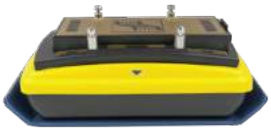
NOGGIN®

POWERFUL RESULTS FROM GPR MADE SIMPLE



Sensors & Software

NOGGIN

Quick, simple setup. Powerful, on-the-spot results

Noggin GPR systems offer unparalleled power and simplicity. Lightweight and easy to use, they offer everything from basic line scanning to advanced area mapping. Available in several operating bandwidths, Noggins span the depths and resolutions required for the most common subsurface investigations. A wide range of deployment configurations enable Noggins to be easily interchanged so you can leverage your initial investment to new applications.

High accuracy geo-referencing

Geo-tagging targets in reports and Google Earth™

High visibility screen

Configurable software to control data collection, display images in real time and save data for post-processing.

Cutting-edge ultrawide band GPR antennas

Ground-coupled for maximum signal penetration.

Rugged by design

Noggin systems are used worldwide in a wide range of environments, extreme temperatures,and weather conditions.

FLEXIBLE CONFIGURATIONS

High performance, lightweight and easy-to-use subsurface imaging instruments

Configurations

Noggins can be deployed in several configurations to reduce setup time and allow for rapid surveying. Select from a variety of deployment platforms that combine with the real-time DVL display to deliver the results you need to get the job done. In addition to single channel deployment, Noggins can be configured into multi-channel arrays using the SPIDAR architecture.

SmartHandle

Operate on vertical or overhead surfaces and in confined spaces.

SmartCart

A rugged, non-metallic, 4-wheeled cart to quickly cover large open areas.

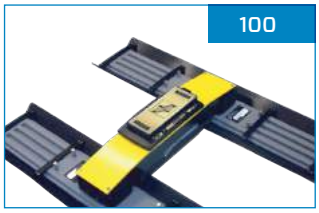
SmartTow

Large wheel odometer for rough terrain or a small wheel odometer for smooth areas like concrete floors.

SmartChariot

Attaches to any vehicle with a hitch to quickly survey large areas of roads or other smooth surfaces.

INCREASE PENETRATION



INCREASE RESOLUTION

Collect GPR data on lines or grids. Grids enable 2D depth slice maps and 3D visualization

Exceptional bandwidth and signal fidelity offer an excellent combination of resolution and penetration

Image deep and shallow targets simultaneously

Product specifications

Specs	Noggin 100	Noggin 250	Noggin 500	Noggin 1000
Size	91 x 76 x 17 cm (36 x 30 x 6.5 in)	63 x 41 x 23 cm (25 x 16 x 9 in)	38 x 23 x 15 cm (15 x 9 x 6 in)	30 x 15 x 11 cm (12 x 6 x 4.5 in)
Weight	9.5 kg (21 lbs)	5.7 kg (12.5 lbs)	3 kg (6.5 lbs)	2.3 kg (5 lbs)
Transducer: Center Frequency & - 3dB Bandwidth	100 MHz 50 - 150 MHz	250 MHz 125 - 375 MHz	500 MHz 250 - 750 MHz	1000 MHz 500 - 1500 MHz
Shielding Front to Back	Uses ground coupled focusing	>20dB	>20dB	>20dB
Maximum Time Window*	20,800 ns @ 0.8 ns/pt	10,400 ns @ 0.4 ns/pt	5200 ns @ 0.2 ns/pt	2600 ns @ 0.1 ns/pt
Maximum Depth Setting* (@ Velocity = 0.1 m/ns)	1040m	520m	260m	130m

Additional Specifications

Maximum Points/Trace* 26,000
Power 8 watts 12V @ 0.6A DC
Performance Factor 160 dB + 10 $\log_{10}N$ ex: for 2048 stacks are 193 dB
Acquisition Rate* 100,000 samples/second
Locate & Mark Output Digital image in .LMN Format
Survey & Map Output Digital (raw) 16 bit 2's complement
Stacks (N) Unlimited
DynaQ Yes
Integrated GPS Point mark or continuous NMEA string logging
Operating Temperature -50 to +50°C
Environmental IP65

* Determined by the computer software controlling data acquisition. DVL specifications indicated here. Noggins complies with the Industry Canada (IC), United States Federal Communications Commission (FCC), and European Technical Standards Institute (ETSI) Regulations for ultra-wide bandwidth (UWB) devices.

APPLICATIONS

Ground-coupled antennas for maximum signal penetration

ARCHAEOLOGY

GPR is used by professional archaeologists worldwide to image underground artifacts, tombs and the foundations of ancient structures.

CONCRETE & PAVEMENT ASSESSMENT

GPR is widely used to assess the interior of concrete and pavement for asset management and maintenance planning.

FORENSICS

Law enforcement personnel regularly use GPR to uncover buried caches of drugs, money and weapons, and to locate clandestine graves.

