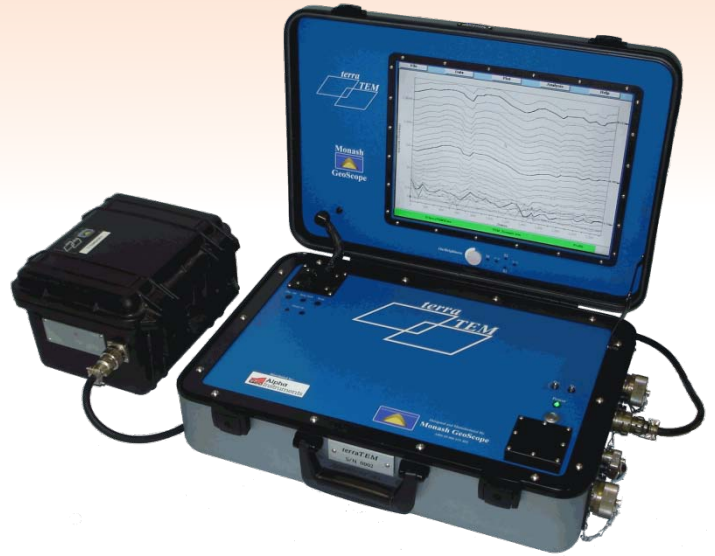


## terraTEM Features

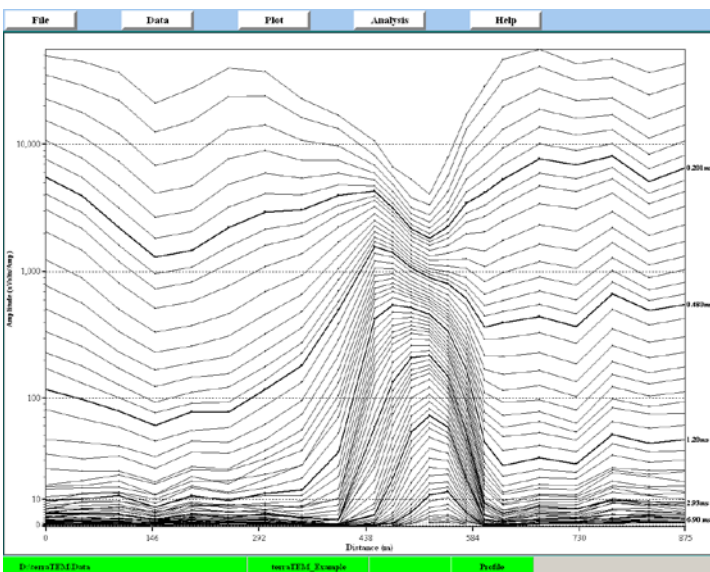
- Transmitter and receiver in one unit
- Single or 3 channel receiver with 10 amp. transmitter
- High speed sampling at 500 kHz for superior near surface resolution
- Easy to use touch screen with auto set-up and smart menus
- Large 15" LCD display for data visualisation
- Fast and easy data transfer via USB port
- Integrated 12 channel GPS system for seamless station positioning (option)
- Integrated PC for data visualisation, data processing, and interpretation in field using built-in software
- Rugged construction with external 24 V battery power pack and charger
- Several optional extras to broaden capability



