

## Technical Note

# Trained Dogs in the Crime Scene Search

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**Abstract:** In 2002, we began a project to determine the length of time that a trained police canine could locate evidence in the field. Despite fifty years of research in the field of police dogs and scent, there was a dearth of literature in this area. The researchers decided to conduct preliminary pilot studies in this area. A single dog was used, rather than a large group of canine teams, to identify any potential problems. In hindsight, this was a good decision because many issues in experimental design and data collection arose.

## Profile of Canine

K9 Rommel, a six-year-old German shepherd dog, was used for the pilot study. Although he had been originally trained for detection of narcotics, he had been also trained in basic scent functions such as tracking, area, and article searches. At the time of the study, K9 Rommel was not assigned to a law enforcement agency, and he was being used by the principle investigator as a teaching tool in undergraduate criminal justice classes. In this role, his training was almost entirely in article (evidence) searches because this is the easiest scent function to demonstrate to large groups. Consequently, he was extremely proficient in this task and was able to cover a football field-sized area in ten minutes.

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## **Research Design**

A large field several hundred yards long and wide on the University of Central Florida campus was plotted into grids measuring 30' x 30'. This size corresponds to the standard testing field as defined by the United States Police Canine Association [1]. Each grid this size should be able to be successfully searched within three minutes. Some areas of the field were mowed on a regular basis, and others were left in their natural state. Searches took place at a variety of times to simulate realistic work conditions.

Several hundred bottle caps (Zima brand) were used as scent objects. They were collected, sanitized, and numbered for the experiment. Bottle caps were used because they posed the least danger to lawnmower blades that might strike them if the bottle caps remained undetected at the conclusion of the study, and their distinctive markings and lack of popularity reduced the probability of mistaking trash for targets.

Using a grid map of the experimental zone, the scent objects were randomly placed into the field. Some grids were empty, and others contained scent objects. Each object was held for one minute prior to placement. In the initial stages, several individuals provided the scent, but after it became evident that the canine performed no better or worse regarding the personal scent, the handler used his own scent.

K9 Rommel was released into the wind of each grid to identify the presence (or lack of) a scent cone and follow it to the source. When he located the strongest source of scent, he indicated an alert by lying down by the object. Searches (ten to fifteen grids) took place every day. Scent objects were placed in the grid anywhere between eight hours and seven days before the search took place. A great deal of planning was required to ensure that data were collected properly and that sufficient scent objects were in place for up to a week. When objects were recovered, they were sanitized and recycled back into the project. This process was replicated daily for six months.

## **Findings**

In the initial stages of the project, the findings were consistent with the anecdotal evidence of the canine community. The scent on the object decayed over time and began to assume the odor of the landscape. In the case of K9 Rommel, his detection ability dropped uniformly at a rate of approximately twenty percent each day. We named this the Rommel Probability of Detection Curve. (At the time, it was thought that this discovery rate would be uniform between all canines and would thus require a name for the literature. However, this would not be the case.)

After five days, K9 Rommel rarely found any of the scent objects. However, we noticed on certain occasions that he would miss an unusually large number of articles on one day only to locate them several days later while performing with a much higher success rate. This was surprising because the scent on the objects should have been much less. Because we had conducted the project in conditions similar to those faced by actual canine search teams, K9 Rommel was used in a wide range of weather conditions. Given that the experiment took place outdoors in Florida, weather fluctuated greatly, particularly in summer when thunderstorms develop and disappear quickly. Performance was most negatively affected just prior to a thunderstorm. Factors previously identified in the literature as influencing factors (temperature, wind, sunlight, humidity, barometric pressure) were present at these times. Because changes in all occurred before these storms, it was impossible to determine which was the most influencing factor.

