



# Working Dogs: Scent Detection

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German Shepherd Sniffing an Explosive



<https://www.abc.com/news/news/how-a-dogs-nose-supports-police-work>

## Interview with Sally Dickinson (Professional USAR Dog Trainer)

Dickinson has worked with various breeds of dogs including Labradors, Dutch Shepherds, German Shepherds, Mutts, but she prefers to work with Border Collies. As for the training process, Dickinson uses basic "Pavlovian conditioning where she pairs whatever the thing that she is looking for with an appetitive" (Dickinson 2023). Next, she stated "I set a sample of fentanyl down, and say 'here is a treat', and then I move five feet away at the point where the dog is orienting back, until the point where I can stay twenty-five to thirty feet away, and the dog will naturally orient towards where the odor is coming from" (Dickinson 2023).

She stated that USAR (Urban Search and Rescue Dogs), need to be mandated by FEMA which is the governing body, and FEMA requires the dogs to do a "hold and bark" where the dog will stay at the location of the found substance and bark. This also requires stimulus control. Once it has learned how to accomplish the "hold and bark," it must recognize the odor of the stimulus as a cue to elicit the behavior of barking.

One of the twenty-eight USAR teams throughout the country will then come to the dog's home base to certify he or she for police work, and Dickinson says "the sky's the limit" after the dog reaches this point. Dickinson is authorized to certify detection dogs herself, and she stated that "she can only think of one time in the last fifteen or sixteen years that she has certified a dog in her home pile," so it appears to be extremely common to travel around the country for certification.

### Her Best Story On the Job

When I asked Dickinson what her most memorable deployment experience was, she told me an incredible story where she says, "one day I was minding my business driving my firetruck when I got a call saying, 'hey we need dogs to go on a mission'" (Dickinson 2023). A military aircraft (a KC-135) crashed, and the two pilots had been found, but the third passenger who was operating the air refueling had yet to be found. Usually, the military contracts with the FBI for cadaver dogs because they do not have their own, but at this specific time the FBI was working on a massive criminal case and was unable to tend to the crash. Because Dickinson's USAR team is located close to Washington D.C. and they are credentialed to fly on military aircrafts, they were deployed out to Kyrgyzstan, which is east to Afghanistan and south to Mongolia. After four separate flights, Dickinson along with her canine team arrived at the crash site via helicopter, where the aircraft had crashed on a site that had thirteen-thousand feet elevation. She said she was "gasping for air, but the dogs were not affected by altitude the way humans are due to the way they take up oxygen" (Dickinson 2023). After four days, the dogs were able to find the passenger who was "basically vaporized in the explosion across two and half square miles of debris."

## USAR Dog Sniffing out Survivors at a Natural Disaster Site



<https://www.tasteofthewildfeed.com/get-news/urban-search-rescue-dogs/>

## Introduction

For my capstone project, I have chosen to study the use of canines in various working settings, including in the police force for narcotics and explosives, as well as in the human search and rescue squads searching for deceased people. Over the past four months, I reviewed current research on the topic, interviewed Sally Dickinson (a professional human remains detection dog trainer), and will be speaking with the Blacksburg Police about their own working dogs. Working dogs have proven to be indispensable and thus have prompted my research to gain a deeper understanding of their functionality.

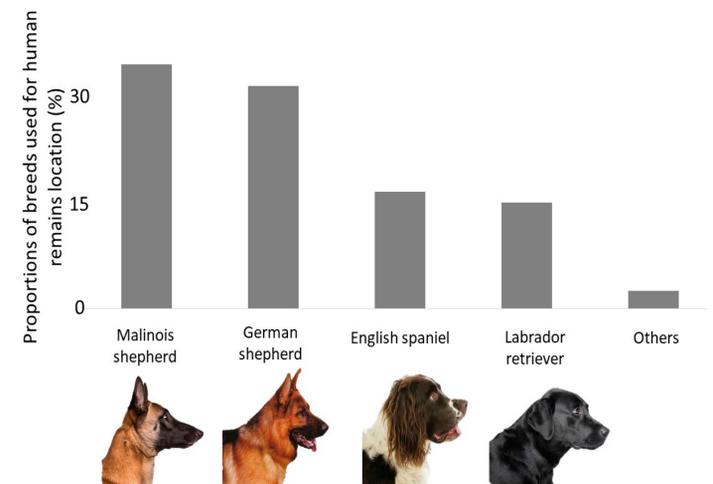
## On The Job!

