

# GPR SYSTEMS FOR ARCHAEOLOGY & FORENSICS

40 Simon Street • Nashua, NH 03060-3075 USA • [www.geophysical.com](http://www.geophysical.com)





# PETER LEACH, STAFF ARCHAEOLOGIST



Peter joined GSSI in 2016 as the archaeology and forensics application specialist, as well as a member of the training and technical support team. He is a member of the Register of Professional Archaeologists and specializes in terrestrial geophysical methods applied to archaeology, geographic information systems (GIS) analyses, and submerged prehistoric archaeology.

Peter has conducted GPR surveys on four continents as a specialist for academic research teams, and has carried out over 90+ terrestrial geophysical surveys on archaeological sites, in cemeteries, and for forensic searches in the US and Canada.

Prior to joining GSSI, Peter worked as a professional archaeologist in New England and the Mid Atlantic, where he honed his GPR skills “in the trenches.”

Peter is also a doctoral student at the University of Connecticut, with dissertation research focused on precontact archaeological sites submerged by sea-level rise. When not at GSSI, Peter spends most of his time reorganizing the feline residents of his computer desk and using his dog as a less-than-ideal footrest.

PETER LEACH



# AN IMPACT IN EVERY CORNER OF THE GLOBE

1970

YEAR  
FOUNDED

7

CONTINENTS  
SERVED

86

NUMBER OF  
EMPLOYEES

72k

HQ SPACE  
SQ. FT.

## COMPANY VISION

GSSI is an internationally respected corporation known for our technological advancements in the geophysical, archaeological, forensics, infrastructure, public works and transportation industries. We serve our clients with technical expertise, unsurpassed customer support and training facilities, and superior products.

## OUR MARKETS

GSSI products are distributed through a series of application specialists and representatives worldwide to five primary markets: concrete inspection, utility mapping and locating, road and bridge deck evaluation, geophysics, and archaeology. We also serve many specialty markets including autonomous vehicles, tree assessment, golf course management, environmental assessment, and ice and snow investigation, to name a few.

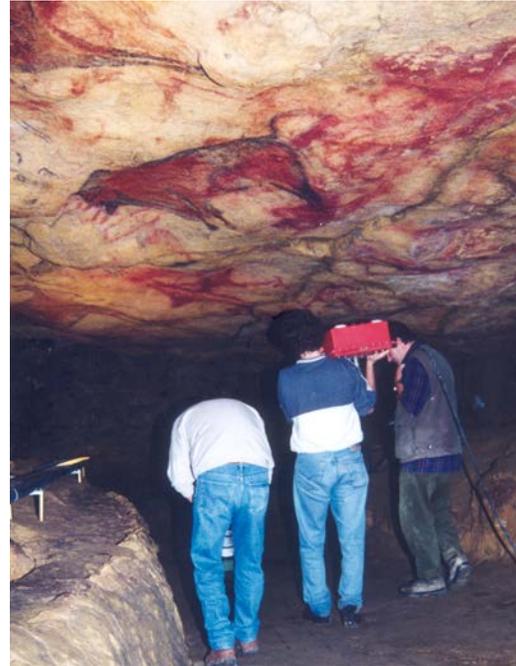
ABOUT GSSI

# GPR FOR ARCHAEOLOGY & FORENSICS

Archaeologists and forensic specialists rely on GSSI GPR as a key tool for non-invasive investigations. Whether the goal is landscape-scale site mapping, excavation planning, or locating forensic targets or sensitive cultural resources, GSSI's remote sensing technologies have augmented the traditional archaeological and forensic toolkits for almost 50 years.

Non-destructive GPR surveys are critical components of field investigations. Archaeologists commonly use GPR to locate, investigate, and protect/avoid cultural resources. This includes mapping unmarked graves and site assessments prior to construction activities.

Law enforcement, forensic anthropologists, and crime scene investigators employ GPR to locate clandestine burials and buried objects. In these cases, GPR is instrumental in locating victims, hidden caches of weapons or evidence, and locating the remains of soldiers and civilians in war zones.



# TRAINING IS A BIG PART OF WHAT WE DO

5

NUMBER OF  
FULL TIME  
TRAINERS

54

YEARS OF  
EXPERIENCE  
IN TEAM

120  
+

NUMBER OF  
CLASSES,  
YEARLY

5k

DEDICATED  
TRAINING SPACE  
(SQ. FT.)

## THE GSSI ACADEMY ADVANTAGE

There is no substitute for in-person, hands-on equipment and software training. Our GSSI Academy team is comprised of five professional GPR trainers who instruct 120+ in-house hardware and software classes each year. Additionally, all GSSI Academy staff are technical support specialists and ready to discuss any and all aspects of GPR. GSSI creates world-leading GPR equipment, and GSSI Academy creates world-leading GPR operators.

GSSI ACADEMY

## OUR FACILITIES

GSSI HQ in Nashua, NH has 465 sq. m (5,000 sq. ft.) of dedicated indoor training space, including two classrooms and a first-in-the-industry indoor utility pit. With an experienced archaeologist on staff, our customers have access to customized GPR method and theory instruction.

Specialized field instruction for archaeologists, cemetery mappers, and forensic investigators takes place in numerous locations around Nashua, NH. These include historical and modern cemeteries and historical archaeological sites. Customized, in-depth RADAN 7 instruction is also available for specialized researchers.

## SPECIALIZED CLASS: GPR FOR ARCHAEOLOGY

Ground Penetrating Radar for Archaeology is an advanced course offering through GSSI Academy. The class covers relevant GPR theory, the planning of geophysical fieldwork, survey area layout and best practices, data acquisition, and post-processing techniques in GSSI's RADAN 7 software. Also discussed are methods for integrating GPR data into other software platforms (like Surfer and ArcGIS).

A fieldwork component will include gridded GPR data collection at a 19th-20th century historical site in Nashua, New Hampshire. Class participants will then post-process collected datasets and learn how to interpret archaeological GPR data.

Prerequisites for class participation include previous experience with GPR (>1 year preferred), familiarity with GPR post-processing and RADAN 7, and experience with archaeological method and theory. GSSI highly recommends participation in UtilityScan and RADAN 7 classes prior to enrolling in this course.





UTILITYSCAN®

# MEET UTILITYSCAN: GSSI'S COMPACT GPR SYSTEM FOR ARCHAEOLOGY

GSSI's UtilityScan is a full-featured, easy-to-use, and highly portable GPR system. UtilityScan is a cost-effective GPR solution ideal for archaeological, cemetery, and forensic work. The system provides excellent resolution, unparalleled data quality, and enhanced depth penetration. UtilityScan incorporates our patented HyperStacking<sup>®</sup> technology which provides better data in less-than-ideal soil conditions and exceptional resistance to external noise. A state-of-the-art real-time gain algorithm optimizes field data, meaning you'll spend less time setting up the system and more time collecting data.