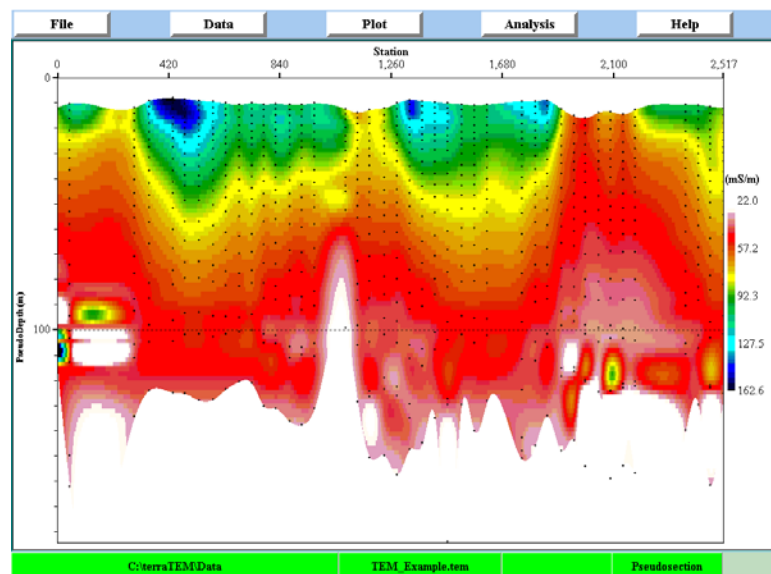
The terraTEM and its ancillary equipment are designed and manufactured in Australia by Monex Geoscope Pty. Limited

## Screen Dumps

The following are a number of screen views from the terraTEM system.



**Full control of all aspects of data display, post-survey filtering, and decay curve analysis**



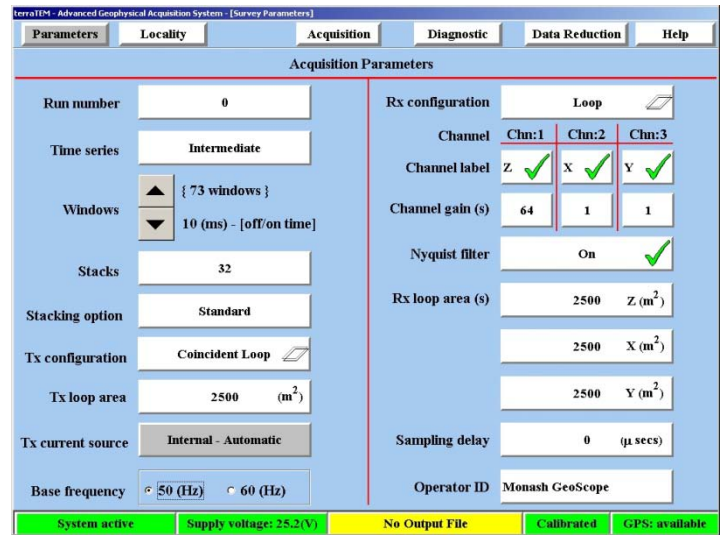
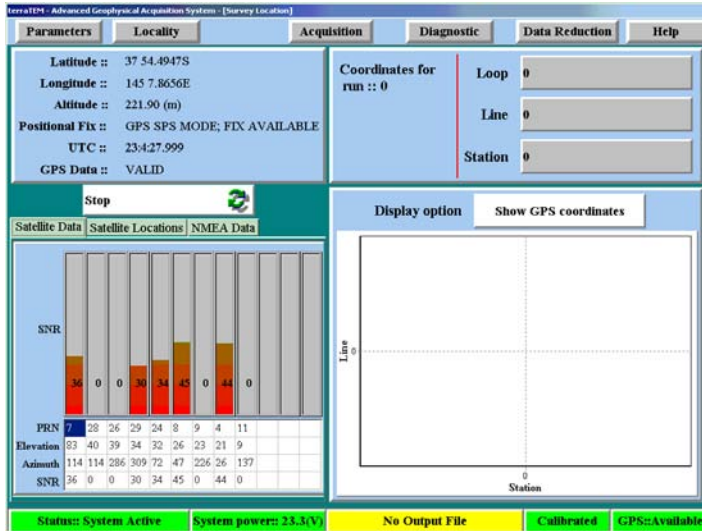
**Multiple display formats, including gridding and raster images (options)**



# Applications

The terraTEM can be used for various applications including the following:

- Mineral exploration
- Near surface including geo-technical and engineering investigations
- Groundwater and salinity studies
- Environmental surveys



*Easy access to all parameters, multiple binning and stacking options; smart menu system.*

