

**NEW!**

# Airborne

Potassium Magnetometer / Gradiometer (GSMP-30A)



Our World is **Magnetic.**

**The new optically pumped Potassium "Mini-Mag" is the most advanced airborne sensor on the market today.**

It offers a number of benefits for fixed wing and towed survey configurations, including:

Highest sensitivity (0.0007 nT) for enhanced resolution of geological and cultural features in a variety of applications.

Highest absolute accuracy (varying by no more than +/- 0.1 nT between sensors)

Negligible orientation (heading) errors

Faster sampling

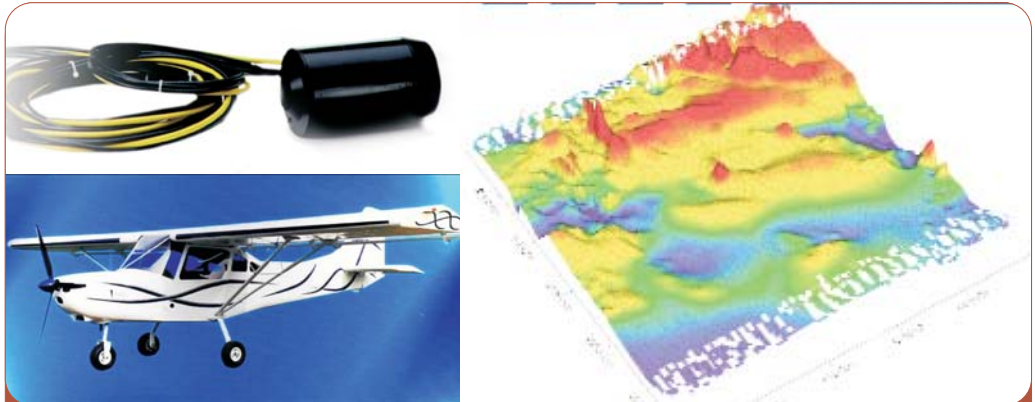
Insensitivity to microphonics

Ultra light weight  
Lowest maintenance (no re-alignments)

As well, GEM offers advanced base station capabilities, such as:  
Potassium & Overhauser

3 modes for flexible base station scheduling

GPS option for precise time synchronization with onboard GPS



Optically pumped Potassium SuperSensor (GSMP-30A) sensor and cable. Can also be configured with additional sensors for gradiometer readings.

The worldwide application of airborne magnetic and gradiometric data is growing, driven by the increasing demand for high-resolution, low cost data to:

- \* Map targets, geology and geologic structure in mineral exploration
- \* Perform frontier evaluation, augment seismic data in hydrocarbon exploration
- \* Detect Unexploded Ordnance (UXO)
- \* Map pipelines and other cultural objects in environmental and engineering investigations

To address industry requirements, GEM recently introduced "SuperSensor", the highest resolution magnetometer/gradiometer airborne system available.

The SuperSensor (GSMP-30A) is based on a unique optically pumped Potassium sensor - a technology that offers an order-of magnitude increase in resolution over other systems. It also provides:

- \* Reduced "heading" errors
- \* Highest absolute accuracy
- \* Decreased maintenance costs

These advantages plus GEM's reputation as a proven supplier of advanced technologies make the GSMP-30A a key solution for your next airborne installation.

### Key Components

The SuperSensor technology comprises:

- \* Sensor with 70mm Potassium cell
- \* Radio Frequency (RF) pre-amplifier and drive electronics module
- \* Cable (1 to 10m - standard 5m) to separate sensor and electronics for noise elimination
- \* Optional signal processor / console and cable

The sensor deploys as a single unit, or in combination with other sensors for magnetic gradient measurements.

In the example below, the sensor is deployed in a multi-sensor configuration for gradient and total field magnetic measurements. Here, four Potassium units can be installed in a special "bird" with 2



bins at the tips of an imaginary tetrahedron to allow for measurement of Total Magnetic Field and the gradients in 3 directions:

- \* Vertical gradient
- \* Horizontal gradient (along-the-track)
- \* Horizontal gradient (across-the-track)

Horizontal gradient measurements are increasingly popular for providing details about the lateral extent of subsurface anomalies located between survey lines. Vertical gradients can assist significantly in identifying geologic/structural contacts and near-surface targets (UXO).

