MIQDASH BETHEL COVENANT INSTITUTION

STUDY REPORT

Gold and Silver by "Frequency"

Is There a Machine That Finds Gold or Silver by Its Frequency? What Works, What Does Not, and Why

November 6, 2026

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THE SHORT ANSWER

Yes and no. Real machines that use frequency to find gold and silver exist and work every day: the ordinary **VLF (very low frequency) metal detector**, the **pulse induction** detector, **geophysical survey instruments** used by mining companies, and the **XRF analyzer** that identifies a metal by its characteristic X-rays.

But none of them works the way the "frequency" sellers describe. Gold and silver do not give off a frequency of their own that can be picked up from a distance. A detector has to send energy *into* the metal and read what comes back, and that return signal fades so fast with distance that real detectors work from a few inches out to a few feet, not hundreds of meters.

The devices sold as **"long range locators"** (LRLs) that claim to tune to "the frequency of gold" and point to it from hundreds or thousands of meters have never passed a blind test. The same family of devices, sold as drug and bomb finders, was declared a fraud by the FBI in 1996 and led to a 10-year prison sentence in Britain in 2013.

I. WHAT "FREQUENCY" MEANS FOR A METAL

A frequency is how many times per second something repeats: a wave, a vibration, an alternating current. Gold and silver sitting in the ground are **passive**. They do not hum, glow, or broadcast. A buried nugget at earth temperature puts out no signal that sets it apart from the rock around it. Everything a real instrument learns about a metal, it learns by **sending energy in and measuring the response**.

That said, gold and silver do have real physical "fingerprints," and several of them involve frequency. The table below lists the ones that are real, how they are measured, and the distance at which they work.

Fingerprint	What it is	Measured by	Working distance
Electrical conductivity	How easily current flows. Silver is the best conductor of all metals (about 63 million siemens per meter); gold is about 41 million. A metal detector reads this through the eddy currents it creates.	VLF and pulse induction metal detectors	Inches to a few feet
Eddy-current "time constant"	How long the currents induced in a piece of metal take to die away. It depends on conductivity times size squared, so a big silver coin and a tiny gold flake answer very differently.	Phase (VLF) or decay time (pulse induction)	Inches to a few feet
Characteristic X-rays	When struck by X-rays, each element gives back X-rays of its own exact energies. Gold: about 9.71 keV (L-line) and 68.8 keV (K-line). Silver: about 22.16 keV (K-line). These are true atomic "frequencies," unique to each element.	XRF analyzer	Touching or within about an inch
Nuclear magnetic resonance	Atomic nuclei spin at set frequencies inside a strong magnet. Silver's nuclei can be read this way in a lab; gold's nucleus (gold-197) is one of the hardest in the periodic table to read at all.	Laboratory NMR spectrometer	Sample inside the magnet
Color (light)	Gold's yellow color comes from how its electrons absorb blue light. Tiny gold particles absorb near 520 nanometers and look red.	Eyes, spectrometer	Line of sight, surface only

Key point: every real "frequency fingerprint" of gold or silver must be *excited* by the instrument and works only at close range or on a sample in hand. There is no known frequency that gold or silver gives off by itself that can be detected across a field or a mountainside.

II. MACHINES THAT REALLY FIND GOLD AND SILVER BY FREQUENCY

II-A. The VLF Metal Detector

The VLF (very low frequency) detector is the common metal detector. A transmit coil carries an alternating current, typically somewhere from about 3 kHz to 70 kHz or more. Its magnetic field reaches into the ground and induces **eddy currents** in any metal it meets. Those currents make a small magnetic field of their own, and a second (receive) coil picks it up. The electronics compare the returning signal with what was sent. The amount of delay, called the **phase shift**, tells the machine roughly how conductive and how large the target is, and the machine turns that into a tone and a target ID number.

Here is where frequency truly matters, and where the honest version of the "gold frequency" idea lives. Detector makers and experienced users agree on a simple rule: lower frequencies respond better to highly conductive targets, and higher frequencies respond better to low-conductive targets. Kellyco, a large U.S. detector retailer, puts silver and large iron in the first group, and small gold such as stud earrings or tiny nuggets in the second.

- **Gold prospecting:** specialized gold detectors run high, roughly 45 kHz to 71 kHz, because they are more sensitive to small nuggets and flakes.
- **Silver coins and relics:** lower frequencies (single digits to low teens of kHz) reach deeper on large, highly conductive silver and copper targets.
- **Multi-frequency machines:** many modern detectors transmit several frequencies at once so one machine covers both kinds of targets.

A correction to a common forum claim: pure gold is *not* a poor conductor. It is the third-best common conductor, after silver and copper. Gold *reads* low on a detector because natural nuggets are usually small and alloyed with silver and other metals, and jewelry is alloyed too. What the detector really reads is conductivity **and size together**. That is why one setting cannot pick out "gold" as such: a small gold ring, a pull-tab, and a piece of foil can all read in the same range.

The trade-off: high frequencies are also much more sensitive to mineralized ground (iron-rich soil and hot rocks), so gold machines need careful **ground balancing**.

