



# Deployment of Acoustical Alert Devices on Select DoD Vessels to Mitigate the Risk of Vessel Collisions with Marine Mammals

Project # 08-414

## Background:

The West Indian manatee (*Trichechus manatus*) is an endangered marine mammal which inhabits the waterways of Department of Defense (DoD) installations in S.E. Georgia and peninsular Florida. Manatees are vulnerable to collisions with watercraft. In an effort to protect manatees, slow speed zones have been implemented by wildlife regulatory agencies which impact DoD support vessel traffic and base operations. The DoD Legacy Management Resource Program supported behavioral hearing and acoustic propagation studies that revealed manatees cannot adequately detect and locate the dominant lower frequency sounds of approaching vessels and slower speeds can actually increase the risks of collisions. These discoveries led to the development and successful field testing of an acoustic warning device designed to provide wild manatees with the sensory awareness to avoid collisions.

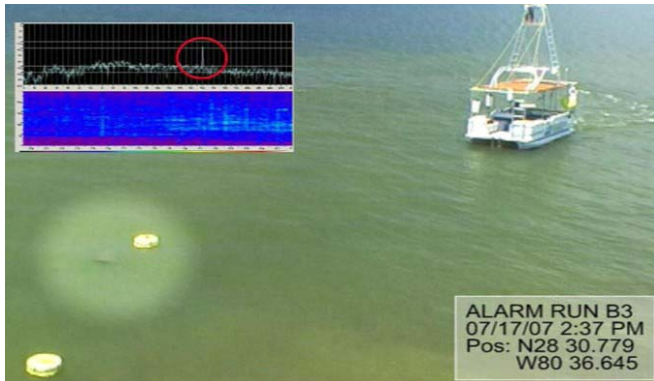


Figure 1. Manatee is diving to avoid boat during alarm trial at NASA

## Objective:

The project is designed to develop modified prototype manatee alert devices for real world deployment of select vessels operating at DoD installations. Real world deployments are necessary to further demonstrate the efficacy of devices and test their robustness during extended working deployments on different vessels.

## Summary of Approach:

The manatee warning devices have been modified to incorporate transom and bow attachment systems to accommodate up to three different DoD vessels at either the Kings Bay submarine base and Jacksonville Cape Canaveral Air Force Service Command. The deployments will be monitored for several months with

observers onboard to document manatee responses during normal vessel exercises and operations.

## Benefit:

The device is an effective and inexpensive technological solution to protect manatees at DoD installations. It will allow DoD vessels to operate unimpeded in manatee inhabited areas, sustaining readiness while protecting this endangered species. Aside from direct military benefits, the device could protect manatees throughout their range from commercial and recreational vessels. The controlled field testing of this device attracted wide spread positive media attention. Follow-up real world deployment of the devices on DoD vessels would also receive positive media attention and further demonstrate DoD's commitment to protecting marine mammals.

## Accomplishments:

Two parametric transducers have been developed to project a stable narrow beam of sound just under the surface of the water for distances of up to 150 m. Since the device has been designed to exploit the manatees best hearing abilities very little power is required. Low power, and high directionality insures no cumulative or harmful noise effects. This parametric transducer design has been successfully tested in manatee habitats at the Kings Bay submarine base and Cape Canaveral installations.



Figure 2. The prototype projectors are ruggedized encased in 5" long x 3" high x 1" thick aluminum blocks. Each projectors consists of 45 ceramic elements that radiate on an axis source level of ~200 dB at both 210 kHz and 225 kHz, producing a narrow directional beam width of about six degrees.

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