<b>MAX DEPTH</b> 10 m (35 feet)	<b>ANTENNA FREQUENCY</b> 350 MHz
<b>WEIGHT</b> 15.4 kg (34 pounds)	<b>STORAGE CAPACITY</b> 64 GB
<b>OPTIONAL SOFTWARE</b> RADAN 7	<b>ACCESSORIES</b> Multiple GPS options, Transit case, Sunshade, Rugged 3-wheel cart, Rugged 4-wheel cart

## The UtilityScan Advantage

The modern user interface is intuitively designed and quickly mastered, making it ideal for all skill levels. This is a major benefit when introducing GPR in the classroom or in-field school settings.

UtilityScan connects to the 350HS antenna via WiFi. This means fewer cables to bring into the field. The system uses a ruggedized tablet with internal GPS, and can interface with an external Bluetooth GPS for enhanced spatial resolution. Combine the UtilityScan with a ruggedized 3- or 4-wheel survey cart for improved "off roading" performance.



# UTILITYSCAN FEATURES

## Compact and Portable

During field projects, lots of gear means that space is always at a premium. UtilityScan weighs just 34 pounds and can collapse to fit in the back of a small vehicle or even in an airline overhead compartment. For long-distance travel on foot, secure the UtilityScan to an external frame backpack or simply carry it in your hand. The system's small footprint is also beneficial during surveys – smaller size means better access to tight spaces or getting closer to walls, trees, or grave markers.

## TYPICAL USES

### Archaeology

- Site delineation
- Excavation planning
- Cemetery mapping
- Cultural Resource Management

### Forensics

- Evidence locating
- Clandestine grave locations

## Premium Features, Entry Level Price

UtilityScan incorporates GSSI's patented HyperStacking technology which provides excellent near-surface resolution and increased depth penetration in most soil types. A new wireless antenna eliminates the need for cabling, resulting in a system that can withstand challenging field conditions.

## Advanced Capabilities

The tablet for UtilityScan has an integrated GPS and can interface with external GPS units via Bluetooth. An added benefit is the built-in 5/8" range pole adapter for mounting a GPS antenna. An optional LineTrac power detection module can identify and trace the precise location of underground electrical and RF-induced utilities. In urban environments, this feature helps avoid potential subsurface electrical hazards.

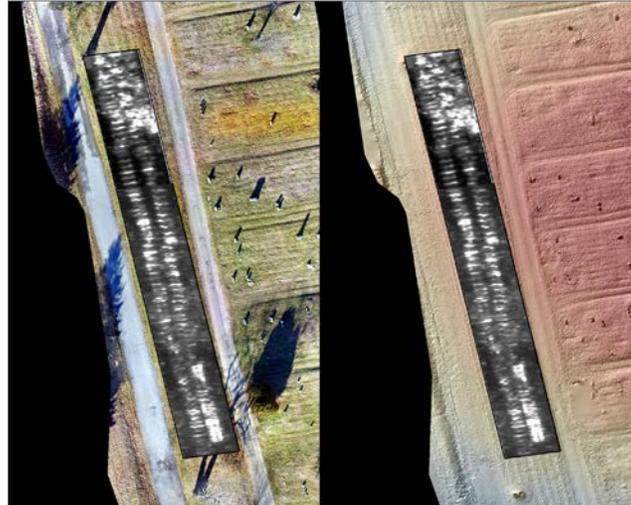
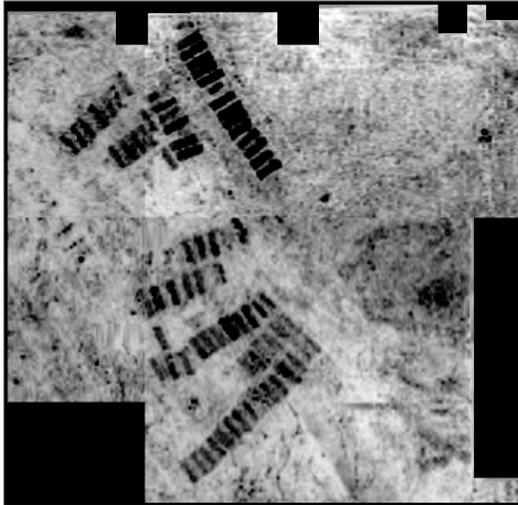
FCC, RSS-220 and CE Certified

UTILITYSCAN®

# CEMETERY MAPPING

Many historical and more recent cemeteries contain unmarked graves. This is usually a byproduct of fallen and/or relocated grave markers, though in some cases there may never have been a stone or other marker. Unmarked graves are also common to historical landscapes, battlefields, and crime scenes. Ground-penetrating radar is a high-resolution and non-invasive method for finding these burial sites. Cemetery surveyors typically look for grave shafts that are vertical stratigraphic cuts, hyperbolic targets suggestive of coffins or vaults, and geometrical patterning in 3D time slices.

**Cemetery Data Examples:** These data examples exhibit the results of gridded GPR surveys in cemeteries. On the left is a GPR time slice from a 19th-to-20th century pauper cemetery in New Hampshire. The image to the right shows unmarked graves with time slices overlaid on a drone-derived aerial photograph and a digital elevation model.





SIR® 4000

# SIR 4000: GSSI'S RUGGED, HIGH-PERFORMANCE GPR CONTROLLER FOR UTILITYSCAN PRO AND GS SERIES

The SIR<sup>®</sup> 4000 is GSSI's professional-grade, rugged (IP65) control unit and is designed to interface with both digital and analog antennas. The SIR 4000 works seamlessly with nearly every GSSI antenna, meaning today you could survey cemeteries, and tomorrow perform deep testing evaluations on a floodplain. Want to upgrade your previous-generation control unit? Simply purchase a SIR 4000 and mounting adapter and interface with your existing antenna and cart.

