# IMPROVING THE TRAINING OF YOUR
# DETECTION DOG

By Simon Prins

*Working with a detection dog is fascinating. Dogs seems to be so well adapted for this task that it often amazes me how effective they work.*

A well-trained detection dog is not only capable to discriminate between odors and detect the target odor but also capable to pinpoint the exact location of the source. How do they do this? Ongoing research on this topic has already revealed a lot of information and now, scientists can erase some paradigms and beliefs which are going around in the detection world.

One thing we know for sure is that to build a reliable detection dog, we need to do a lot of repetitions. If we start to imprint a new target odor into the dog's mind, 50 repetitions are not enough; we like to go towards 1,000 to 1,500 repetitions.

If we want the dog to discriminate between distraction and target odors, we need to do even more repetitions. This is because there are some target odors that are just in a fraction different than 'non' target odors and when our operational environment, the dog will be encounter a lot of different odors!

Let me give you some examples about the difficulty our detection dogs will face in the "real world." A wildlife detection dog that is searching for otter scat on a riverbank will also be confronted with the poop of all kinds of birds, rodents, rabbits, frogs and many more animals. The cancer detection dog needs to differentiate between many urine samples and only alert to that specific cancer odor. Explosive dogs need to find that unique mixture of different ingredients that form an explosive combination. They need to ignore the separate ingredients that are often present in our mom's kitchen.

To train a reliable detection dog, we don't only have the challenge to present the dog with a lot of repetitions of the target odor. We also need to confront the dog with many distraction odors. We need to teach the dog to ignore the distractors and only alert the target odor(s). The more repetitions we can do will determine how more efficient and effective our detection dogs will be.

## Many ways to imprint odor

There are many ways to imprint and train detection dogs. The traditional detection dog training used to be based on classical conditioning. A play article for the dog, like a tennis ball or a rolled-up towel, was used. Some trainers stuffed the tennis ball or towel with narcotics. They threw it away and started playing the fetch game with their dogs. By classical conditioning, the odor was imprinted in the dog's brain. But to reach a level of 1,000 repetitions, you can imagine that this would take some time. We are all busy in our daily lives, but let's say we take some time every day to train our detection dog. Let's say we commit ourselves to have a detection training moment each day in which we throw the odor stuffed tennis ball 15 times. We would need more then 66 days to reach the level of 1,000 repetitions for one odor. If we like to train the dog on 10 different narcotics, we would need 660 days! Besides the fact that some narcotics and explosives are toxic for dogs, fetching is not a good idea, so we needed to come up with other methods.

Trainers started to use more operant conditioning (OC) in their detection training and presented the target odor to the dog in a different setting, like in a box or in a cup. With a bridge signal, mostly a clicker, dogs quickly got the idea which odor was interesting to find because as soon as the dog was nearby the object with a specific odor, there was 'payment' for him like food or play. This OC method gave us also the opportunity to train dogs to find dangerous targets. Fetching was not needed anymore because the bridge signal gave us the opportunity to shape perfect passive alerts so the dogs were not attempted to touch the odor source.

## The help of scientists

Scientists were helping the training community to inform about the pitfalls in detection training. Because it's not only about imprinting the target odor but also about teaching the dog to ignore the distracting odors. Training the dog to find the target odor in mixtures. Helping the dog to become more sensitive overtime and be able to detect even the lowest thresholds. Quickly, scientists and dog trainers noticed that even the most sophisticated laboratory analysis methods could not reach the lowest detection level threshold where dogs could still make detections.

## The Holy Grail

For all this, the holy grail is repetitions! It's not only repeating the target odor in many different amounts, mixtures and focusing on the lower thresholds but also about being able to present many distractors to teach the dog which odor will pay and which odor does not pay.

## Line-ups

We can use line-ups for that. By making a row of eight boxes or even more, the line-up will have one, none or multiple target odors and also be filled with multiple distraction odors. This is a proofed method to train and test detection dogs. I'm an enthusiastic user of line-ups for odor recognition tests (ORT) because I can easily check the quality of the combination, dog and handler. But there is a catch. The line-up is asking for a lot of work. First, we need a lot of space, as the ideal setting is at least one meter between the target positions. In that case, an eight-target position line-up will need that many meters of space. Secondly, we need to clean the target positions after every trial. On top of that, we need to move the distracting and (hot) target odors after every trial. If not, the dog will work on just its memory of the positions. Lastly, the most important line-up problem for a lot of trainers is the fact that dogs very quickly realize that there is a start and an end in a line-up. In training, we see dogs easily skip the first one or two positions because they are very enthusiastic. When they start to realize at target pos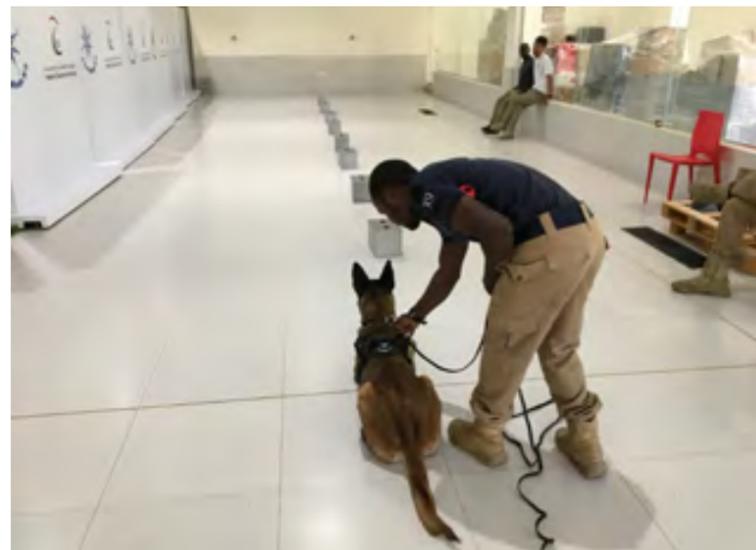ition seven or eight that the end is there, we have another problem. They will give false positive alerts trying to get a reinforcement. Dogs do that, not because they want to trick us, but because they are opportunistic animals and are trying to find the quickest and shortest way to get to the reinforcer.

