Helicopter

Magnetometer / Gradiometer (GSMP-35A v7.0)

GEM's unique Helicopter system combines data quality, survey efficiency with ease-of-installation for cost-effective airborne surveying in any environment.

Specific components and capabilities include:

Cost effective installation via an integrated set of acquisition components - bird, radar altimeter, precision GPS, sensor electronics, sensor and tow cable

Easy operation using GEM's proven GSMP-35A acquisition console

Elimination of costly data acquisition systems with GSMP-35A console

Reliable acquisition of high resolution data via GEM's unique K-Mag technology

Rapid data transfer (using the advanced GEMLinkW software and high-speed RS-232 connection)

Optional survey base station unit

And all of these advantages come complete with the most attractive prices and warranty in the business!



Helicopter outfitted with GEM's GSMP-35A optically pumped Potassium (K-Mag) technologies

With the increased activity in airborne geophysics, earth science professionals are seeking solutions for acquiring high-quality helicopter airborne data at minimal cost. GEM is pleased to be able to offer such a solution based on its optically pumped Potassium technology. Main benefits include:

* Cost effective installation via an integrated set of acquisition components
* Easy operation using GEM's proven GSMP-35A acquisition console
* Elimination of costly data acquisition systems with GSMP-35A console
* Reliable acquisition of high resolution data via the most sensitive commercial airborne magnetometer / gradiometer on the market
* Accurate positioning of survey measurement locations with the system's integrated radar altimeter and GPS data
* Rapid downloading of results via high-speed RS-232 connection

Note that the system can also be adapted to fixed-wing aircraft. Please contact GEM directly to enquire about this type of solution.

Cost Effective Installation

With helicopter systems, sourcing and installation of components can be challenging; requiring significant research and time to identify an optimal solution.

GEM's Helicopter Magnetics solution provides a complete set of components that are designed to interface easily with each other. Components include:

* Precision-designed bird for housing magnetic sensors, sensor electronics, GPS antenna, radar altimeter and batteries.
* State-of-the-art instrumentation including GEM's leading GSMP-35A magnetometer and console, TRA3500 Terra Radar Altimeter and NovAtel GPS receivers with antenna.
* High-strength, kevlar reinforced tow and data communication cable

With all components in its Helicopter Magnetics solution, installation is quick and easy … simply requiring the operator to connect the tow / communication cable, bird and helicopter-based acquisition console, and start using the system.

Easy Operation Using GEM's GSMP-35A Acquisition Console

The Acquisition Console is mounted in the helicopter cabin and connected to the tow

/ acquisition cable via a military style connector.

Prior to surveying, the operator simply enters a starting line, line and station increment, and data acquisition rate, and turns the magnetometer on. Warm-up time is approximately ten minutes … so that the system can be warmed up during the flight to the survey site.

During the survey, the console shows either a text-based set of values or the data can be shown in graphical format. At the end of each line, an End-of-Line (EOL) function is selected and the data is incremented to the next line and station number. Lines and stations can be entered manually if required.

Elimination of Costly Data Acquisition Systems

Many helicopter systems use acquisition systems that are very powerful and correspondingly expensive. These systems are designed to record multi-parameter data and very high volumes of data.

However, for users who are strictly interested in magnetic data, GEM's solution provides a cost-effective alternative. The system records data in real-time using GPS timing and records high volume data directly to memory for later downloading.

Memory additions up to 32 megabytes provide more than sufficient memory for several days surveying, although data can obviously be downloaded on a daily basis for ongoing quality control and data monitoring.

Reliable Acquisition of High Resolution Data

GEM was the first manufacturer to develop and fly a four-component gradiometer in the early 1980's. Since then, the company has continued to develop its technology and now offers an optically pumped Potassium magnetometer for airborne work … either in standalone or in gradiometer configurations.

Key benefits of GEM's Potassium magnetometers and gradiometers are their durability and minimal effects from heading error. Sensitivity, high absolute accuracy and sampling are also maximized to provide optimal data on which to make exploration follow-up or drilling decisions.

The GSMP-35A is also capable of acquiring data at 20 samples / second -- twice the sampling frequency of competing systems -- for precise resolution of anomalies.

Accurate Positioning of Survey Measurement Locations

Accurate positioning of the bird during flight is essential to ensure that anomalies can be effectively located on the ground for subsequent follow-up surveys and drilling.

GEM's helicopter solution features a dual antenna Trimble TRA3500 Radar Altimeter (or equivalent) which is able to "see" from ground to 850m (in contrast to single sensor receivers). This system provides accurate height information which can be later plotted to identify problematic sections of the flight and sudden deviations in the bird height.

For X and Y positional information, the system uses two precision Novatel GPS (or equivalent) antennas mounted on the bird. Positional accuracy is generally sub-metre … making the system ideal for well positioned, high-volume magnetometer / gradiometer results.

Rapid Downloading of Results via High-Speed Connection

Following acquisition of high volume magnetic data, results can be output rapidly using GEM's high-speed RS-232 connection and data downloading software (GEMLinkW).

Output formats are selectable so that the user has control over the order in which data are displayed. A typical format is TIME,X,Y,Data1, Data2, etc.

Note that GEM also offers base stations for effective elimination of diurnal effects.

Performance

Sensitivity:	0.0025 nT RMS @ 1 Hz*

* High Sensitivity (0.0007 nT) Option Available

Resolution:	0.0001 nT
Absolute Accuracy:	+/- 0.1 nT
Dynamic Range:	20,000 to 100,000 nT*
Gradient Tolerance:	>30,000 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:	141mm x 64mm (external dia.) and 1.3 kg
Electronics Box:	310mm x 75mm x 90mm and 1.6 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 @ -40°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, console, 4m sensor / pre-amplifier cable, manual & ship case.

TRA3500 Radar Altimeter

1000 lb reinforced Kevlar tow cable

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Rev. 03/12/2007