II-B. The Pulse Induction (PI) Detector

A pulse induction detector sends short, powerful bursts of current through its coil instead of a steady wave. Between bursts it listens to how long the eddy currents in the ground take to die away. Metal holds those currents longer than soil does. PI machines ignore most ground mineralization, reach

deeper, and are the workhorse of serious nugget hunters in heavily mineralized goldfields. Their weakness is that they tell iron from gold poorly, so the user digs more trash.

II-C. Why Real Detectors Have Short Range

This is the physics that settles the long-range question. A detector coil's magnetic field weakens with the **cube of distance** on the way out to the target, and the target's answering field weakens with the **cube of distance** again on the way back. Together the signal falls off roughly with the **sixth power** of distance. Double the distance and the signal drops to about 1/64. Go from 1 meter to 10 meters and it drops a million times. Go from 1 meter to 1,000 meters and it drops by a factor of 10 to the 18th power (a billion billion).

That is why a coin-sized target is usually found at depths on the order of the coil's diameter (inches to about a foot or so), and why even a large cache or a pot of coins is only found a few feet down. No amount of tuning to a "special frequency" overcomes this falloff; it is a property of the magnetic field itself.

II-D. What Mining Companies Use: Geophysical Surveys

Companies searching for gold ore do use frequency-based instruments, but they do not detect gold directly. Gold in ore is usually present in tiny amounts, often a few grams per ton. Instead, geophysics maps the **rocks and minerals that travel with gold**:

- **Induced polarization (IP) and resistivity:** current is pushed into the ground and the "charge-up" of sulfide minerals (such as pyrite, which often carries gold) is measured. A U.S. Geological Survey study at the Haile gold mine in South Carolina used IP and found its readings tracked the silica and pyrite content of the gold-bearing rock.
- **Magnetic surveys:** map faults, intrusions, and altered rock that control where gold veins form.
- **Electromagnetic methods (VLF-EM, time-domain EM, CSAMT):** map conductive and resistive zones; used, for example, in Nevada exploration for bulk gold deposits.

These surveys point to *where to drill*. The gold itself is confirmed only by drilling and laboratory assay.

II-E. Identifying Gold and Silver in Hand: XRF

An X-ray fluorescence (XRF) analyzer fires X-rays at a sample, and each element in the sample answers with its own characteristic X-rays, which Thermo Fisher describes as each element's "unique fingerprints." Handheld XRF units read gold, silver, platinum, and palladium content in seconds without damaging the piece. They are used by pawn shops, refiners, and even gold-mine laboratories as a fast screening tool alongside fire assay. This is the one machine that truly identifies gold and silver by

an element-specific "frequency," but it must be pointed at the surface of the sample itself; it cannot see underground.

III. THE "LONG RANGE LOCATORS": WHAT THEY CLAIM

A whole market sells devices that claim to do exactly what the question asks: find gold or silver by its frequency, from far away. Their claims, taken from their own manuals and sales pages:

- The GDI **Gold X-Finder** is advertised as a "digital, ionic long range locator" with 10 factory frequency modes for gold, silver, iron, lead, aluminum, copper, bronze, diamonds, water, and caves, tuned between 0 and 20,000 Hz.
- Its sales page tells buyers to use a gold sample as "bait" and roll through frequencies until the locator reacts only to it, and warns *not* to test it on unburied or freshly buried metal, because it supposedly detects "ionization fields" around long-buried metal.
- The **Rayfinder** manual claims frequency accuracy down to 0.1 Hz and a detection range that can be set from 300 to 2,100 meters.
- The X-Finder manual says the operator holds the antenna balanced by its handle and feels "a weak hesitation of the antenna" as it swings past the target direction.

Notice what is being described: a rod or antenna that swings in the operator's hand. That is the same thing as a dowsing rod with a battery box added. Some long-range locators have no internal power at all and are advertised as powered by the body or by static electricity.

Notice also the instruction not to test on freshly buried metal. That rule makes the device impossible to test fairly, because a fair test requires someone to bury a known target in a place the operator does not know.

IV. WHAT THE TESTS AND THE COURTS FOUND

IV-A. The Same Device Family, Sold to Police and Armies

The long-range locator idea (a swinging antenna that "tunes" to a substance) was sold for decades as a drug, weapon, and bomb detector. The record is clear:

Device	What happened
Quadro Tracker (USA, 1993–96)	Advertised to find drugs, weapons, explosives, missing people, precious metals, and golf balls. The FBI Laboratory and Sandia National Laboratories examined it and found it contained no electronics at all. In 1996 the FBI warned police nationwide it was a fraud, and a federal court enjoined its manufacture and sale. (Its officers were later acquitted of mail fraud by a jury.) Notably, the case began with an FBI agent in Beaumont, Texas, and Louisiana and southeast Texas agencies had bought units.
MOLE (UK, 2002)	Sandia ran a double-blind test with a hidden explosive sample. Chance alone would get about 5 of 20 right; the MOLE got 6 of 20, which Sandia judged to be no better than random guessing. When the operator could see where the sample was hidden, it scored perfectly; once the test went double-blind, the skill vanished.
ADE 651 (UK/Iraq, 2007–13)	Built from a cheap novelty golf-ball finder and sold for up to $40,000 each, mostly to Iraq. Experts testified it had no grounding in science. James McCormick was convicted of fraud at the Old Bailey in April 2013 and sentenced to 10 years; the judge said he had blood on his hands.