<b>WEIGHT</b> 4.5 kg (10 pounds)	<b>STORAGE CAPACITY</b> 32 GB
<b>BUNDLED CONFIGURATIONS</b>	
<ul style="list-style-type: none"><li>• SIR 4000, 400 MHz Antenna, 3- or 4-wheel cart</li><li>• SIR 4000, 350 HS or 300/800 DF Antenna, 3- or 4-wheel cart</li></ul>	
<b>OPTIONAL SOFTWARE</b> RADAN 7	<b>ACCESSORIES</b> SIR 4000 chest harness

## The SIR 4000 Advantage

The SIR 4000 is the control unit for our UtilityScan Pro systems and the new GS Series antenna (see GS Series section). These full-system packages are configured with a 3-wheel or 4-wheel cart and choice of antennas, including 400 MHz, 350 MHz HyperStacking<sup>®</sup>, and 300/800 MHz Dual-Frequency. The large selection of GSSI's antennas improves the SIR 4000's versatility, making it a truly adaptable GPR solution.

GPS integration is hassle-free through a serial port connection, allowing GPS-enabled collection along simple or complex tracklines. The new-and-improved user interface is easy to navigate yet it provides powerful in-field filtering options to maximize data interpretation. The SIR 4000 records raw, unfiltered data as well as display parameters, which makes evaluating pre-processed field data easier or you can post-process data from scratch.



# SIR 4000 FEATURES

## Modular Design, Flexible Solutions

As field scientists, we can rarely choose our site locations. To acquire the best data possible we need reliable, powerful, and user-friendly GPR equipment. The SIR 4000 and UtilityScan Pro systems meet and exceed these requirements. Coupled with a wide selection of antenna choices and other options, you can rely on the SIR 4000 to meet project needs wherever your research takes you.

## TYPICAL USES

### Archaeology

- Excavation planning
- Cemetery mapping
- Cultural Resource Management

### Forensics

- Evidence locating
- Clandestine grave locations

### Cemeteries

- New plot layouts
- Unmarked grave locations

## Accurate and Reliable Performance

The SIR 4000 offers unique collection modules including Expert Mode (analog antennas) Digital 2D (digital antennas), Quick 3D (analog antennas), and Digital 3D (digital antennas). Whether you want single or gridded 2D profiles (Expert Mode, Digital 2D), or effortless 3D field collection (Quick 3D, Digital 3D), the SIR 4000 is the ideal solution for efficient data collection and visualization.

## Premier Software Features

The SIR 4000 incorporates advanced display methods and filtering capabilities for in-the-field processing. These include an intuitive Manual Gain process (for optimizing data display) and on-screen linear gain, high-and-low pass frequency filtering, and background removal. You'll also have access to a multitude of collection parameters including scans/unit, time and depth range, and dielectric constant. The SIR 4000 includes a real-time hyperbolic matching feature so you can quickly and accurately calculate soil dielectric in the field.

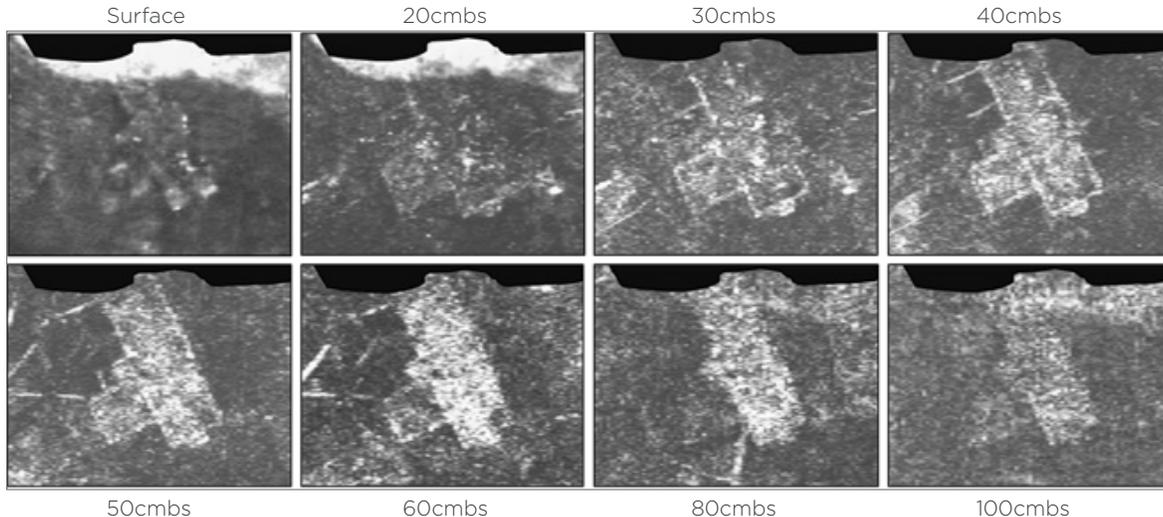
[FCC, RSS-220 and CE Certified](#)

SIR<sup>®</sup> 4000

# EXCAVATION PLANNING

Archaeological and forensic investigations are often expensive and time-consuming, and there is always a risk of missing significant targets. A ground-penetrating radar survey can efficiently map landscape-scale subsurface targets, facilitating a more refined and informed investigation. GPR data can reveal vertical and horizontal relationships between important archaeological and landscape features, such as buried structures, wells and privies, and historical roads. These data can then be used to guide excavation efforts and minimize impacts to the landscape.

**Data Example:** GPR data from a buried historical structure, showing time slice data at multiple depths. With data like these, excavation planning can incorporate horizontal and vertical anomaly patterning and assess important areas for archaeological ground-truthing or resource avoidance. For analysis purposes, time slice data can reveal contextual information regarding site layout and the spatial relationship between features.





GS SERIES

# GS SYSTEM: INNOVATIVE, RUGGED, AND WIRELESS

The GS system is our next-generation high-performance and purpose-built GPR system. Equipped with state-of-the-art technology, the GS System is designed for applications that require improved depth penetration and full control over collection parameters. The IP65 rated housing contains system electronics, an internal GPS, and connectivity ports. The system's modular design allows operators to select which controller best suits their needs. The rugged SIR 4000 combined with our new WiFi Module provides a familiar user interface, plug-and-play GPS integration, and convenient data transfer options. An additional controller option is the Panasonic Toughpad G1 Tablet with its newly-designed, intuitive user interface and enhanced capabilities for real-time processing and imaging.

<b>MAX DEPTH</b> 21 M (70 FT)	<b>ANTENNA FREQUENCY</b> 200 MHz
<b>WEIGHT</b> 19.3 kg (42.6 pounds)	<b>STORAGE CAPACITY</b> SIR 4000: 32 GB Panasonic ToughPad G1: 256 GB

## BUNDLED CONFIGURATIONS

- SIR 4000, WiFi Module, HS Module, 200 HS Antenna
- Panasonic ToughPad G1, HS Module, 200 HS Antenna
- Upgrade Kit for existing SIR 4000: WiFi Module, HS Module, 200 HS Antenna

## ACCESSORIES

Multiple GPS options, Adapter plate for GPS pole, 4-piece wheel kit, Transit case, Survey wheel

## 200 HS Antenna

The 200 HS antenna uses GSSI's patented HyperStacking<sup>®</sup> technology which improves signal to noise performance and increases depth penetration in ideal soil conditions.

