**3D SEISMIC SIMULATION FOR DETECTION OF SHALLOW SMALL-SIZE HIGH-CONTRAST BURIED OBJECTS**

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**Abstract**

Acoustic and seismic energy can be used to detect high-contrast ultra-shallow buried objects such as landmines. Propagating acoustic or seismic waves interact with the buried object, exciting resonant oscillations that result in higher ground surface vibrations at the location of the buried object. Therefore, object resonances and excitation responses can be used as attributes for the localization of shallow buried objects. Soil type, burial depth, type of ground excitation, and type of object influence the response of the ground surface vibration. On the other hand, a buried object can act as a secondary seismic source after excitation by incoming seismic waves, interfering with the primary wavefield, and making the whole problem more complex. Thus, understanding the response of buried objects is required to increase the probability of shallow object detection. The finite-element seismic modeling is performed to simulate seismic wave propagation, excitation and, scattering of a buried high-contrast object. Simulations of the on and off target ground surface velocity (as would be measured using a 3-component geophone) for layered/non-layered ground composed of different materials (soft or hard soils) will be presented. 3D simulations will be used to calculate the in-line and cross-track seismic wavefield. We will discuss wavefield filtering and separation to isolate the signature of the buried object, enhancing buried object localization.

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