

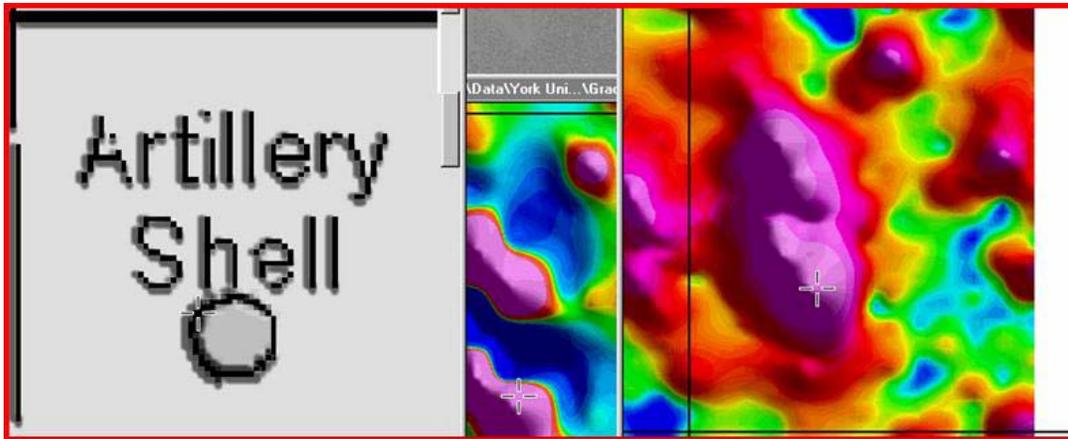


GEM Systems Advanced Magnetometers
52 West Beaver Creek Road West, Suite 14
Richmond Hill, ON Canada L4B 1L9
Ph. 905-764-8008 Fax. 905-764-2949
info@gemsys.on.ca www.gemsys.ca

Magnetics in UXO Applications

Magnetometers / gradiometers are one of the primary tools used for locating and characterizing Unexploded Ordnance (UXO). The widespread industry use is based on key factors:

- Almost all UXO have magnetic signatures,
- The method has the highest survey efficiency in terms of ground coverage per day,
- Algorithms and approaches for characterizing UXO from magnetic signatures are improving,
- Magnetics works in many different geological environments.



Our World is Magnetic



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Disadvantages, such as the effects of surface clutter on magnetic readings and magnetic background in certain geological terrains, may be offset by the positive factors noted above and implementation of sound field practices including surface cleaning and test surveys. Each UXO survey must be treated individually to optimize the methodologies and results generated from the surveying program.

Meeting Key UXO System Requirements

In designing its magnetometers / gradiometers for UXO applications, GEM has focused on developing systems that meet the key requirements for locating and characterizing UXO. These include:

- Easy-to-use. UXO field personnel can be quickly trained in correct use of GEM's magnetometers for acquisition of high-quality data.



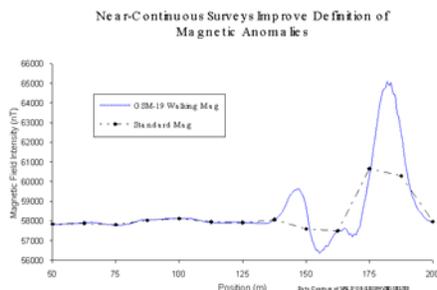
- Digital data output. Digital geophysical records are essential today for recording anomaly signatures for interpretation and for generating maps and dig charts for remediation and regulatory compliance.

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- Range of sensitivities. Depending on the UXO under investigation (i.e. sizes and depths), users can select from different GEM product families to meet their needs. Proton systems offer 0.5 nT sensitivity, Overhauser offers 0.035 nT sensitivity and Potassium offers 0.003 nT sensitivity at a comparative 2 sample / second recording interval.
- High-volume data acquisition and survey operation. Built-in ease-of-use and optional memory enhancements ensure that surveys are performed efficiently and that data acquisition is maximized on every survey.
- High-quality data. With the development of new UXO modeling and inversion algorithms, it is increasingly important to have noise-free, high-quality results that preserve the magnetic anomaly "shape" information that assists in locating and characterizing UXO. GEM's ongoing research and development programs are designed to continuously enhance data quality through implementation of new signal processing algorithms and technologies.
- Georeferenced readings. GPS options ensure that GPS positions are assigned to all measurements automatically at the desired GPS survey resolution. Georeferenced readings are essential to re-locating UXO targets for removal following initial analysis.
- Fast sampling for both walking and vehicular surveys. GEM's products range between 2 samples / second (Proton), 5 samples / second (Overhauser) to 20 samples / second (Potassium). High sampling rates along survey lines increase the likelihood of detecting and discriminating small targets.