The GS system is ideal for archaeological and geoarchaeological applications that require enhanced depth penetration and high reliability under challenging survey conditions. Examples of typical usage include a) alluvial/floodplain settings or other deep testing projects where conventional antennas do not reach required depths; and b) investigations where archaeological materials must be evaluated in a broader (vertical) geomorphic context.



## GS SERIES ADVANTAGE

### Acquire Data Wirelessly with the HS Module

The 200 HS is a wireless digital antenna that improves survey efficiency and in-field usability. The HS Module connects the SIR 4000 or Panasonic Toughpad G1 to the 200 HS antenna. With the new WiFi Module users can deploy their existing SIR 4000 to control the GS System. For multi-person surveys, the WiFi range can reach distances of up to 15 meters (50 feet) within line of sight between the controller and antenna.

### TYPICAL USES

Archaeological investigations  
Geoarchaeological surveys  
Geomorphic projects  
Floodplains and deep testing  
Landform assessment  
Urban Archaeology  
Underwater Archaeology  
Forensic Searches  
Caves and sinkholes

### HyperStacking Technology & Improved Depth

The GS System uses GSSI's proprietary HyperStacking<sup>®</sup> Technology to provide clear, high resolution data of subsurface features. HyperStacking improves resistance to external noise and improves data quality. In certain environments the 200 HS achieves nearly double the depth penetration of equivalent conventional GPR antenna designs.

### Optional Survey Accessories

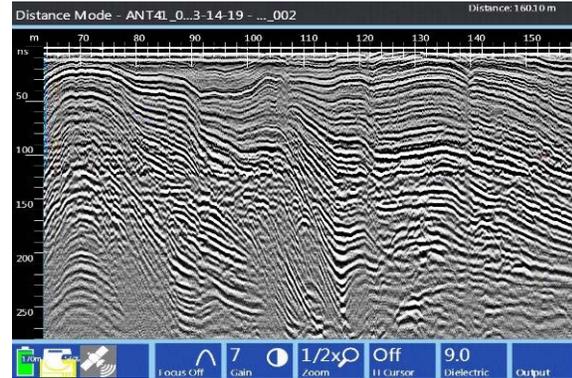
Several accessories are available and enhance ease of use and system versatility. These options include a GPS mount and a four-piece wheel kit that decreases antenna wear on prepared surfaces (such as gravel and asphalt). An optional rugged transit case is designed to hold the HS Module, wheel kit, tow strap, batteries and battery charger, as well as the SIR 4000 WiFi Module or the Panasonic Toughpad G1 Tablet.

[FCC, RSS-220 and CE Certified](#)

# CONTROLLER OPTIONS

## SIR 4000

The SIR 4000 is a high-performance GPR control unit designed to operate with all of GSSI's analog and digital antennas. The SIR 4000 is IP65 rated, and its high definition screen is clearly visible in bright sunlight. Hands-free carry is possible with the optional chest harness. When coupled with the new WiFi Module the SIR 4000 becomes a familiar and field-proven wireless controller for the GS Series. Customers that previously purchased the SIR 4000 can easily attach the WiFi module and start collecting data with the 200 HS. The WiFi Module attaches to the back of the SIR 4000 and has user-replaceable WiFi antennas. Operators can also connect the SIR 4000 and 200 HS antenna using a digital control cable; this facilitates data collection in especially challenging field conditions or where WiFi use is not permitted.



## Panasonic ToughPad G1

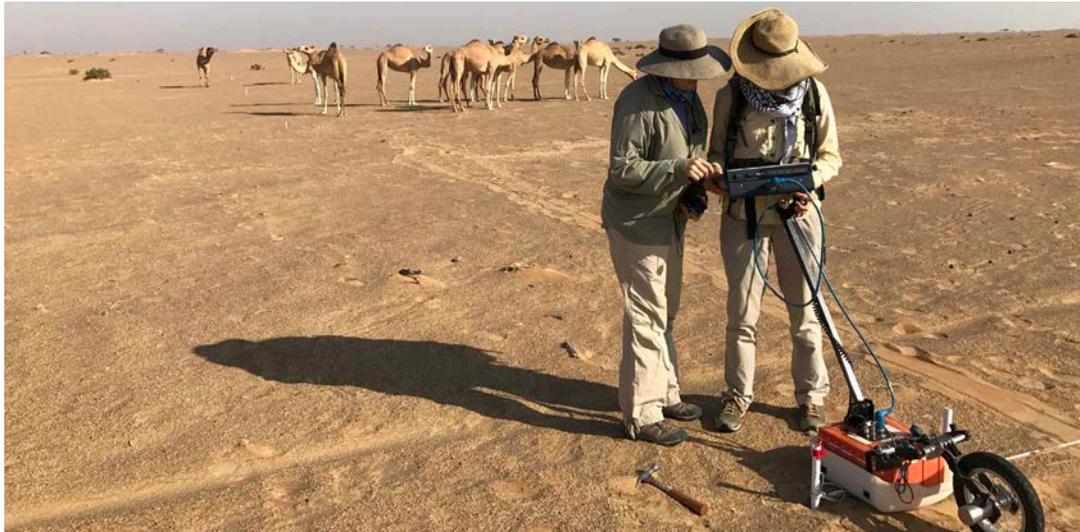
The Panasonic ToughPad G1 is a rugged Windows 10 tablet bundled with GSSI's intuitive and powerful software for the GS System. The tablet weighs 3.0 lbs (1.4 kg), features an easy to use interface, and has an integrated geographic information systems (GIS) map mode. When map mode is displayed, the left side of the screen displays the GPR data and the right side shows GPR tracklines on a basemap. The mapping environment provides position information via user-selected GPS and serves as a tool to visualize the survey layout.



# GSSI ANTENNAS FOR ARCHAEOLOGY, FORENSICS & CEMETERIES

## A Wide Range of GPR Antennas for All Your Project Needs

Here at GSSI we manufacture many different analog and digital antennas, giving you the freedom to choose the right combination of depth penetration and resolution. High frequency antennas provide higher resolution, but typically offer limited penetration. Lower frequency antennas collect deeper data, but they do not image small targets or closely-spaced soil boundaries. Whatever your survey requires, we've got you covered.



