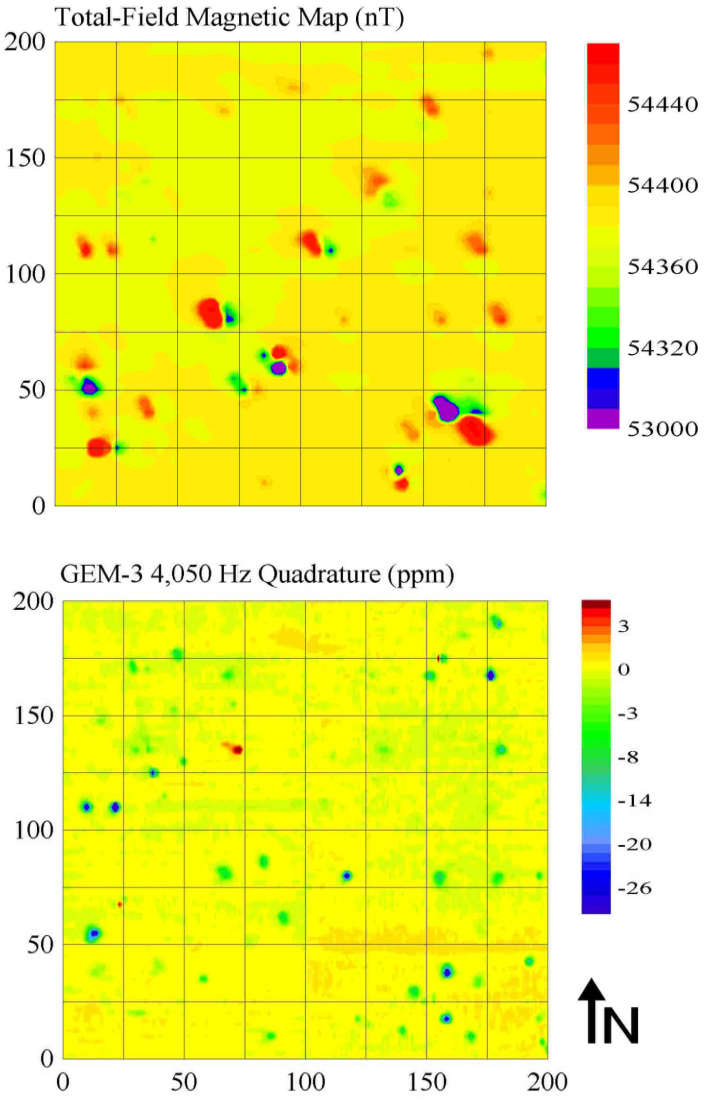
Unexploded Ordnance (UXO) Detection

In recent years, numerous US military bases with decommissioned ordinance ranges have been transferred to civilian use. These former military sites are often close to high population areas and therefore pose safety and environmental concerns to the public. As a result, there is an urgent need to conduct near-surface geophysical surveys to detect and recover unexploded ordinances (UXO) and remediate these sites.

The two geophysical methods that are most effective in detecting UXOs are the (1) magnetometer and (2) electromagnetic methods. On the right are two images from a test survey conducted at the Jefferson Military Proving Grounds where both techniques were employed (Won, 2000). The resultant images from the test site using both techniques are shown: magnetometer (top-right) and electromagnetic (bottom-right). The digital electromagnetic method yields a sharper image with higher resolution than the magnetometer.

Why the difference? The magnetometer is a passive sensing device that measures the variations in magnetic susceptibility using the Earth's magnetic field as the source of excitation. Thus, it is only effective when the UXO or target is composed of ferrous metals. However, the electromagnetic induction (EMI) sensor has an active source of excitation and is used to measure the variations in electrical conductivity. An EMI sensor operating at a low frequency acts like an electro-magnetometer and conductivity meter, resulting in its ability to better detect ferrous and non-ferrous metals.

The latest magnetometer and electromagnetic tools are generally lightweight and portable. A single person can operate either system as a handheld device, on a shoulder strap, or mounted on a two-wheel cart to provide more operational flexibility. More sophisticated units can have a GPS system attached to it so that precise X, Y, Z coordinates and elevations are automatically recorded along with the geophysical data.



LM Gochioco and Associates Inc. has extensive experience and expertise in near-surface geophysics and offers a full suite of geophysical surveying services. We offer a variety of solutions to address different engineering, environmental, hydrogeology, and mining problems.

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The founder, Lawrence M. Gochioco, P.G., has over 15 years of diverse near-surface geophysics experience. He has published over 25 technical papers and feature articles in various journals & magazines, and is an editor of his professional society (SEG). The company provides a wide spectrum of near-surface geophysics services and consulting.

LM Gochioco & Associates Inc., Houston, TX (832)647-0867. Email: geophy6@hotmail.com