

Multiple Burial Beacon Searches with Marking Functions - Analysis of Signal Overlap

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Locating multiple buried avalanche victims can be a difficult job for the average recreationalist. To simplify the task, modern avalanche beacons have added “marking” functions that allow a signal to be digitally removed from the search once it is inpointed. The marking functions identify individual transmitters based on small differences in their pulse periods and/or frequencies. These systems work well when the individual pulses remain distinct, but they can become unreliable when two or more units move “into phase” and send transmit pulses at the same time over many cycles. Although this so-called “signal overlap” problem is well known, its rate of occurrence has not been quantified.

Through a combination of electronic analysis and computer simulations, we have determined the likelihood of extended periods of signal overlap for various combinations of transmitters. The results show that long periods of signal overlap can occur when searching for certain older models: There is a 60% chance that four of these beacons will remain overlapped for at least one minute. Based on these findings, we recommend that educators continue to teach standard multiple-burial search techniques and make sure users know how to disengage the marking functions when necessary.