# ANTENNA FREQUENCY, APPROXIMATE DEPTH PENETRATION, AND APPROPRIATE APPLICATION

APPLICATION	PRIMARY ANTENNA	SECONDARY ANTENNA	APPROXIMATE DEPTH
Highest Resolution Prospection	Mini XT (2.7 GHz)*	Palm XT (2.3 GHz)*	15-30 cm (0.5 - 1.0 ft)
High Resolution Prospection	Palm XT (2.3 GHz)*	Palm Antenna 2.0 GHz (analog)	20-40 cm (0.7 - 1.3 ft)
Shallow Soils, Archaeology, Forensics	900 MHz (analog)	350 HS (digital) 400 MHz (analog)	0-1 m (0-3 ft)
Archaeology, Forensics, Cemeteries, Geoarchaeology	350 HS (digital)	400 MHz (analog)	0-4 m (0-12 ft)
Archaeology, Geoarchaeology, Geomorphology	200 HS (digital)	350 HS (digital)	0-7 m (0-18 ft)
Archaeology, Geoarchaeology, Geomorphology	200 HS (digital)	100 MHz (analog)**	0-9 m (0-30 ft)
Geology, Geomorphology	200 HS (digital) 100 MHz (analog)**	MLF (16-80 MHz)**	0-30 m (0-90 ft)

\* Not for use with SIR 4000

\*\* Not sold in USA





## 2.0 GHz Palm Antenna

High frequency GPR antennas aren't just for concrete - archaeologists can use them too! Recent GPR field experiments by GSSI have demonstrated the utility of small-footprint, high resolution antennas in archaeological prospection. Need to investigate an archaeological feature before you excavate it? Looking for stratigraphic layers that are invisible to the naked eye? Here's where the Palm antenna shines.

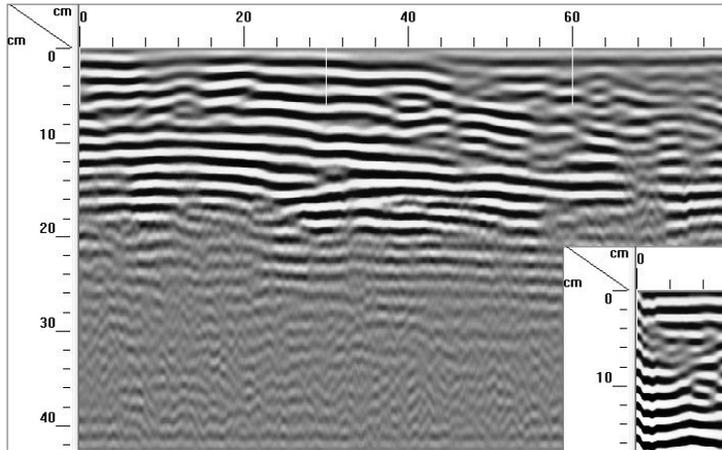
The 2.0 GHz Palm antenna provides high-resolution data for shallowly-buried features (0-30 cm; 0-1 ft). It is compact and lightweight, making it perfect for small excavation units.

ANTENNA FREQUENCY	2000 MHz / 2.0 GHz
DEPTH RANGE	0-30 cm (0-1 ft) - soil
WEIGHT	1.3 kg (3 lbs) with 3m cable
DIMENSIONS	16x11x9 cm (6x4.1x3.6 in)
COMPATIBLE GSSI CONTROLLER	SIR 4000



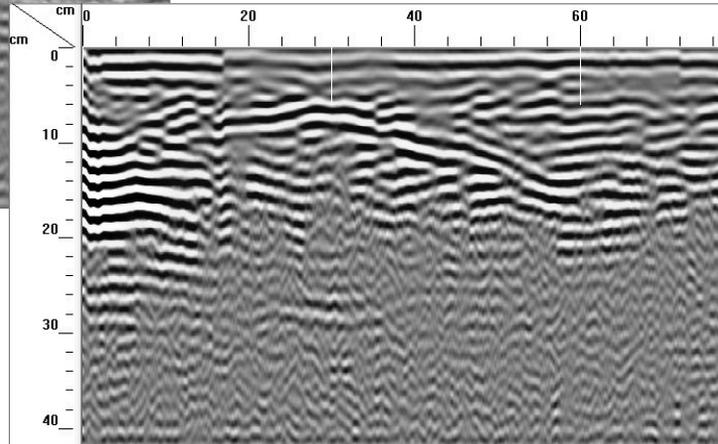
## 2.0 GHz Palm Antenna Data Examples

While the 2.0 GHz Palm antenna is not typically used for archaeological prospection or forensic searches, it is an ideal tool for shallow investigations. The examples below demonstrate the benefits of very high resolution antennas for assessing feature stratigraphy and layout, as well as investigation of shallow stratigraphy in excavation units.



Undisturbed subsoil  
at precontact site

Precontact (ca. 7000yBP)  
archaeological feature





## 900 MHz - Shielded Antenna

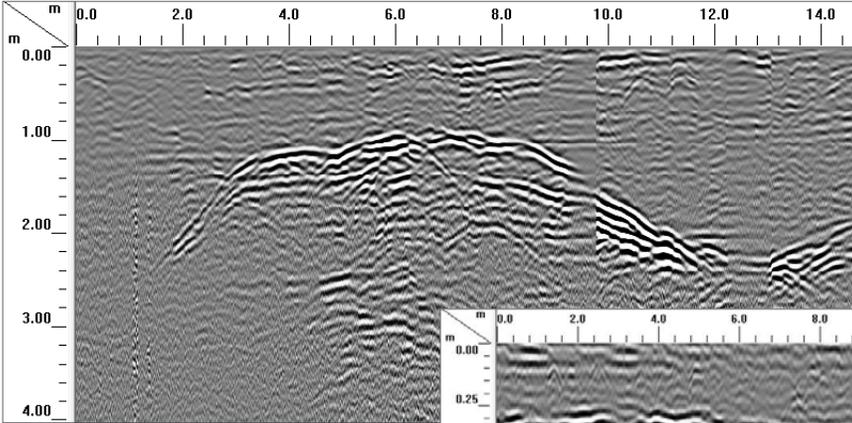
The high-resolution 900 MHz antenna is designed for shallow penetration and reaches depths of 1 m (3 ft) in typical soil conditions. This antenna achieves more than 2X the vertical resolvability of the 400 MHz, making it ideal for shallowly buried sites, near-surface stratigraphy, complex archaeological features, and forensic targets.