Once a dog is certified by USAR (Urban Search and Rescue Dogs), they are able to work out of any base across not only the country, but the entire world. Their certification in scent detection enables them to work in any field of detection including narcotics, explosives, and human remains. Most teams will have between twelve to sixteen dogs. FEMA (Federal Emergency Management Agency) has a regulation that requires full health checks and re-certifications once a dog reaches nine years of age. USAR work is extremely hard on the dogs because it requires constant agility and exercise, so usually dogs will musically retire around the age of eleven to twelve years old, but some do not make it to that age. Because of the toll USAR work takes on the dogs' bodies, there is a strong focus on fitness and conditioning while they are off-duty. On a daily basis, dogs will run on treadmills, do muscle building exercises, and participate in "yoga," to ensure a great range of motion in their joints and extreme core strength. Their physical fitness is what will extend their longevity in the police force.



<https://cceb.org/2018/07/25/canine-treadmill-purchase/>

## Breeds Used for Human Remains Detection



## Questions?

### Ask me anything!

- Check out my interview with VTPD's Officer Ogle on the hand-out below.
- Ask me about:
  - Breed types
  - Training process
  - Certification process
  - Different branches of working dogs
  - How this relates to my career path
  - Why I chose this independent study
  - Canine Evolution
  - Olfactory physiology
  - My interview with Sally Dickinson
  - USAR

## Contact information

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## Background Information

- Humans and canines have been interacting for over 500,000 years.
- The first working dogs were used in the Roman Empire as guard dogs.
- Canines are now used in almost every police force worldwide.
- Detection dogs are responsible for the search for narcotics, explosives, people, weapons, and so much more.
- The argumentation behind the canine's ability to detect specific scents that humans cannot detect is their expansive olfactory abilities.
- Within the canines' olfactory mucosa, there are many olfactory receptors that send information to an olfactory bulb, where the information is then relayed to many other areas in their central nervous system.
- They have an extremely high number of cells compared to humans that will process the information for their olfactory receptors.
- Polymorphisms in their olfactory receptor genes are also responsible for their sensitive olfactory.
- Their DNA sequences have allelic variations, changing their protein sequences to increase their olfactory.
- A Scent detection dog normally costs around six-thousand U.S. dollars.
- Working dogs are ranked as the most reliable and efficient detection devices, even over modern-day technology.

## German Shephard in Odor Detection Training



<https://www.faw.org/international/projects/detection-dogs-berlin>

## Training Process

- The most common breeds of dogs used in scent detection include German Shepherds and Labrador Retrievers due to their "willingness to sniff objects, concentration ability, acuity of smell, and willingness to bring an object back to a person" (Adamkiewicz, Jezierski, Walczak 2014).
- The training process begins with play, where a toy will be hidden, and the canine will seek the toy, receiving a reward when found. The toy is normally hidden inside of a towel.
- Next, the stimulant will be wrapped up inside the towel, and the dog will begin to associate the scents of specific drugs with the towel.
- The level of complication should continue to increase as the towel is hidden in more laborious places, such as areas out of reach or concealed containers, while still receiving a reward when found.
- This is all considered to be positive feedback.
- Once repeated enough times, the canine can detect certain scents when commanded. They can even distinguish slight differences in scents when searching for different substances.
- A "hold and bark" will also need to be taught to the canine upon detection to alert their owners of a stimulus.



A Labrador Retriever in training sniffing out fentanyl in a closed container that is out of reach.

<https://citynews.com/2022/07/19/photos-wyoming-highway-patrol-trains-first-narcotic-sniffing-dog-able-to-detect-fentanyl/>