

## Preparing for the “Long Run”

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The rule of training is to “train as you deploy,” yet patrol dog and trailing dog teams rarely have the luxury of being able to devote an entire day to training for searching for a dangerous subject. Too often tracking or area searches for patrol teams consist of short searches that are part of a event crowded training day. The dog gets out of the car for a quick, short area search and/or a short and fresh track. While these exercises can help to maintain a basic level of proficiency in the dog, they don’t prepare the handler or their support personnel for the problem of a day long trail or series of area searches chasing a suspect some distance from a patrol vehicle. The K-9 team needs to prepare for such a deployment with adequate physical and mental training, including tactical training with back up officers. There are many K-9 trainers who are much better at teaching tactics than I am, but I thought I would cover the options available for one area of long and remote deployments that I am familiar with: navigation and communication with command.

### **Keeping Track of the Dog**

If your patrol or trailing dog always works on lead, then holding on to the lead will work for keeping track of the dog during deployments. For extra insurance in situations where stealth is not that important and/or the dog will be taken off lead or the handler may let go of the lead to negotiate obstacles, a light, bell or bird dog beeper will insure the dog can be easily located. Having the dog be easy to locate aids the handler in reading the dog and keeps the handler from calling the dog back unnecessarily when the dog goes out of sight. For search and rescue situations, putting a bell, light, orange vest or bird dog beeper on the dog will aid in locating the dog and reassure members of the public that the dog is not a wolf or feral dog. A bird dog beeper is a collar that generates an electronic sound that can be set to various types of sounds and volumes. Beeper collars are quite rugged and useful at night or in thick terrain or with dogs that range widely. Most will give different tones or sound patterns if the dog is moving or standing still.

If stealth is required, some beeper collars work off e-collar transmitters and can be turned on and off with the e-collar transmitter, and one of the Garmin dog tracking systems includes an optional, receiver activated collar light beacon.

If stealth is required, then about the only option for knowing an off lead dog’s location is to keep the dog in sight, or utilize a Garmin “Astro” or “Alpha” dog tracking system. The Garmin Astro system has a GPS collar that goes on the dog and a GPS receiver that acts as a GPS for the handler as well as displays the dog’s track and the dog’s direction and distance from the handler. The Garmin dog tracking systems have been used for years by hunting dog enthusiasts and wilderness search and rescue dog handlers and have proven to be reliable under the worst of conditions. The Alpha system includes everything the Astro has, plus a built in “Tritronics” style electric training collar. Garmin bought Tritronics, so all the Tritronics dog training products are now available through Garmin. I have found Garmin products to be very reliable. The Astro and Alpha allow for all the normal GPS functions: maps,

aerial photo capability, tracking, routes, waypoints, saving data, computer downloads, etc. The Alpha unit also allows the tracking of other Alpha receivers as well as the dog collars. The Garmin “Alpha” system has a beacon light on the newest collars that can be turned on and off with the Alpha transmitter.

The Astro and Alpha systems show if the dog is moving or stationary as well as the dog’s location, track, distance and bearing. The display is real time and updates constantly. If multiple dog teams are working, then each tracking receiver can be synced to the other collars, so a handler with the receiver can also see the other dog collar locations and tracks. Unfortunately, the Alpha and Astro systems are not compatible, so Alpha systems cannot see Astro systems.

There are some limitations to the range of the system, in that the older collars are pretty much like a portable radio and their signals are blocked by large buildings and hills. If the collar goes over the mountain, behind a tall building or far enough away on flat ground (a mile or so sometimes in thick Maine woods), the receiver will lose the signal. The newer Garmin dog collars advertise a range of 9 miles, but I haven’t had the pleasure of using them yet. An auxiliary receiver antenna is available for the Astro to enhance range. Unlike many cell tower based tracking systems, the Garmin systems do not require cell signals. One limitation is that the products are not licensed for use in Canada. They work in Canada, but the radio frequencies are not licensed for collar use in Canada.