This small, lightweight antenna is suitable for use with a 3-wheel or 4-wheel survey cart, or a specially-designed external distance encoder.

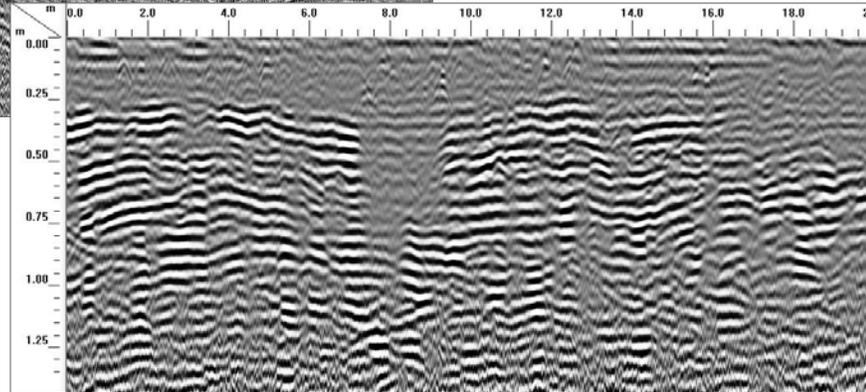
ANTENNA FREQUENCY	900 MHz
DEPTH RANGE	0-1 m (0-3 ft)
WEIGHT	2.3 kg (5 lbs)
DIMENSIONS	33x18x8 cm (13x7x3 in)
COMPATIBLE GSSI CONTROLLER	SIR 4000

## 900 MHz Antenna Data Examples

The 900 MHz antenna typically generates high resolution data to depths of 1 m (3.2 ft). Added resolution is a major benefit for data interpretation. The cave example (top left) shows detailed cave layout and characteristics of sediment deposits. The historical site example (below right) demonstrates the 900's resolution benefits for complex stratigraphy and detection of stratigraphic disturbances.



Example of a cave in limestone



Complex stratigraphy and shaft feature at a historical site





## 400 MHz - Shielded Antenna

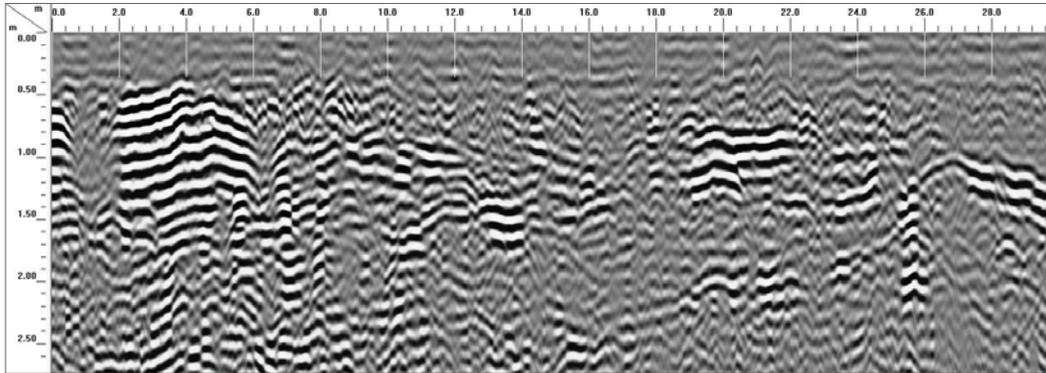
The 400 MHz antenna is widely regarded as the “gold standard” analog antenna for archaeology, cemeteries, and forensics. The 400 provides an ideal intersection of depth penetration and resolution. In typical soil conditions it reaches depths of 3 to 4 meters and offers excellent vertical resolvability. The antenna is lightweight and the compact size makes it easy to transport.

While the 400 is typically used with a 3-wheel or 4-wheel survey cart, it can be pulled manually using an external distance encoder and a tow handle.

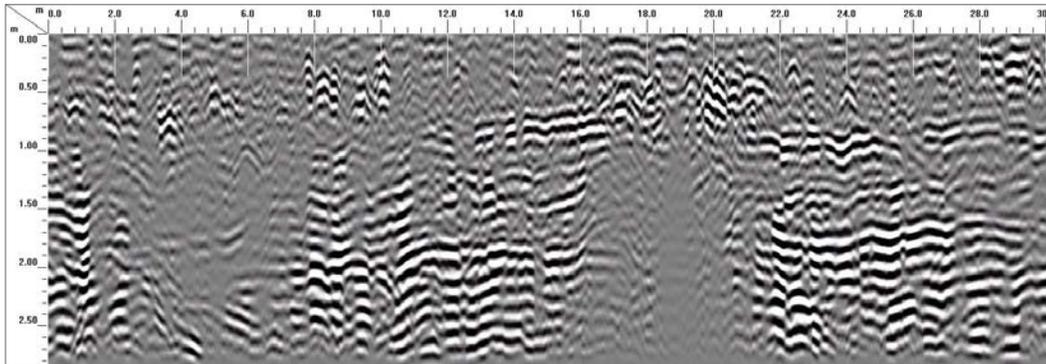
ANTENNA FREQUENCY	400 MHz
DEPTH RANGE	0-4 m (0-12 ft)
WEIGHT	5 kg (11 lbs)
DIMENSIONS	30x30x17 cm (12x12x6.5 in)
COMPATIBLE GSSI CONTROLLER	SIR 4000

## 400 MHz Antenna Data Examples

The 400 MHz antenna provides the perfect interplay between depth penetration and resolution. In these examples, the antenna achieved the desirable depth of investigation and sufficient detail to image a wide range of archaeological features.



Isolated pit feature  
and complex  
stratigraphy



Buried historical  
cellars and alluvial  
stratigraphy





## 350HS - HyperStacking<sup>®</sup> Antenna

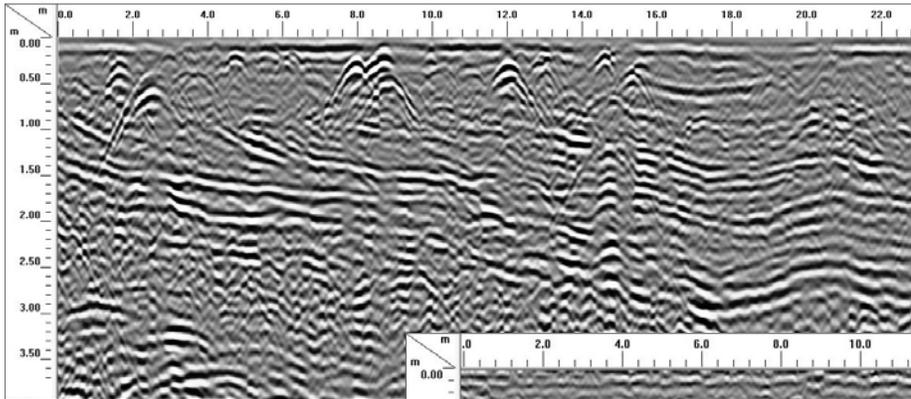
The 350 HS is a state-of-the-art 350 MHz antenna using our patented HyperStacking technology. This next-generation antenna provides excellent resolution, unparalleled data quality, and enhanced depth penetration. The 350 HS provides improved data quality compared to the 400 MHz antenna in less-than-ideal soil conditions, as well as exceptional resistance to external noise.

