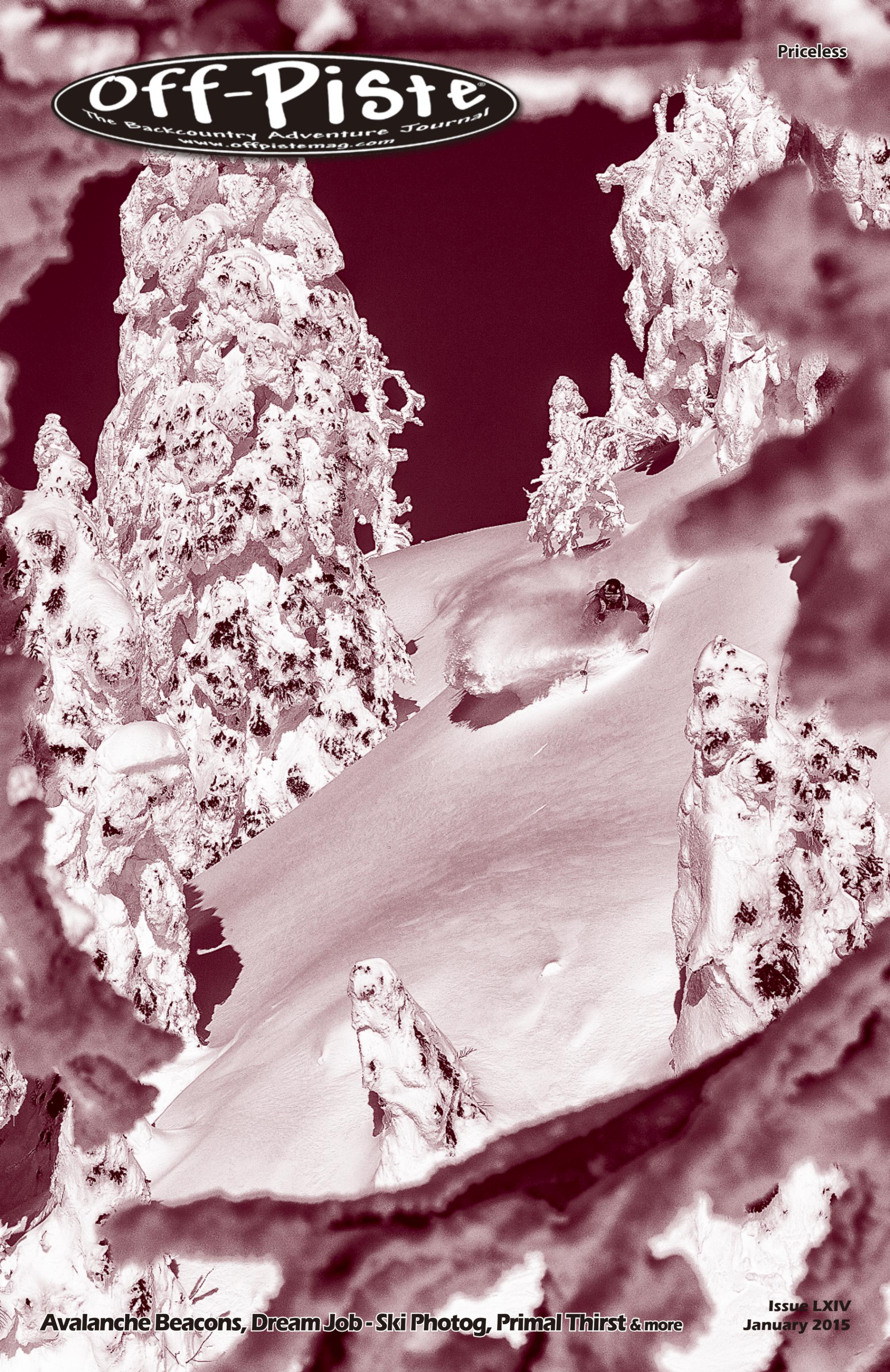


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Avalanche Beacons, Dream Job - Ski Photog, Primal Thirst & more

**Issue LXIV
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Avalanche Beacons

four mid-range beacons that can do it all



If you're in the market for a new avalanche transceiver, today's units are incredibly proficient search tools. Three-antenna construction, digital processing of the signal and directional guidance are all standard fare. We handed our crop of test beacons to rank novices with no tips or explanation for use beyond how to switch to search mode and the resulting search times for a single signal were impressive. When you add a second buried signal, search results became more variable, but the multiple-burial search process is easier to learn than ever before.

