



**CODEVINTEC**

Tecnologie per le Scienze della Terra e del Mare

## G-858 MagMapper Cesium vapor magnetometer



Photo: Geomatrix Earth Science Ltd.

**The G-858 MagMapper is a high-sensitivity, fast-sampling 'walking' magnetometer.**

### Typical uses

- > **Environmental** – Find abandoned wells, pipes, and storage tanks quickly.
- > **Archaeology** – Perform basic magnetic archeology surveys.
- > **Geology** – Survey for regional variations in the magnetic field for mining and oil and gas applications.
- > **UXO Detection** – Collect data at high speed with a fast sample rate, making detection and delineation of UXO quick and easy.



## G-858 – Magnetometer

The **G-858** console includes a graphical interface that makes survey design and data review simple and efficient. The G-858 provides various modes of operation to allow the user to custom design a survey grid for their particular needs. The operator also has the ability to view their position on the grid and the current data profile during the survey. **Display resolution, audible alerts, sample rate and many other functions are user-selectable.**

G-858 data acquisition offers either continuous or discrete station recording. The high sampling rate of the instrument in continuous mode allows the operator to survey an area at a fast walking pace. **A wider search zone can be achieved by adding a second sensor. Adding a second sensor also provides the ability to measure the magnetic field gradient.**

Data is collected in up to 5 separate survey files and transferred via high-speed serial data link to a computer for further analysis and map generation. The full-featured graphical data editing program, MagMap, is provided to allow repositioning, realignment, GPS smoothing, data filtering and interpolation of the data. After editing, the data is formatted in either Surfer for Windows or Geosoft formats for further plotting and analysis.

The G-858™s internal firmware has been streamlined to include those features important for UXO, archaeological, environmental, utility, and mineral exploration.

### Features & benefits

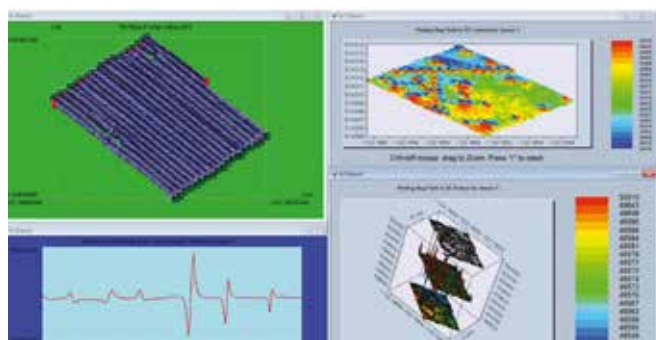
- > **Single or Dual Sensor Modes**  
Easily go from a single sensor survey to either a vertical or horizontal gradiometer survey.
- > **Low Noise/High Sensitivity** - Pick up the smallest changes in magnetic field.
- > **Fast Sampling** - Save money and time on large-scale surveys; detect the smallest objects.
- > **Low AC Field Interference** - Survey next to power lines when necessary.
- > **Easy-to-use Interface** – Useable by inexperienced personnel.
- > **Rugged and Reliable** – Weatherproof. Survives three-foot drop onto hard surface.
- > **Ultra-stable** - No need to calibrate sensors.
- > **Long Battery Life** – Each battery pack allows for 6 hours of surveying with single sensor and 4 hours with gradiometer.
- > **Optional Ergonomic Backpack & GPS** - Upgrade to a complete survey system at any time. Provides more comfort during and after survey.
- > **Optional Non-Magnetic Cart** - Attach two or more sensors to our MagCart for large surveys looking for near-surface features.



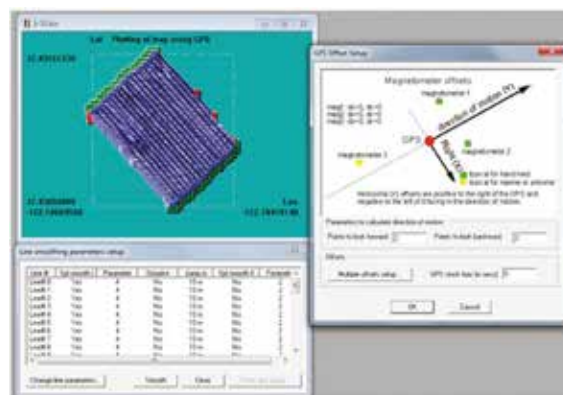
Shown: G-858AP



## MagMap – Processing Software for Magnetometer Survey Data



MagMap™ Data Review Screens



Correcting GPS Data for Offsets

This powerful Windows program provides basic data processing filters for quick analysis of magnetic, Ohm-Mapper, and EM61 data. MagMap™ facilitates data download from Geometrics magnetometers, applies diurnal correction upon export, and generates 2D/3D color contour plots and shaded relief maps. This program also offers full GPS support with UTM conversion, sensor-GPS antenna offset computation as well as GPS file integration with basic magnetic data.

**Erroneous data due to spikes can be eliminated with the despiking function by using a user-selectable maximum and minimum window to cut the data outside of this range.** Dropouts due to entering a dead zone or loss of signal can be removed entirely or interpolated to estimate the actual values.

