UNDERWATER DYNAMIC CLASSIFICATION TECHNOLOGY

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While munitions classification methods have demonstrated tremendous success in reducing false alarm rates and unnecessary excavations following terrestrial electromagnetic induction (EMI) surveys, these performance gains have yet to be fully realized in underwater environments. Several factors contribute to this capability gap including the need to adapt land-based classification models to the underwater environment; however, it can be argued that the greatest obstacle to achieving underwater classification success at this time is the complexity and cost associated with deployment of classification-level EMI sensors in this environment. During underwater surveys, non-GPS positioning constraints are compounded by the challenges associated with the actual sensor deployment, which may require divers, Remotely Operated Vehicles (ROVs), and/or surface vessels. Our objective is to demonstrate the feasibility of an approach for acquiring underwater, classification-level EMI data using a surface tow vessel. We believe this method will provide high quality classification data within the positioning accuracy constraints typically imposed by marine towed surveys. The basis for this technology is a dynamic, advanced EMI sensor methodology demonstrated and proven for land-based dynamic classification surveys. This approach does not rely on the centimeter-level positioning accuracy that can be obtained on land and, therefore, we believe it will be effective for underwater surveys where positioning errors are much greater than those in typical terrestrial surveys. Results from our study include analyses of sensor design parameters that affect classification performance and hydrodynamic stability for an underwater towed system deployment. We also present results from preliminary experiments conducted with bench-top hardware to demonstrate concept feasibility.