

## ACOUSTICS2008/2994 The Broadband In-Water Structural Acoustics of Unexploded Ordinance

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The Laboratory for Structural Acoustics (LSA) at the Naval Research Laboratory consists of a 1 million gallon, deionized water, indoor cylindrical tank (17m diameter by 15m deep). The key features include: 1) vibration and temperature isolation, 2) feedback controlled heating and adiabatic materials (temperature variability <0.010 C), and 3) reverberation reducing anechoic materials. This laboratory has computer controlled robotic scanners and manipulators used for precision freefield measurements including nearfield acoustic holography and compact range scattering. The precision robotics, environmental control, and painstaking measures to insure homogeneity and stability result in a high fidelity, versatile, and unique underwater acoustic measurement laboratory. The LSA also contains an indoor rectangular tank (10m by 8m) laboratory, with a 3m deep sand bottom and 4m of water column. In a similar fashion to the freefield laboratory, this laboratory is used to study target scattering in a marine bottom environment. We discuss such databases focused on the challenging problem of unexploded ordinance (UXO) in water where we use the structural acoustic response measured in a series of laboratory experiments to detect and identify several common UXOs. The 360 degree broadband (1-140 kHz) compact range monostatic and bistatic measurements taken in both laboratories will be discussed.