In the example below, we show the system deployed in a fixed wing "stinger" implementation for acquisition of high resolution Total Magnetic Field data.



### Implementing Your Solution

The GSMP-30AM system can be interfaced to GEM's signal processing console, which provides 32 Mb of memory for data acquisition, or to other data recorders.

GEM's technicians are here to provide set-up and interfacing help, such as:

- \* Installation assistance for "fixed-wing" or "stinger" configurations
- \* Custom "bird" design and development for "towed" configurations
- \* Conversion of output voltages into corresponding frequency and magnetic field values
- \* Electronics interfacing to on-board

### Airborne Base Station Configurations

Another area of application for GEM is in airborne base station monitoring. You have the choice of working with GSMP-30AM or GSM-19 (Overhauser) units.

The GSMP-30AM implementation offers advantages for surveys, where very high resolution diurnal corrections are needed. GSM-19 implementations deliver good resolution and economical pricing. Both implementations share a number of advanced features (introduced in GEM's v7.0 firmware release), including:

- \* Precise time synchronization of field and base station units using a built-in GPS option. This capability is important for working in noisy magnetic conditions and provides very high accuracy.
- \* Flexible scheduling (up to 30 on/off periods). Simply define a series of intervals, the base station will turn itself on as you need. This mode provides great flexibility for longer surveys where leaving your base station on increases efficiency. Immediate start and daily modes are provided.

### Benefitting from the Natural Properties of Potassium Optical Pumping

With our experience in Potassium technologies your survey will benefit in many ways, including acquisition of:

- \* High sensitivity data (reflecting Potassium spectrum characteristics and high natural frequency of 7 Hz/nT);
- \* High absolute accuracy (variation of +/- 0.1 nT between sensors makes the GSMP-30AM an ideal for gradiometer installations);
- \* Data with minimal heading errors (reflecting the insensitivity of Potassium to aircraft / bird orientation);
- \* Data that is not affected by phonics (low frequency vibration in the audio range).

Maintenance costs are minimal as key components can be replaced in the field.

## Specifications

### Performance

Sensitivity: 0.0007 nT @ 1 Hz  
Resolution: 0.0001 nT  
Absolute Accuracy: +/- 0.1 nT  
Dynamic Range: 20,000 to 100,000 nT\*\*  
Gradient Tolerance: 2,500 nT/m  
Sampling Rate: 1, 5, 10, 20 Hz  
\*\* High Field (350,000 nT) option available

### Orientation

Sensor Angle: optimum angle 30° between sensor head axis & field vector.  
Orientation: 10° to 80° & 100° to 170°  
Heading Error: +/- 0.05 nT between 10° to 80° and 360° full rotation about axis.

### Environmental

Operating Temperature: -20°C to +55°C \*\*\*  
Storage Temperature: -70°C to +55°C  
Humidity: 0 to 100%, splashproof  
\*\*\* Optional to -40°C

### Dimensions & Weights

Sensor with 70mm Potassium Cell:  
165mm x 90mm (external dia.); 1.5 kg  
Electronics Box:  
229mm x 56mm x 39mm; 0.63 kg

### Power

Power Supply: 22 to 32 V DC  
Power Requirements: approx. 50 W at start up, dropping to 12 W after warm-up  
Power Consumption: 12 W typical at 20°C  
Warm-up Time: <15 minutes @ 20°C

### Outputs

20 Hz RS-232 output with comprehensive Windows Personal Computer (PC) software for data acquisition and display.  
Outputs UTC time, magnetic field, lock indication, heater, field reversal, latitude and longitude, GPS altitude, # of satellites and differential GPS

### Components

Sensor, pre-amplifier box, 5m sensor / pre-amplifier cable, manual & ship case.



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