



# Potassium Magnetometers

For High Precision Applications

Since 1980

Leading the World of **Magnetics**

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

GEM Systems 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 R+D since 1980.**

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 with smaller and lighter sensors for practical UAV applications.**

GEM Systems large potassium sensors offer the highest sensitivity (20-50 ft) for use in natural hazard research and global ionospheric studies.

**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 Observations Globally.**



**Optically Pumped Potassium Magnetometer with ruggedized console, backpack for electronics, light weight sensors and cables.**

## Potassium Technology

GEM Systems GSMP-35 Magnetometer and the GSMP-35G Gradiometer are the most precise magnetometers on the market today.

The GSMP-35 is the result of development since 1980 and provides the highest available sensitivity at .0002nT @ 1Hz. The Potassium optically pumped technology allows for extreme gradient tolerance of up to 50,000nT/m and systems can be configured to measure in extremely high (greater than 350,000 nT) or low fields (less than 3000 nT). Standard systems provide fast sampling of 20Hz (20 samples per second). In addition Potassium magnetometers, with high absolute accuracy, have the lowest heading error for precise airborne and UAV applications.



**GEM Systems GSMP-35 Magnetometer** provides the highest sensitivity and greatest absolute accuracy on the market for multiple high precision applications. Shown with optional GPS.

## Highest precision applications

Our latest Potassium magnetometers offer the same reliability of our proton and Overhauser magnetometer systems, yet with a level of precision that is the highest in the world for portable magnetometers. GEM Systems GSMP line of Potassium magnetometers are an excellent choice for applications where the ability to map and characterize the smallest contrasts in magnetic physical properties is important. The potassium magnetometer provides best in class data for a variety of projects including;

- Archeology
- Magnetic observatory measurements
- Volcanology and earthquake research
- Airborne Survey
- Unexploded Ordnance Detection

Multiple sensor systems are available for customers including non-magnetic cart applications with 2 to 10 sensors for sophisticated imaging. In addition, the add-on VLF system provides a multiple parameter geophysical tool for imaging the Earth.

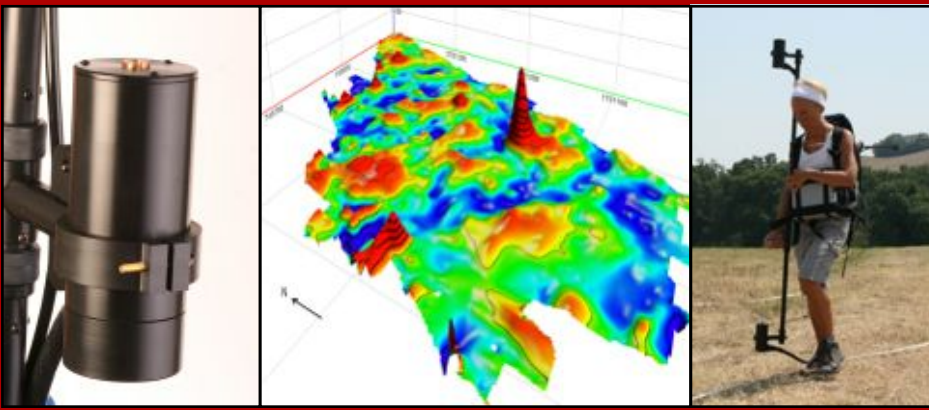
## GEM Systems, Inc.

135 Spy Court Markham, ON Canada L3R 5H6

Phone: 1 905 752 2202 • Fax: 1 905 752 2205

Email: info@gemsystems.ca • Web: www.gemsystems.ca

Our World is **Magnetics.**



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

### Why use 'K' Magnetometers

Potassium magnetometers work within a **narrow spectral line** this means that when they are locked on signal, the error due to heading misalignment is very small. Other alkali vapor sensors, have a much broader spectral line, which translates to larger heading errors. For this reason repeatability between sensors is also the highest possible for Potassium magnetometers over Cs and others. This has significant benefits for high sensitivity gradient surveys, and multiple sensor array surveys for archeology and UXO applications.

