Stalking the Fox

Become a radio *fox hunter* and test your skills against a clever opponent!

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The chase is on! There's a transmitter out there somewhere and it's teasing you, taunting you, daring you to find it! You stop to get your bearings. Where is the signal strongest? Yes, it's almost due east, but how far?

Another hunter appears at the top of the next ridge. She turns her antenna slowly and then, suddenly, she stops. Does she have the fix, too? You'd better get moving or you'll come in second place...or worse! Your heart is pumping like a jackhammer as you hurry down the hill. Where is the fox? WHERE IS IT?

Getting Started

Most sport transmitter hunting (sometimes abbreviated "T-hunting") is done on the 2-meter FM band. You can get started with just a portable 2-meter receiver that has a signal strength meter, or *S-meter*. You *can* use a receiver without a meter, but you'll have to rely on your ears to tell you whether the signal is getting stronger or weaker. A meter is a more precise indicator.

One item you'll definitely need is an *attenuator* between the antenna and rig. You can build a simple attenuator from plans in *The ARRL Handbook*. An attenuator is used to deliberately reduce the received signal strength as you get closer to the transmitter. If the signal becomes too strong, you won't be able to pinpoint the source.

You'll also need a directional antenna, but you can build one easily, from plans in *The ARRL Antenna Book*. Like any sport, serious players have more exotic equipment. Like you, most of them started out with simple receivers and antennas.

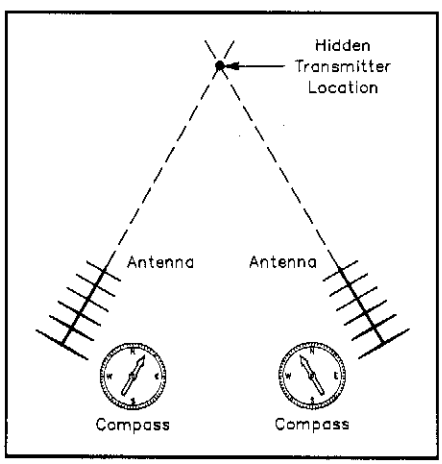

Fig 1—When you're close to a hidden transmitter, you can use *triangulation* to pinpoint its location. Take two bearings from locations a few hundred feet apart and draw lines representing the bearings on your map. The transmitter is located very near the point that corresponds to the intersection of the two lines.

Sport Hunting

Recreational transmitter hunts are usually organized by clubs. While the participants gather at a local landmark, the transmitter operator—otherwise known as the *fox*—is heading into the field to hide. A favorite trick of transmitter hiders is to plant a low-power transmitter near the starting location. They position the antenna so the signal reflects off hills or mountains, making it *seem* as though it's many miles away!

The transmitter comes on the air at a prearranged time. Hunters swing their antennas to take their first bearing. Within a few minutes, everyone jumps into their cars and the chase is on. (Of course, the entire hunt can take place on foot. This type of hunt is an ideal activity for a club picnic.) Hunting is easier and more fun when done with another person. While one drives, the other checks the maps and swings the antenna.

Once you have a rough idea of the area in which the transmitter is operating, you get as close as you can and take more bearings. (For example, is the fox south or southeast from your present position? Check and make sure!) Each set of bearings should bring you closer to the transmitter. Here's where having two or more people on your team pays off. As you get closer to the transmitter, a real traffic jam of hunters will develop.

When you're *very* close to the transmitter (it takes lots of attenuation to keep the signal from overwhelming your receiver at this point), taking a bearing from a second location lets you *triangulate* to get a better idea of the transmitter's location (Fig 1). If the transmitter is fairly close, the two initial locations from which you take bearings need be only a few hundred yards apart. If the transmitter is far away, it's better to take the initial bearings from more distant locations. The terrain over which the hunt takes place determines the necessary separation, as does the type of antenna you're using.

The Game's Afoot!

Foxes aren't known for making life easy for hunters. You can bet the terrain will be challenging. As you get closer to the transmitter, you may find the signal gets so strong that it's hard to determine its peak strength. Using the null off the sides or back of your beam may help. Here's where having an attenuator between the antenna and receiver really comes in handy. You'll probably want to make a smaller antenna for hand-held use.