I have found the Astro and Alpha systems to be invaluable for training. Instead of hoping the person you sent out to lay a track for you followed the route you described, you can give them a dog collar and see their track and their location on your Astro receiver. Every tracking or trailing dog handler knows the frustration of running training tracks and finding out the tracklayer didn’t go where they needed to go. The dog tracking systems give you the option of knowing where the track is in real time. This allows for many training options, like backtracks, circles, etc., or the use of coach with a receiver that can run with the handler. The worst thing a dog handler can do is to pull the dog off track when the dog is right, so having the option of knowing where the track is essential in beginning training. In training, if I want to run the track “semi-blind,” I leave the Astro receiver in my pocket and only consult it when the dog and I lose the track or I have a question about where the tracklayer went. For area searches, the search subject can be sent out with a collar and the handler/trainer/certifier can know without question where they are located rather than taking a chance of having them out of the area or hiding in the wrong place. It also allows for a safety measure for the subject. Having searched for a novice SAR subject for several hours some time ago in a National Park (luckily we found her before we had to make the embarrassing call to Park headquarters that we “lost” a mock victim), I know that this can be important.

### **Keeping Track of Yourself and Your Backup Team**

Every dog handler who will be searching or tracking with a police K-9 or search and rescue dog should learn how to use a GPS. Handlers should also know the basics of map and compass in case the GPS is lost or runs out of batteries or otherwise fails. But the ability of GPS use to provide an exact location, record the user’s track and show what is up ahead is invaluable for working dog teams. They

also provide an accurate and complete record of every search or deployment for Incident Command, training or evidence purposes.

When I started in K-9, GPS units did not exist. We headed out into the woods with our compasses, and, if we were lucky, a half decent map and a helper. If you had time to look at the map while trying to follow the dog and not be totally destroyed by the vegetation slapping and poking at you, maybe you could anticipate what swampy “hell hole” (a Maine woods term) you were headed into. Once the track ended, either by finding the subject or losing the track, then you had to figure out how to get back to your vehicle. Usually we had a very rough idea where we were, so taking a compass bearing and walking to a road normally worked. You just hoped there wasn’t a lot of water or swamp between you and the road.

Tracking at night was always an adventure. As a handler trying to follow the dog in thick woods, I never had time to keep track of where I was, and by the time the dog cut a few circles while trying to figure out the track, I never knew which way was north, south or towards civilization. If I had another warden with me, they were able to keep track of our direction of travel and see some of the landmarks I couldn’t notice because I was too busy holding on to the lead and fending off vegetation. Adding the worry of “where the hell are we” to “how long will this flashlight battery last” and “I know my portable radio battery is half dead” was not conducive to a good mental attitude about following the dog on track. If the handler is harboring negative thoughts about the operation due to his or her equipment or lack of training preparation, it becomes all too easy to doubt the dog when the dog is actually doing a good job tracking. A negative attitude causes the handler to give up when they shouldn’t.

Using a GPS takes the worry out of “where the hell are we.” If the GPS has downloaded aerial photos, then the user has a good picture of what the terrain and vegetation is ahead. The GPS also provides a record of the team’s track, and evidence found or other points of interest along the way can be recorded as waypoints. If the team loses the track, the points where the dog was tracking well can be marked as the team proceeds so that the team can go retrace their route and try to re-acquire the track.

With practice, a handler can use a GPS while handling the dog, but it is best if a back up officer runs the GPS and radio so the handler can concentrate on the dog, the upcoming terrain and have both hands available. Under optimal conditions on a track for a dangerous subject, trailing unit would have one or more people in charge of communications and navigation as well as adequate protection for the dog team and other personnel. However, every tracking dog handler should still run their own GPS record of their tracks on a quality GPS unit as a backup even if they have someone else to help.

There are a number of mapping applications like Google Maps that will give you your location and aerial photo maps on your smart phone. These are great for seeing what the terrain is around you.

There are now a number of smart phone apps that allow you to record your track with various degrees of accuracy. “My Tracks” and “Sports Tracker” are examples of these, and most have free versions. Most programs provide details like the time, duration and length of the track. With Sports Tracker, the tracks can be stored on the cloud and made available on the web page. The few I am

familiar with don't sync automatically with the web page, so there isn't a possibility of real time tracking. I've run some experiments by running tracks with a Garmin GPS and Sports Tracker and found that the smart phone apps seem reasonably accurate, but not as accurate as a real GPS. For example, the tracks differed as much as 50 to 80 feet from the GPS track, not real accuracy to relocate a piece of evidence found on the track, but accurate enough to get someone within shouting distance of someone on the track. I have good cell reception in the areas I working in, and poor cell reception would probably increase the inaccuracy. I haven't experimented with more than three of the tracking programs, but I found Sports Tracker easy to use. The free version of Sports Tracker allows for the sharing or downloading of tracks in gpx format, so they could be used with a mapping program, and they can be saved as a gpx file.