Most beacon manufacturers now offer two or three beacon models including a basic introductory unit, a mid-range unit with added functionality like multi-signal marking and a high-end unit with programming capabilities aimed at professional users. The four beacons included in this test are mid-level beacons with a focus on an easy-to-use interface and signal masking for multiple-burial scenarios. They are designed for solid recreational users and beyond.

We conducted our practice sessions with a BCA Beacon Basin up at Sol Mountain Lodge in British Columbia's Monashee Mountains. The beacon basin includes multiple buried transmitters all controlled from a central switch box. The system had five buried beacons and allowed us to set up consistent test scenarios and a wide variety of multiple burial situations.

Field-testing proved unequivocally that each of these beacons is incredibly efficient at finding a single buried signal, the most likely real-world scenario for the bulk of avalanche beacon users. From seasoned veteran to rank beginner, single-burial course searches were handled with ease. Fine search proficiency required a little practice with each beacon, but the digital processors and three-antenna designs ensure a smooth transition from initial signal detection through coarse and fine searching. Processing speed and signal detection range varies between beacons but made little impact on overall search times for single burials in our testing. Subtle differences revolved around the style of tones and the fine search interface, with each beacon offering a slightly different approach but all proving to be very functional.

Where the beacons show more significant differences is during multiple-burial scenarios. Multiple burials are statistically less common than singles but are still a factor worth considering when evaluating your next avalanche beacon purchase and when practicing your search skills. The bottom line is that even with signal marking technology, multiple burial scenarios require technique, practice and familiarity with your beacon's specific features and functionality.

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Ortovox 3+

\$369 www.ortovox.com

Overview: The slick design of the Ortovox 3+ yields a modern look and relatively small package that includes a rubberized surface for easy grip and an easy-to-read LCD screen. The 3+ employs Ortovox's Smart Antenna technology, which is capable of selecting the best antenna for transmitting based on the beacon's orientation. In other words, like a cell phone that can detect its orientation and optimize the display horizontally or vertically, the 3+ can switch transmitting antennas to maximize the beacon's transmit signal based on burial orientation. This feature maximizes the range at which the 3+ signal can be picked up by a searching beacon. Though not capable of completely mitigating poor orientation burial, the Smart Antenna is able to boost the signal by 40% in worst-case scenarios, and that's a good thing to have on your side when you are the one buried. There's a simple multiple-burial indicator and a one-button signal marking function to aid in multi-signal searches. The 3+ also offers a group-check mode for testing your partners' beacons at the start of a tour complete with error codes to trouble shoot transmitting beacons should there be a problem.

Searching: Search mode is engaged by pulling the two switch-locks in opposite directions (requires two hands). The button may not be intuitive the first time you use it, but once you see it, it's easy. The maximum range is pretty average at about 40 meters. Once engaged, search mode includes the usual distance readout, directional arrows and an audible tone. Once within 2.5 meters of the signal, the beacon automatically switches to fine search mode where the cadence and pitch of the audio increases as you get closer, the distance indicator becomes the central icon and the directional indicators end.

Multiple Burials: The 3+ initially directs you to the strongest signal in a multiple-burial scenario and shows body icons on the LCD, one per signal for up to three. In the event of four or more signals, a 4+ appears next to the three bodies. Once within five meters of the first signal, the mark button can be used to mask the signal and facilitate moving to the next. The body icon for the marked signal gets a black background indicating successful marking. Signal masking worked well, but efficiently moving on to the next signal varied by user. The lesson here is to practice and learn the nuances of the 3+ in multiple burial situations. There's no way to unmark a signal once marked without cycling the beacon back to transmit and restarting the search, which we like as it reduces potential confusion by mistakenly unmarking a signal. The 3+ offers some advanced information for those ready to learn in the form of indicating signal overlap. If that makes your brain glaze over, don't worry you're not alone. But if it perks your interest, be sure to read what Ortovox has to say about signal overlap and associated techniques in the manual.

