pulseEKKO®

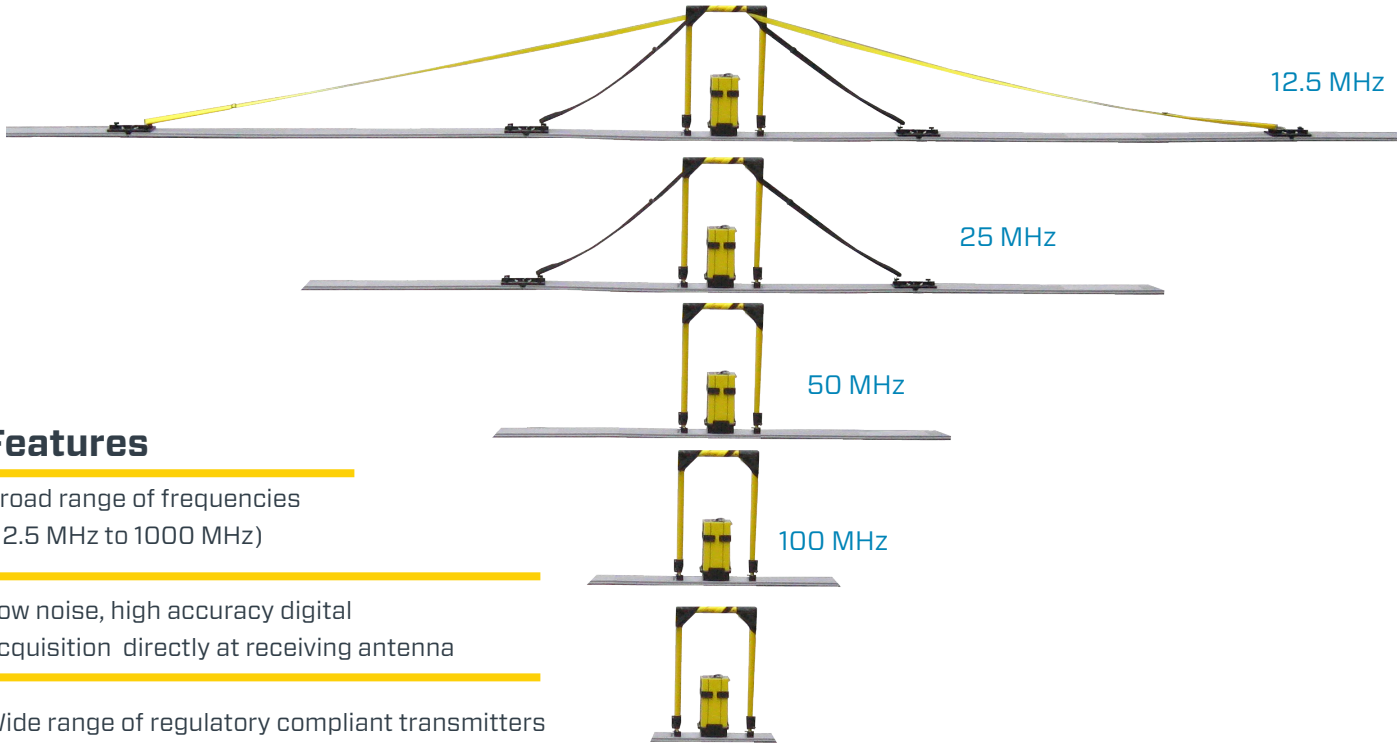
FOR THE GPR PROFESSIONAL



Sensors & Software

pulseEKKO

Unparalleled performance with a wide range of frequencies for applications ranging from deep mineral exploration and glaciology to high resolution geotechnical investigations and concrete imaging.



Features

Broad range of frequencies (12.5 MHz to 1000 MHz)

Low noise, high accuracy digital acquisition directly at receiving antenna

Wide range of regulatory compliant transmitters

Computer controlled voltage and temperature-stabilized time and amplitude

Low power consumption

	Deep Geology Glaciology	Geology	Utilities, Geotechnical	Archaeology	Forensics, Snow + Ice	Mining, Quarrying	Concrete, Roads, Bridges
12.5 MHz	•						
25 MHz	•						
50 MHz	•	•					
100 MHz		•	•				
200 MHz		•					
250 MHz			•	•	•		
500 MHz				•	•		
1000 MHz						•	•



