

Active acoustic time-reversal for underwater acoustic barriers

S.M. Jesus sjesus@ualg.pt

Institute for Systems and Robotics, Universidade do Algarve,
Campus de Gambelas, PT-8005-139 Faro, Portugal.

Comments: download [pdf](#).

Ref.: 153rd Meeting of the ASA, Salt Lake City, USA, June 2007.

Abstract

This work addresses the possibility of using successive transmissions of time delayed channel probe pulses between two closely spaced acoustic sensor arrays for forming an acoustic barrier for target detection in shallow water. One array is a transmit-receive array (TRA) while the other is a receive only vertical line array (VLA). The two arrays are connected via cable or wireless. Time reversed replicas of the acoustic channel response to the probe signals are retransmitted into the ocean propagation plane to form focus peaks at each VLA element. It is shown both theoretically and with simulated data that an optimum disturbance detector can be build from the data received at the VLA. This detector becomes sub optimal due to usual time reversal drawbacks such as ocean non stationarity and spatial sampling limitations. Real data tests are foreseen to take place during summer 2007 to answer questions such as allowable ranges and frequencies of operation.

Acknowledgement: this work was supported under project UAB (POCI/MAR/59008/2004), from FCT (Portugal).