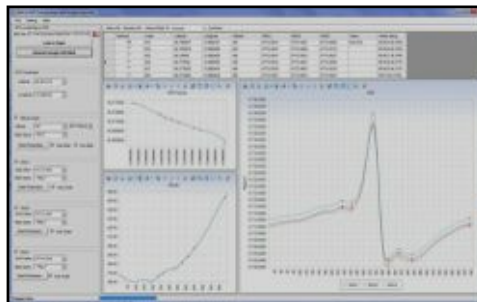
### GPS and Navigation

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. Operators can define a complete survey on PC and download points to the magnetometer via RS-232 before leaving for the field.

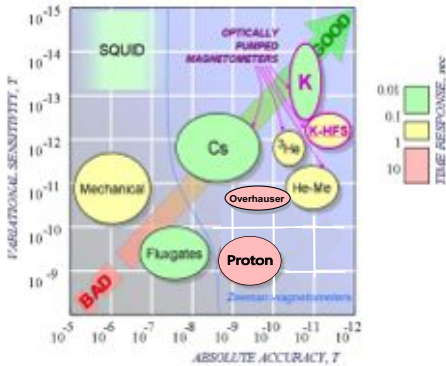
### GEMLink+

#### Software for Processing Magnetic Data

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



**GEMLink+** Data QAQC software with multi window data processing and plotting (screen shot)



**Magnetometer Technology;** When plotted with other magnetometers for the main metrological parameters Potassium is one of the most sensitive and has the highest absolute accuracy (ref. Ioffe Phys.-Tech. Institute).

The GSMP-35 Potassium Magnetometer is packaged with the same attention to detail that all of GEM Systems magnetometers are made. Robust and practical for real world use. A light weight version of this sensor is available for drone applications.

## Specifications

### Performance

Sensitivity:	0.0002 nT @ 1 Hz
Resolution:	0.0001 nT
Absolute Accuracy:	± 0.1 nT
Range:	15,000 to 120,000 nT
Low/High Field Options:	3000 to 350,000 nT
Gradient Tolerance:	50,000 nT/m
Sampling Rate:	1, 5, 10, 20 Hz

### Orientation

Sensor Angle: optimum angle 35° between sensor head axis & field vector  
 Proper Orientation: 10° to 80° & 100° to 170°  
 Heading Error: ± 0.05 nT @ 360° full rotation about axis

### Storage (# of Readings in millions)

Magnetometer: 3.3M, Gradiometer: 2.4M  
 Base Station: 8.3M

### Environmental

Operating Temperature: -40°C to +55°C  
 Storage Temperature: -70°C to +55°C  
 Humidity: 0 to 100%, splashproof

### Dimensions and Weights

Console: 223 x 69 x 240mm (8.7x2.7x9.5in)  
 Sensor: 161 x 64mm dia (6.8x3in); 1.0 kg (2.2lb.)  
 Electronics Box: 236 x 56 x 39mm(9.3x2.2x1.5in);  
 0.60 kg (1.32lb.)

### Power

Power Supply: 22 to 32 V DC  
 Power Consumption: 0.5 amp typical at 20°C  
 Warm-up time: <10 minutes at 20°C

### Standard Components

Console, electronics box, backpack, **GEMLink+** software, harness, charger, sensor with cable, 25,9V 4Ah Lithium battery, RS-232 cable with USB adapter, staff, instruction manual, and case.

### Options

Gradient Magnetometer, Walking Mode, Multi sensor

#### Available GPS

##### GPS Time Only (Option A)

##### Standard GPS (Option B):

- 0.7m SBAS (WAAS, EGNOS, MSAS)
- < 1.5m non-SBAS

##### Enhanced GPS (Option C):

- 0.6m SBAS (WAAS, EGNOS, MSAS), GLONASS, BeiDou, Galileo

##### High resolution GPS (Option D):

- 0.6m SBAS (WAAS, EGNOS, MSAS), GLONASS, BeiDou, Galileo
- 40 cm or 4cm accuracy with NovaTel Correct (TerraStar Subscription required)
- Consult GEM for availability

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

**The GSMP 35 and 35G systems come complete with an industry leading three year warranty**



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