The Berkeley UXO Discriminator (BUD) is an optimally designed active electromagnetic (EM) system that not only detects but also characterizes unexploded ordnance (UXO). The system incorporates three orthogonal transmitters and eight pairs of differenced receivers. BUD is mounted on a small cart to assure system mobility. System positioning is provided by state-of-the-art real-time kinematic (RTK) global positioning system (GPS) receiver. The system operates either in a search mode, in which the system moves along a profile and exclusively detects targets in its vicinity providing target depth and horizontal location or in a discrimination mode, in which the system, stationary above a target, from a single position, determines three discriminating polarizability responses together with the object location and orientation. Field survey results from various test sites clearly show that BUD can resolve the intrinsic polarizabilities of a target, and that there are very clear distinctions between symmetric intact UXO and irregular scrap metal or clutter. Nearly intact UXO displays a single major polarizability coincident with the long axis of the object and two equal, smaller transverse polarizabilities, whereas metal scraps have distinct polarizability signatures that rarely mimic those of elongated symmetric bodies.

After a very successful discrimination survey at the former Camp Sibert in Alabama, with one target-of-interest (TOI) and a benign topography, we participated in a discrimination survey at the former Camp San Luis Obispo (SLO) with a challenging terrain, a wider mix of TOIs, and multiple objects present. We will present results of our discrimination approach in these challenging field conditions and when multiple objects are present.

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