Conclusion: The 3+ is a fully functional beacon that aced single burial scenarios and offers an easy-to-use marking feature for multiple-burial situations. Though our multiple-burial scenario results varied among users, we found a little practice to go a long way in improving multiple-burial results. Some testers found the fixed audio tone pulse in the initial search phase less appealing than other units that change pitch and cadence. The fixed tone means you must rely more on the distance and directional information, where a changing pitch and cadence helps to intuitively guide some users in their search.

Pros: Smart Antenna Technology
Cons: Audio tones did not appeal to all testers

Backcountry Access Tracker 3

\$335 www.backcountryaccess.com

Overview: The long-anticipated Tracker 3 (T3) from Backcountry Access is 20% smaller than its predecessor, the Tracker 2 (T2). Though, it's only slightly smaller than the other beacons here. Given all the technology we have in wafer-thin mobile phones, it's nice to see beacons getting smaller. The T3, like the T2, is a three-antenna beacon but adds a user-friendly signal suppression function for multiple-burial searches. It also incorporates new motion-sensing technology to help prompt its auto-reverting from search to transmit modes. Staying true to its roots, the T3 maintains an easy-to-read red LED display and a



AVY SAVVY

Having the proper companion rescue gear - beacon, shovel, probe - is important, but understanding avalanche terrain and safe travel/ski protocols is the foundation to staying out of harm's way.

PRACTICE

Avalanche Beacons are understood to be required equipment for backcountry skiing, but they are only as valuable as you are familiar with their operation.

SIGNAL SEARCH

The initial phase of a beacon search is to acquire a signal. Some scenarios may offer a signal as soon as you switch to receive. If not, understanding search strip width is critical to efficiently picking up a signal. Refer to your beacon's manual for its maximum search strip width and more details on search technique.

COURSE SEARCH

Once you acquire a signal, the course search begins. Move calmly and keep the beacon horizontal in front of you. Be sure to keep an eye on the distance numbers to ensure you do not pass the buried beacon.

FINE SEARCH

The fine search is where you pinpoint the buried signal. It is critical to move down to within a few inches of the snow's surface while conducting your fine search.

STRATEGIC SHOVELING

Quick, effective beacon searches are important, but you must consider the time required to shovel and excavate a buried skier into your understanding of avalanche recovery. Shoveling is likely to be the longest part of the search process. Yes, there is a science to shoveling, for more details watch this video: <https://www.youtube.com/watch?v=bNji6SS5ghA>

UPDATES

Many beacons now offer updates to their firmware as changes and improvements in program code become available. These updates make your beacon work better, smoother and faster. Make it part of your pre-season routine to check with the manufacturer of your beacon or your local shop to see if there is an update available for your model.

BATTERIES

Always use fresh matching alkaline batteries when installing batteries in your beacon. Never use rechargeable or lithium-ion batteries. Replace batteries when the strength falls to 40%.

INTERFERENCE

Cell phones (even in airplane mode), VHF / FRS radios, cameras, and gps units can all interfere with your beacon, especially while in search mode. The professional standard is to keep electronics about 20" (50cm) from your beacon or, better yet, keep electronics turned off except when necessary.



FLOAT

BCA and backcountry.com athlete Cody Barnhill floats the Chugach, Valdez, AK. Photo by Mark Fisher

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simple user interface. Those familiar with the T2 will recognize the basic "TR" and "SE" indicators for transmit and search modes. The T3 moves to directional arrows from the simple dots on the T2. More remarkably different on the T3 are the search tones. The new tones elicited an amused response from everyone. Those old enough will be reminded of video games from the 80's. Regardless, the tones are easy to hear and change pitch and cadence throughout the search process. The unit fits nicely in your hand and has a simple harness. The T3 is designed to allow future software updates by the user via a computer.

Searching: Search mode is engaged by sliding the switch-lock mechanism with one hand and turning the on/off dial to SE with the other hand. The spec'd 40-meter range proved to be about the same in testing. Once in search mode with a signal engaged, the distance readout, directional arrows and an audible tone help guide you to the burial. At four meters, the audio signal changes pitch more dramatically and within two meters the directional arrows stop so you can conduct your fine search. The fine search tones do not change their cadence as dramatically as some beacons, but searching was intuitive for most users.