250 MHz



500 MHz



1000 MHz



TR 1000

Resistive Dipole Antenna

Center Frequency	Size	Weight
12.5 MHz	736 × 14 × 5 cm (290 × 5.5 × 2 in)	7.2 kg (15.9 lbs)
25 MHz	368 × 14 × 5 cm (145 × 5.5 × 2 in)	3.6 kg (7.9 lbs)
50 MHz	184 × 14 × 5 cm (72 × 5.5 × 2 in)	1.8 kg (4 lbs)
100 MHz	92 × 14 × 5 cm (36 × 5.5 × 2 in)	1.2 kg (2.6 lbs)
200 MHz	46 × 14 × 5 cm (18 × 5.5 × 2 in)	0.8 kg (1.8 lbs)

Resistive Dipole Transducer

Center Frequency	Size	Weight
250 MHz	38 × 38 × 20 cm (14.5 × 14.5 × 8 in)	3.0 kg (6.6 lbs)
500 MHz	23 × 23 × 17 cm (9 × 9 × 6.5 in)	1.2 kg (2.6 lbs)
1000 MHz bistatic	15 × 15 × 12 cm (6 × 6 × 5 in)	0.6 kg (1.3 lbs)
1000 MHz Tx-Rx Combined	19 × 13 × 15 cm (7.5 × 5 × 6 in)	1.0 kg (2.2 lbs)

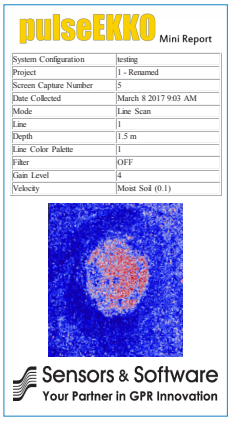
Flexible and efficient data collection

The digital video logger (DVL) has a high-resolution, sunlight visible, touchscreen and an intuitive user interface for efficient data-collection. Easily adjust survey parameters including survey type, antenna geometry, stacking and triggering to optimize your GPR survey.

Wi-Fi Enabled
Connect to a Wi-Fi network or hotspot to email reports from the field

Internal GPS
Geo-tag screen captures and grids for Google Earth™



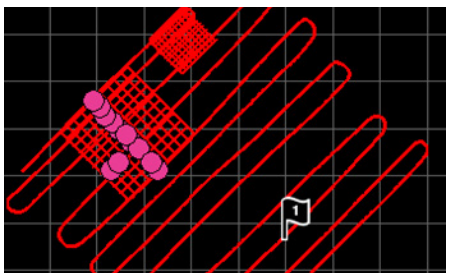


Optional External GPS
Serial port GPS connection for high accuracy positioning

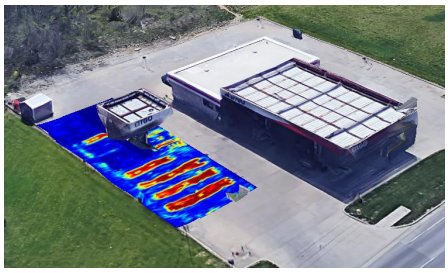
USB Data Transfer
Quickly transfer project data for further analysis

Color Field Interpretations
Mark targets at depth with the touch of a finger

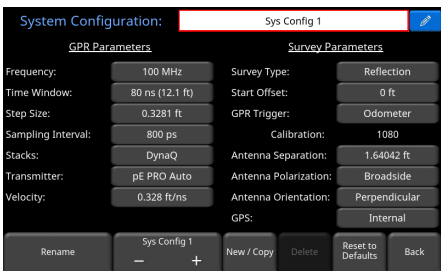
In-Field Depth Slicing
Flexible grid collection with immediate results



Map View
Using GPS, view a map of the GPS survey path, grids, field interpretations & flags.



EKKO_Project Software
EKKO_Project makes complex GPR analysis and reporting easy with intuitive tools to organize, edit, process & plot your data.



Save configurations
Easily setup, name and save multiple configurations on the DVL to increase efficiency in the field.

ADAPTABLE CONFIGURATIONS

Full Bistatic



Work in rough, poorly accessible areas.

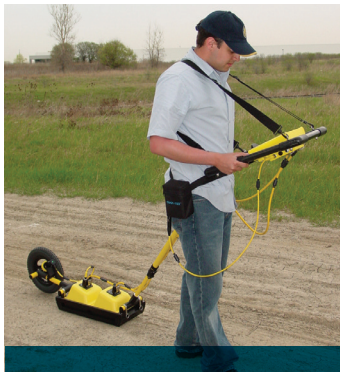
SmartCart



Fast surveying to cover large flat open areas.