Additionally and most importantly, we were able to identify conditions that were more conducive to canine search success. Midmornings were the most productive time of day. Temperatures were still mild (70-80 °F), humidity was lower, and the sunlight created a thermal lift from the object. Consequently, the dog was not required to bury his nose in the tall grass in order to reach the scent cone and was not prone to overheating within a short period of time. This is important because it allows a search team to pick the time to conduct an evidence search when the canine can function at his full potential. It becomes a balancing act between time (success rates dropping by 20% each day) and adverse weather conditions. It is also possible for a crime scene unit to conduct its own search first, yet still be able to use a canine team at a later time without concern of contamination. This may seem impossible until the nature of scent is examined.

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The human body is constantly discarding skin flakes, perspiration, and a variety of gases. When a person walks across a grassy field, these items fall in the area that he travels, along with a chemical reaction of the grass that is crushed beneath his feet. These scent disturbances start to immediately degrade and, within eight to sixteen hours, these odors are not detectable to most dogs. The item of evidence, however, covered in the skin oils of the suspect, continues to generate a source of odor, decaying at a much slower rate. As a result, one can unsuccessfully search an area, yet return the next day with a canine team and have a moderate chance for successful recovery.

We were able to identify two cases that supported this theory. In the first case, a ring had been lost in the snow. The owner and several others had made an extensive search of the area but had been unsuccessful. Of interest to this research note, the area had been thoroughly trampled, and a great deal of snow had been displaced from its original resting place. A trained police canine was brought in within a short period of time and was also unsuccessful. The handler went back on patrol and, as an afterthought, made a second search right before the end of his shift. The canine was released into the wind and indicated almost immediately. The ring was found directly between the dog's front paws.

In the second case, also involving a ring, a burglary suspect confessed to a theft and told the detectives that the ring had been discarded in a large field. The field was searched numerous times by officers (by hand and metal detector) and eventually the field was cut by a mower to aid in the search. Twelve days after the original theft and as a last resort, a canine team was brought in to conduct an article search. The canine gave an indication that he had located the source of human scent, and the ring was recovered at that location. We were originally skeptical, because this was the longest period on record that a German shepherd dog had located a piece of evidence. However, when we reviewed the conditions at the time of the search, we found that they were optimum for this type of search: 63 °F, sunny, 10 mph winds, and 10:30 a.m. (when the thermal lift was well underway).

As a result, we were forced to rethink our position that the length of time was the most important factor in these searches. Additionally, as we interviewed canine handlers, we found massive differences in the length of time that their dogs were able to locate scent objects.

## **Conclusion**

This article has discussed many of the issues involving K9 research. Logistics and planning played as great a part in the project as did the actual searches. Conducting a large-scale project becomes difficult, if not impossible, when considering the amount of space that must be allocated for this purpose. Individually, however, a canine handler could accomplish the same project with similar planning and a football field-size plot of land that is relatively inaccessible to a large amount of foot traffic and trash dumping.

For the reasons discussed earlier, bottle caps were used in our pilot study. They correspond to the approximate size of the smallest evidence that a team might be called upon to find, representing a worst-case scenario. Shell casings, rings, and car keys would likely fall into this category. It is acknowledged that larger objects would hold greater amounts of scent, making them easier to detect and detectable for a longer period of time. Lastly, the composition of the object itself has a great deal to do with its detection. If the item has places for sweat and skin oils to adhere to (e.g., grooves in the grip of a handgun), the canine has a much better chance of finding it. Conversely, perfectly smooth objects, such as glass bottles, may not hold scent to the same degree.

As in many exploratory studies, we created more questions than answers. However, what should be taken from this analysis is the fact that trained canines can and should have a role in the processing of many crime scenes. If the scene can be kept secured after the initial crime scene investigators have left until the sixteen hours' time period has lapsed, the canine can certainly be used to conduct one last sweep for undetected physical evidence. Finally, because canine teams are already trained to do this task, there is no additional cost associated and there are no discernable negative consequences in their use.

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## **Reference**

1. United States Police Canine Association, Inc. Certification Rules and Regulations 2006-2007, available online at [www.uspcak9.com](http://www.uspcak9.com).