Multiple Burials: In the event of multiple signals, the two red body icons light up. If more than two signals are present, a plus sign appears and brackets around the body icons indicate close proximity (< 6 meters) to the searcher. The T3 locks onto the strongest signal in a multiple-burial scenario offering distance and directional advice for only the strongest signal. Once the first signal is pinpointed, you can engage the signal suppression feature by pressing the "mode" button (the only button) on the beacon until "SS" appears. The T3 will suppress the signal for one minute, allowing you to engage a second signal. BCA describes the multiple-burial search process with the T3 as a series of single-signal searches. As you get closer to the second signal, the T3 locks onto to it, just like it did the first signal. So, if the search process takes more than a minute and the suppression mode expires, you should be able to follow the second signal without interruption, provided you are making progress in the right direction. The signal suppression function proved reliable but, like with other beacons, we did experience variable success rates in finding beacon number two – likely due to signal overlap from the transmitting beacons. Again, the lesson is to practice and be familiar with your beacon. The T3 has deeper functionality for more skilled and curious users including Big Picture (BP) mode. BP mode is akin to analog mode in older beacons and allows you to see the big picture of how many and at what distance multiple signals are being processed. It is designed to aid advanced users in complex multiple-burial scenarios.

Conclusion: The T3 sets a nice standard for small size and an easy-to-read interface. Like the other beacons tested, the T3 seamlessly located all single burial scenarios. Multiple-burial searching is much improved for beginner users over the T2, and the T3 offers advanced users options for customization and complex burial scenarios. A few practice sessions with multiple burials improved results dramatically, proving that getting to know your beacon is a significant step in advancing your skills. Testers liked the high contrast nature of bright red LED's on a black screen. The audio tones still left some users chuckling, but they are easy to hear and that's the most important thing.

Pros: Compact design and high contrast red LED interface

Cons: Audio tones did not appeal to all testers, potentially more functionality than some users want

Barryvox Element

\$350 www.mammut.com

Overview: The Barryvox Element is a simplified version of Mammut's high-end beacon, the Pulse. The two beacons share many similarities, but the Element drops several advanced user functions in favor of a one-button interface and ease-of-use for a wide range of users. It also costs \$140 less. The Element pleased novice and veteran searchers with its easy-to-read interface and intuitive audio tones. It also features the longest receive ranges of the beacons, though this did not impact our search times but could in a larger scale situation. Universally, testers found the Element's audio tones the most intuitive of the beacons sampled. Its LCD display and directional icons were equally well liked and include a u-turn icon during the course search to alert that you have gone past the signal. Size and feel are similar to the others. Like the Pulse, the Element features multiple burial icons and the ability to suppress a signal once located. It also has offers an easy to engage "Group Check" function each time you turn on the unit. You simply select Group Check with the side button (the only button) after the unit finishes its self-check process. The Element is updatable but updates must be done through a dealer or Mammut.



Searching: The Element's search mode is engaged by depressing and sliding the top-mounted switch to the right (with beacon facing you). Mammut specs a 50-meter range and the Element did test to have the best range of the group (the Pieps DSP Sport was a close



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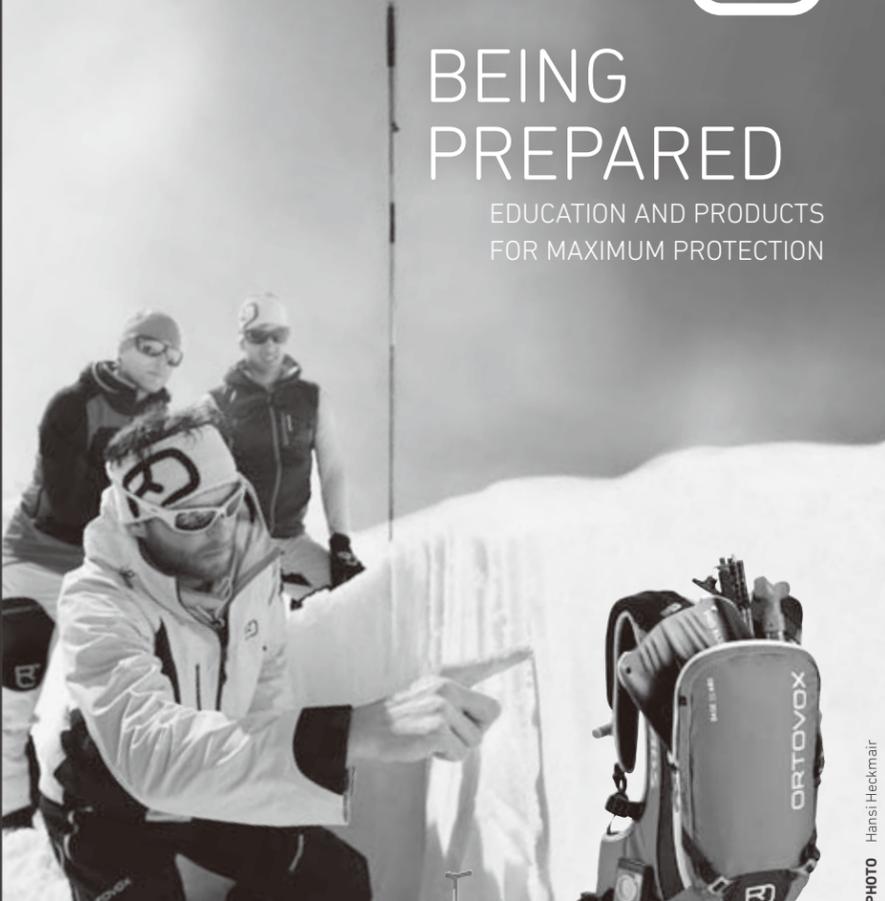