When you finally close in on your target, don't be surprised to find that several others have already beaten you to the spot. Transmitter hunting is like running a marathon: at the beginning, it's important to finish, not win. With experience you'll develop techniques to help you finish sooner.

Games Transmitters Play

If the world was perfectly flat it would be relatively simple to find any hidden transmitter. Hills, mountains and buildings are good reflectors of VHF signals; so transmitter hunting becomes a real challenge when they're in the vicinity! Fig 2 shows a typical case. The hidden transmitter is down in the valley, connected to a highly directive beam antenna pointed at the mountain. From our observation point we detect only the reflection off the mountain. Carefully swinging our antenna *may* detect the direct signal from the back of the beam—if our antenna is directive enough.

T-Hunting Equipment Suppliers

BMG Engineering, 9935 Garibaldi, Temple City, CA 91780

Doppler Systems, PO Box 2780, Carefree, AZ 85377; tel 602-488-9755

L-Tronics, 5546 Cathedral Oaks Rd, Santa Barbara, CA 93111; tel 805-967- 4859

Radio Engineers, 3941 Mt Brundage, San Diego, CA 92111; tel 619-565-1319

Douglas RF Devices, PO Box 246925, Sacramento, CA 95824-6925; tel 916-688-5647

Books

Transmitter Hunting—by Joseph Moell, KØOV, and Thomas Curlee, WB6UZZ. Available from your favorite dealer or the ARRL. $19.

***QST* Articles**

J. Moell, "Transmitter Hunting: Tracking Down the Fun—*Part 1*," April 1993, pp 48-51.

J. Moell, "Transmitter Hunting: Tracking Down the Fun—*Part 2*," May 1993, pp 56-58.

B. Leskovec, "Build the HANDI-Finder," May 1993, pp 35-38. Additional information: Oct 1993 *QST*, pp 78-79.

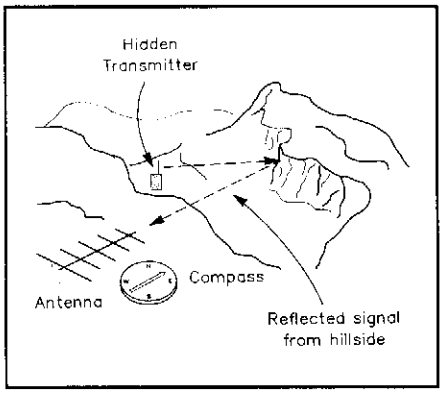

Fig 2—A transmitter hidden in a valley can cause misleading beam headings. In this example, the transmitter antenna is a beam, pointed at the hillside. The strongest signal is coming from the hill. With experience you'll be able to detect and identify the weaker signal coming from the transmitter itself. A similar effect occurs when the transmitter is hidden among buildings or other reflective surfaces, like railroad cars or truck trailers.

Before we started climbing that bramble-covered mountain, we'd want to take a few bearings from its foot, just to be sure.

Urban transmitter hunts are equally challenging, as a cluster of steel-framed buildings can scatter the transmitter's signal in dozens of directions. The problem gets worse at higher frequencies. If you're hunting in the city, remember that the transmitter need not be at ground level. When you're close to a transmitter hidden a few floors up, in a building sandwiched between others, dogged persistence pays off. Use your best directive antenna to "paint" across and up and down the buildings around you, looking for the peak from the transmitter itself.

Practicing Your Skills

It only takes two to T-hunt. You and a friend can take turns hiding and seeking. If no one else is available, try hunting local repeaters or their users. Hunting a user is particularly challenging because the signal isn't constant. In fact, it may leave the air at any minute. Of course, you'll ask permission before going onto private property. Be sure you have your amateur license with you, in case you have to prove you're not a crook plotting a heist! When you get some experience and are ready for a real challenge, try hunting mobiles!

