



Celebrating 35 Years
Leading the World of **Magnetics**

Overview

GEM Systems is celebrating 35 years in business leading the advancement of magnetometer technology. GEM is the number one global leader in the manufacture and sale of high precision magnetometers. Throughout its history GEM has been leading innovation in the field of Magnetics. The GEM potassium magnetometer technology provides the most precise magnetometer in the world for applications from archeology to magnetic observation. The super sensitive potassium gradiometer, the Super Grad is being utilized in the research of Natural Hazards and Earth studies globally.

GEM is the only commercial manufacturer of the Overhauser magnetometer, this technology is accepted by Magnetic Observatories all over the world as the defacto reliable and long lasting calibration sensor. GEM engineered products include the robust and easy to use proton magnetometers.

GEM Systems was the first to introduce the walking magnetometer and the first to integrate real time gps navigation. Now GEM also has incorporated ground vlf into our systems as an add-on or stand alone method to provide resistivity imaging.

Today GEM is creating the absolute best airborne sensors for the airborne industry and leading the way in super sensitive potassium sensors specially designed for the UAV sector. The Monarch UAV is a newly launched horizontal gradiometer UAV platform providing cost effective surveys in new markets.

GEM's leadership and success in the world of magnetics is the key to your success in applications from Archeology and UXO detection to Mineral and Oil Exploration and Magnetic Observation – Globally.

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Ground Survey Systems

- Mineral & Oil Exploration
- Environmental & Engineering - detection
- Unexploded Ordnance Detection (UXO Exploration)
- Archaeology
- Education & Research

PRODUCT LIST

Potassium Magnetometers

**High Precision
For Advanced users**



GEM GSMP-35 (Magnetometer)
GEM GSMP-35G (Gradiometer)

Sensitivity .0003nT@1Hz

(Available with High Field option and with high sampling speed 20Hz and higher)

GEM GSMP-35 The optically pumped Potassium Magnetometer is the most precise and accurate magnetometer on the market today. Utilising the same sensor technology as the incredible super gradiometer sensors, this system provides extreme sensitivity at .0003nT. Available in several configurations; single sensor, gradiometer, walking and with optional gps.*

Overhauser Magnetometers

Cost Effective

**High Quality and
Sensitivity**





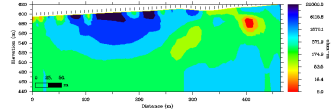

GEM GSM-19 (Magnetometer)
GEM GSM-19G (Gradiometer)

Sensitivity .022nT@1Hz

GSM-19PRO Sensitivity .015nT@1Hz

GEM GSM-19 The Overhauser magnetometer is available only through GEM. This technology allows for much more rapid sampling than our proton magnetometer and provides precision and accuracy close to Cs magnetometers at a fraction of the price. Sensitivity is .022nT @ 1 Hz. This system is available with .015nT@1Hz in the **GSM-19PRO** model.

These are excellent base stations for airborne applications

<p>Proton Magnetometers</p> <p>Affordable & Robust</p> <p>Good Quality and Repeatability</p>	 <p>GEM GSM-19T (Magnetometer) GEM GSM-19TG (Gradiometer)</p> <p>Sensitivity .15nT@1Hz</p>	<p>GEM GSM-19T Most of the features of our high end magnetometers are available in the Proton magnetometers. This unit will provide years of dependability with good quality and repeatability</p>
<p>Automated GEM Ground VLF</p> <p>Resistivity Depth Sections</p>	 <p>GEM GSM-19WV</p> <p>Measure 3 user selected stations True in-phase and quadrature readings</p>	<p>GEM GSM-V VLF has been used for years as a basic mapping tool for faults and structure. Now, with the ability to measure 3 stations at once, coupled with new software to provide resistivity depth sections, VLF is having a rebirth, as an effective standalone survey or in conjunction with Magnetometer surveys.</p> <p>Optional: VLF2DMF software for resistivity sections</p> 
<p>GEM Cart</p> <p>Towed Non Magnetic Sensor cart</p>	 <p>GEM GSM - Cart</p>	<p>The GEM cart assembles easily for practical near surface applications of multiple magnetometers. Can be configured to hold as many as 4 Overhauser or 10 potassium high sensitivity magnetometers for 5 gradiometers</p>
<p>Included Accessories</p>	<p>Harness, backpack, staff and case, operations manual, GEM Link+ Software for data QAQC, basic plotting, verification, diurnal</p>	

