Tri-Axial Helicopter

NEW!

Gradiometer (GSMP-35GA4 v7.0)

Our World is **Magnetic.**

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

The Tri-Axial Helicopter Gradiometer was the first four-sensor gradiometer developed in the world. Since its inception in the mid-1980's, the system has been outfitted with optically pumped Potassium sensors and has evolved into a reliable platform for a variety of applications, including:

* Mineral exploration
* Diamond exploration
* Oil & Gas exploration
* Environmental
* UXO
* Pipeline mapping

System Components

This special gradiometer is a magnetic measuring system deployed at 30m below the helicopter. It consists of a three-armed towed bird configured with four-sensors for calculation of Tri-Axial magnetic gradients.

A special configuration of sensors is used to achieve vertical gradient spacing of 3m, and horizontal across and along track gradient separations of 3.46 and 3.76, respectively.

The sensors measure three "true" gradients based on simultaneous measurements from each of four sensors.

Additional components include GPS (<1.5m or higher resolution) for accurate positioning of the bird during the flight.

Data capture is either to the GSMP-35A acquisition console or a 3rd party unit. For 3rd party units, the system has an easy interfacing capability, so that multi-method surveys can be flown. An example is the interfacing of magnetic gradiometer systems with radiometrics for gold or uranium exploration. Other combinations can also be achieved.

Why Use Gradients?

Gradients have come into vogue in the last few years for a variety of reasons:

* Freedom from diurnal effects and noise

* "Real" analytic signal computed from measured gradients can be used for more accurate target positioning

* Across track gradient improves between-line positioning of anomalies for target positioning

* Improved definition of structures that are non-parallel to survey line

To take advantage of gradients, it is necessary to have Tri-Axial system.

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 multiparameter data and very high volumes of data.

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 stores high volume data directly to memory for later downloading.

Memory additions up to 32 Mb provide space to store several days surveying; also data can be downloaded for ongoing quality control and data monitoring.

Why Use the Tri-Axial System

The Tri-Axial system is unique in that it uses the highest resolution com-mercial magnetometer available today resulting in a new level of detection of subtle anomalies. Subtle anomalies can be related to alteration patterns or small metallic objects, for instance.

Other benefits include:

* 4 sensor system accurately computes "real" gradients using implementation of sensors in a triangular configuration plus one sensor housed within bird

* Provides very stable and noise-free platform for acquiring high resolution data in all types of terrain

* Delivers accurate data for reduction of positioning errors using onboard GPS

* No magnetic compensation required; distance from helicopter is sufficient to escape the noise from rotor blades and other moving parts on helicopter

* Bird skirt is adjustable to allow for flight optimization and further noise reduction

Advantages Over Fixed Wing

Fixed-wing surveys are an important component of many earth science programs. However, there are also certain circumstances in which the Tri-Axial Gradiometer can outperform these surveys.

For example, the Tri-Axial Gradiometer maintains the same or lower height than fixed wing surveys - generating higher resolution data.

Additionally, the system does not not require compensation (real-time or post-survey) and flies at reduced speeds for higher volumes of data along survey lines. Surveys can also be flown at uniform survey heights for minimization of noise-effects arising from variable ground clearances.

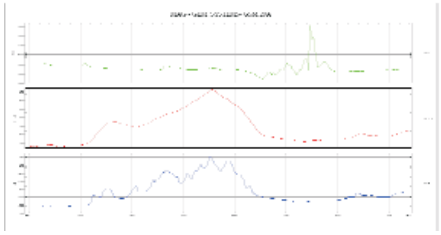
Advantages Over Fixed Helicopter
Fixed Helicopter surveys are performed using a boom or series of booms mounted around the helicopter.

Typically, a Tri-Axial survey can outperform these types of surveys in a number of areas.

* No compensation required

* Same ground clearance possible

* Simplicity of installation and operation



Specifications

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: < 0.1 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
*** -40°C option available

Dimensions & Weights
Sensor: 141mm x 64mm (external dia.); 1.5 kg
Electronics Box: 229mm x 56mm x 39mm; 0.63 kg

Power
Power Supply: 18 to 35 V DC
Power Requirements: approx. 25 W at start up, dropping to 8 W after warm-up
Power Consumption: 8 W typical at 20°C
Warm-up Time: <15 minutes @ -40°C

Outputs
Cycled measurements of the Total Magnetic Field with position & time as digital readout or graph form on the console or as ASCII format through an RS-232 COM port. Pre-amplifier outputs are continuous signals at the Potassium Larmor frequency which is proportional to the magnetic field (7 Hz/nT).

Components
Sensors, bird, pre-amplifier, console, 5m Electronics box cable, manual & ship case.
TRA3500 Radar Altimeter
4500 lb reinforced Kevlar tow cable
Helicopter on-board cable
Novatel ProPak II GPS

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ADVANCED MAGNETOMETERS

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