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second). Once in search mode with a signal engaged, the display shows distance, directional arrows and audio tones. At three meters, the Element switches to fine search mode with a single, fixed directional arrow indicating what Mammut calls the "landing strip." The audio tones change pitch and cadence throughout the search process adding an intuitive feel throughout a search.

Multiple Burials: The Element performed the most consistently of the beacons in multiple-burial searches. Multiple signals are indicated on the LCD display by head icons for up to three signals. Given more than three signals, a plus sign appears at the top of the icons. Suppressing a located signal was effective and indicated on the display with a check mark. Once suppressed, the signal remains so unless you cycle the beacon between search and transmit to begin again. One aspect of the Element that threw users for a curve was it how it can flash a "stop" sign and beep loudly mid search if it detects signal overlap or if you move erratically during a multiple-burial search. In practice, you need only hold still for a few seconds as the beacon reprocesses the signals and then continue on your search. Nonetheless, it can be disconcerting. Really, it's akin to other beacons offering unclear data or directional info during a search, but rather than display conflicting information, the Element tells you to stop and hold still while it processes the situation. Like the others, practice and familiarity with the Element are key to efficient multi-signal searching.

Conclusion: The Element was a clear winner regarding an intuitive combination of audio and visual guidance. The interface is simple and the search icons straightforward. Basically, the Element offers the power and processing of the more sophisticated (read complicated for some) Pulse model with a simplified user interface. The multiple burial results were great, but the "stop" command takes some getting used to or, better said, practice to understand. All in all, the Element is a nice blend of sophistication and ease-of-use.

Pros: Very intuitive audio and visual search indicators

Cons: Potential for "stop" command to confuse users

Pieps DSP Sport

\$275 www.blackdiamondequipment.com

Overview: The Pieps DSP Sport is the sibling to the DSP Pro. It's a feature rich beacon but with a simplified interface when compared to the Pro model. The DSP Sport is a step forward from the earlier DSP Tour. It has a new, more robust housing and switch, larger screen, faster processing and several subtler improvements including a consistent audio tone that changes cadence throughout the search process. Like the others, the Sport has a single-button interface with the ability to mask signals in a multiple-burial scenario. One feature that goes unnoticed unless you read the manual is the ability for the Sport to switch between antennas if it senses interference with or damage to the antenna in use while transmitting. It's called Auto Antenna Switch. In fact, the display shows which antenna is in use while in transmit mode. So you can create interference with a radio or cell phone and see it switch on the display. Overall, the beacon has a very solid feel and good ease-of-use appeal. Like the others, it's capable of firmware updates to stay current with the latest programming.



Searching: Search mode requires two hands to engage and is easily accomplished with gloves on. Once a signal is found, the display instantly offers the usual distance, direction and audio feedback. The battery power indicator icon also happens to be displayed at all times, which some users found to crowd the display. The Sport defaults to fine search mode at two meters and drops the directional arrows. The pitch of the audio remains constant while its cadence picks up as you move closer to the buried signal. It's pretty intuitive, but not quite as loud as the Element or T3.