Ergonomic deployment platforms. Quick release fasteners and interchangeable components enable rapid system reconfiguration. Integrated support for GPS, odometers and fiducial markers with triggering from a wide range of inputs provides accurate spatial positioning.

SmartTow



Rapid GPR profiling over smooth to moderately rough surfaces.

One-Man



Single person operation for surveying in moderate to rough terrain.

SmartChariot



Vehicle hitch-mounted; rapidly survey large, flat areas such as roads and golf courses

Product specifications

Control Module

- Time Window: 0.5 to 200,000 ns
- Points per Trace: 10 to 31,000
- Hardware Stacking: 1 to 32768
- Software Stacking: Unlimited
- Signal Enhancement: DynaQ
- Hardware Temporal Sampling Increment: 5 ps
- Sampling: Digital Equivalent Time Sampling (DETS)
- Pulse Repetition Frequency (PRF): up to 100 kHz
- Data Quality Assurance: Active temperature and supply voltage compensation
- Power Consumption: 100 mA @ 12V
- Temperature Range: -50 to +50 C

Transmitter

- Emission Regulation-Compliant Transmitters: FCC, ETSI (EU) and Industry Canada
- Power Consumption: 150 mA @ 12V
- Temperature Range: -50 to +50 C

Receiver

- Receiver Sensitivity: 1.5 V lsb
- Data Recording: 16 bit
- Power Consumption: 100 mA @ 12V
- Temperature Range: -50 to +50 C

System

- Maximum System Performance: 186 dB + 10*$\log_{10}$(#stacks) ex. 219 dB @ 2048 stacks
- Environmental: IP65
- Auxiliary Positioning: GPS, laser tracking

Regulatory Specifications

Complies with regulatory agency requirements for ultra-wideband equipment: FCC (Federal Communications Commission), Industry Canada and European Community (ETSI) standards.

ADVANCED SURVEY METHODS

pulseEKKO's bistatic antennas allow for variable antenna separations – ideal for CMP, WARR, multi-fold and transillumination surveys.

CMP

Common mid point (CMP) surveys for subsurface velocity measurements and seismic-style trace stacking.





WARR

Wide angle reflection and refraction (WARR) surveys.

Borehole

Subsurface measurements in boreholes.





Transillumination

Direct one-way transmission through an object to extract travel time, amplitude and dispersion information.

