

Field Instruction Guide

Tracker DTS Field Instruction Guide



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The Tracker DTS Field Instruction Guide is a resource for avalanche educators and others teaching on-snow transceiver use. The objective is to help educators teach students how to properly use the Tracker DTS. However, this guide is equally applicable to other digital beacons and can be used for general avalanche transceiver training, whatever the brand. The guide is most effective when used with the BCA flux diagram and our beacon training video, "Take Charge: Leading a Companion Rescue." These can be ordered from BCA by calling (800)670-8735.

As a supplement to the Field Instruction Guide, we offer the Tracker DTS Advanced Tutorial. This provides detailed instructions on advanced techniques not included in our owner's manual and generally not taught in recreational avalanche courses. This can also be obtained by calling BCA or by downloading from our website at www.backcountryaccess.com/education/teaching.php.

Instruction principles

- Try not to tell a student what to do. Whenever possible, show them.
- Do not assume they have learned what you've taught them; they should be able to demonstrate their understanding.
- Get the Tracker into the hands of the student and get them practicing. Five minutes of use in the field (or sandlot) is more effective than far greater time in the classroom.
- When teaching recreationists, the objective is to build confidence by enabling them to succeed in performing a basic single beacon search.
- Only go into advanced search technique once students are practiced in the fundamentals.

Instruction setup

For maximum teaching efficiency, hold your training at a BCA Beacon Training Park. For more information on this program, see www.backcountryaccess.com/education.

Target audience for basic instruction

- First-time beacon users
- Heli and snowcat clients
- Rental customers
- Professionals using a digital beacon for the first time

Familiarization

Demonstrate the following:

- Wearing the transceiver properly under outer layer
- Deploying and extending for searching
- Turning it on, checking battery power, going into transmit
- Going into search mode
- Going back into transmit mode

Lesson I: Single Burials

A) Explain the three elements of the search:

- Primary/signal/coarse search: detect the signal.
- Secondary/fine search: get close to the buried beacon.
- Pinpoint search: define the smallest possible probe/dig area.

B) Primary search

If time does not permit, then it is not essential for students to practice the primary search during this phase of the clinic. However, a brief introduction should be provided, and they should become familiar with the search strip width of their transceiver. Use the diagram on the back side of the vinyl BCA flux diagram to illustrate the three phases of the transceiver search.

Effective Range: The "worst case," or "effective" range is 10 meters for the Tracker DTS and most other digital avalanche beacons. Allow a maximum of 10 meters between the searcher and the edge of the slide path.

Search Strip Width: Allow a maximum of 20 meters (or twice the effective range) between searchers or switchbacks.

- 1) "SE" will flash in the distance window until the signal is captured.
- 2) Once you receive a signal, rotate your beacon until you engage the center search light. You have completed the primary search when you have engaged the signal on a consistent basis.
- 3) Move as quickly as possible during the primary search. Scan the surface of the snow looking for clues such as equipment and protruding extremities.

C) Secondary search: flux diagram usage

Use the front side of the BCA flux diagram to illustrate a "flux" line search. [The back side of the Flux Banner shows the 3 phases of the search.] In the absence of this diagram, flux lines should be drawn in the snow.

- 1) Place a transmitting beacon horizontally on the ground, on top of the flux diagram, with the transmitting antenna attached to the Velcro at the center of the diagram.
- 2) Perform a small search for the beacon that is attached to the diagram. Perform the search on the same plane as the transmitting beacon (on top of the vinyl surface). This will eliminate the potential for "spike" signals, which are discussed in the Advanced Tutorial.
- 3) Make sure the center light is engaged and the number in the distance window is decreasing. If it is increasing, turn 180°. If the light to the right (or left) of center engages, rotate your beacon slightly to the right (or left).
- 4) Explain that all beacons follow the direction of the electromagnetic field. Perform several small searches, following the flux lines on the diagram, starting at several different points at the edge of the diagram. Show how the secondary search path can differ significantly, depending on the relative orientations of the two beacons.

- 5) Point out that when performing a secondary search with the Tracker, it is not always necessary to have the center light engaged. When the signal is first detected, it is adequate if any of the three center lights are flashing. The searcher should move very quickly to ten meters.
- 6) Inside ten meters, move slowly and deliberately, keeping the center light engaged.

An effective way to illustrate flux lines is to place a transmitter in the center of the group, preferably on the flux diagram. Have them follow the directional lights to the transmitter, then look at their footprints in the snow.

