

AirBIRD UAV Magnetometer System

Our Supplier, 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.



The lightweight AirBIRD is a complete high sensitivity Potassium Magnetometer system for towing under an UAV. Complete with power, altimeter, GPS, data acquisition, data radio link, tow cable and ground control station.

The AirBIRD

The AirBIRD is a self contained lightweight complete airborne magnetometer system designed for UAV applications.

At the core of the **AirBIRD** is GEM's modified high sensitivity Airborne Magnetometer. Especially redesigned for UAV applications, the UAV Mag is the most sensitive Magnetometer on the market and boasts the highest absolute accuracy and lowest heading error available. The electronics component of the magnetometer (**GSMP-35U**) has been modified to both store magnetic data and integrate with additional component data.



GSMP-35U Potassium high sensitivity UAV magnetometer has the highest sensitivity and absolute accuracy and smallest heading error available in the airborne industry.

Within the lightweight aerodynamic housing of the bird are critical components for accurate data mapping and processing.

Data from the **AirBIRD** system is stored in the magnetometer's DAS as well as Radio linked to the ground station, where the operator can monitor the data in real-time.

Why UAV's for Magnetic Surveying

Uav's offer a safe way to collect detailed information in remote, hard to access areas of geological interest for exploration. An UAV survey can provide a higher level of detail than both a ground magnetometer survey and an airborne survey in certain cases.

- UAV surveying is ideal and cost effective for grids of 10 line km upto 2000 line km.
- UAV surveys can accomplish hundreds of line km of survey in just days, where for a man or woman to collect it on the ground would take weeks.
- No line cutting is required for magnetometer surveys and line spacing can be very close for extremely detailed surveys.
- UAV surveys fly closer to the ground than airborne surveys and so the level of resolution is much better.
- UAV's can also cost effectively fly lines spaced as little as 10 metres or less, where a helicopter, plane and people rarely provide surveys with line spacing closer than 100 metres due to the increased cost.



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AirBIRD

The **AirBIRD** comes complete with 1 GSMP-35U (or 25U) Potassium Magnetometer, laser altimeter for altitude tracking/post processing, IMU for bird and sensor orientation, GPS navigation, battery, radio link and tow cable. The magnetometer performs all of the functions of a data acquisition unit. The self contained, self powered stand alone system does not require any integration with the UAV's navigation or electrical systems.

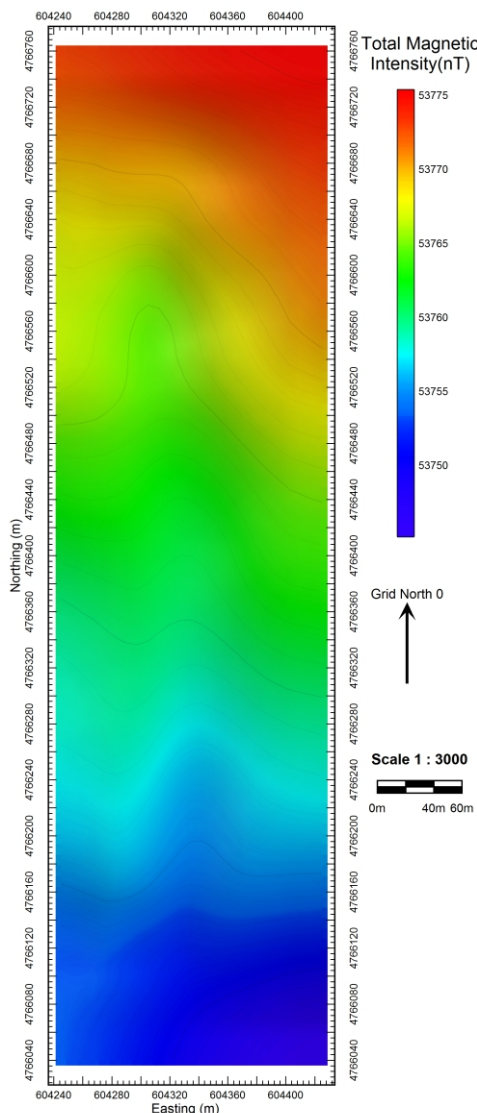


Radio Link ground station antenna and single case for complete storage and shipping.

AirBIRD Specifications

The overall length of the **AirBIRD** is 2.2 metres with the GSMP-35U sensor, installed on a gimbal in the tail to allow for ± 45 degree rotation of the sensor. The housing shell weighs only 1.6 kg. With all components added, including power, the bird weighs just under 3.6 kg. The battery allows for 1 hour of equipment operation.

A laser altimeter is located in the front pod, along with a LiPo battery for system operation of upto an hour (System operation can be higher per customer request). A 2.4 GHz dual antenna radio link and GPS antenna are mounted on the airframe with the fully adjustable magnetometer sensor mounted on a gimble within the tail of the bird. The system is towed by the UAV with a lightweight high strength Dyneema tow cable.



AirBIRD test flight data. Bird height was 20 metres. Data range is 14 nT. Width of grid is 10 metres. Line spacing 1.5 metres.

Magnetometer Specifications

AirBIRD Components

Light weight sensor, sensor electronics, GPS, Laser Altimeter, IMU sensor and box, interface cables, light weight bird, 10m tow line (adjustable), LiPo battery with charger, ground station with Radio-Link, manual, carrying case

UAV Magnetometer Performance

Sensitivity: 0.0002 nT / $\sqrt{\text{Hz}}$ (GSMP-35U)
0.022 nT / $\sqrt{\text{Hz}}$ (GSMP-25U)

Resolution: 0.0001 nT

Absolute Accuracy: ± 0.1 nT

Dynamic Range: 20,000nT 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 (50, 100 Hz Optional)

Magnetometer 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 between 10° to 80° and 360° full rotation about axis.

Environmental

Operating Temperature: -40°C to $+55^\circ\text{C}$

Storage Temperature: -70°C to $+55^\circ\text{C}$

Humidity: 0 to 100%, splashproof

Dimensions & Weights

Sensor: 161mm x 64mm (external dia) with 2m cabling ; 0.43 kg

Electronics Box: 236mm x 56mm x 39mm; 0.46 kg

Power

Power Supply: 22 to 32 V DC

Power Requirements: approx. 40 W at start up, dropping to 15 W after warm-up

Power Consumption: 15 W typical at 20°C

Warm-up Time: <10 minutes at 20°C

Output

Output: X, Y, height, UTC time, magnetic field, lock indication, heater, field reversal, GPS position (latitude, longitude altitude, number of satellites)

GEM Systems provide an industry leading 3 year Warranty



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