Glossary of Metal Detecting Terms
Source: Varies locations
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Air Test: A test performed by moving various sized metal samples beneath the metal detector search coil to check the detector's features and target response. This test is not an accurate indicator of ground depth penetration capability.

Alkaline: A type of battery able to sustain longer periods of current drain with greater storage life when compared to the standard carbon-zinc type.

All Metal: Any operating mode or control setting which allows total acceptance of any type of metal targets. Usually associated with the Ground Balance mode.

Audio ID: See Tone ID

Audio Response: See Target Response

Auto Tune: Circuitry which continuously retunes the detector's threshold to the initial manually tuned audio level. The retuning rate following target rejection or drift can be preset or variable.

Back Reading: A false signal, when operating in the discriminate mode, caused by a rejected target coming within one inch of or contacting the search coil bottom.

Bench Test: An air test to determine at what approximate discriminate settings various metal samples are rejected or accepted. The test is conducted in a non-metallic area.

Black Sand: One of the most extreme components of nonconductive, negative ground minerals. Also called magnetite (Fe3O4) or magnetic iron oxide.

Body Mount: A configuration whereby the control housing is separated from the control shaft and fastened to the operator's body lessening arm fatigue and expanding usability for shallow water hunting. Also known as hip mount.

Cache: Any intentionally buried or secret hoard of valuables.

Carbon-Zinc: The most common standard dry cell battery type.

Coil: See search coil

Coin Depth Indicator: A visual indicator used in conjunction with calibrated circuitry to indicate depth of buried coins in inches or millimeters.

Concentric: A search coil configuration using one or more transmit and one receive windings having unequal diameters aligned on a common center; most recently arranged on the same plane and called coplanar concentric.

Conductive Salts: One of the major mineral types which make up the positive ground matrix. Wet, ocean-salt sand produces a positive rise or metallic type response on an air tuned threshold.

Conductivity: The measure of a metal target's ability to allow eddy current generation on its surface.

Control Housing: A metal or plastic box which holds circuit boards, indicators, meter, controls and power supply.

Convertible/Combination: A metal detector configuration allowing versatility in operator handling i.e. hand held to body mount.

Coplanar: Any search coil configuration in which transmit and receive windings occupy the same level or plane.

Crystal Controlled Oscillator: A transmit oscillator employing a crystal to maintain stable output frequency.

Depth Penetration: The greatest measure of metal detector's ability to transmit an electromagnetic field into the soil matrix and produce a target signal.

Detection Pattern: The densest or strongest region of the search coil's electromagnetic field where detection occurs. Its shape is balloon and changes in size directly proportional to target surface area.

Detuning: Adjusting the audio threshold into the null or less sensitivity tuning zone. Also a method of narrowing a target signal width manually for precise pinpointing. This is accomplished by retuning to audio threshold over the target response area.

DISC: See Discrimination

Discrimination: Adjustable circuitry which ignores or nulls audio responses from a specific conductivity range allowing positive responses to be heard from metals higher in conductivity above the discriminate control setting. Designed primarily to eliminate audio response from trash metals. See also Motion Discriminator.

Double Blip: A signal characteristic common to elongated ferrous targets such as nails or coins lying close to the surface detected in the All Metal no-motion mode.

Double D or 2 D: See Wide Scan.

Drift: A loss of threshold tuning stability caused by temperature change, battery condition, ground mineral content or detector design.

Eddy Currents: Small circulating currents produced on the surface of metal by the transmitted electromagnetic field. These currents then produce a secondary

electromagnetic field which is then detected by the search coil receiver windings resulting in inductive imbalance between the windings.

Electromagnetic Field: An invisible force extending from top and bottom of the search coil created by the flow of alternating oscillator frequency current around the transmit winding. See also Detection Pattern.

Electronic Pinpointing: An automated detuning feature which narrows signal response for the purpose of target pinpointing.

Elliptical Coil: A search coil with an ellipse shape. This coil can be either concentric or wide scan type.

Faint Signal: A sound characteristic of targets that are sometimes deeply buried or very small in size.

False Signal: An erroneous signal created by over shoot, ground voids or highly mineralized hot rocks. See also Back Reading

Faraday-Shield: A metal foil wrapping of the search coil windings or metallically painted search coil housing interior for the purpose of eliminating electrostatic interference caused by wet vegetation.

Ferrous Oxide: An oxidized particle of iron which generally becomes nonconductive and makes up the natural negative ground mineral matrix. Hematite, which is also and iron oxide (Fe2O3), will respond as positive or metallic. See also Black Sand.