In typical soil conditions, the 350HS reaches depths of 4 to 6 meters and offers excellent vertical and near-surface resolvability. The antenna is lightweight, and its compact size makes it easy to transport. The 350HS is typically used with a 3-wheel or 4-wheel survey cart, but it can be pulled manually using an external distance encoder.

ANTENNA FREQUENCY	350 MHz
TYPICAL RANGE	6 m (20 ft)
MAXIMUM RANGE	12 m (40 ft)
WEIGHT	5 kg (11 lbs)
DIMENSIONS	33x30x18 cm (13x12x7 in)
COMPATIBLE GSSI CONTROLLER	SIR 4000

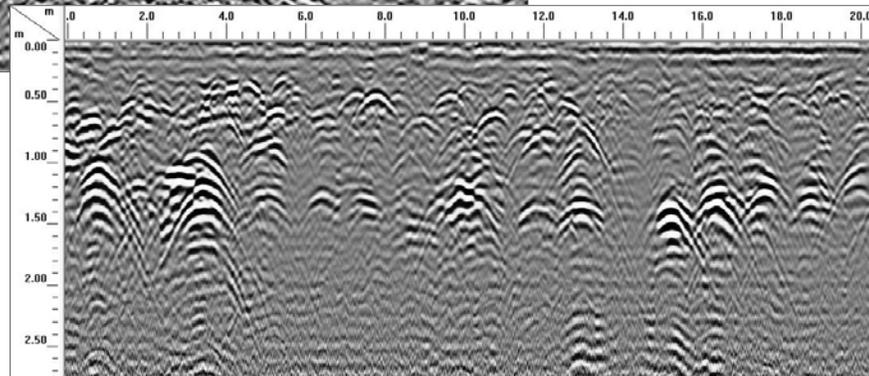
## 350 HS Antenna Data Examples

The 350 MHz antenna improves on the depth penetration and resolution of the 400MHz antenna by reaching greater depths and greatly improving data quality in less-than-ideal and lossy/conductive soil conditions. In the stratigraphy example (top left), the 350 MHz HyperStacking antenna achieved excellent depth penetration and helped place archaeological features into a geomorphic context. The cemetery example (bottom right) demonstrates the antenna's data quality in lossy soil conditions (wet clay).



Deep and complex stratigraphy at an archaeological site

19th century graves in wet glaciomarine clay





## 200HS - HyperStacking<sup>®</sup> Antenna

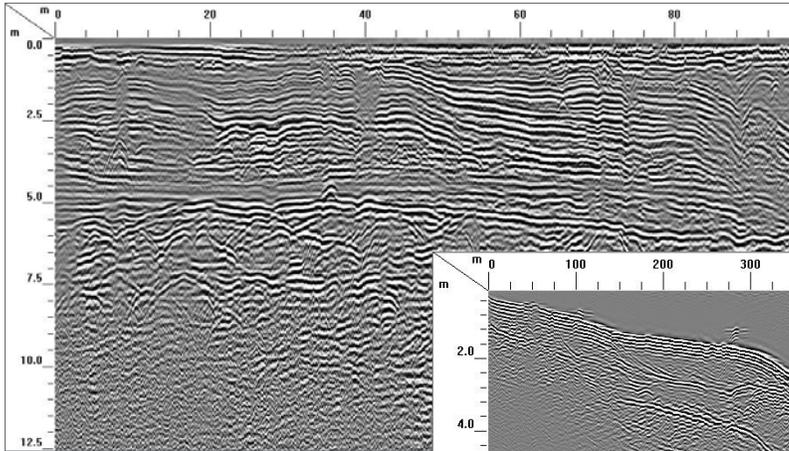
The first antenna in the GS Series is the newly designed 200 MHz digital, wireless antenna (200 HS). The 200 HS incorporates GSSI's patented HyperStacking technology which greatly improves signal-to-noise performance, depth penetration, and data quality in all soil conditions.

The 200 HS is ideal for geoarchaeological, geologic, geomorphic, and soil investigations that require enhanced depth penetration without sacrificing data resolution. These surveys could include deep testing for paleosols in floodplain settings, prospecting for submerged freshwater cultural resources, investigating the layout of caves, or penetrating through deep and complex historical fill sequences in urban environments.

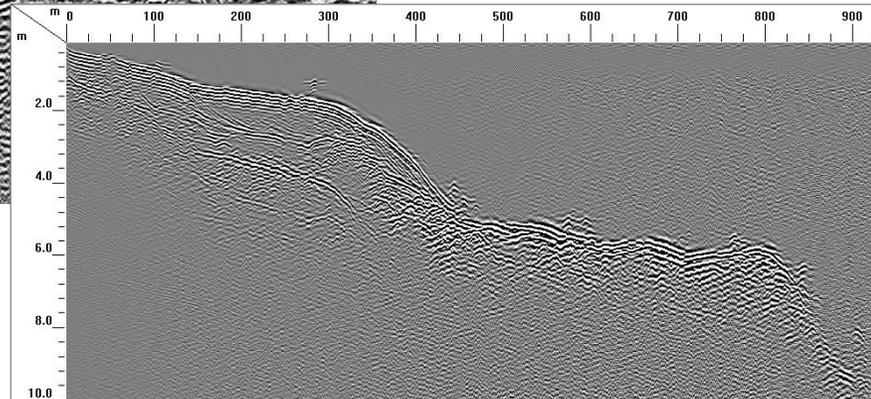
ANTENNA FREQUENCY	200 MHz
MAXIMUM RANGE	30 m (100 ft)
WEIGHT	19.3 kg (42.6 lbs)
DIMENSIONS	64.8 x 64.8 x 34.3 cm (25.5 x 25.5 x 13.5 in)
COMPATIBLE GSSI CONTROLLER	Panasonic Toughpad G1 SIR 4000

## 200 HS Antenna Data Examples

The 200 MHz HyperStacking antenna improves on the depth penetration and resolution of the previous-generation 200 MHz analog antenna. The 200 HS reaches greater depths, exhibits exceptional near-surface resolution, and offers distinct advantages in lossy/conductive and other less-than-ideal soil conditions. In the stratigraphy example (top left) the 200 HS achieved excellent penetration (approx. 10m) and successfully imaged Holocene alluvial strata and the underlying Pleistocene glacial till. In the freshwater example (bottom right), the antenna was placed in a canoe and used Time Mode collection to capture relatively deep bathymetric data and subbottom lake sediments.



