

In situ Membrane Introduction Mass Spectrometry for Subsea Characterization of Light Hydrocarbons

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The oil and gas industry, and organizations that environmentally monitor deep ocean and coastal regions, have a need to detect and characterize light hydrocarbons in these regions. Hydrocarbons can enter the water column through natural seepage from the sea floor, or through unintended leaks and spills from drilling operations and transportation of oil and gas to shore. The ability to perform this analysis *in situ* greatly enhances achievable spatial and temporal densities. In addition, real-time *in-water* chemical measurements allow for rapid decision-making, provide adaptive sampling strategies, and offer the possibility of tracking chemical gradients to trace leaking chemicals to their source. SRI International's *in situ* membrane introduction mass spectrometry (MIMS) instruments can quantitatively detect light hydrocarbons in water at trace levels, while simultaneously monitoring the concentrations of all light, stable dissolved gases to a depth of 2000 meters.

We will discuss the design and operational parameters of our new *in situ* MIMS instrument, which is deployable on smaller platforms, such as the Bluefin BF-12 autonomous underwater vehicle (AUV). We will also present results from recent deployments of our MIMS systems to characterize hydrocarbon seeps in the Gulf of Mexico, the Santa Barbara Channel, and Tampa Bay.