Ferrous: Descriptive of any iron or iron bearing material.

Frequency Shift: A feature which suppresses the audio interference (cross-talk) between two detectors using identical transmit frequencies in close proximity.

Frequency: The number of complete alternating current cycles produced by the transmit oscillator per second. Measured in cycles per second.

Ground Balance - Factory Preset: A feature which eliminates the manual ground balance control and its adjustment from the operator's setup procedure. This adjustment is performed internally by the factory to optimize operation over an average range on nonconductive soils.

Ground Balance - Manual Adjusted: A feature requiring a manual control adjustment procedure to neutralize the effects of negative minerals in the search matrix.

Ground Balance - Self Adjusting: A feature which senses change in ground mineral content and continuously readjusts the ground balance while in operation. Sometimes called Ground Tracking or Automatic Ground Balance.

Ground Balance: A state of operation using specialized circuitry to ignore the masking effect that iron ground minerals have over metal targets.

Ground Filter: Complex circuitry found in motion-type detectors which separates mineral signal from the metal signal allowing it to be further processed by the discrimination circuitry.

HALO: A geological soil condition manifesting an effect known as "Metallurgical Phenomenon". A metallic halo is generated over time by the combination of acids and water in the soil leaching minute particles off a metal target into the surrounding soil.

Hand Held: A metal detector configuration whereby the operator holds a shaft or handle which supports the search coil and control housing. Also called pole mount.

Head: See Search coil

HF: High Frequency = 3 to 30 MHz

Hip Mount: See Body Mount.

Hot Rock: A rock which contains a higher concentration of nonconductive ground minerals than the surrounding matrix to which the detector is balanced. A metallic (positive) response will be heard in the motion and non-motion modes and a null or negative drop in threshold is heard in the all-metal, ground balance mode over these rocks.

Hz or Hertz: Cycles per second. See also Frequency.

INDUCTANCE: An object that conducts electricity easily (is inductive) is slow to react to changes in the current. You can think of inductance as a deep river: Change the amount of water flowing into the river and it takes some time before you see a difference.

IRON STONE: A rock heavily laced with iron.

Isolator: A nonmetal stem which attaches the search coil to the control shaft eliminating metallic interference in the detection pattern. On some detectors, the entire lower shaft is made of a nonmetal substance.

kHz or Kilohertz: 1000 cycles per second. See also Frequency.

LCD or Liquid Crystal Display: Used on a metal detector as a graphic visual indicator same as a meter/needle indicator.

LED or Light Emitting Diode: A semi-conductor which produces an illuminated visual response.

LF: Low Frequency = 30 to 300 kHz

Loop: See Search coil

Matrix: Refers to the total volume of ground penetrated by the transmitted electromagnetic field--which may contain varying amounts and combinations of minerals, metals, salts and moisture.

Menu: A Series of listings and/or prompts on a visual display designed to aid the operator in feature or program selection.

Metal Detectorist: A person operating a metal detector in the field.

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Metal: Metallic substances such as iron, foil, nickel, aluminum, gold, brass, lead, copper, silver, etc.

Meter: A detector component that provides visual information to aid in target identification. Meters feature either an LCD or needle indicator which may display intensity of signal, target depth, target identification, type of metal, or battery condition.

MF: Medium Frequency = 300 to 3000 kHz

Mineral-Free Discriminator: Any metal detector that can reject or ignore trash metals while simultaneously balancing ground mineralization.

Mineralized Ground: Any soil that contains conductive or nonconductive components.

Mode: A condition of operation, selected by the operator, for specific desired function(s).

Motion Discriminator: A detector type that requires search coil motion to activate its simultaneous ground balance and discriminate functions. Se also Mineral-Free Discriminator and VLF/TR

Narrow Response: a target that produces an audio response so short that pinpointing is almost not needed.

Negative Ground: Soil that contains nonconductive minerals which have a negative or null effect on an air-tuned threshold.

Neutral Ground: Soil that has no nonconductive or conductive mineral properties. Lacks mineralization.

Ni-Cad or Nickel-Cadmium: A rechargeable type of battery cell.

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No-Motion: Refers to any mode of operation that does not require search coil motion to trigger target response. Also called non-motion.

Non-Ferrous: Not of iron. Metals of the precious class (i.e.. gold, silver, copper, etc.)

Notch Accept: Operation whereby all target responses are "tuned-out" except those the instrument is adjusted to accept in the notch "window".

Notch Discrimination: Filtering circuitry which allows a "window" of desirable targets to be accepted within the entire rejection range of unaccepted targets, i.e. rejecting nails, foil and pulltabs while accepting nickels and gold rings of the same conductivity. This circuitry can also be adjusted to reject all metal targets while accepting only a specific conductivity range.

