects handlers to report each day for K9 maintenance. The decisions around K9 boarding should be driven by the CONOPS, policy, and access to veterinary care.

A broader philosophical consideration around all K9 programs, including cell phone detection K9 programs, is how to reward the dogs for successful alerts. Many K9 handlers insist that their dogs must "work to eat." The dogs do not simply receive a pan of dog food at a prescribed time each day like family pets. Rather, they must search for and locate a hidden cell phone before they are rewarded with food. Others contend that K9 handlers should not use food rewards for their dogs, particularly in

the corrections environment, because of the amount of authorized commissary food in cells and kitchen areas that would distract them during searches. These handlers reward their K9s for successful alerts with a toy and effusive praise.

Handler Selection and Compensation

Handler selection varies across agencies. In those with collective bargaining agreements, the selection criteria for K9 handlers are often more formalized and prescribe eligibility requirements around seniority and experience. Many agencies also seek prospective K9 handler candidates from the pool of employees with prior military and/or law enforcement K9 training. Others suggested that they would rather train a candidate who is not already predisposed to a training method that might be at odds with their agency's CONOPS, policy, and training.[2] Lastly, some subscribe to the theory that simply being a "dog lover" is good enough for handler candidates.

After selecting K9 handlers, most agencies will automatically promote them from the corrections officer ranks into the more specialized position, resulting in increased salary and benefits costs. When handlers maintain the K9s at their residences, they are also typically afforded additional compensation (sometimes on an overtime basis) for off-duty K9 care. From our convenience sample of K9 programs, the annual cost of a single team of a K9 and handler ranges from $62,000 (Oklahoma Department of Corrections) to $261,834 (California Department of Corrections and Rehabilitation). Clearly, this is a wide cost range that is driven largely by the salary and benefits packages unique to each jurisdiction.

K9 Acquisition and Training

According to our convenience sample of corrections departments, there are four primary methods for procuring cell phone detection K9s:

- procuring pretrained dogs from a reputable contractor

- procuring "green dogs" from a reputable contractor

- procuring rescue dogs from a shelter

- using in-house breeding programs

Pretrained dogs can be purchased from several reputable contractors around the country. Some contractors specialize in training and selling certain breeds of dogs, which often include hunting/herding breeds (e.g., Labrador retrievers, pointers, and Belgian Malinois) because of their

innate work ethic and hunting instinct. Pretrained K9 detection dogs cost between $7,500 and $15,000.

Green dogs are dogs that have been bred and tested for certain characteristics including their health, intelligence, obedience, hunting drive, and sociability. They are not pretrained, but they have been professionally socialized and introduced to "toys" that represent the types of targets they will be exposed to as full-fledged working dogs. Once purchased, green dogs require additional training to become deployment-ready. They can be purchased from reputable contractors for approximately $3,000 to $10,000, though there are additional personnel costs associated with the agencies' handlers training these dogs. Most agencies reported a preference for these dogs, likely because the up-front costs are lower, and the agencies can train the dogs using their own approaches and personnel.

Rescue dogs have been successfully deployed in law enforcement and correctional K9 roles for years. Most often these are mixed-breed dogs. Experienced K9 handlers/trainers must assess the dogs' capacity to work, using the same characteristics mentioned above. The cost of adopting a dog from a rescue shelter is generally between $250 and $500. The Delaware Department of Correction reported that it deploys rescue K9s alongside green dogs. The Massachusetts Department of Correction used animal shelter rescue dogs for 10 years after establishing its drug detection K9 teams, before switching over completely to green dogs. Their experience has been that green dogs are better for detection training because rescue dogs are often too docile and lack the drive to hunt.

In-house K9 breeding programs involve corrections agencies breeding dogs for the purposes of contraband interdiction and other security protocols and significantly reduce K9 acquisition costs. In these programs, dogs are typically housed and maintained in kennels operated by corrections agencies (instead of the handlers' homes), allowing agencies to consistently monitor K9 feeding, health, behavior, and training progress and to control breeding in a structured way. Two of the agencies in this study, the Texas Department of Criminal Justice and Oklahoma Department of Corrections, reported operating in-housing breeding programs.

In-house K9 training (using department-trained green dogs, rescue dogs, and dogs bred in house) and outsourced K9 training (using dogs that are pretrained before acquisition) have different pros and cons. Clearly, cost is one of the biggest factors in the decision about training. A pretrained K9 purchased from a reputable contractor could be deployment-ready within three weeks. In-house training generally takes longer, likely five to six weeks. Most agencies we spoke with reported that they initially started their K9 programs with outsourced training but quickly applied what they learned to run their own in-house training programs.