Options	<ul style="list-style-type: none"> • All Magnetometer systems are available in gradiometer and multi sensor configurations. (G) • All systems are available with “Walking” Survey mode. (W) • VLF – EM can be added to all Magnetometer systems. (V) • Various software packages are available for advanced processing and interpretation including; Encom and VLF2DMF <p>* Integrated GPS is available in standard 0.7m accuracy supported by SBAS or in high definition DGPS with up to 4cm accuracy.</p>
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Celebrating 35 Years
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Magnetic Observation / Earth Monitoring Systems

PRODUCT LIST

- Magnetic Observatories
- Research - Volcanology and Earthquake
- Education & Research
- Mineral & Oil Environmental & Engineering

Potassium Super Gradiometer

**Super High
Precision**

**Long term
monitoring system**



GEM GSMP-20S3 (Monitoring)

Sensor size 130mm or 150mm
Sensitivity .03pT@1Hz
Resolution .0001pT
Absolute Accuracy +/- .1nT

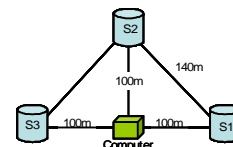
GEM GSMP-20S3 Super Gradiometer consisting of 3 super large Potassium sensors (130mm or 150mm) cables and console. This can measure magnetic gradients in 3 chosen directions. The sensitivity of these sensors is an incredible .03pT @ 1Hz.

Typical applications involve the study of properties of the magnetic field as related to Earthquake research, Volcanology and studies of the ionosphere. Visit www.conrad-observatory.at , where 3 Super Grads are installed, for more information.

Potassium Mini Super Gradiometer

**Super High
Precision**

**Long term
monitoring system**





GEM GSMP-20S3M (Monitoring)

Sensor size 80mm
Sensitivity .05pT@1Hz
Resolution .0001pT
Absolute Accuracy +/- .1nT

GEM GSMP-20S3M Super Gradiometer consisting of 3 super large Potassium sensors (80mm) cables and console. This can measure magnetic gradients in 3 chosen directions.

The sensitivity of these sensors are a bit less than the SuperGrad is an incredible .05pT @ 1Hz. Typical applications involve the study of properties of the magnetic field as related to Earthquake research, Volcanology and studies of the ionosphere.

<p>Observatory Standard</p> <p>Overhauser High Precision</p> <p>Long term monitoring system</p>	 <p>GEM EUROMAG GSM-90 (Monitoring)</p> <p>Sensitivity .022nT@1Hz Resolution .01nT Absolute Accuracy +/- .1nT</p> <p>Available Sensitivity .015nT@1Hz Offered in GSM-90PRO model</p>	<p>GEM EUROMAG GSM 90 – is a very sensitive overhauser magnetometer designed for long term stable continuous readings at a set location. This Scalar Magnetometer is available with standard .022nT sensitivity or can be ordered in the high precision .015nT (GSM 90PRO) model. Available with or without display. It can be operated by a computer. Also available in 1 or 5 readings per second. Gradiometer mode is also available.</p>
<p>DELTA Inclination DELTA Declination</p> <p>Super High Precision</p> <p>Suspended Coil Vector Magnetometer Monitoring system</p>	 <p>GEM GSM/GSMP-dIdD (Monitoring)</p> <p>Utilizing Overhauser Technology Sensitivity .022nT@1Hz Potassium Technology Sensitivity .0003nT@1Hz</p>	<p>GEM GSMP-dIdD and GSM- dIdD – This system provides a means to measure the components of the Magnetic Field and can measure the changes in Declination and Inclination.</p> <p>Established in a stable environment, this system provides an alternate and more precise means for magnetic observation.</p> <p>The system relies on suspended sensor within field biasing coils to provide 6 distinct magnetic field readings (Provides Total Field, X,Y,Z components & Delta Inclination and Delta Declination) provided with/without display to a level of .03pT @ 1Hz. Stable in temperature ranges of -50 to +50 this system far surpasses current observatory methods for precision and accuracy at increased measuring speeds.</p>
<p>Included with system purchases and Options</p>	<p>Training, GEM Link+ Software for Data QAQC, basic plotting, verification, diurnal, GEM dIdD Software with Graphics provided</p> <p>Options: Radon sensors, remote communication, solar power systems GPS integration</p>	