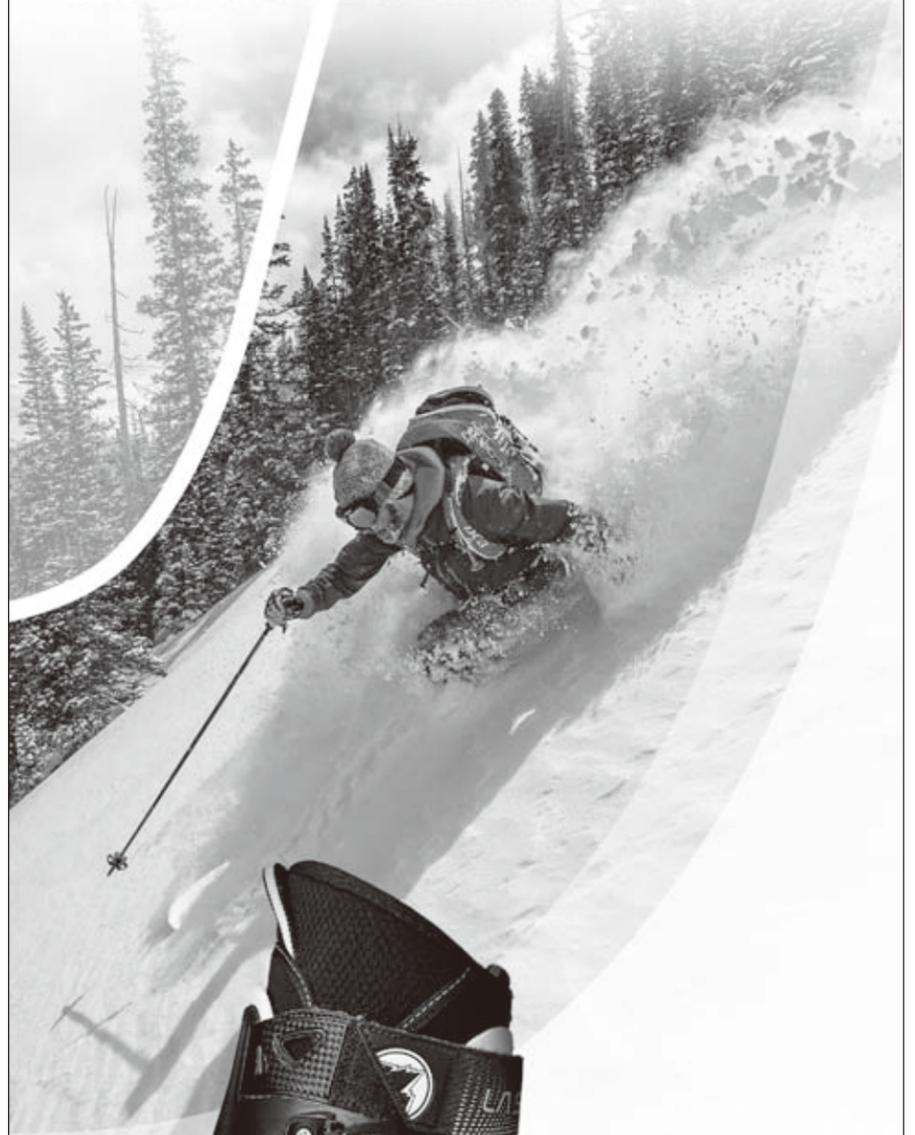
Multiple Burials: The multiple-burial masking function, Pieps calls it flagging, has a very positive feel and worked well. The learning curve for multiple burials was short and the DSP Sport had wide appeal among users. That's not to say it was flawless but, like we've said before, practice yields efficient searching. Multiples are indicated by up to three body icons. More than three signals prompts three dots to appear along side the icons. Successful flagging is shown with a box around the body icon. Flagged signals can be unflagged by holding the button down for three seconds.

Conclusion: In addition to the DSP Tour's bright color (yellow/green), which makes it easy to find in your gear bag, it was easy to use and its fast processing and prompt guidance during searches instilled confidence in users. It's a distinct move forward from the earlier Tour model in processing speed. The display can feel a little busy at times but, like any beacon, you get used to what you know. We like the bomber feel of the new housing and Pieps really packs some serious functionality in for \$275. There's no question it gets the value award.

Pros: Fast signal processing, value

Cons: Display busy with unnecessary info

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