

**Contract No.:** B2532534  
**Technology:** Delta Electromagnetic Gradiometer  
**Contractor:** Stolar Research Corporation

**Summary of technology:**

The method uses reflected Electromagnetic (EM) waves to infer the presence of subsurface targets (e.g. mine voids). A transmitter is used to generate EM Waves at the ground surface. Secondary waves generated as a function of the subsurface conditions are measured at the ground surface using the Delta EM Gradiometer. The instrument consists of a rod-mounted device that simultaneously measures EM waves from two receivers, one at each end. It is carried horizontally along the ground surface. A subsurface feature (e.g. void) is identified when the gradient of the two readings is zero (same reading from both receivers).

**Stated limitations of technology:**

A subsurface conductor is needed. This can be a rail line, water, or even the salts left behind after accumulated water/moisture has evaporated. Overhead power lines or other overhead conductors may create “noise” in the output. The company indicates that the detection depth ranges from several feet to several hundred feet.

**Field demonstration results:**

<b>Field Demonstration Conditions</b>	<b>Goal of Demonstration</b>	<b>Results of Demonstration</b>
Relatively clear ground surface. Overburden depth ranged from 40 to 400 feet. Mine entries were approximately 20 feet wide and 8.5 feet high. No flooded workings were anticipated.	Locate subsurface mine voids at various depths.	Some mine voids detectable in the data. The output from the demonstration was not, however, as straightforward as the example output presented in the proposal. Confirmation drilling (2 holes) did not intersect the mine voids (possibly due to GPS error).