Notch Level: a control used to select the target level or target conductivity which the notch filter will act upon.

Notch Reject: Operation whereby all targets within the notch width at chosen notch level will be "tuned-out".

Notch Width: a finite discrimination range of target conductivities ("window") at the chosen notch level.

Null: The zone just below audible threshold in metal detector tuning. This also refers to the momentary drop or quiet response of threshold sound as the search coil passes over a discriminated or rejected target.

Overlap: The amount of search coil swing advance not greater than the search coil's physical diameter.

Overload: A situation in which too much information is coming too quickly for circuitry to discern and react. Can occur when sensitivity settings are too high for ground conditions or detector settings as they are. Can also be caused by targets being too large (buried car), too close (base of steel light pole) or too conductive (high power lines or another detector).

Overshoot: A common false signal heard as the search coil passes over a rejected target when using a no-motion All Metal mode in conjunction with automatic retuning.

excessive tuning restoration pushes the audio above threshold level creating a positive response at the edges of target detection periphery.

Phase Response: The length of time between eddy current generation sustained on a metal's surface and the resultant secondary electromagnetic field effect on the search coil's receive winding. Related to target conductivity.

PI or Pulse Induction: A mode of operation where the transmitter circuit pulses and electrical current into the ground before it quickly shuts down. The eddy currents dissipate immediately from poor conductors such as wet salt sand and ground minerals. Metals hold eddy currents because they are better conductors. When the receiver circuit comes on, it picks up the returning signal from metal; the eddy currents in the ground minerals have already disappeared.

Pinpointing: Finding the exact target location with respect to a search coil's designated center. Accomplished by interpreting the centers of audio response width in perpendicular direction or scans. See also Detuning.

Positive Ground: Soil which contains conductive minerals or moist salts which have a positive or upward effect on an air-tuned threshold.

Pulse Induction or PI: A mode of operation where the transmitter coil circuit sends short powerful bursts (pulses) of current into the ground just before it quickly shuts down. Each pulse generates a brief magnetic field. When the pulse ends, the magnetic field reverses polarity and collapses very suddenly, resulting in a sharp electrical spike. This spike lasts a few microseconds (millionths of a second) and causes another current to run through the coil. This current is called the reflected pulse and is extremely short, lasting only about 30 microseconds. The eddy currents dissipate immediately from poor conductors such as wet salt sand and ground minerals. Precious metals hold eddy currents because they are better conductors. When the receiver circuit quickly comes back on, it picks up the returning signal from metal; the eddy currents in the ground minerals have already disappeared in this short time. Unlike VLF, PI detectors may use a single coil as both transmitter and receiver, or they may have two or even three coils working together. PI detectors have poor discrimination but work better than VLF detectors in salt-water and can find very deep metals better

Quick Response: A short time period between metal target sensing and a peak audio/visual indicator appearing. Usually associated with all frequency ranges of TR detectors. See RECOVERY SPEED.

Quick Response: A short time period between metal sensing and peak audio/visual indicator indication usually associated with all frequency ranges of TR detectors.

Receiver Coil: On a VLF metal detector this is the inner coil loop contains another coil of wire. This wire acts as an antenna to pick up and amplify frequencies coming from target objects in the ground.

Rejection: an indication of target non-acceptance by a null in threshold or broken sound while operating in a discriminate mode.

Relic Hunting: Searching for items of historical value, such as weapons, ammunition, tools, or buttons used in a war.

Resistance: An object that does not conduct electricity easily (resistive) is quick to react to changes in the current. Using a water analogy, resistance would be a small, shallow stream: Change the amount of water flowing into the stream and you notice a drop in the water level very quickly. See INDUCTANCE for contrast.

RF-Two Box: A radio frequency detector having its own transmit and receive winding separate and in an orthogonal configuration. This detector is capable of deep large object detection while naturally ignoring small targets such as nails and individual coins.

Scan: Refers to 1) the effective search coil detection width or 2) search coil movement over the ground.

Scrubbing: The search coil is pressed and held in contact with the ground while searching to maintain even audio threshold. With newer detectors, this technique is used to gain depth.

Scuff Cover: A protective cover for the search coil bottom. Also called coil cover or skid plate.

search coil Cable: An electrostatically shielded cable of conductors (wires) which convey signals to and from the search coil and control housing.

search coil: A circular (or other shaped) plastic housing containing single or multiple transmit and receive windings (wire coils) in a specific configuration. A search coil emits and receives signals from the ground and metal targets. Also called loop, coil or head.