The magnetic data collected can be checked for accuracy either as a complete profile of the survey, with each transect stitched together, or on a line-by-line basis. **The zooming feature focuses the window on a point of interest and helps determine the validity of a series of readings.**

The time, date, and magnetic readings can be seen in the bottom panel for reference. Data can be shown for each individual magnetometer, both sensors on the same plot to examine consistency, or as a pseudo-gradient.

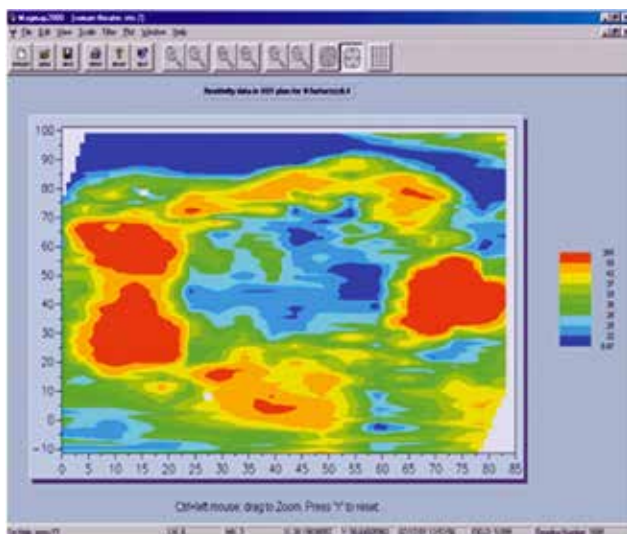
### Features

- > **Runs on Windows XP, 7, 8 and Newer** - Multicore Multi-tasking operating systems.
- > **Prompts Automatic Data Download** from Geometrics Magnetometers.
- > **Quickly View Color Contour Maps** within a few clicks after data download.
- > **Process EM Data** in the same program as the magnetometer data such as from the OhmMapper™ or EM61.
- > **Fix Operator Errors** by manually deleting points, lines, or shifting them to the correct position.
- > **Remove Erroneous Data** with Despiking, Destriping and “Remove Dropouts” features
- > **Correct GPS Positions** by performing a sensor-to-GPS offset correction
- > **Merge GPS and Magnetic Data Files** which do not already contain GPS positions.
- > **Constant Updates** feature automatically checks Geometrics FTP site for newer releases of the program each time the program is opened.



## Analog components

MagMap also downloads data from the OhmMapper and can create 2D image plots showing differences in the resistivity of the survey area. Using multiple receivers for a survey also allows you to create multiple depth slices to see how the resistivity changes at different depths, as well as creating vertical profiles of a transect. GPS offsets can be incorporated to properly position the resistivity data.



Map of OhmMapper Resistivity Data

## Merging gps and magnetic data files

If you collect magnetic data and do not have an integrated GPS unit you can still merge both datasets in MagMap. It is important that both files contain accurate time stamps and were recorded simultaneously to marry the two datasets together. It is necessary to download GPS Babel prior to attempting to merge GPS and magnetic data. A link to the download website is provided in the software.

## GPS corrections

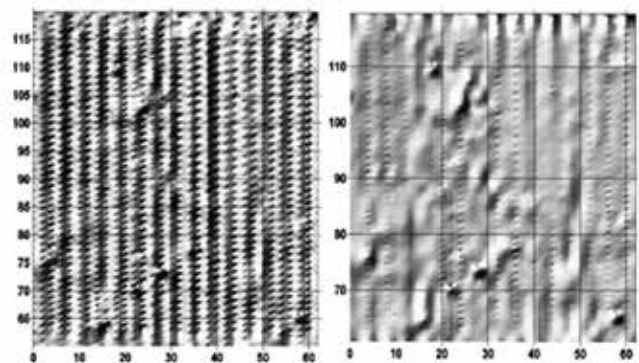
MagMap allows the user to include GPS offsets to correctly associate location information with each magnetic data point. Smoothing parameters are also available to reduce relative positioning errors in the GPS readings.

## 2D/3D grid views

Data can be seen in a traditional 2D image plot or shaded relief to examine the size and nature of each anomaly. The 3D plot is a colored wireframe plot to give a visual representation of the strength of each anomaly as well as a comparison between two features. The 3D grid option also allows you to zoom in on areas of interest for a closer examination of subtle differences in the data.

## Data destriping

Heading and operational errors can be removed with the destriping function. It also employs a high frequency filter to remove small sinusoidal noise typically representative of the walking gait of the operator.



