

GEM SYSTEMS

Overhauser Magnetometer

Magnetometer - Walking Magnetometer GSM-19/19W
Gradiometer - Walking Gradiometer GSM-19G/19GW

Celebrating 35 Years
Leading the World of Magnetics

GEM Systems is the number one global leader in the manufacture and sale of high precision magnetometers.

GEM is the only commercial manufacturer of Overhauser magnetometers, that are accepted and used at Magnetic Observatories over the world.

Our Potassium Magnetometers are the most precise magnetometers in the world.

Our Proton sensors are considered the most practical and robust magnetometers for general field use.

Proven reliability based on 35 years of R&D

We deliver fully integrated systems with GPS and additional survey capability with VLF-EM for convenience and high productivity

Today we are creating the absolute best in airborne sensors and are leading the way in super sensitive potassium sensors specially designed for highly sensitive studies with super large sensors for research of Natural Hazards globally and now smaller and lighter sensors for practical UAV applications.

Our Leadership and Success in the World of Magnetics is **Your key to success** in applications from Archeology, Volcanology and UXO detection to Exploration and Magnetic Observation **Globally.**



GEM Overhauser Magnetometer system. It can be configured with an additional sensor for simultaneous gradiometer readings, walking mode, gps

GEM - Overhauser Magnetometers

The GEM GSM-19 Overhauser total field magnetometer and the GSM-19G Gradiometer provide improved data quality and greater absolute accuracy than Proton magnetometers, while providing a robust and comparable system to costlier Cs magnetometers for ground applications.

Technically Superior

The GSM-19 Overhauser instrument is the total field magnetometer / gradiometer of choice in today's earth science environment - representing a unique blend of physics, data quality, operational efficiency, system design, and options that clearly differentiate it from other quantum magnetometers.

The GSM-19 is a standard in many fields, including:

- Mineral exploration
- Environmental and engineering
- Pipeline mapping
- Airborne basestation
- Unexploded Ordnance Detection
- Archaeology
- Magnetic observatory measurements
- Volcanology and earthquake prediction

Taking Advantage of the Overhauser Effect

Overhauser effect magnetometers are essentially proton precession devices - except that they produce an order-of-magnitude greater sensitivity.

The Overhauser effect occurs when a special liquid (with unpaired electrons) is combined with hydrogen atoms and then exposed to secondary polarization from a radio frequency (RF) magnetic field. The unpaired electrons transfer their stronger polarization to hydrogen atoms, thereby generating a strong precession signal that is **ideal for very high sensitivity total field measurements.**

In comparison with proton precession methods, RF signal generation also keeps **power consumption to an absolute minimum** and **eliminates noise** (i.e. generating RF frequencies are well out of the bandwidth of the precession signal). In addition, polarization and signal measurement can occur simultaneously - which enables **faster, sequential measurements.** This, in turn, facilitates advanced statistical averaging over the sampling period and/or increased cycling rates (i.e. sampling speeds).

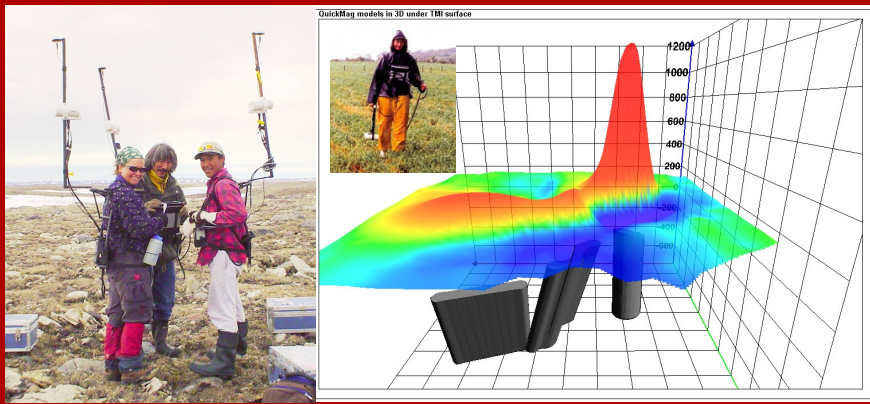
Our World is **Magnetics.**

GEM Systems, Inc.