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Airborne Survey Systems

- Mineral & Oil Exploration
- Environmental & Engineering Applications
- Water Exploration
- Unexploded Ordnance Detection (UXO Exploration)

PRODUCT LIST

Complete Helicopter Towed Magnetometer / VLF systems



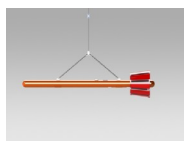
GEM GSMP-35A (Magnetometer)
GEM GSMP-35GA (Gradiometer)
GEM GSMP-35GA3 (Tri-axial systems with 3 or 4 sensors)
(Available with VLF)

GEM has designed and manufactured complete towed airborne geophysical systems that utilize the precise Potassium magnetometer technology.

Systems include; tow cable, data acquisition system (MUX) electronics, radar altimeter, GPS, IMU and installation guide

GEM designed airborne towed birds

Robust Fiberglass structure Proven Designs



Bird only, custom designs available

Airborne systems can be custom designed to hold multiple sensors in geometries desired by the user. Available systems include single birds for mag and or VLF as well as single gradiometer or triaxial systems.

<p>GEM Airborne Magnetometers</p> <p>High Precision Optically Pumped</p> <p>Worlds best heading error and absolute precision</p>	<div data-bbox="552 224 823 345" data-label="Image"> </div> <p>GEM GSMP-35A (Potassium Magnetometer)</p> <p>Sensitivity .0003nT@1Hz</p> <div data-bbox="913 160 1062 360" data-label="Image"> </div> <p>Available for precision base stations.</p>	<p>GSMP-35A - GEM has packaged our reliable potassium technology in lighter weight configurations for use in airborne systems.</p>
<p>GEM Airborne VLF system with non-magnetic</p> <p>High performance, non magnetic Air Coils</p>	<div data-bbox="483 613 854 716" data-label="Image"> </div> <p>GEM GSM-90AV</p> <p>Available separately or integrated with Magnetometers</p> <div data-bbox="978 563 1182 716" data-label="Image"> </div>	<p>The GEM Airborne VLF system consists of 2 independent sensors for multi station capability. The nested orthogonal air coils provide a way to measure true inphase and quadrature readings from 2 user selected stations simultaneously to provide reliable results in airborne acquisition. Available software allows the user to create resistivity sections from the collected data.</p> <p>Optional: VLF2DMF software for resistivity sections</p> <div data-bbox="1455 894 1780 1002" data-label="Figure"> <p>A resistivity section plot generated by VLF2DMF software. The vertical axis represents depth in meters, ranging from 0 to 1000. The horizontal axis represents resistivity in Ohm-meters, ranging from 10 to 100,000. The plot shows a color-coded cross-section of the subsurface, with a color bar on the right indicating resistivity values from 10.0 (blue) to 100,000.0 (red). The plot shows a high-resistivity (red/orange) layer near the surface, which transitions to lower resistivity (green/blue) at greater depths.</p> </div>



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UAV Survey Systems

- Mineral & Oil Exploration
- Environmental & Engineering Applications
- Water Exploration
- Unexploded Ordnance Detection (UXO Exploration)

PRODUCT LIST

GEM UAV Magnetometer

High Precision Optically Pumped

Worlds best heading
error and absolute
precision



GEM GSMP-35U
(Potassium Magnetometer)
Sensitivity .0003nT@1Hz

GSMP-35U - GEM has packaged our reliable potassium technology in lighter weight configurations for use in UAV applications.

The GSMP-35U UAV sensor weight including electronics is only 1 kg which provides new applications and surveys for “multicopter” survey companies looking to expand their survey offering.