MULTI-CHANNEL SURVEYS

Multi-Frequency



Multi-channel array



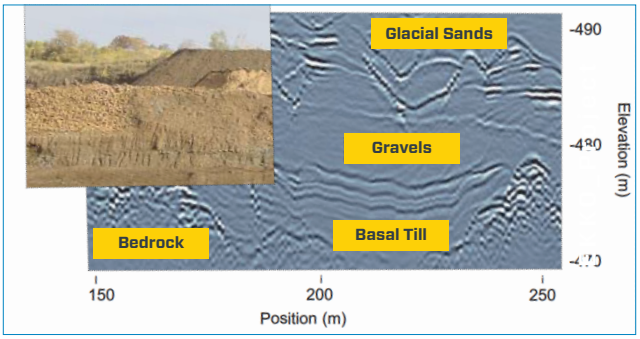
Multi-fold survey



APPLICATIONS

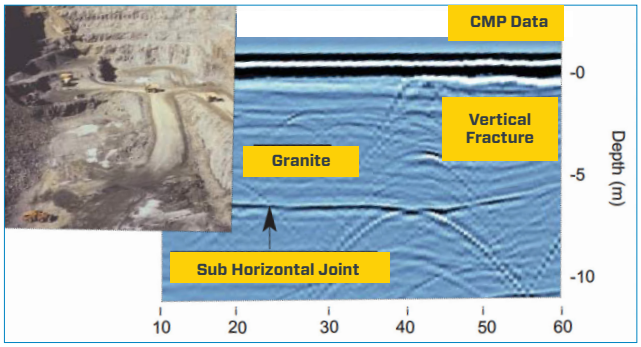
pulseEKKO applications include

GEOLOGICAL STRATIGRAPHY



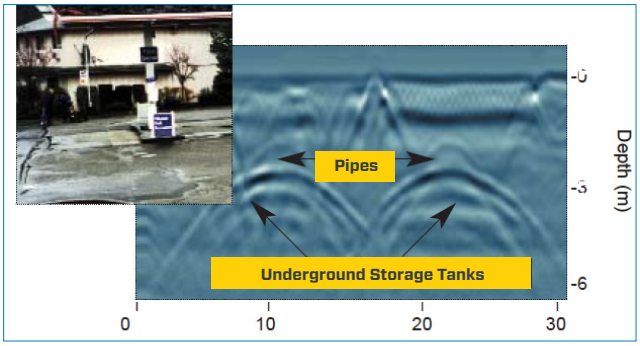
Profile subsurface stratigraphy and bedrock surface

MINING & QARRYING



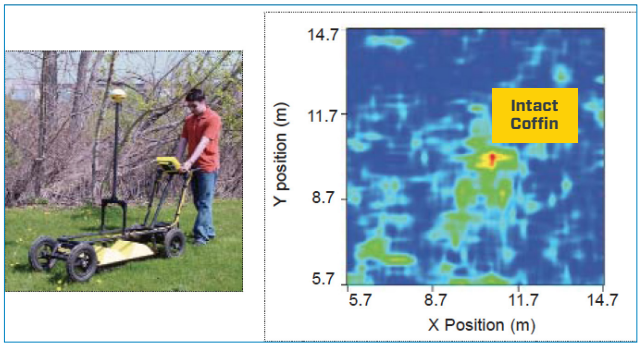
Detect changes in rock type, fractures, faults and joints for safety and resource development in underground mines.

GEOTECHNICAL & ENVIRONMENTAL



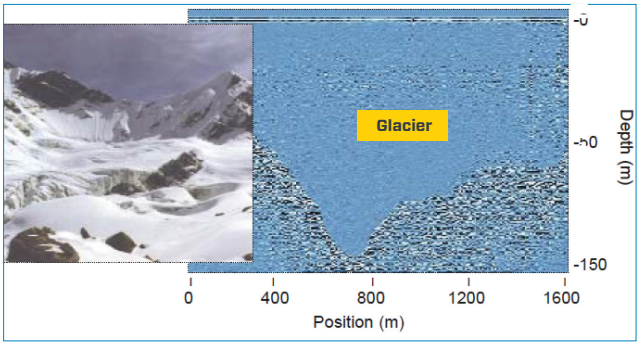
Map depth to bedrock, detect sinkholes, locate underground storage tanks (USTs). Drainage systems on golf courses and farms can also be located.

FORENSICS & ARCHAEOLOGY



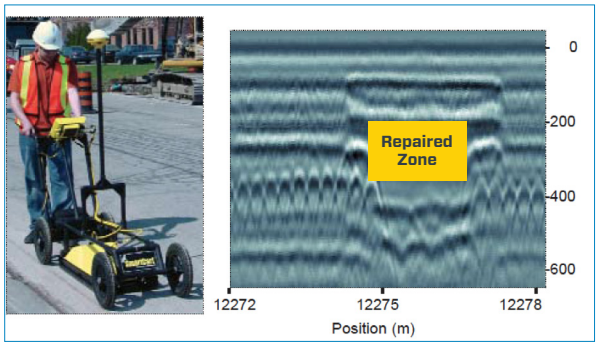
Law enforcement uncover buried caches of drugs, money, weapons and clandestine graves. Archaeologists image underground artifacts, tombs and the foundations of ancient structures.

GLACIOLOGY, ICE & SNOW



Measure ice thickness for winter road safety, snow depth, glaciological and polar ice-cap research.

STRUCTURE ASSESSMENT



Assess the interior of concrete and pavement for asset management and maintenance planning.

Subsurface imaging solutions

Sensors & Software Inc.

