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GT-MAG

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GT-MAG

THE HIGHEST SAMPLE RATE AND
SENSITIVITY OF MAGNETIC MEASUREMENTS

GT-MAG - magnetometers are used for different applications:

- for airborne magnetic surveys (GT-MAG-2)
- for the ground based geophysical surveys (GT-MVS)
- as a base station magnetometer (GT-MVS-SB)

All devices use self-oscillating split-beam sensors

Technical specifications

	GT-MVS-SB (Base station)	GT-MVS (Walk)	GT-MAG-2 (Airborne)
Precise sensor type	High-sensitivity Self-oscillating split-beam (Cs, K, ...)		
Sensor number	1	1	2
Sensitivity	0.0002 nT/√Hz		
Resolution	0.001 nT		
Sample rate	1 Hz	up to 1000 Hz	up to 1000 Hz
Fluxgate channels	-	-	3
Fluxgate sample rate	-	-	same as for precise channel
Data storage	USB-flash	USB-flash	-
Data output interface	Wi-Fi, USB	Wi-Fi, USB	USB
Internal GPS	GlobalSat OEM GPS Receiver ET-332, 1 Hz	GlobalSat OEM GPS Receiver ET-332, 1 Hz	up to two GPS-receiver (up to 100 Hz)
External GPS	Any with serial output	Any with serial output	-
Radar altimeter	-	-	TRA 3000/3500
Standard software	NavDat (ground module)	NavDat (ground module)	NavDat, Reinmag
Power supply	10-26 V / 15W (45W max)	10-26 V / 15W (45W max)	22-31V / 15W (60W max)
Console dimensions	170x215x35 mm	170x215x35 mm	325x290x70 mm

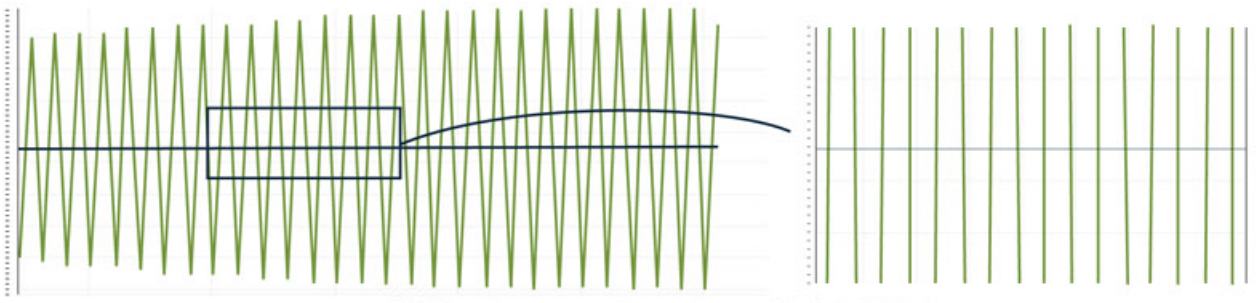
GT-MAG FEATURES

- **RECORD SAMPLE RATE**
  GT-MAG magnetometers combine the highest sample rate of magnetic field measurements - 1000 measurements per second - with the sensitivity corresponding to the best cesium-vapour sensors: 0.2 pT/√Hz (the declared sensitivity of CS-3, CS-L sensors produced by Scintrex is 0.6 pT/√Hz). High sample rate provides the solution of the important problems associated with difficult conditions of high-dynamic flight and in the presence of electromagnetic noise.

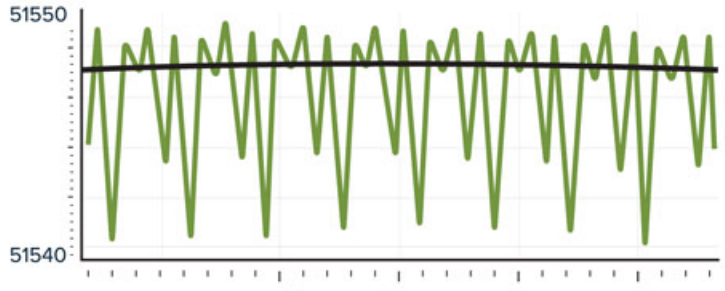
- **WORK IN THE PRESENCE OF INDUSTRIAL NOISE**
  Conducting of magnetic survey in industrial areas is complicated by influence of electric power lines field. When a frequency of measurements is 1000 Hz correct use of digital filters allows suppressing this influence successfully.

- **WORK NEAR THE HELICOPTER ROTOR**
  Rotation of the helicopter rotor is inevitably connected with cyclic change of influence of its magnetic elements. Angular velocity of the rotor is changeable and character of a magnetic noise changes with it also. High-frequency measurements allow applying an adaptive digital filter to suppress this noise during data processing.