These are not gold detectors, but they are the same design and the same claimed principle: pick a substance, "tune" to it, and follow the swinging antenna. When one was tested blind, it failed.

IV-B. Gold Locators Specifically

- The general scientific assessment summarized in reference works is that the resonance principle LRLs claim has no scientific support and the devices have not worked in blind testing.
- On TreasureNet, the largest treasure-hunting forum, an LRL owner using a gold setting reported that he and another user got the same strong signal from rusted iron and brass as from gold.
- On the same forum, a detector engineer wrote that he had offered $25,000 to anyone who could pass a simple scientific test with an LRL, and in 20 years no one had succeeded. (This is one person's statement; it is consistent with the formal tests above.)

IV-C. Why the Rods Move: The Ideomotor Effect

The operators are usually honest. The antenna or rods really do swing. The cause is the **ideomotor effect**, first described by the physiologist William Carpenter in 1852: tiny muscle movements a person makes without knowing it, driven by expectation. A rod balanced on a pivot magnifies these movements. When the operator knows or suspects where the target is, the rod "finds" it. When the test is double-blind and no one present knows, the rod does no better than chance. That is exactly the pattern Sandia recorded with the MOLE.

V. COULD SUCH A MACHINE BE BUILT?

A real detector, yes. VLF and pulse induction detectors are straightforward electronics: an oscillator or pulse driver, a coil, a receive amplifier, and a comparison circuit. Hobbyist designs and kits for both kinds exist, and anyone with an electronics background can build a working one. Changing the transmit frequency changes what kinds of targets it favors, exactly as described in Section II.

A machine that tunes to gold's own frequency and points to it from a distance, no. Not because no one has had the right idea, but because of three hard facts:

- Gold and silver emit no signal of their own that a field instrument can pick up.
- The eddy-current response of a metal is broad, not a sharp "resonance" at one magic number like 5,000 Hz. Gold, brass, and aluminum overlap.
- Any induced signal fades with roughly the sixth power of distance, so range is measured in feet, not meters or kilometers.

The one place gold has a sharp, element-specific frequency (its characteristic X-rays) requires the instrument to be essentially touching the metal.

V-A. How to Test Any "Frequency" Gold Finder Before Buying

If anyone offers a long-range or frequency gold finder, a simple fair test settles it in an afternoon:

Step	What to do
1	Get 10 identical small boxes or holes, spaced well apart. One person (the "hider") puts a gold or silver piece in one, chosen by dice roll, and records it secretly.
2	The hider leaves. A second person who does *not* know the answer walks the operator to the test area. This makes it double-blind: no one present can give a cue.
3	The operator uses the device and names one location. Repeat 20 times, re-randomizing each time.
4	By chance alone the operator will be right about 2 times in 20. A working device should be right nearly every time. Anything near 2 to 4 is guessing.
5	Agree on the rules in writing before the test, including the burial time the seller says is needed, so the result cannot be explained away afterward.

VI. PRACTICAL GUIDANCE FOR FINDING GOLD AND SILVER

- **For gold nuggets:** a high-frequency VLF (roughly 45–71 kHz) for small, shallow gold, or a pulse induction machine for deeper gold in mineralized ground. Use a small coil for tiny gold and work slowly; go where gold has already been found (old placer districts, known lode areas).
- **For silver coins and relics:** a lower-frequency or multi-frequency VLF with good discrimination.
- **To check a find or a purchase:** have it tested by XRF at a coin shop, jeweler, or refiner, or sent for assay.
- **Before digging anywhere:** confirm you have the landowner's permission and that the land is open to detecting; many parks, historic sites, and public lands restrict or forbid it.
- **Before spending money:** be wary of any device sold by "frequency," "ionic," "molecular," or "resonance" claims with ranges of hundreds of meters, especially one that swings in the hand or must not be tested on freshly buried metal.

VII. FINDINGS

Finding	Grade
Detectors use transmit frequency to favor certain targets; higher frequencies favor small gold, lower favor silver and large conductive targets.	Corroborated (manufacturers, retailers, engineering forums)
Gold and silver have real element-specific "frequencies" (characteristic X-rays) that identify them, measurable only at contact range.	Corroborated (XRF manufacturers, physics)
Gold and silver emit a detectable frequency of their own that can be picked up from a distance.	Not supported (no physical basis; not demonstrated)
Long-range "frequency" locators find gold or silver at hundreds of meters.	Not supported (no blind-test success; related devices declared fraudulent)
Devices of the same design sold as substance detectors failed double-blind testing and were declared fraudulent.	Corroborated (FBI, Sandia, UK courts)
The swinging of LRL rods is caused by the ideomotor effect.	Corroborated (consistent with blind-test pattern; long-established psychology)

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