D) Pinpoint search

For novices, we recommend starting with a bracket pinpoint technique. For more advanced pinpoint techniques, see the Advanced Tutorial.

Bracketing

- 1) If students are wearing their beacons, demonstrate how to extend the lanyard to increase their range of motion.
- 2) Within three meters, place the beacon as close as possible to the snow surface and search in the general direction they were headed during the latter part of the secondary search. Look for the smallest distance reading.
- 3) Ignore sudden fluctuations in distance and direction. The strongest signal is often just past these fluctuation points, or "spikes."
- 4) Verify the smallest distance/strongest signal by maintaining the Tracker's orientation and moving it perpendicular to the point where the smallest reading is captured. More brackets can be performed until the lowest number is found. This is identical to pinpointing with an analog/audible-based beacon. When bracketing, however, it is important only to concentrate on the numeric distance readings; directional arrows should be ignored.
- 5) Begin probing at the smallest number found. We suggest an expanding spiral pattern.

Exercise I: Exposed transmitter/supervised

Have each student conduct a secondary and pinpoint search for the transmitter on the snow surface. By leaving the transmitting beacon visible, the student will build confidence.

- 1) Follow each student one-at-a-time to make sure they are "trusting" what the beacon is telling them. A common mistake is to travel straight despite the light flashing to the left or right of center. Another common mistake is to move too fast during the pinpoint search.
- 2) Encourage them to move the Tracker slowly, not abruptly, when centering the search light. This is especially important for experienced users of analog/audible-based beacons.
- 3) Students should be encouraged to say the distance numbers aloud. This reinforces to the instructor and student that the user is looking at the distance display and is getting closer.
- 4) Have them perform the pinpoint search using the bracketing technique only. Make sure that once they start bracketing, they should ignore the directional lights and move at clean right angles.

Exercise II: Buried transmitter/supervised

Perform the same exercise as above, but searching for a buried transmitter.

Exercise III: Buried transmitter/unsupervised (in pairs)

Depending on the number of students, have them break into pairs and conduct secondary and pinpoint searches together. Each team of two should practice while the instructor rotates between teams. One person buries, the other searches, then switch. Maintain a distance of at least 40 meters between groups.

Timed Searches: If time permits, perform a timed contest, including all three phases of the search. Timing the searches will help simulate the stress associated with actual conditions. After pinpointing, each contestant re-hides the beacon for the next. In a flat, packed search area, a student should be able to perform a successful search in under three minutes.

Before moving on to multiple burials, we suggest reviewing efficient probing and shoveling techniques. For more information, see www.backcountryaccess.com/education/teaching.

Lesson II: Multiple Burial Searching/SE Mode/Three-Circle Method

Complex "special case" multiple burials are rare in the recreational setting. Almost all multiple burials can be solved as a series of single burials. For more information on multiple burial statistics, see "Revisiting Multiple Burial Statistics: U.S. Avalanche Incidents 1995-2007" found at www.backcountryaccess.com/research.

Only teach students multiple-burial technique once they have mastered single burials, strategic shoveling, and organizing a search. Multiple burials should only be taught in Search mode. Special mode and is discussed in the Advanced Tutorial.

It is important to emphasize that whenever possible, the searcher should turn off the victim's beacon once they have been located. This limits the multiple search to a series of simple, single-burial searches. However, it is sometimes more efficient to begin searching for other victims if other companions are available to begin shoveling.

A) Illustrate the Tracker's signal-strength filtering:

- 1) Place two beacons on the snow, about 10 meters apart. Remain in Search mode. Pinpoint one transmitter, then move closer to the second. Show how the Tracker automatically isolates the second one. Distance readings should increase as you move away from the first beacon, then decrease after isolating the second.
- 2) If possible, use beacons of different brands as transmitters. This will allow students to experience their differing pulse rates. If using "marking" features on other brands, always mention the risks of overlapping signals. For more information, see "Signal Strength Versus Signal Timing: Achieving reliability in multiple burial searches" found at www.backcountryaccess.com/research.

B) Show how the display looks with two beacons transmitting:

- 1) Using the same two transmitters, begin a secondary search from at least 20 meters away. Note what the display looks like when they have both been detected. Often signals can be differentiated better by slightly changing the orientation of the Tracker until the received signals are in different directional windows.

