MetalMapper 2x2
Advanced Time Domain EM UXO Sensor

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The MetalMapper 2x2 is the next generation of Geometrics' original MetalMapper. It is a commercial version of the instrument developed by the Naval Research Lab (NRL). It classifies buried metallic objects as scrap or UXO by using modern electronics to acquire high dynamic range, wide bandwidth, and multi-component data, building on the success of the MetalMapper by offering a smaller, lighter, and easier-to-deploy geophysical platform. The cables and electronics have been upgraded to rugged geophysical instrumentation standards.

The MetalMapper 2x2 allows rapid data acquisition in both dynamic and cued modes. It features easy-to-use acquisition software with includes displays of the transmitter and receiver wave forms for in-field quality control. Acquisition parameters are flexible — decay length, number of stacks and number of time gates are all user-configurable. Navigation software provides displays that allow positioning the array over flagged locations or acquiring dynamic data along survey lines.

FEATURES & BENEFITS

- **Allows discrimination between shrapnel and UXO to a high degree of certainty** – Far less expensive digging

- **Can be pushed on a wheeled cart or towed by an ATV** – Use for focused identification of UXO or as reconnaissance tool.

- **Identify position, depth, and orientation of UXO** – Know what to expect when you have to dig.

Various pieces of located and recovered ordnance

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Configurations: Four transmitter loops, four 3-component MetalMapper receiver cubes/loops, field modifiable configuration for cart-mounted wheeled transport or skid-steer mounted sled of antenna assembly at different heights, instrument package deployed by backpack, cart, or machine. Data acquisition system is a fully featured ruggedized tablet computer with touch screen controls.

A/D Conversion: Up to 24, 16-bit A/D channels simultaneously sampled and operation at 250 kHz.

Bandwidth: DC to 50 KHz for purposes of anti-aliasing. Effective bandwidth is independent of data collection parameters.

Noise Floor: 4 nT/s/√Hz at 1000 Hz.

Stacking Trigger Accuracy: All timing accurate to one sample interval (4 μs).

Maximum Input Signal: Receivers withstand any transient capable of being produced by the transmitter.

Effective area of each receiving loop/preamplifier: 100.00 m2

Transmitter loops: Four loops oriented in a 2x2 horizontal array , each 35 cm x 35 cm.

Transmitter loop moment: 30 A-m2 typical

Receiver loops: Each receiver cube contains three 10 cm x 10 cm orthogonally-oriented, co-located loops.

Data acquisition time blocks: 33.33 ms, 100 ms, 300 ms, 900 ms, 2.7s

Data point acquisition and storage rate: 30, 10, 3.33, 1, 0.37 data points/s.

Cycles of time-domain signal in each data-acquisition block: 1, 3, 9, 27, 81, 243.

Transient-decay length: Selectable based on data-acquisition block time and cycles within that block. Useful decay lengths can vary from 103 μs to 675 ms long.

Data acquisition modes: Full wave (stores all data samples for each channel, i.e. 4 μs samples), Decays (stores data samples in one decay curve after stacking multiple decays from a data-acquisition block, Decimated decays (stores decays after stacking time gated decays and computing average amplitude in each time gate).

Transmitter turn-off and primary die-away time including receivers' response: 100 μs maximum after initiating transmitter turn-off. After background subtraction, secondary decay transients can typically be observed at 50 ms. Transmitter turn-off to 1% is on the order of 10 ms.

Decimation time gates: The gate widths are determined by applying an (operator selectable) fraction of the delay time at each gate , with a one sample minimum. Gating begins after a selectable hold-off time.

Transmit Current Monitoring channel: One digital channel records digitized transmitter current to same sampling specifications as receiver channels.

Data Storage and Format: Data are acquired to the controller tablet hard drive and stored as HDF5 file format. Following acquisition, data can be transferred to alternative storage media via any method used to access another PC (USB, LAN, wireless, remote terminal).

Data Export Format: After acquisition, the user can manually or automatically/sequentially re-read the data in HDF5 format or export it to text-based CSV files.

Acquisition Software: Standard operating/acquisition software (e.g. ATEM Acquire) provides capabilities for acquisition and display/QC. Acquisition controls parameters and starting/stopping acquisition. Display options during acquisition include display of a map of data points that have been collected in a series, and a novel display of the vertical and horizontal components of each receiver-sensor. Display/QC options include capabilities for graphical displays of decay transients on Log, Linear, and Log/Linear scales, of selected components for any or all receivers.

Operating System: Debian (Linux-based)

Data Terminal/Display: Ruggedized, Day Light Readable Touch Screen.

Power: Three 12 A-h Li-Ion batteries. Requires +12V supply for data acquisition and ±12V supplies for the transmitter.

Operating time on full battery charge: Up to 8 hours.

Environmental: 0 to 50 degrees C.

Backpack Electronics Size: 14"L x 14"W x 8"H. Weighs 30 lb including batteries.

Warranty: One year standard, extended warranty available.

Specifications subject to change without notice. MetalMapper2x2_v1 (0217)