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pulseEKKO® Ultra Receiver

FOR THE GPR PROFESSIONAL



Ultra Depth
See more than twice as deep

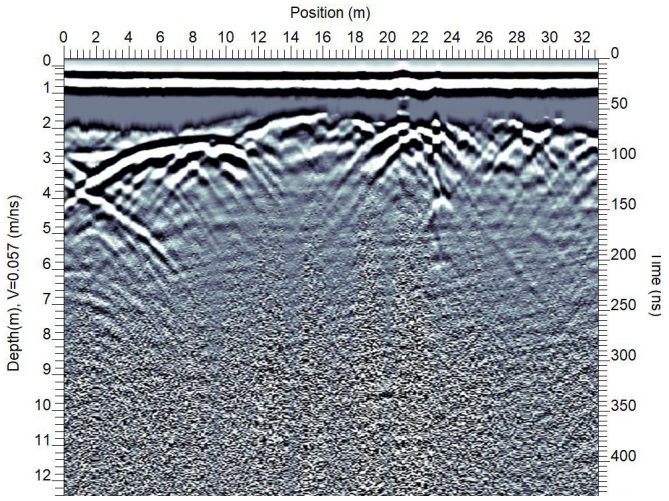
Ultra Detail
See weaker, deeper reflectors

Sensors & Software

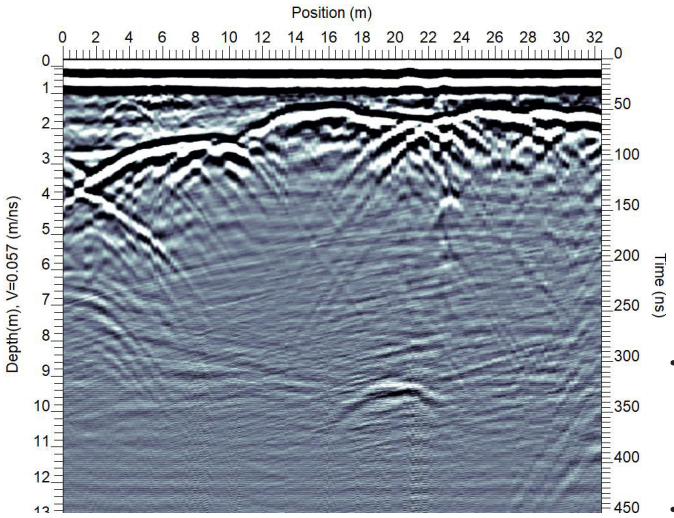
pulseEKKO

Ultra Receiver

Data Example 1

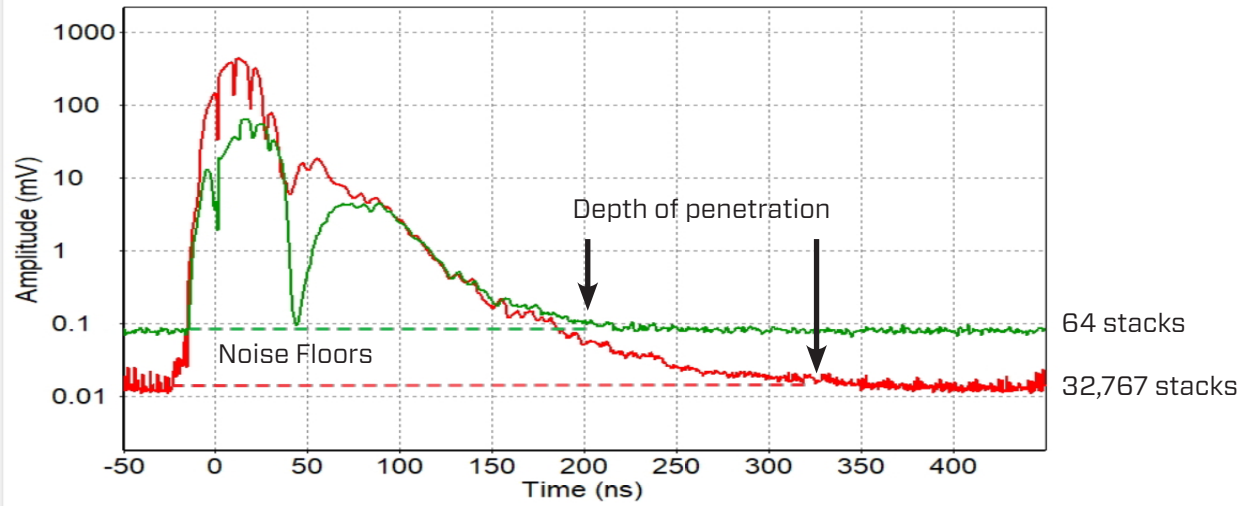


64 Stacks



32,767 Stacks

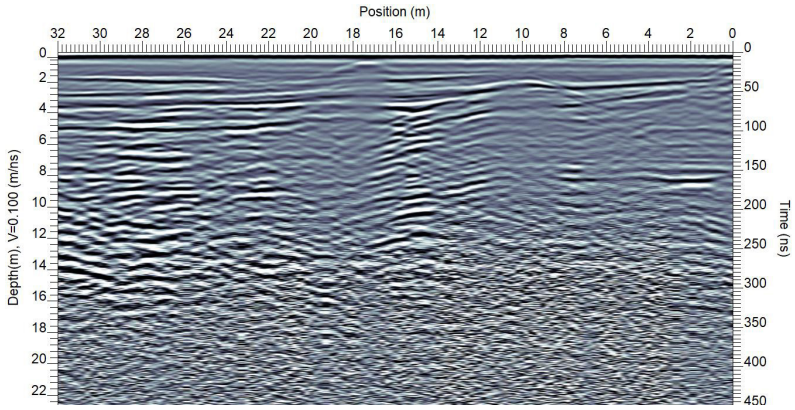
Deeper, weaker reflections



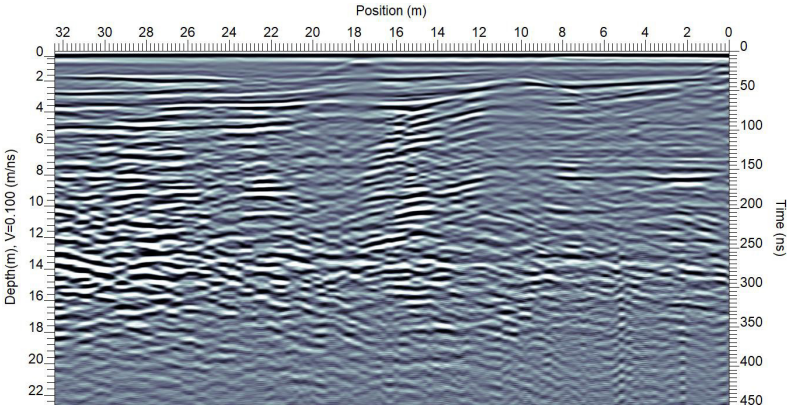
pulseEKKO

Ultra Receiver