*Internal GPS, for positional accuracy (option)*

# General Specifications

	terraTEM	Options
Transmitter Output	10 Amps. (max.), 240 Watts	terraTX-50 Transmitter– 5 kW
Receivers	1 Channel	3 Channels (simultaneous)
High Resolution Sampling Rates	500 kHz	-
Multiple Time Gates	Three (3) Sets	User Selectable
Gain Functions	10 Selectable Gain settings from 1 to 8,000	Auto Gain
Stacking Options	1 to 65,536 Stacks	Sferic Rejection
Communications – Port for Data Transfer	USB and RS-232 Standard	-
Data Visualisation and Processing in field	Standard Software	Enhanced Software
Storage Device – 4 GB Flash Disk	Standard	-
GPS Receiver – 20 channel	-	Option
External Synchronisation	-	Cable or GPS
Continuous Recording (with external GPS Interface)	-	Option
VecTEM 4 Interface Module (for down-hole surveying)	-	Option
Dimensions:	Console: 530 x 350 x 160 mm. 13 kg. Battery Box: 280 x 250 x 180 mm. 12 kg.	
Operating Temperature:	-20 to +45 degrees C.	



## Technical Specifications

### Transmitter

Output	10 Amp. (max.) at 24 Volts
On/Off Time	Adjustable 10 ms (50 Hz) or 8.33 ms (60 Hz) increments to 500 ms.

### Receiver

Sampling	500 kHz each channel
Repetition Rate	From 25 Hz or 30 Hz. to 0.5 Hz in 28 Stages according to off time
Gain	1 to 8,000 in 10 steps Auto Gain Optional
Windows (Gates)	Up to 150 depending on time series selected
Resolution	Maximum 28 bits, effective
Functions Measured	Tx/Rx loop resistance, Tx current, Tx turn-off time, battery voltage, automatic gain/offset calibration, transient response

### Console

Display	LCD TFT, 15 inch
Touch Screen	Splash-proof
Storage	4 GB flash RAM

### External Interfaces

Communications	USB and Serial port for data transfer
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### Equipment Supplied

- Console
- Loop connectors (x4)
- Battery Pack (24 volts), complete with connector cable (batteries not included)
- Battery charger
- USB flash disk (for data transfer)
- Operations manual (on CD)

### Sensor Attachments Available

Surface Receiver	Multi-turn Coil, TRC or cable loop
Downhole	3-component VecTEM 4

### Physical

Housing	Aluminium case
Console: Weight	13 kgs.
Dimensions	530 x 350 x 160 mm.
Battery Pack: Weight	12 kgs.
Dimensions	280 x 250 x 180 mm.
Operating Temperature	-20 to +45 degrees C.

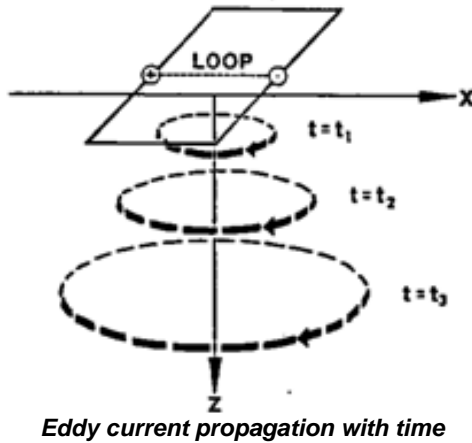
### Options

GPS Receiver	20 channel receiver
Multi-channel Receiver	3 channel simultaneous A/D
External Transmitter Synchronisation	Cable or GPS synchronisation option for use with terraTX-50 high powered transmitter
VecTEM 4 Interface	Internal interface module
Continuous Recording	Continuous recording of unit with external GPS interface using NMEA standard
Software Options	Extra Stacking Options, Sferics Rejection and Gains, Spectral Analysis and Digital Signal Processing User-defined time series



# Introduction

**Transient Electro-magnetics (TEM) or Time-domain EM (TDEM)** is one of the two main divisions of electro-magnetics. It is distinguished from the other main division, **Frequency domain EM (FDEM)**, by the transmitter not being continuously on, as in FDEM, but pulsed on and off. This provides one great advantage to TEM in measuring the received "secondary" signal when the stronger "primary" transmission signal is off.