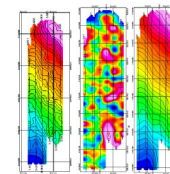
Optional: GEM GSMP-35UP includes built in Data acquisition and connections adapted for use with the PIXHawk flight navigation and controller system

MONARCH UAV Magnetic Gradiometer





Left Gradient Right
(2nT data range on Gradient map)
GEM UAV Monarch

The **Monarch** is an autonomous Horizontal Magnetic gradiometer. This system provides the user with a means to collect up to 80km of total field magnetic data and Horizontal gradient data per flight. Applications include surveying over water and regions where access and safety for ground crews is poor.



Includes: Two GSMP-35U light weight Potassium Magnetometers, Navigation System Onboard Laser Altimeter and data storage Training Included

Optional: RTK GPS, Compensation, Encom software

<p>GEM AirBIRD</p>	 <p>AirBIRD – Turnkey UAV towed magnetometer</p>	<p>GEM has designed and manufactured a complete turnkey towed airborne UAVBird Magnetometer that utilizes the precise Potassium magnetometer technology.</p> <p>System includes; One GSMP-35U, light weight cowling (AirBird shell), tow cable, data acquisition system (GEMDAS) electronics, laser altimeter, GPS, IMU, data radio link to ground station, ground computer and installation guide</p> <p>Optional: All of the necessary components without the lightweight AirBird cowling for customer installation</p>
<p>GEM AirBIRD and UAV complete</p>	 <p>HoverFly Quadcopter with AirBird</p>	<p>System includes; One GSMP-35U, light weight cowling (AirBird shell), tow cable, data acquisition system (GEMDAS) electronics, laser altimeter, GPS, IMU, data radio link to ground station, ground computer and installation guide</p> <p>UAV; GEM will provide an appropriate UAV platform for your needs and customize everything for ease of operation and use.</p>



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PRODUCT LIST

GEM Systems Product Table

Nov-15

ITEM	Model		OPTIONS AVAILABLE							
			Single Mag	Gradient Mag	4 Sensor Backpack	High Field	Base Station	Walking Mag	VLF	GPS
<u>Ground Survey Systems</u>										
GEM Proton Magnetometer	GSM-19T	G-W-V	x	x	x		x	x	x	x
GEM Overhauser Magnetometer (3sec)	GSM-19	G-W-V	x	x	x		x	x (.2sec)	x	x
GEM Potassium Magnetometer	GSMP-35	G-W-V	x	x	x	x	x	x	x	x
GEM Ground VLF	GSM-19V		x	x	x					x
GEM Land Rover Cart UXO/Archaeology	GSM-CART		1-4 Overhauser or 1-10 Potassium magnetometers available							
<u>Ground Monitoring Systems</u>										
GEM Super Gradiometer (3 Sensor Potassium Sensitivity .03 picoTesla)	GSMP-20S3		Radon Monitoring System				available with 2 or 4 sensors			
GEM Super Gradiometer Min (3 Sensor Potassium Sensitivity .06 picoTesla)	GSMP-20S3		Radon Monitoring System				available with 2 or 4 sensors			
GEM Overhauser for Observatory	GSM-90	F/G/GF	1 sec	1 and 5 sec			Gradiometer			
GEM Delta Inclination Delta Declination (with Suspended Coils)	GSM- DIDD		Overhauser				Console with/without display			
GEM Declination Inclination Meter // Directional Drilling Orientation	GSM-DDO		Overhauser				Console with/without display			
<u>Airborne Systems</u>										
Airborne Potassium Magnetometer Sensor	GSMP-35A		VLF optional on all birds							
Airborne Mag Bird		Mag and /or VLF								
Airborne Gradient Bird			4th magnetometer sensor optionsl							
Airborne Triax Bird										
Airborne Triax Bird		with 3 potassium magnetometers								
Airborne VLF	GSMP-90AV									
Airborne Mag/VLF		with potassium magnetometer								
<u>UAV Systems</u>										
Monarch Autonomous Horizontal Gradiometer System	GSMP-35UAV (2sensors)		Option - adapted for use with PIXHAWK Navigation system							
UAV Potassium Magnetometer Sensor	GSMP-35U									
AirBird	GSMP									
AirBird Components Only										
AirBird with UAV										