It should be noted that K9 detection training is not a "once and done" endeavor. Even on their time off, K9 handlers must continuously work with their dogs to keep them healthy and in peak working condition. This is known as maintenance training, which includes regularly hiding training phones for the dogs to find. In most correctional agencies, these additional responsibilities drive overtime costs, which depend on agency policy and collective bargaining agreement language.

Special Duty Compensation and Other Costs

Standing up a cell phone detection K9 program involves costs and considerations beyond paying handlers and acquiring and training K9s. These additional costs apply to the addition of any dogs, regardless of what they are trained to detect. Agencies must arrange for dogs' medical services, which usually involves a service contract with a local veterinarian. The contract should make it clear how services, including routine and emergency care, are to be delivered. Average veterinary services cost around $250 a year for a healthy dog, though the cost can be significantly higher when injuries or illness arise. Generally, the dogs are brought to the veterinarian's community clinic, although some agencies require that care be provided by a mobile veterinary service on site at the agency kennel. In some locations, there may be opportunities to partner with local veterinary schools at discounted rates to provide veterinary students experience and training.

Programs that board K9s at handlers' homes are customarily assigned agency vehicles (typically SUVs) to transport the dogs to their assigned deployment sites. The costs of obtaining and maintaining those vehicles must be factored into the overall operations costs (~$75,000 per team per year). Each K9 must also be provided with a kennel (~$2,000), a transportation crate (~$200), and dog food (~$500/year).

Performance Metrics, Reporting, and Evaluation

Once an agency has put a program in place, it is important for it to think about how it measures K9 performance. Most agencies that we spoke to for this study track how many contraband cell phones K9 teams recover. Often, however, it is difficult to directly attribute a contraband find exclusively to a K9 alert. Because K9 alerts trigger more thorough searches of subjects or target areas, these finds could be credited to pat searches or cell searches rather than (or in addition to) the K9 teams. There have been instances of duplicate counting and inconsistent categorization when it comes to reporting credit for contraband recoveries.

One way to ensure consistent reporting of K9 performance is to clearly define the metrics that will be gathered and evaluated. It may be necessary for an agency to revise its incident report form and associated management information systems to capture metrics on K9-found contraband. Modifying computer applications can be a time-consuming and costly endeavor in some agencies, and it is therefore often neglected. Instead, cell phone detection K9 handlers often rely on their own self-kept records that may or may not reconcile with their agencies' "official" numbers.

In addition to simple tabulations of the number of contraband cell phone recoveries, other more granular metrics can be gathered. For example, it might be useful to record (with detail) the number of false alerts; the frequency of K9 deployments (including downtime for rest, maintenance, and training); the locations, dates, and times of finds; and K9s' and handlers' unique identifiers. Over time, patterns may emerge that may inform when and where to most effectively deploy future K9 resources. Surrogate metrics can often be used to measure performance and deterrence factors, such as variation in the usage patterns of a facility's legitimate telephone system before and after K9 deployments (that is, reducing the availability of illicit phones should increase residents' reliance on the authorized system). Such information could facilitate evaluation of a K9 program's performance and factor into a cost-benefit analysis.

Moreover, K9 handlers regularly train/retrain their dogs outside when they are not actively working. This includes, for example, placing cell phones around a particular location within a closed environment (e.g., an unused cellblock or visiting area) and seeing whether the dog can successfully find them. Agencies should document how often these take place and the results of each test (i.e., frequency of successful and false alerts). A well-conceived K9 performance evaluation system would enable corrections administrators to distinguish between the quality of the training method, competence of the handler, adherence to the training curriculum, and the ultimate performance of the K9, which can vary over time.

What to Do with Cell Phones after Recovery

While removing a cell phone from a facility is itself a desirable outcome, many agencies also conduct forensic analyses of recovered phones to uncover actionable intelligence. Agencies can do this through partnerships with law enforcement agencies or by standing up their own internal cell phone forensics labs. Easy-to-use products designed to extract a wealth of information from cell phones and other electronic devices are commercially available to agencies that set up their own labs. This information includes numbers from phones' contact lists, which can be cross-checked against the numbers associated with institutions' authorized phone systems, staff and contract employees, crime victims, witnesses, and court authorities. Text messages and photographs extracted from recovered devices can also provide a trove of potentially actionable intelligence for corrections and law enforcement investigators.

