

Remotely Operated Mass Spectrometers: Adaptive Search Platforms for Field Chemical Profiling

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In-situ directed profiling of the spatial and temporal variability of a chemical signal in the environment is possible using autonomous underwater vehicles (AUVs) equipped with mass spectrometers. A more flexible platform for environmental screening is a remotely operated vehicle outfitted with a mass spectrometer. This configuration allows an “analyst in the loop” principle. We have developed a tetherless guided vehicle to transport sensors in the field including an underwater mass spectrometer. Our vehicle can be controlled in one version by a serial rf link and in another by an rf Ethernet link that allows remote vehicle control for location of, and reaching, a chemical target using the onboard chemical sensor along with video and sonar sensors. This configuration permits the creation of a virtual sensor array. The concept will be presented and various merits of the technology will be addressed. Results from field trials will also be presented.