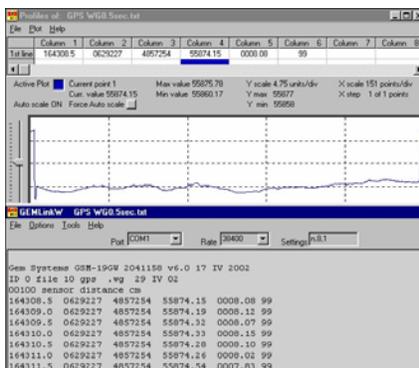


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- Random and detail grid survey modes. GEM's Random mode enables operators to perform reconnaissance surveys over sites or survey around obstacles. The Detail modes provide regular line-based "grid-type" capabilities for high-efficiency, production surveys.
- Orientation-independent readings. Other magnetometers / gradiometers that operate on optically pumped Cesium principles are subject to increased noise / loss of signal due to the orientation of the sensor in the earth's magnetic field. GEM's Overhauser, Potassium and Proton magnetometers are not affected by these limitations.
- No re-calibration required. Experience from technical service personnel shows that optically pumped Cesium systems are subject to re-calibration due to misalignment of sensitive internal optics. GEM's Overhauser, Potassium and Proton magnetometers are not affected by these limitations.
- Lightweight and portable. GEM's Proton, Overhauser or Potassium systems are designed to be the lightest and most robust magnetometers / gradiometers available for UXO projects. Depending on your needs, you can choose from very lightweight Proton or Overhauser systems or the lightweight Potassium system.
- Easy data transfer to PC. While UXO data acquisition is easy with GEM, it's also essential that data can be output efficiently for rapid processing and interpretation of results. The GEMLinkW software program enables efficient output of results to a PC via RS-232 serial connection at rates of up to 115 kBytes / second.



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- Gradient configurations. Gradient configurations are often optimal for UXO applications – eliminating diurnal effects and enhancing near surface results. GEM’s magnetometers are based on a “true” gradiometer model where measurements are made simultaneously for highest quality calculation of gradients. The Potassium system can be operated in horizontal survey gradient mode to increase survey efficiency by a factor of two.



- Multi-sensor configurations. GEM’s magnetometers can be configured with multi-sensors on different platforms (backpack or towed / mounted) as required. This capability further enhances productivity as well as the amount of UXO diagnostic information generated from each survey.



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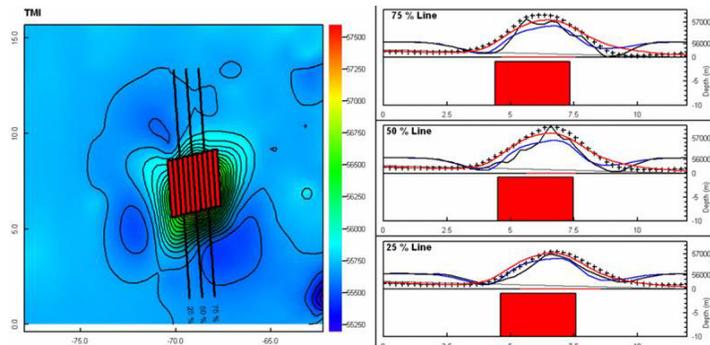


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Summary

GEM's advanced magnetometers offer a variety of benefits for UXO applications including high data quality, enhanced productivity, and the ability to effectively detect UXO and phenomena that may affect UXO remediation efforts, such as buried drums or underground storage tanks.

Acquisition of high-quality magnetic results is one of the crucial components of a well-managed UXO remediation project; with GEM, you can be assured that your project will be both productive and effective.



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