Recently I purchased the Earthmate cell phone app from DeLorme (about \$30.00 per year). This is also a cell phone tracking program that gives you your location, track, and aerial map options for the area. It also automatically syncs with a web page that allows the map, track and waypoints to be displayed on a computer. This allows the track and waypoints to be exported as a GPX file that could be utilized in a number of computer mapping programs. Routes can be designed on the web page and downloaded to the phone to pre-plan a trip. Unfortunately, there does not seem to be any storage provisions for tracks – the web page only shows what is on your phone and doesn't save past tracks. So once the track is erased on your phone, it is gone on the web site, and the converse is true – if you erase a track on the web site, it will be gone on the phone next time the phone syncs. However, if you export the track and waypoints as a GPX file, they can be saved on a mapping program or just as a computer file. The program syncs every 10 minutes, so there is some possibility for someone else to view your track in "real time," at least every 10 minutes. This would require someone with an internet connection and the log in information for the person using the smart phone application.

I ran a small experiment tracking a training exercise to compare the accuracy of GPS vs. the Earthmate cell phone application. The accuracy of Eathmate was about the same as Sports Tracker. GPS experts note that the GPS functions on cell phones are not as accurate as a true GPS, but I can see that they could serve to record training tracks and for basic navigational aids when on real tracks, if nothing better is available. They can provide aerial views of the area, something that usually requires paying for a subscription for GPS units. The greatest limitation of cell phone apps is that **THEY DON'T WORK IF THERE IS NO CELL SIGNAL.**

If you work in an area with good cell signals, then a cell phone application should work for short deployments, but they use up phone battery power much more rapidly than normal cell phone use. Using these applications for a day would probably mean a dead cell phone by the end of the day.

### **Command Coordination of Dog Team Deployment**

I am not a technical expert, and I know that other radio and GPS tracking equipment exists besides the commercially available Garmin and GPS equipment. Anyone who needs this type of equipment and has the budget for it should do more research. I am primarily familiar with the Garmin dog tracking systems and how they enhance our deployment of tracking and SAR dogs in Maine. They

are not dependent on cell coverage, and since about 75% of Maine doesn't have cell coverage, that is a good thing. Besides keeping track of the dog, the Astro or Alpha system could be used by command units to keep track of the dog team, assuming the dog wearing the GPS collar and handler stay together, or one of the tracking team carries another dog collar. If command had a Astro or Alpha receiver, they would get nearly instantaneous, real time updates of the tracking team's position. One limitation is that they would have to stay in range of the radio signal, like within a mile in very hilly terrain, further in flat terrain, unless the receiver had a long range antenna (available from Garmin). An Astro can be connected to a computer with Garmin's mapping program (Basecamp) and the track displayed on the map on the computer to provide a bigger picture. Again, the hookup would have to be within radio reception of the operation.

There are other commercially available GPS tracking alternatives. There are a number of "vehicle," "pet" and "other" tracking systems available. An internet search will reveal many sites that advertise these, and detectives and narcotics investigators are probably familiar with tracking systems that have worked for them. K-9 handlers would do well to look into GPS senders their department may already be using that they could carry in a pocket or backpack while on deployment. Costs vary with the quality of the unit and the capabilities, and all the cell network based systems require a data plan subscription as well as the cost of the unit. But they provide position updates on web pages that can be viewed (I assume) by anyone with an account. I have not used them and I am not familiar enough with them to know if they allow for track downloads. Update intervals vary, most seem to update only every 10 minutes. Getting current location information could be very important when chasing a felon, so pay attention to the update interval when working with and researching these systems.

