In support of ESTCPs Discrimination Study Pilot Program at Camp Sibert, Alabama, SAIC analyzed electromagnetic and magnetic data collected in standard survey modes. The principal objective was to discriminate targets of interest (TOI) from non-TOI by identifying features that help separate the classes of objects, thereby reducing false alarms without impacting recovery of TOI.

We analyzed Marine Towed Array Detection System (MTADS) magnetometry data, MTADS EM61 MkII array data, MTADS GEM array, and standard cart EM61 MkII survey data. Typical industry standard equipment and procedures for navigation, geo-location, and data recording and reduction were used by others to collect the data.

The anomaly characterization algorithms used for our analysis assume a dipolar source and derive the best set of induced dipole model parameters that account for the spatial variation of the signal as the sensor is moved over the object. The model parameters are target X,Y,Z location, three dipole response coefficients corresponding to the principle axes of the target, and the three angles that describe the orientation of the dipole. The size of the target can be estimated from the sum of the targets’ response coefficients. The shape can be estimated from the relative magnitudes of the three coefficients. In addition to utilizing the best-fit unconstrained model parameters, we constrained the model to reflect parameters obtained from labeled TOIs and compared fitted parameters.

We will discuss the inversion approach adopted for each data set, identify the features that were optimal based on the labeled training data, and report results of blind testing.