Data Example 2

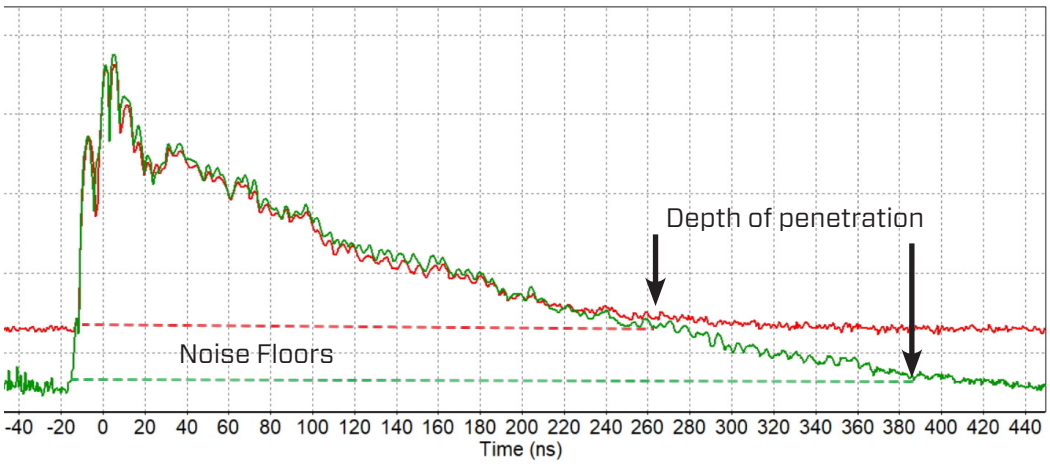


64 Stacks



8,192 Stacks

Deeper, weaker reflections



64 stacks

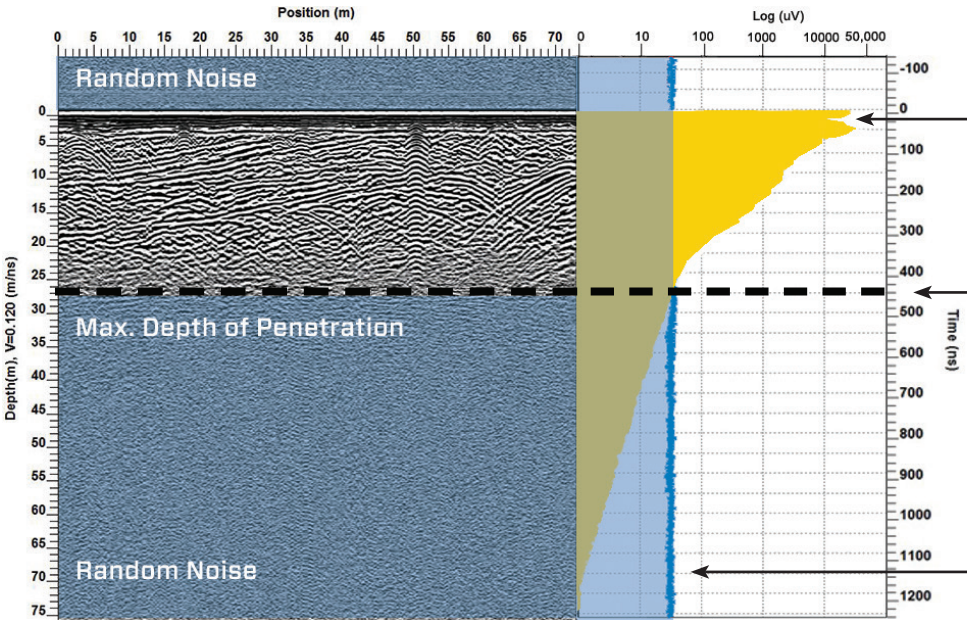
8,192 stacks

pulseEKKO

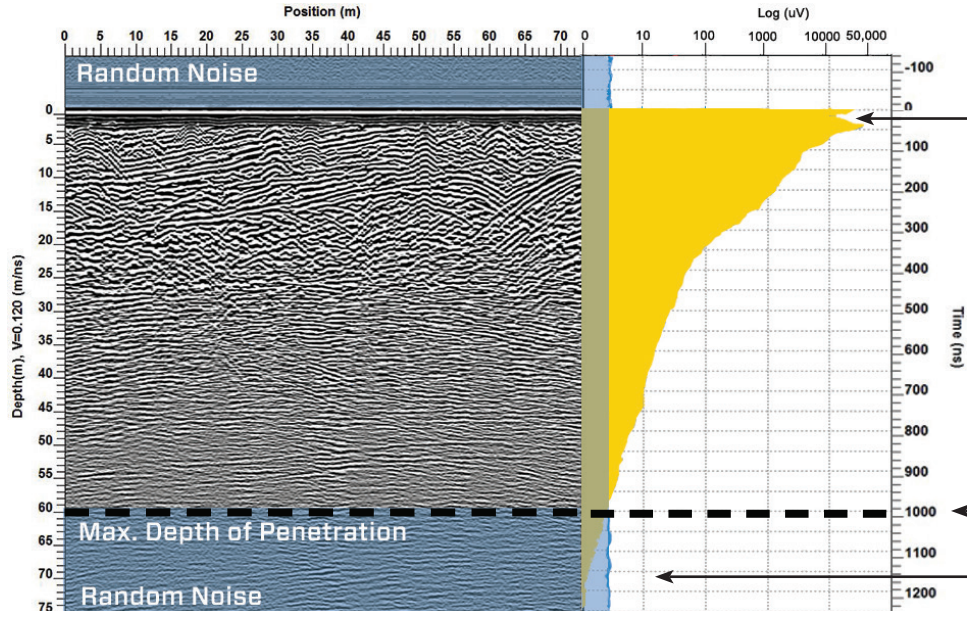
Ultra Receiver

The Ultra Receiver can stack GPR traces thousands, even as many as one million times, resulting in deeper GPR penetration than ever thought possible. This technology allows GPR professionals to see signals 100 times smaller than before, greatly increasing the imaging depth. This enhanced receiver performance overcomes the regulatory emission limits that currently constrain GPR exploration depth. With the highest data quality available in a GPR system, pulseEKKOs are uniquely suited to take full advantage of the Ultra Receiver's capabilities. See more and achieve more with the pulseEKKO Ultra Receiver.

pulseEKKO PRO Receiver Average trace amplitude (ATA) Plot



NEW pulseEKKO Ultra Receiver - More than double the depth of penetration



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Subsurface imaging solutions