Correctional authorities also work with their district attorneys' offices to prosecute incarcerated people, staff, or others for introducing contraband cell phones into facilities. But some prosecutors are reluctant to bring these charges because they do not appreciate the operational risk cell phones pose to correctional environments, or because they see little value in prosecuting cases that may result in relatively minor convictions.

Other K9 Program Resources

Some of the best resources for additional information on cell phone detection K9 programs are other correctional agencies. Most of the agencies we spoke with that have established such programs would be willing to share their CONOPS, example policies and procedures, and training curricula and to discuss how they overcame operational challenges.

In addition, the National Institute of Standards and Technology recently commissioned the Organization of Scientific Area Committees for Forensic Science to draft *General Guidelines for Training, Certification and Documentation of Canine Detection Disciplines*. The working draft of this document is available online (OSAC 2019). The guidelines include information on K9 team requirements, team assessments, certification, training, maintenance, training aid storage and handling, and K9 recordkeeping and document management.

The Detection Canine Program run by the Department of Homeland Security's Science and Technology Directorate has also issued information and guidelines for detection K9s.[3] Although DHS is focused more on the detection of explosives with K9s, much of the information it provides can be applied to drug detection and cell phone detection dogs. The DHS program is focused on three areas:

developing and testing K9 training aids; testing and evaluating K9 performance and in-field assessments; and research and development to study olfaction (sense of smell), cognition (understanding), genetics, genomics, breeding, and K9 behavior and to improve operational performance and training methods.

DHS has also published a 16-page document titled *Best Practices for Detection Canine Training and Testing* (DHS 2020). Although generic, in terms of the specific training targets (explosives, ballistics, drugs, or cell phones), the document offers useful information to consider when developing and operating a detection K9 program.

Recommendations for Future Work

This examination of cell phone detection K9s shows that, not surprisingly, K9 CONOPS, policies, training methods, and performance tracking approaches vary widely. Though these are often tailored to agencies' specific needs, we propose two recommendations that would advance the use and understanding of cell phone detection K9 programs in corrections.

First, it is important to evaluate the performance of K9 cell phone detection programs. The variation between K9 programs, including those that use single-, dual-, and multi-purpose-trained dogs, makes it vitally important to identify which approaches and practices are more effective. For example, researchers could conduct a head-to-head comparison of K9 teams that operate under different CONOPS and training styles to determine whether there are any performance differences. Two specific issues that should be evaluated are the effect of the latent cell phone odor phenomenon and whether cell-phone-trained K9s can discern the difference between unauthorized contraband ESDs (cell phones) and authorized ESDs (e-tablets). These issues were cited specifically by several respondents.

Second, nationally recognized correctional K9 training and certification standards should be established, and a database of accredited providers and best practices geared for correctional agencies should be created. Related to the need for a better understanding of the efficacy of correctional K9 programs, several of the agencies we spoke with noted that there is no single source for locating qualified K9s and K9 trainers. Generally, training is sought locally and by word-of-mouth referral. Some reported that the outsourced providers they had worked with lacked any experience with cell-phone-specific detection training.

Because there are no established standards or documented best training practices with respect to cell-phone-trained K9s in corrections, there is ample misinformation about what scent the dogs alert on and how best to simulate that scent for training purposes. Some trainers smash old cell phones and put the pieces in a pouch for dogs to smell. Others simply use old intact cell phones that they have confiscated. Other variances in boarding and handler assignments suggest a need to determine which practices are best.

The creation of national standards and documentation of best practices could be spearheaded by the American Correctional Association, with endorsement by the Correctional Leaders Association. One of the primary services the ACA provides the field is establishing and maintaining a variety of correctional standards. The ACA and CLA could draw from any evaluation of extant K9 programs and establish and convene a committee of subject matter experts to discuss and address this need. This committee could also establish standard cost accounting and performance tracking metrics that would inform any future evaluations.

Notes

1   "The Beginning of American K9 Units: A Brief History," National Law Enforcement Officers Memorial Fund, accessed October 19, 2023, https://nleomf.org/the-beginning-of-american-k9-units-a-brief-history/.

2   For example, some trainings, like military/law enforcement attack and takedown training, are completely different from contraband detection. In addition, K9 discipline and obedience training methods vary considerably. Several K9 training programs use food to reinforce behaviors in dogs. If an agency prefers to use other reward means, it would have to retrain pretrained dogs to respond to other reward types.

3   "Detection Canine," Department of Homeland Security Science and Technology Directorate, accessed March 31, 2023, https://www.dhs.gov/science-and-technology/detection-canine.

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