The ultimate solution for working in areas without cell coverage is to use a satellite based communication system. These are much more expensive, but worth the money for working in remote areas. There are various "vehicle" tracking satellite options, but the ones on the web I researched had an update interval of 10 minutes. The DeLorme "inReach" GPS/satellite messaging unit is the latest and greatest innovation in GPS for extreme outdoor use. It allows for GPS navigation and text messaging anywhere in the world based on satellite uplinks. Using the same Earthmate application I mentioned earlier, it allows the sharing of positions with others via the Earthmate web site, so command could see the position of the tracking team. The "normal" data subscription that comes with inReach provides for updates every 10 minutes, but they have a more expensive plan that allows for a 2 minute update interval. In addition, someone using the Earthmate app is able to "ping" the inReach and learn the current location of the inReach when it is pinged between update intervals. Subscription plans can be purchased for various amounts of time. The inReach unit also has an "SOS" function that can be activated to provide an emergency beacon signaling and text communication with a search and rescue emergency center (it probably won't go to your local 911 communication center). The unit also allows for regular text messages to anyone through the satellite system. An inReach Explorer goes for about \$380.00, and a month's subscription to the two minute update plan is about \$100.00. The one basic GPS feature that inReach does not have that regular GPS units have is a map screen with maps. It has tracks, routes and waypoints but no maps. Rumor has it that adding maps is the next step in the inReach line of units so that they can be used like a regular GPS unit.

## **The Ultimate Tracking Set Up**

With an unlimited budget, and based on the commercially available equipment I am familiar with, I would purchase an Alpha training system, an extra collar or two and an extra Alpha receiver with an added long range antenna. The newest collars have a 9 mile reception range, and a collar beacon light that is activated or deactivated by the Alpha transmitter. Whatever "chase" vehicle was following the tracking team would get the other Alpha transmitter to keep track of the team's route and location. The Alpha provides all the usual GPS functions plus e-collar training options. A similar Astro set up provides the essential tracking and GPS functions at a lower price.

I'd also have an inReach unit to provide position information to search command and text communications. There are probably better systems out there for military use, but I am not familiar with them, and I know that the Garmin and DeLorme units are rugged and made for use by non-technical outdoor enthusiasts.

## **The Human Factor**

Perhaps the greatest limitation to the use of these GPS systems is the training of command and support people. Handing an Astro or Alpha over to a sergeant or other command or support person means that they have to be familiar with the unit's operation. The same is true of the Earthmate web application or other web applications that cell or satellite location systems would interface with. I've dealt with many K-9 officers who never learned to use their GPS the way they should, much less been able to provide training for the other members of their department. To handle a dog and use the GPS, you have to be familiar enough with the GPS that you can almost to run it like you run your smart phone.

Like any other piece of electronics, GPS Units and dog collars need regular maintenance. They have to have charged batteries and they require software updates just like a computer. Only a compass can be left in your pack for months at a time and still work when you pull it out. And, like a computer or computer program, over a long enough period of time, the manufacturer will stop providing support and updates for the Unit. The Astro 220, the first dog tracking system receiver put out by Garmin for dog tracking, is no longer supported by updates from Garmin. Already the 220 units in our SAR dog unit are showing decreased accuracy compared to the Astro 320s.

Fortunately, most younger police officers are very familiar with electronics and use their smart phone and computers like older SAR dog handlers can use a map, compass and coordinate system to plot their position. Most electronics work basically the same these days, so younger officers can usually pick up a GPS unit and figure out how to use it in a short period of time. K-9 handlers should pick out some of their fellow officers who are likely to help as back up officers and familiarize them with the equipment. Regular back up officers and SWAT members that deploy with K-9 tracking teams should also be trained in the use of GPS, as well as command units that will be supervising the team and deploying other resources.

If the member of a small K-9 unit doesn't have access to this help, they might look to whatever department would be handling a large, multi department operation. In Maine, the Maine Warden Service runs all the SAR incidents and has become the expert department in back country searches, resource tracking and allocation. They often assist regular law enforcement with searches for felons in remote areas, and hopefully a similar mutual aid situation exists between departments in all states. If the handler can't arrange for a mock felon search for training, they might be able to join a search and rescue mock search or training exercise to work on their GPS and command interface skills and systems, even if they attend without their dog. Working with a high quality volunteer SAR dog unit that does operations in remote areas would also help handlers to understand navigation options.

In summary, there are a number of technical advances that allow K-9 handlers to track safer and more effectively, but like all advances, they require equipment, equipment maintenance and personnel training to work. Some cell phone based systems are relatively inexpensive and easy to learn and use. Handlers should also do their own research and determine which system is best for their area and type of deployment.

Anyone who has done research on this subject and has more information on tracking systems that work for them is welcome to e-mail me at [dpalman1@gmail.com](mailto:dpalman1@gmail.com), and I will provide the information in a future article. I will be the first to admit that I am not an expert in this field. I know what has worked for us, but there are more systems out there that I am not familiar with.