

APPENDIX B  
GEOPHYSICAL INSTRUMENT DATA

## GEOPHYSICAL INSTRUMENT DATA

The letter on the following page was e-mailed to manufacturers of geophysical instruments. ECG called the manufacturers to follow-up on the requested information. We also did a search on the Internet for instrument specifications and descriptions.

The information presented immediately after this letter was obtained from the Internet or the manufacturers and distributors of the different geophysical instruments. The information obtained from the manufacturers and distributors will be use to evaluate UXO sensitivity to instrument radiation during the later part of this study.

DATE: June 24, 1997

TO: Geophysical Equipment Manufacturer

SUBJECT: Survey of Characteristics of Geophysical Instruments

The U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville was established as the Mandatory Center of Expertise for the Ordnance and Explosive (OE) program within the U.S. Army Corps of Engineers. The mission is to safely eliminate or reduce risks from ordnance, explosives, and recovered chemical warfare materiel at current or formerly used defense sites. The Center of Expertise is responsible for Ordnance and Explosive activities in support of the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS), Installation Restoration (IR), Base Realignment and Closure (BRAC), and Services for Others (SFO) programs.

One of the objectives of this project is the need for an authoritative comparison of the electromagnetic signatures of the most widely used OE detection geophysical instruments and compare them with fuzing systems that were produced by the U.S. and commonly used prior to 1960.

Therein, we are requesting the following electromagnetic characteristics of your geophysical equipment:

- A. Model No.
- B. Operating mode
- C. frequency
- D. pulse duration
- E. pulse repetition rate
- F. turnoff (fall) time or rise time
- G. In the transmission loop
  - (1) current peak (A)
  - (2) moment (A-m<sup>2</sup>)
- H. output power (W), peak and average
- I. appropriate footprint (diameter in meters)

Your prompt assistance in this effort is greatly appreciated.

**ECG, Inc.**  
**300 Sparkman Drive, NW**  
**Bldg 1, Rm 323**  
Huntsville, AL 35805  
**Telephone: 205-726-2502; FAX: 205-726-3909**

## **PulseEKKO 1000 Specifications** (from Internet)

### Antennas (Shielded)

Frequency	Size	Weight
110 MHz	92 x 16 x 16 cm	9.0 kg
225 MHz	40 x 23 x 7 cm	1.0 kg
450 MHz	23 x 16 x 6 cm	0.7 kg
900 MHz	23 x 16 x 6 cm	0.7 kg
1200 MHz	18 x 12 x 12 cm	0.5 kg

### Console

- control and data output RS 232 serial port (optional parallel)
- power requirement 2.1 amp @ 12 V dc
- size 25 x 16 x 16 cm
- weight 2.8 kg

### Control & Display

- computer XT to Pentium to P6 and beyond
- digital storage hard drive & any PC medium
- output PC compatible printers

### GPR Parameters

- maximum system performance 162 dB
- programmable sampling interval 10 ps – 20,000 ps in 2 ps steps
- equivalent time sampling rate to 100 GHz
- programmable stacking 1 – 2,048 stacks
- programmable time window 1 ns – 32,767 ns

### Receiver Electronics

- output 16 bit digital
- lsb 1.5 uv
- size 23 x 16 x 5 cm
- weight 1.5 kg

### Transmitter Electronics

- output 200 V
- size 23 x 16 x 5 cm
- weight 1.7 kg

## **SCINTREX V-920**

The V-920 Portable Ferrous Ordnance Detectors one of our newest instruments to complement our diverse line of security products. The V-920 is a high-sensitivity high-resolution, optically-pumped, portable cesium vapour magnetometer designed for a variety of tasks including detection of buried ordnance and ferrous objects.

### Applications

With a sensitivity of .01nT combined with two types of data processing output, the V-920 is ideal for many applications including:

- military cleanups (UXO-OEW) – mines, buried ordnance. Capable of 10m penetration depths in non-ferrous soil.
- Forensic applications for buried evidence
- Underwater searches for submerged ferrous objects
- Industrial pollution studies
- Verification of site clean-up

The V-920 is compact and lightweight and is supplied with a staff-mounted sensor and an optional 64 x 240 pixel LCD graphic screen, used to display a variety of graphics displays which allow the operator to quickly analyze characteristics of the magnetic survey data and is visible in all light conditions. A battery belt provides DC power to the instrument. The optional display provides an easy-to-use menu driven data processing, mapping and optional anomaly analysis software system called ENVIMAP®. This unique software is designed to be as simple as possible and runs on any IBM PC compatible computer.

### Features

- High sampling rates as fast as ten times per second
- Large capacity memory expandable to 310,000 readings
- Easily readable Liquid Crystal Display
- Operator friendly, interactive menu system
- Dual survey Modes
- Sweep mode provides audio feedback for large areas
- Survey mode provides an output that is compatible with data processing programs for graphical representation including a 3-dimensional plotting output. The resulting 3-D map is ideal for verification of site cleanup
- Comprehensive data processing, mapping and anomaly analysis software

### Specifications

Operating Principle: Self-oscillating split-beam Cesium Vapour (non-radioactive Cs-133)

Operating Range: 15,000 – 100,000 nT (y)

Active Zone: Angle between sensor head and magnetic field vector; 10 to 85 degrees

Sensor Orientation: Continuously adjustable  $\pm 90^{\circ}$

Sensitivity: 0.01 nT (y) at 2 Hz bandwidth standard

Bandwidth: User selectable: 8, 4, 2, 1, 0.5 Hz.

Measurement Rate: 10 times per second

Embedded Controller: Electronics package process Larmor frequency and provides digitized value of RS-323C.

Visual Output: 8 character, super bright display. Complete with 4-key keypad.

Audio Output: User selectable sensitivity, DC-15kHz output with audible clicks for low frequency and auto baseline tracking.

Audio Headset: Non-magnetic piezoelectric headphones with volume control.

Power Supply: 2 x 12 VDC rechargeable Lead Acid batteries (in belt)

Operating time: Approximately 5 hours (with standard battery). Approximately 10 hours (with optional heavy duty battery) at  $20^{\circ}\text{C}$ .

Operating Environment:  $-20^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  sensor and electronics Waterproof (submersible in up to 1 m of water)

Dimensions and Weight:

Sensor: 2.5" diameter by 6.3" long (6.3cm diameter by 16cm long)

Sensor/electronics/staff: 3.92ft (1.2m) 4.6lbs (2.1 kg)

Console 10" x 6" x 3.3" (25.4 x 15.3 x 8.4 cm)

Battery Belt: 9.7lbs (4.4kg) standard battery;

4 lbs (6.4kg) optional heavy duty battery