Results of Destriping and Periodic Noise Removal Feature



## G-858 MagMapper I Specifications

### Magnetometer / Electronics

<b>Operating Principle</b>	Self-oscillating split-beam Cesium Vapor (non-radio-active Cs-133) with automatic hemisphere switching
<b>Operating Range</b>	20,000 nT to 100,000 nT.
<b>Operating Zones</b>	For highest signal-to-noise ratio, the sensor long axis should be oriented at 45°, ±30 to the earth's field but operation will continue through 45°, ±35°. Sensor is automatic hemisphere switching
<b>Noise</b>	< 0.008 nT/Hzrms (SX (export) version: 0.02 nT/ Hzrms)
<b>Heading Error</b>	< 1.5 nT including backpack and GPS
<b>Gradient Tolerance</b>	> 500 nT /in (>20,000 nT/m)
<b>Temperature Drift</b>	< 0.05 nT/°C
<b>Max Sample Rate</b>	10 Hz
<b>Data Storage</b>	Non-volatile RAM with capacity for 8 to 12 hrs of magnetometer, time, event marks, field notes and XYZ or GPS locations
<b>Audio Output</b>	<ol style="list-style-type: none"> <li>1. Audio tone of field variation; pitch and volume adjustable. (Search mode)</li> <li>2. Audio pulse each 1 second (pace metronome)</li> <li>3. Alarm for loss of signal, low battery or quality control setting exceeded</li> </ol>
<b>Data Output</b>	Three-wire RS-232 standard serial port, optional continuous real-time transmittal of data via RS-232 to PC. Total memory output transfer time less than 5 min at 115,200 baud.
<b>Visual Output</b>	<ul style="list-style-type: none"> <li>- 320 x 200 graphic liquid-crystal display, daylight-visible with selectable outputs for:</li> <li>- Display of up to 5 stacked profiles, real time or review mode. Survey grid showing boundaries and position.</li> <li>- All system set-up functions, e.g., memory status, data transfer, sample time.</li> <li>- All survey set-up functions, e.g., survey profile number and direction, station number or GPS data transfer protocol, line number.</li> <li>- Survey monitoring functions, e.g. total field, noise level, profile number or x-y coordinates</li> </ul>
<b>Internal Clock</b>	Resolution of 0.1 sec, drift: < 1 sec/day
<b>Power</b>	24 VDC rechargeable gel cell, 5 hrs for Mag w/GPS. Magnetic effect less than 1.5 nT at 4 ft. Internal backup battery for clock and non-volatile RAM.
<b>Operating Software</b>	<ol style="list-style-type: none"> <li>1. Survey Modes: Search survey - Simple survey - Mapped survey, station or continuous - Base station</li> <li>2. Data acquisition/display: Acquire and store data and survey functions. Display profiles, total field to 0.1 nT resolution, survey / map parameters and diagnostics.</li> </ol>

<b>Post-acquisition Software</b>	MagMap software for installation on customer's computer
	<ol style="list-style-type: none"> <li>1. Data transfer and corrections: <ol style="list-style-type: none"> <li>a. Transfer of data from field Magnetometer, GPS, or Base station to PC.</li> <li>b. Diurnal correction using base station data.</li> <li>c. Processing the corrected data into ASCII values of X-Y-Z.</li> </ol> </li> <li>2. Data processing functions include spike editing, spline filtering, repositioning of X, Y, Z or GPS Lat/Long, conversion to UTM coordinates, profile and contour map plotting.</li> </ol>

### Mechanical

<b>Sensor</b>	DIA: 6 cm; L: 15 cm; Weight: 340 grams (2-3/8x6-3/4 in; 12 oz)
<b>Backpack</b>	4.3 kg (9.5 lb)
<b>Console</b>	L: 28 cm; W: 15 cm; H: 8 cm; Weight: 1.6 kg (11x6x3 in; 3.5 lb). Magnetic effect less than 1 nT at 4 ft.

### Environmental

<b>Operating Temperature</b>	-25°C to +50°C (-13°F to + 122°F)
<b>Storage Temperature</b>	-35°C to + 60°C (-30°F to + 140°F)
<b>Water Tight</b>	Weatherproof in driving rain
<b>Shock</b>	Survives a 3 ft drop onto a hard surface
<b>Warranty</b>	1 year on G-858 and sensor, 1 year on accessories

### Other models

<b>G-858AP</b>	Includes ergonomic backpack and Tallysman GPS
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### Tallysman TW5341™ specs

	Code and carrier phase tacking with 1Hz Position, velocity, time output
	SBAS capable and designed for harsh environments
	RS-232 compatible interface
<b>Size and Weight</b>	DIA: 66.5mm; H: 21mm; Weight: 60 g (2.6x0.8 in; 2.1 oz)
<b>Input Voltage</b>	+9 to +16 VDC
<b>Power Consumption</b>	1.2W (typical)
<b>Com Ports</b>	1 RS-232 (optional 2 RS-232) at up to 19,200 baud
<b>Operating Temperature</b>	-40°C to +85°C (-40°F to +185°F)
<b>Position Accuracy</b>	Single point L1 <2 m CEP; WAAS L1 <1 m CEP
<b>Data Rates</b>	Measurements 1 Hz; Position 1 Hz
<b>Time to First Fix</b>	Cold start 39 sec; warm start 34 sec; hot start 2.5 sec.
<b>Signal Reacquisition</b>	<1 sec typical