

Abstract Submitted  
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**Detection of the Electromagnetic Field Induced by the Wake of a Ship Moving in a Random Sea of Finite Depth** ODED YAAKOBI, GREGORY ZILMAN, TOUVIA MILOH, Faculty of Engineering, Tel-Aviv University, Israel — The purpose of this work is to examine the feasibility to detect an ocean going vessel by its wake in the presence of wind waves. The wake of a ship and the ambient sea waves generate velocity field of electrically conductive seawater. Consequently a disturbance in the Earth geomagnetic field is induced. A closed-form solution for the magnetic field induced by the wake of a ship moving in a sea of finite depth is obtained, and the corresponding numerical simulations are performed. The results of the simulations are compared with the corresponding magnetic field disturbed by wind waves. Spectral analysis of the magnetic field, induced by the wake of a ship and sampled by an air-borne magnetometer moving steadily along a rectilinear path is performed. Numerical computations indicate that the spectra of the magnetic fields induced by the ambient random waves and by the wake of a moving body have quite different characteristic. Typically, the peaks of the body-induced magnetic field spectra are located in the range of frequencies where the corresponding values of the wind wave's spectra are less significant. It is shown that the feasibility of electromagnetic detection of ships wake depends on their speed and water depth.

Oded Yaakobi  
Faculty of Engineering, Tel-Aviv University, Israel

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