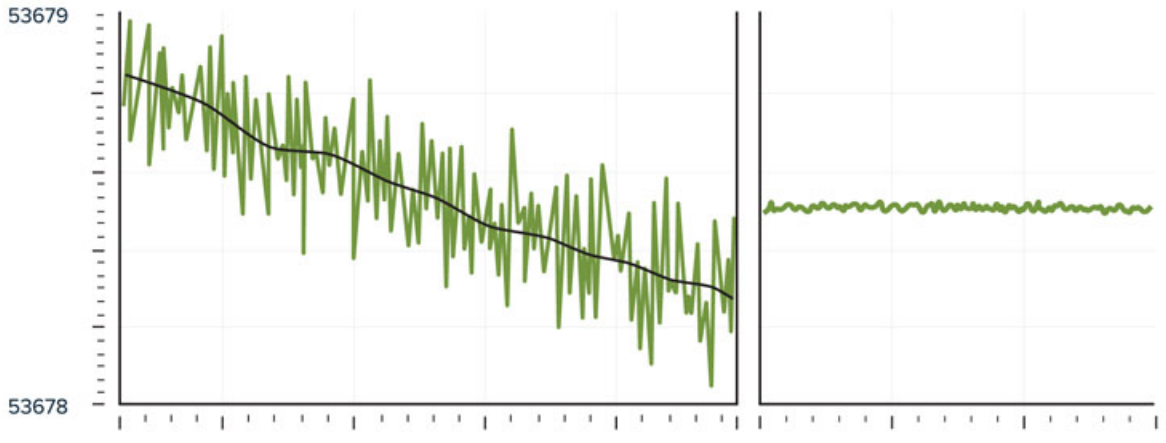
- **WORK IN THE PRESENCE OF VIBRATIONS**
  It does not matter how rigid the sensor was fasten to the aircraft fuselage, mechanical vibrations caused by the working engine bring noise at 20-40 Hz frequencies. Amplitude of this noise can exceed a threshold of sensitivity of the magnetometer a lot. Field measurement with a frequency of 1000 Hz allows excluding this influence by using an adaptive filtering.



50 Hz noise suppression, noise amplitude is 200 nT



Rotor noise suppression



Field measured in the flight

Suppression of noise caused by vibrations

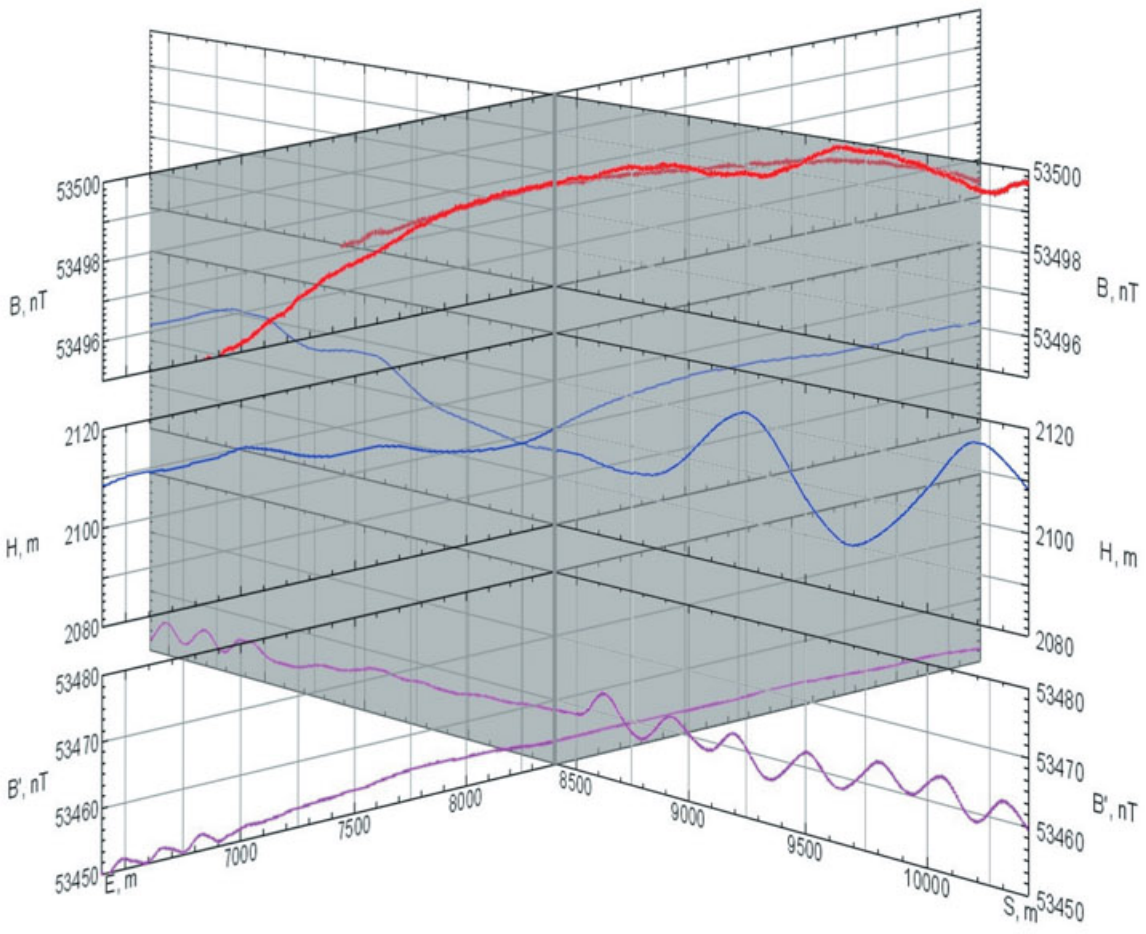
Field measured on ground, engine was turned off

IN ADDITION

When magnetic sensor is rigidly mounted to the aircraft fuselage the REINMAG program is used to compensate the magnetic influence of the aircraft. Algorithms of compensation are based on the modified Leliak (Poisson) model and take into account change of measured values when aircraft moves in a magneto-gradient field. As a result, field gradient in calibration zones doesn't affect correction parameters and measurements keep adequate dependence on altitude and speed of flight. Besides, the same set of compensating parameters is used for all directions of flight and it describes roll, pitch, and course deviation.

If NAVDAT system is used the operator can observe result of compensation in real time.

MAGNETIC DEVIATION AFTER COMPENSATION		
Course, grad	Altitude, m	Field, nT
5	2100.5	53697.5
95	2100.0	53697.6
185	2095.5	53697.7
275	2093.0	53697.9



Compensation results for two orthogonal routes.

UPPER CHART - the field after compensation (1 nT per cell),

MIDDLE CHART - altitude,

BOTTOM CHART - field before compensation (10 nT per cell).