Leveraging Remote Sensing and Geophysical Insights for Enhanced Target Detection Across Diverse Environments
Justin Toller

Our work investigates the interplay between geophysical, atmospheric, and environmental factors on the detectability of buried and surface targets using remote sensing techniques. We deployed tower-based systems equipped with thermal and visible cameras, supported by a suite of environmental and soil sensors, to conduct two-week data collections across multiple locations in the United States, encompassing a wide range of soil types, and climate. By analyzing correlations between soil moisture, temperature contrasts, and environmental conditions, we are working to identify optimal conditions for detecting both metal and plastic targets across varied regions and soil types. Our approach integrates thermal and optical imaging with geophysical data to pinpoint scenarios that maximize thermal and optical contrast between targets and their surroundings. Preliminary results indicate that soil moisture, temperature, and composition, and atmospheric conditions contribute significantly to the detectability of targets.