Knowing that the first and last positions are tricky, we humans are willing to set up the line-up in favor of our dogs. In that way, we use around six target positions to offer our target odor(s) and distraction odors to the dog. But this also limits us in the number of repetitions because in each trial, we can work with only six odors. If we want to reach a high level of reliability, we need to be able to repeat a lot of target and distraction odors to build the 'odor library' into the dog's mind. Only then, can the dog quickly decide which odors to ignore and which odors to alert on.

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**Do more repetitions in a short time**

With the knowledge that scientists provided to us and seeing our own data and experiences in general detection work, we started to use scent wheels many years ago. These scent wheels gave us the opportunity to do a lot more repetitions in a short amount of time.

Loading, unloading, cleaning, loading and changing positions of a then meter-long line-up with eight target positions costed us hundreds of meters walking on each trial! Besides the walking, we spent a lot of time on this. It was not efficient, so we were eager to change our training. Also, we wanted to confront the dog with as many odors we could do each trial. That's why we came up with the idea to build our scent wheels that are also known as carousels.


*Our first scent wheels*


*Simple cheap scent wheels*

Over the last 25 years, we've built many different systems and used many different materials. We started with easy, cheap and simple devices that eventually helped us to invent and construct the most sophisticated scent wheels you have ever seen.

We are stoked about our latest version, which is fitted with very sensitive sensors in all target positions. This scent wheel will send the performance data of our dogs directly to an iPhone or iPad! In all our designs, we kept focus on the goals: how to train and maintain the quality of our detection dogs in the best possible way and how to keep the systems easy to use. For those reasons, we built scent wheels that are easy to transport, light enough to carry, simple to set up without the use of tools and quickly foldable so you can put them in the trunk of your car or in the corner of your training space.


*The ACT! foldable scent wheels*

Some of our models offer 12 target positions, so in each trial, we can do a lot of repetitions of different odors. Some of our training sessions are done with five scent wheels per trial so that in this way, we ask the dog to discriminate between 60 different odors. *In one training session of 10 trials, we can confront the dog with 600 different or repeating odors!*


*12 target position scent wheel*

**Odor Delivery Device (ODD)**

In our scent wheels, we use our unique ACT! Odor Delivery Devices (ODDs). These devices are great during the setup of the training and are able to collect data! Besides the fact that we use these ODDs in our scent wheels, we also use them in our line-ups. To keep data recording simple, we use 'target' as the position that will hold the ODD. The ODD is marked in three different types:

HODD – Hot Odor Delivery Device that contains the target odor
DODD – Distraction Odor Delivery Device that contains a distracting odor
BODD – Blank Odor Delivery Device that is empty



**The ACT! Odor Delivery Device (ODD)**

Before we start our training, we prepare our ODDs. We use QR codes to make sure we can work fast and double blind because we need a QR reader to scan them. In that way, it's possible to set up all our different target odors and distractor odors in front of the actual training, which allows us to train very efficiently. When the dog is present, we don't lose a lot of time in preparing the trials; we can move on fast! As soon we start the training, we can quickly load, unload, clean and reload the scent wheel. We don't have to walk more than one meter and this saves us so much time!

Are you interested in scent wheel training? We present a whole range of seven different scent wheels on our website www.simonprins.com under "Products." You will also find our online scent wheel course there. This unique course is very helpful to understand how scent wheels in general can improve your detection training. Enjoy your training!

**Simon Prins** is known for introducing operant conditioning to the Police K9 training world. For the last 25 years, he's skillfully trained and purposed dogs for special operation missions and has mastered the art of using robotics and sensors with dogs to perform such tasks successfully. He's titled and trained countless dogs and trainers from special units across the globe, and firmly believes that science can significantly improve our work with animals. Simon Prins is a/n speaker, author, innovator, animal trainer and behaviorist, and is currently working with the Netherlands Police Agency.

He started working with hunting dogs in 1989. When he joined the police force he became one of the youngest patrol dog handlers and worked with these dogs for several years. In 1996 he was asked to set up a special K9 R&D project. Working with radio guided camera dogs was one of the many topics of this program.

In the years that followed he started programs as hard surface tracking, laser guided attack dogs, detection dogs for special operations and trained many different detection dogs and their handlers. In 2002 he selected and trained the 16 dogs and handlers to start USAR, focused on search and rescue operations.

In all of these topics he also worked himself with dogs in these operations. In 2006 he started to make combinations of dogs and electronics. Radio directional canines equipped with sensors and carrying small robots into operations. During these years Simon wrote many training protocols and developed innovative training apparatus. He is convinced that following protocols, collecting data and educating trainers is the key of the success. But the most important issue is taking out the traditional punishment training methods and replace this by operant conditioning techniques.

If you are interested in one of our seminars or workshops, please take a look at our website **www.simonprins.com**