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WITTEN
TECHNOLOGIES INC

SUE, RT and Geomatics

How do Subsurface Utility Engineering (SUE) and modern geophysical imaging techniques such as Radar Tomography (RT) relate to Geomatics?

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RALF BIRKEN

CHIEF SCIENTIST
VICE-PRESIDENT

ABSTRACT

How do Subsurface Utility Engineering (SUE) and modern geophysical imaging techniques such as Radar Tomography (RT) relate to Geomatics?

SUE and RT are techniques that allow engineers to accurately survey and assess the subsurface, and create precise maps not only above ground, just with a different error attached to it. SUE uses many well established geophysical methods to solve the puzzle of underground utilities. During the last 7 years new array-based geophysical methods have been commercialized that have a huge impact on how SUE work will be performed in the future. Those land-based array systems can efficiently cover large areas while collecting sensor data on fine survey grids.

Witten Technologies Inc. (WTI) has developed a non-invasive subsurface imaging array system for detecting and digitally mapping buried utilities, structures and anomalies based on Ground Penetrating Radar (GPR) technology. RT is a technology that combines multiple standard GPR antenna in an array configuration with accurate positioning and advanced signal processing to create high-resolution three-dimensional (3D) images of the shallow subsurface. The continuous images show buried objects of most types and compositions (plastic, metal, ceramic and cement) and changes in soil conditions (such as backfill in a trench) down to depths of about 4 to 12 feet (in typical organic soils) with a resolution of inches. These images are used to create 3D underground utility maps from scratch or to correct existing maps.

WTI has also developed an electromagnetic induction array system that complements the RT system and has unique capabilities to locate deep conductive utilities. The array of broadband (1 kHz to 80 kHz) vector electromagnetic induction sensors collects time series' that produce detailed maps of three orthogonal electromagnetic field polarizations. The receiver array operates with multiple "clamp-on" sources directly coupled to a particular pipeline and/or with an "onboard" source moving along with the array at a fixed spacing. All transmitters are broadcasting simultaneously and continuously each at a different frequency.

Several case histories will illustrate the capabilities of those geophysical subsurface imaging systems and their contribution to SUE.

35 MEDFORD STREET

SUITE 306

SOMERVILLE, MA

02143

PHONE 617 236 7103

FAX 617 941 0566

WWW.WITTENTECH.COM

R.BIRKEN@
WITTENTECH.COM