Practical Hunting

Using FM repeaters is not without certain aggravations. Microphone push-to-talk buttons sometimes stick closed. Some hams leave their rigs turned on when they leave their cars. The combination may result in unintentional jamming of a repeater. Also, Amateur Radio has its own collection of loose nuts, who sometimes feel compelled to jam repeaters or simplex frequencies. Repeater clubs often have interference committees. Committee members are probably among those who find the hidden transmitter first at the monthly T-hunt. Otherwise, they go about their committee business in secret. Only those unfortunate enough to receive a visit from the committee know how efficiently they can track down an "open mike" or a malicious jammer.

Transmitter hunting is a necessary part of high-altitude ATV (Amateur TV) balloon flights. Depending on the winds aloft, the balloon can drift a hundred miles or more before it finally bursts. From the moment of launch, the hunters track the balloon, trying to position themselves directly beneath it. When the balloon pops and the payload falls earthward on its parachute, the hunters have to be ready to track the package and recover it. Thanks to the skills of transmitter hunters, most payloads are recovered successfully.

Transmitter hunting is also a skill practiced by rescue organizations, especially in the Western mountains. Many private airplanes carry emergency locator transmitters (ELTs), operating a few megahertz below the 2-meter band. ELTs emit a distinctive tone and have built-in batteries that will keep them going for several hours. Many search-and-rescue volunteers are hams.

On With the Hunt!

The best way to find out about T-hunting in your area is to ask other users of your local repeaters. If nobody's doing it yet, why not get the ball rolling?

Participants will need adequate equipment. If you don't have enough rigs to go around, form teams. Building some T-hunting antennas and attenuators would be another good club project. Imagine the pleasure you'll get from tracking down the hidden transmitter with an antenna you built yourself!

The first hunts should be easy, to give everyone a chance to find the transmitter. Arrange a meeting place and time and spread the word through club meetings and the local repeaters. Depending on the local terrain, you may want to distribute photocopied street maps of the area in which the transmitter may be located.

The winners of *sprint* hunts within the boundary of a town or small city are often determined by how long it takes them to find the transmitter. The team that finds the transmitter first wins. This method is common when the hunt is held on a repeater input frequency, to reduce the time the repeater is tied up. Wide-area and other advanced hunts are generally scored by mileage, much like a sports-car rally. Scoring by mileage recognizes skill in taking bearings, and discourages high-speed driving during the hunt. These hunts are usually held on simplex frequencies to avoid tying up a repeater.

If you wish, you can collect a small entry fee from each hunter and use the proceeds to buy a plaque or an ARRL book for the winner. The best prize might be to let the winner be the transmitter operator next time. If the winner can't operate a transmitter on the band you use for your hunts, ask someone who can to go along as control operator.

If you're looking for an exciting Amateur Radio activity, transmitter hunting is an excellent choice. It's hard to top the thrill of chasing down a fox and savoring the satisfaction of finally finding it! QST

Radio Tips:

Using an Autopatch to Report an Accident

Repeater *autopatches* allow hams to use their radios to place telephone calls from virtually any location. Autopatches are common throughout the US and they are extremely valuable in cases where there is an immediate threat to life or property. If you come upon the scene of an accident, by all means use the autopatch.

Remain calm and get as much information as you can prior to placing your call. When it's time to use the patch, don't worry about breaking into someone's conversation. *You* have priority! Here's a typical emergency autopatch procedure:

❑ Give your call sign and say "emergency patch."

❑ Dial the access code followed by 911.

❑ When the dispatcher answers, say that you are an Amateur Radio operator reporting an accident.

❑ Give the highway number and direction of travel. If the accident site is near a mile marker or exit, provide this information.

❑ State whether traffic is blocked, or if the accident is out of traffic.

❑ List any apparent injuries along with the number of persons involved.

❑ If a fuel or chemical spill has occurred, say so. If there is a fire, let the dispatcher know.

For example, "This is KR1S. I am an Amateur Radio operator reporting a two-car accident on I-94 northbound, about 1 mile south of exit 24. The right hand lane is blocked. Property damage only."

Keep your details very brief and to the point. Don't waste time adding superfluous information such as the makes and models of the vehicles. If the dispatcher needs to know, he or she will ask. When you've finished your call, deactivate the autopatch and remain on the frequency. If you've stopped at the accident scene, try to stay until help arrives.—*Richard Regent, K9GDF*