ICE & SNOW

Applications for GPR include ice thickness for winter road safety, snow depth, location of avalanche victims, and glaciological and polar ice-cap research.

MINING & QUARRYING

GPR has been adopted by underground mines for safety and resource development. GPR detects changes in rock type and senses major structures such as fractures, faults and joints.

MILITARY & SECURITY

GPR is used in diverse applications such as Search and Rescue, locating clandestine tunnels, landmines and UXO and buried IED detection.

AGRICULTURE & FORESTRY

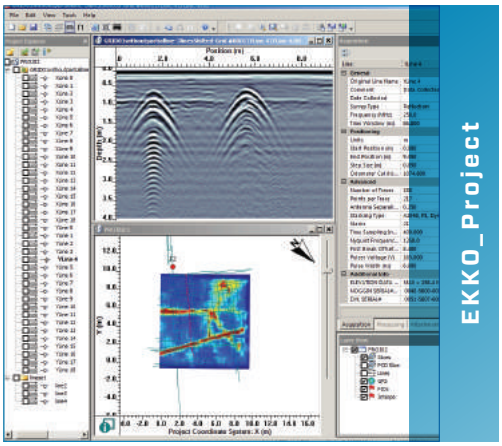
GPR is used for drainage tile detection and mapping, geological characterization of soils in crop-growing areas, tree root mapping, water content evaluation and biomass assessment.

GEOTECHNICAL & ENVIRONMENTAL

GPR applications in this area include imaging geological stratigraphy, mapping depth to bedrock, sinkhole detection, locating underground storage tanks (USTs) and route selection for roads, railway and pipelines.

EKKO_Project

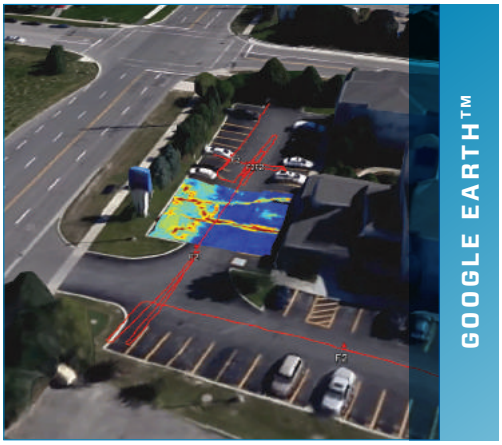
Data analysis Software



EKKO_Project:

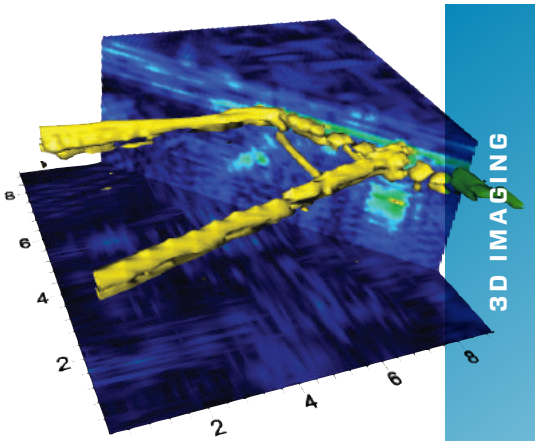
PC software for GPR data management, data integration and basic GPR data display:

- Includes all GPR data and ancillary files such as GPS, topography, photos, videos, and field notes
- The MapView window automatically shows a map of the project
- Display GPR lines and save them to graphic image files such as .jpg, .bmp, and .png.
- Display depth slices generated by processing GPR grid data. Slice up and down in depth through the data volume to reveal targets. Works with multiple grids simultaneously
- Reporting used to extract useful information from the GPR data:
  The Summary Report allows the user to select data images and photographs, add text, and output to a PDF report. Other reports extract field interpretations added to the data and outputs them in formats such as spreadsheet (.csv), Google Earth (.kmz), GIS and CAD (.dxf)



Additional modules - EKKO_Project can be enhanced with:

1) **LineView** module for modifying and displaying GPR lines
2) **SliceView** module for modifying and displaying depth slices from GPR grid data
3) **Interpretation** module for adding interpretations in post-processing. Specialized reporting modules that use interpretations added to the data are also available:
   i. **Bridge Deck Condition Report** module extracts rebar interpretations and generates ASTM-standard maps of bridge deck deterioration
   ii. **Pavement Structure Report** module extracts subsurface layer interpretations such as bottom of asphalt and generates thickness charts, tables and statistics
4) **Processing module** for advanced data processes such as filtering and migration



3D Visualization:

SliceView exports GPR grid data to a 3-dimensional output. Use a 3D visualization application to:

- View and rotate data as a 3D cube.
- Modify the opacity to make weaker signals invisible and 'melt out' stronger targets in the volume.
- Slice through the cube in any direction.

Subsurface imaging solutions

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