## Principle of Operation

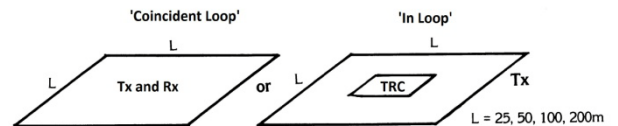
A loop of insulated wire, usually in the shape of a square or rectangle, with side dimensions of from 1 to 1,000 metres is laid out on the ground. By connecting it to a generator of electrical current, the passage of current in the loop, called the **transmitter loop**, develops a magnetic field which propagates into the earth. See Figure 1. After some time, which is usually some milliseconds, the current is switched off to terminate the **primary magnetic field**. (Hence the name "transient" or, "time domain").

Due to Faraday's law, the rapid switching off of the field **induces** currents to flow in the subsurface, called "eddy" currents. The peak current, migrates downward and outward from the loop with time at a velocity dependant on the conductivity of the subsurface, be it uniform or varying. When this current intersects a discrete conductor, currents are induced in it. They in turn, have a magnetic field, the **secondary field**, which can be detected on another loop, called the **receiver loop** (or since the transmitter loop is no longer transmitting it can be that same loop). This set-up can be likened to a common power transformer with primary and secondary

windings and the core being like the conductive earth. By this means we can detect conducting bodies or layers of different conductivity in the subsurface.

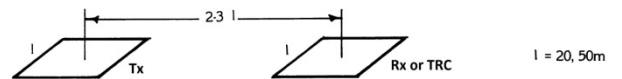
The receiver loop measures the time rate of change of the magnetic field which intersects the loop. With a properly calibrated receiver, the units are volts per transmitted current. That is, the measurement is 'normalised' to the current as its variation would alter the voltage alone. Sometimes this expression is also normalised to the area of the receiver loop as this also determines the value of the received signal and is important in comparing results from different loop sizes in the same place.

### COAXIAL LOOP GEOMETRY



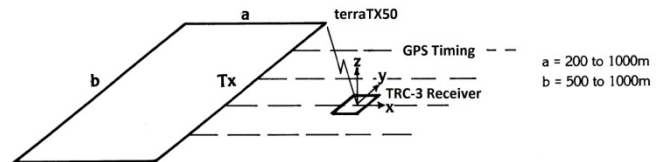
Advantages: Convenient, strong signals, no blind zones  
Disadvantages: Complex anomaly shape

### SEPARATED MOVING LOOPS



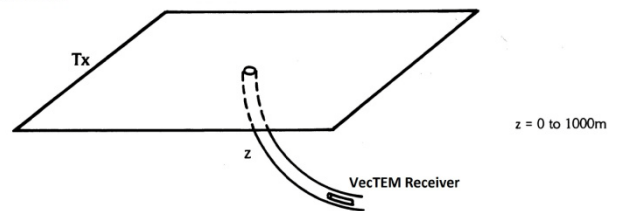
Advantages: Less confusing anomaly shape  
Disadvantages: Weaker signals. Less convenient.

### LARGE FIXED LOOP GEOMETRY



Advantages: Reduced rate of fall-off. Constant source field.  
Disadvantages: Blind zones. Dependant on location of Tx.

### DOWNHOLE



**Loop Configurations**

## Further Information

For further information regarding this product, either technical or sales, please contact:

 <p>Unit 1, 43 Stanley Street, Peakhurst. N.S.W. 2210. Australia  <b>Phone</b> +61 (0) 2 9584 7555 <b>Fax</b> +61 (0) 2 9584 7599  <b>e-mail</b> info@terratem.com <b>website</b> www.terratem.com</p>	<p>Your Distributor:</p> <div style="text-align: center;">   <b>ARMAN FANA VARAN-E-ZAMIN</b> </div>
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