

Detecting Underground Cavities and Objects Using Elastic Waves

Soheil Nazarian,

Department of Civil Engineering, The Univ. of Texas at El Paso, TX 79968

ph: 915-747-6911, fax: 915-747-8037e:mail: nazarian@utep.edu

Yoseph Bar-Cohen,

JPL/Caltech, (MC 82-105), 4800 Oak Grove Drive, Pasadena, CA 91109-8099

phone 818-354-2610, Fax 818-393-4057 yosi@jpl.nasa.gov

Detecting cavities and underground objects is of great interest to a number of applications including military, environmental engineering, lifeline and infrastructure projects. Variety of tools and methodology exist that can detect or size such targets. Each method has its own strengths and limitations, where Seismic methods utilizing elastic waves are the most popular and effective methods. The co-investigators are investigating elastic wave methodologies that utilize Rayleigh and Lamb waves. For this purpose the spectral-analysis-of surface wave (SASW) method is being considered. This NDE method allows determining variation in soil and pavement layers elastic moduli and it has a significant potential to become an automated method for detecting the location of cavities and other buried object in an automated fashion. Numerous analytical, numerical and in situ studies have been carried out using the SASW method. The recent initiative to automate the system as a means of detecting underground objects will be covered in this presentation.