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Single sensor and gradiometer modes provide flexibility and fast sampling and are used for detecting changes in the magnetic field. Applications include; alteration mapping, structural geology, archeology and UXO applications

GEM Overhauser Sensor

Technology

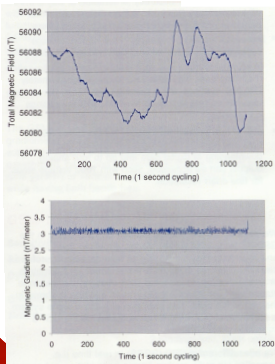
GEM's sensors represent a **proprietary innovation** that combines advances in electronics design and quantum magnetometer chemistry.

Electronically, the detection assembly includes dual pick-up coils connected in series opposition to suppress far-source electrical interference, such as atmospheric noise. Chemically, the sensor head houses a **proprietary** hydrogen-rich liquid solvent with free electrons (free radicals) added to increase the signal intensity under RF polarization.



GEM GSMP-Overhauser Magnetometer

Small and light weight. Rugged plastic housing protects the internal components during operation and transport.



Sample data
Gradiometer data shows very low noise level .2nT noise.

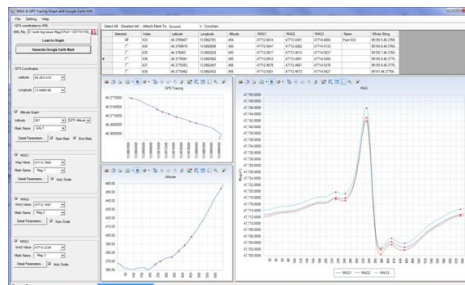
GPS and Navigation

Along with basic GPS tracking, GEM provides a Navigation feature with real-time coordinate transformation to UTM and local grid. A survey "lane" guidance system with cross track display coupled with automatic end-of-line flag and guidance to the next line allows the operator to navigate seamlessly while carrying out the magnetic survey. Professionals can define a complete survey on PC and download points to the magnetometer via RS-232 before leaving for the field.

GEMLink+

Software for Processing Magnetic Data

GEMLink+ processing software is provided with every GEM magnetometer system. **GEMLink+** provides all of the data visualization features needed by the geoscientist to quickly assess the data quality in the field. The software provides diurnal correction, profile plotting, line path maps and some basic mapping and modeling functions. Files can be imported/exported to Google kmz format and coordinate transformations can be made.



GEMLink+ Data QAQC software with multi window data processing and plotting

Specifications

Performance

Sensitivity:	0.022 nT @ 1 Hz
Resolution:	0.01 nT
Absolute Accuracy:	+/- 0.1 nT
Range:	20,000 to 120,000 nT
Gradient Tolerance:	< 10,000 nT/m
Samples at:	60+, 5, 3, 2, 1, 0.5, 0.2 sec
Operating Temperature:	-40°C to +50°C

Operating Modes

Manual: Coordinates, time, date and reading stored automatically at minimum 3 second interval.

Base Station: Time, date and reading stored at 1 to 60 second intervals.

Remote Control: Optional remote control using RS-232 interface.

Input / Output: RS-232 or analog (optional) output using 6-pin weatherproof connector with USB adapter.

Storage - (# of Readings)

Mobile:	1,465,623
Base Station:	5,373,951
Gradiometer:	1,240,142
Walking Mag:	2,686,975

Dimensions

Console:	223mm x 69mm x 240 mm
Sensor:	175mm x 75mm diameter cylinder

Weights

Console with Belt:	2.1 kg
Sensor and Staff Assembly:	1.0 kg

Standard Components

GSM-19 console, GEMLink software, batteries, harness, charger, sensor with cable, RS-232 cable and USB adapter, staff, instruction manual, and shipping case.

Options

Gradient Magnetometer, Walking Mode, Multi sensor

Standard GPS Option : 0.7m SBAS (WAAS, EGNOS, MSAS)

High resolution GPS Option D: 0.6m SBAS (WAAS, EGNOS, MSAS) / 0.6m OmniStar (VBS2 subscription)

VLF Option : Frequency Range: Up to 3 stations between 15 to 30.0 kHz. Parameters: Vertical in-phase and out-of-phase components as % of total field.

The GSM 19 , 19G,19W and 19GW systems come complete with an industry leading three year warranty

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