Sensitivity: The capacity of a metal detector to perceive changes in conductivity within the detection pattern. Generally, the more sensitivity a detector can smoothly provide, the more depth it will achieve in sensing targets.

Signal Width: The total distance of ground an audio signal is sustained during search coil travel or scan.

Signal: An audio response or visual indication alerting the operator that a target has been detected.

Silent Search: Refers to detectors capable of producing a target signal while operating below the threshold audio. Also called silent operation.

Slow Motion: A description of search coil speed required to operate the motion discriminate mode.

Stability: The ability of a metal detector to maintain manually adjusted tuning threshold under the effects of outside interference. See also Drift.

Surface Area: Refers to the area of a target closest to the search coil where eddy current generation can take place.

Surface Mount: The art of mounting electronic components on the surface of a printed circuit board rather than using the "through board" method. This allows more technology in a much smaller space and with much higher tolerances.

Sweep: The motion employed in moving the search coil across the ground.

Target Masking: When large sizes or high concentrations of trash metals drive the threshold into the null zone suppressing weaker, positive responses from deeper or smaller targets.

Target Response: See Signal.

Target: Refers to any object that causes an audio or visual response in a detector.

Ten-Turn: A control which can be manually rotated ten times to cover the full electrical range of the function. Usually associated with tuning or ground balance function.

Test Garden: A mapped plot of buried targets intentionally planted at various depths to aid in learning characteristic target responses and in comparing metal detector performances under a given ground mineral content. Also called test plot or test bed. (NOTE: Due to an effect known as “Metallurgical Phenomenon” or “halo” newly buried coins are difficult to detect. If you bury them deep don’t expect to locate them for a while until they have had time to react with the acids in the soil and form an electromagnetic halo.)

Test Garden: A mapped plot of buried targets at various depths to aid in learning characteristic target responses and in comparing metal detector performances under a given ground mineral content. Also called test plot or test bed.

TH'er, TH'ing: Universal word contractions for treasure hunter and treasure hunting. Also know as Metal Detectorist.

Threshold: Continuous tone that establishes a reference point for tuning the detector to ground balance it. The threshold tone also establishes the minimum sound level for deep targets in the discriminate mode.

Tone ID: Circuitry producing different audio tones for each target's conductivity range, i.e., low tone for nickel, high tone for coins.

TR or Transmitter-Receiver: Term describing method of operation of early detectors. Some manufacturers still product this type of detector. Electromagnetic field distortion

caused by mineralized ground interferes with depth penetration as this type of detector does not ground compensate. It does balance conductive salt water effects so, it is primarily used in salt water and on low mineral salt water beaches or low mineral inland locations.

Transmitter Coil: On a VLF metal detector this is the outer coil loop of the search coil. Within it is a coil of wire. Electricity is sent along this wire, first in one direction and then in the other, thousands of times each second (measured as kHz) to produce an electromagnetic eddy on metallic targets in the soil. See FREQUENCY.

Transmitter-Receiver / TR: Term describing method of operation of early or primitive detectors. Some manufacturers still produce this type of detector. Electromagnetic field distortion caused by mineralized ground interferes with depth penetration as this type of detector does not ground compensate. It does balance conductive salt-water effects so; it is primarily used in salt water and on low mineral salt-water beaches or low mineral inland locations.

Treasure Hunting: A sub-group of the broader metal detecting hobby, it's using historical, biographical, geographical, topographical, geological and even genealogical research to locate and then (utilizing a metal detector) find: caches of gold, silver or anything else thought to have been hidden or lost.

V.D.I: Visual Display Image

VGI: A Visual Graphic Image. See VISUAL ID.

Visual ID: A feature in which a visual indication is produced to help identify the target.

Visual Indicator: A meter, LCD or LED that signals a target's presence.

VLF or Very Low Frequency: See Frequency.

VLF- Very Low Frequency = 3 to 30 kHz

VLF/DISC: Term associated with detectors capable of mineral-free operation in both Discriminate and All Metal modes.

VLF/TR: A class of detector that can operate in both the All Metal, Ground Balance mode and the No-Motion Discriminate, Non-Ground Balance mode.

Wide Response: A target that produces an audio signal over an area wider than the search coil diameter.

Wide Scan: A coplanar search coil with two "D" shaped transmit and receive windings positioned back to back and overlapping. This search coil type is capable of detecting a target across at least its full diameter. Also called Double-D, 2-D or DD.

Zero Discrimination: Used to describe detectors whose discrimination control allows the acceptance of all metals at zero setting.