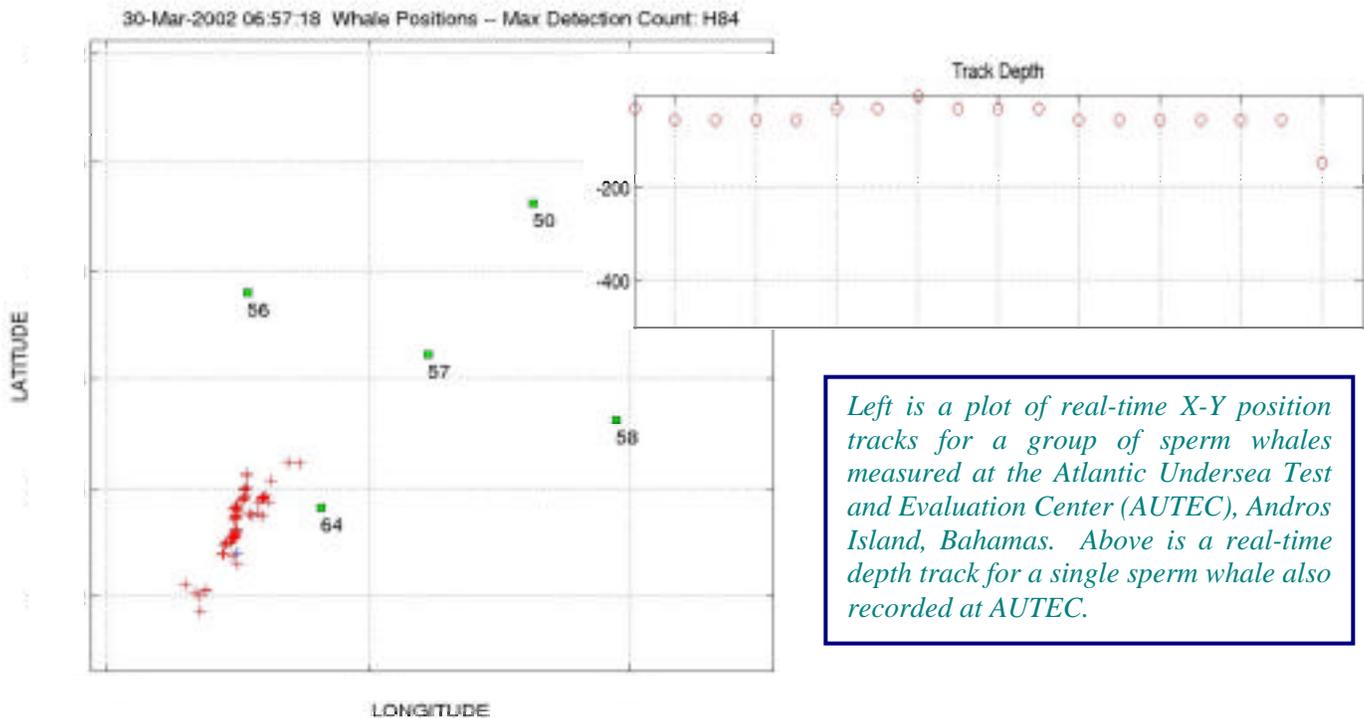


M3R -- Marine Mammal Monitoring on Navy Ranges

A Novel Dual-Use for Navy Undersea Range Facilities

The main objective of the Marine Mammal Monitoring on Navy Ranges (M3R) project was to develop a toolset for passive detection, localization, and tracking of marine mammals using existing Navy undersea range infrastructure. The project was funded by the Office of Naval Research (ONR) as an effort to provide an effective means of studying marine mammals in natural, open ocean environments.

M3R has successfully developed and tested a suite of signal processing tools that can automatically detect and track marine mammals in real-time using Navy range facilities. The M3R toolset allows automated collection of data previously unavailable for the long-term monitoring of the bioacoustic behavior of marine mammals within their natural environment. This opportunity has been created with minimal investment in infrastructure by utilizing Navy undersea ranges as a dual-use asset. Research applications of the M3R system include the ability to remotely estimate marine mammal abundance, assessment of bioacoustic behavioral baselines, and evaluation of the impacts of anthropogenic noise by comparison to those baselines.



Located around the world, the Navy's fixed undersea ranges have several hundred deployed hydrophones in diverse environments. When coupled with the M3R toolset, these hydrophones represent "sensors of opportunity" for the study of marine bioacoustics in open ocean environments.



Ideally located in the Tongue of the Ocean, AUTECH served as a test bed for the M3R toolset during March and April 2002. Over 500 sq. Nmi of open ocean were automatically monitored using passive acoustics. The movements of several species of odontocetes were successfully tracked in three dimensions.

The M3R toolset is also compatible with portable and deployable tracking systems. Using deployable tracking systems, bioacoustic characterization of specific habitats could be conducted. The M3R toolset could also be extended to the detection and localization of soniferous fish populations. Such localization could be useful to fisheries biologists and for fisheries management.



Deployable tracking systems, which use acoustic sensors deployed from sonobuoys or autonomous station-keeping buoys (left), could bring M3R detection and tracking capabilities to specific habitats of interest.

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