

ACOUSTICS2008/3090 Combined seismic, radar, and induction sensor for landmine detection

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An experimental system to collect co-located ground penetrating radar (GPR), electromagnetic induction (EMI), and seismic data was developed to investigate possibilities of using the sensors in a cooperative manner and to investigate the benefits of the fusion of the sensors. These sensors were chosen because they can sense a wide range of physical properties. The seismic sensor is sensitive to the differences between the mechanical properties of a landmine and the soil while the GPR is sensitive to the dielectric properties, and the EMI sensor is sensitive to the conductivity. In the experiments, a range of mines and clutter objects were buried at various depths in a sandbox. Multiple burial scenarios were investigated with a variety of antipersonnel and antitank mines and typical clutter objects. The GPR makes use of modified resistive-vee antennas. The EMI sensor collects broadband data so that the relaxation spectra of the buried targets can be used to aid discrimination. The system uses electrodynamic shakers to generate seismic waves, and a radar is used to measure the displacement of the surface caused by the seismic waves. The responses of each of these sensors to the buried targets will be shown. [Work supported by ARO.]