

MagArrow

UAV Deployable Magnetometer



Survey large areas of inaccessible terrain 10x faster than a typical magnetic survey

The MagArrow by Geometrics is our first ever UAV deployable magnetometer, and it sets a new standard for UAV magnetic surveys. The MagArrow is engineered to address the limitations of both large manned and small helicopter surveys. To meet these special survey conditions, the MagArrow was built with reliability, efficiency, and ease of use in mind.

The vessel is made of an aerodynamic, light-weight carbon fiber shell. Internally the system contains an MFAM miniature magnetometer, GPS, IMU sensors, an SD card, and battery connectors. The MFAM sensors in the MagArrow are our most groundbreaking sensors yet, capable of highly precise measurements in an extremely lightweight and tiny package. Our system ships complete with a full featured data logger and Android™ Tablet.

The MagArrow can be attached easily to a wide variety of enterprise UAV. The 1000 Hz sample rate synchronized to the on-board GPS allows the system to function independently of the UAV and the UAV software. With such a fast sample rate, surveys can be completed at speeds up to 10 m/s with samples collected every 1 cm.

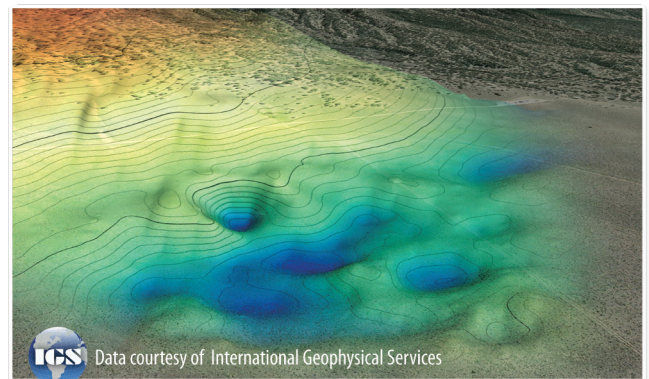
Operation in the field is simple. Survey details are programmed into the user's UAV software of choice. The MagArrow is turned on, and once airborne, preprogrammed GPS waypoints carry the MagArrow in altitude stable survey lines. Once work is completed, data from the MagArrow can be wirelessly downloaded to a computer.

The MagArrow is a robust yet flexible system that can adapt to changing field conditions and new user workflows. How will you use the MagArrow?

FEATURES & BENEFITS

- **Lightweight** – Weighs only 1 kg, allowing a flight time 20% longer* than a 2.5 kg-payload UAV.
- **UAV Agnostic** – Can be easily attached to your existing enterprise UAV.
- **Self-Contained** – GPS, storage, and WiFi on board. No connection to UAV needed.
- **Super-Fast Sampling Rate** – Fly faster, up to 10 m/s with samples every 1 cm. Filter out UAV motor noise.
- **Long Battery Life** – 2 hours of battery life will outlast multiple UAV flights. Hot swappable.
- **No Drop-outs** – Reliable high quality data no matter the sensor orientation.

*DJI Matrice 600 Pro



"The UAV-enabled MagArrow also fills the gap between pilot-on-board aeromagnetic surveys and ground magnetic surveys where the areal size of the survey is too small to justify a pilot-on-board aeromagnetic survey, or the need for low altitude flight operations makes a pilot-on-board survey too risky or too costly."

— Ron Bell of International Geophysical Services, MagArrow user.

POWERFULLY BUILT, SIMPLY EXECUTED

For simplicity in the field, the MagArrow has no external connections, instead containing the GPS, WiFi, and memory on board. Battery packs are hot swappable. All operations are accessed through the web-browser interface. Internal IMU sensors allow for a complete suite of data compensation algorithms to be applied, if desired, to remove platform-induced field variations.

Operating Principle: Laser pumped cesium vapor (Cs133 non-radioactive) total field scalar magnetometer.

Operating Range: 20,000 to 100,000 nT.

Gradient Tolerance: 10,000nT/m.

Operating Zones: Configurable for operation anywhere in the world without dead zones.

Dead Zone: Polar only, 60° inclusive angle.

Noise/Sensitivity: $0.005\text{nT}/\sqrt{\text{Hz}_{\text{rms}}}$ typical ($0.01\text{nT}/\sqrt{\text{Hz}_{\text{rms}}}$ guaranteed); (SX (export) version $0.02\text{nT}/\sqrt{\text{Hz}_{\text{rms}}}$)

Sample Rate: 1000 Hz. synchronized to GPS 1PPS

Bandwidth: 400Hz.

Heading Error: $\pm 5\text{ nT}$ over entire 360° equatorial and polar spins typical.

Output: WiFi data download over 2.4GHz WiFi access point.

GPS: Commercial grade with up to 1 m accuracy.

USB Port: Port for USB flash drive. Used for field upgrades.

Data Logger: Built in Data Logger.

Data Storage: 32 Gbyte Micro SD card, U3 speed class. Not field-accessible. Contact sales for higher capacities.

Data Download: Over WiFi 2.4GHz using user-supplied browser-capable Android* device. 10 minutes of data requires 1 minute to download.

*note: this system is not compatible with iOS operating systems

IMU: Bosch BMI160 Accel/Gyro - 200 Hz sample rate. Insentek Compass - 100 Hz Sample rate.

Total Weight: 1 kg without batteries.

Length: 1 m.

BATTERY

Battery Connection: 2x XT60 connectors for 206 type batteries.

Battery Recommendations*: Non-magnetic 1800 mAh or 2200 mAh lithium polymer, 3cell 11.1v. Hot swappable.

***Battery NOT Included**

ENVIRONMENTAL

Operating Temperature: -35°C to +45°C (-21°F to +113°F).

Humidity: Non-condensing.

ACCESSORIES

Standard: Carrying case, AC power adapter, USB drive containing operation manual and software, JIS1 screwdriver and drill bit, suspension cords.

Warranty: 1 year



Specifications subject to change without notice. MagArrow_v4 (062322)