200 HS data showing deep and complex Holocene floodplain strata overlying a Pleistocene glacial till basement



200 HS data (Time Mode) revealed bathymetric information and subbottom stratigraphy for a New Hampshire lake





STRUCTURESCAN™ MINI XT

# STRUCTURESCAN MINI XT: HIGHLY PORTABLE, AMAZINGLY HIGH RESOLUTION

High resolution, portable GPR systems aren't just for concrete scanning – they also work well in the dirt! The StructureScan Mini XT, GSSI's latest all-in-one handheld GPR system, is modular with a continually expanding arsenal of external attachments for enhancing its versatility. This little powerhouse incorporates a 2.7 GHz antenna for superior target and layer resolution, providing depth penetration of 60 cm (24 inches) in concrete, and 30-40 cm (12-18 inches) in soil. A touchscreen interface and handle-based controls make data collection and system navigation easy. The entire Mini XT system fits into a rugged Pelican case for environmental protection and ease-of-transport in vehicles or as luggage.

## The Mini XT Advantage

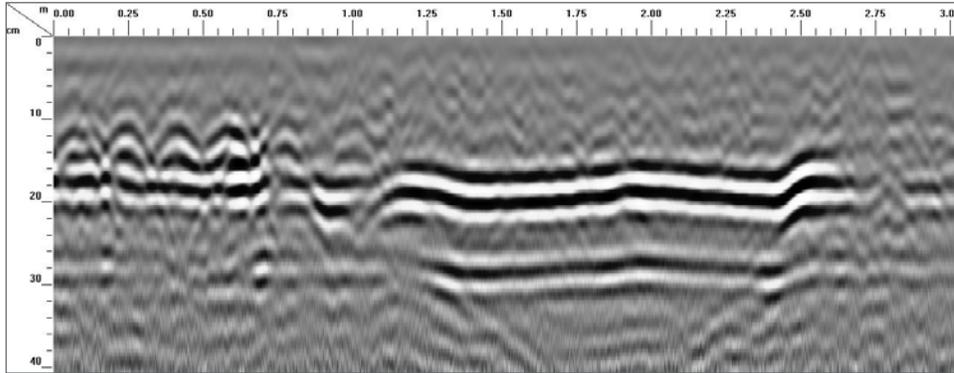
The StructureScan Mini XT is a small and powerful system, making it ideal for tight spaces, remote field locations, or other situations that are unsuitable for larger equipment.

The exceptional data resolution is suitable for investigating forensic targets under or within concrete, acquiring detailed GPR profiles of archaeological features, or GPR-based stratigraphic recordation. The optional Palm XT antenna is the smallest antenna on the market, making it the perfect tool for small excavation units or other cramped spaces.

<b>MAX DEPTH</b> Concrete: 60 cm (24 inches) Soil: 40 cm (18 inches)	<b>ANTENNA FREQUENCY</b> 2700 MHz
<b>WEIGHT</b> 1.8 kg (4 pounds)	<b>STORAGE CAPACITY</b> 14.5 GB
<b>OPTIONAL SOFTWARE</b> RADAN 7	<b>ACCESSORIES</b> Palm XT Antenna, LineTrac XT, Extension Pole, Carry Harness



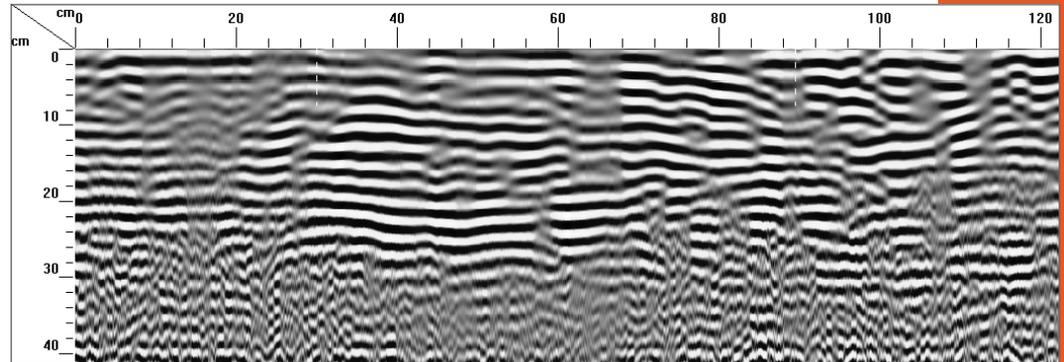
# STRUCTURESCAN MINI XT DATA EXAMPLES



Mini XT data showing concrete reinforcement and a large void under the slab.

This is a good example of soil compaction from buried evidence, possible prior disturbance, or decomposition of clandestine burials.

Data from a precontact archaeological site. These high-resolution Palm XT data revealed complex stratigraphy that was not visible during excavation.





## 2300 MHZ - Palm XT Antenna

This 2300 MHz Palm XT antenna offers superior maneuverability and amazing resolution. It features a full keypad control on the antenna that provides remote control of the user interface. The antenna has seamless software integration, and three acquisition configurations for variable conditions - Standard, Cross Polarization, and Side Car.

The Palm XT antenna is only compatible with the StructureScan Mini XT.

ANTENNA FREQUENCY	2300 MHz
MAXIMUM RANGE	Concrete: 0-60 cm (0-24 in) Soil: 30-40 cm (12-18 in)
WEIGHT	0.75 kg (1.65 lbs)
DIMENSIONS	7.1x6.4x15.2 cm (2.8x2.5x6 in)
GSSI SYSTEM	StructureScan Mini XT

# RADAN SOFTWARE

## Make the Most of your GPR Data

RADAN® 7 is GSSI's state-of-the-art GPR post-processing software. A powerful and versatile software platform, RADAN excels at processing 2D GPR profiles and creating 3D time slice datasets. RADAN is a Windows™ based program, making it a familiar and easy-to-use environment for all levels of experience.

Post-processing GPR data is a critical component of surveys since archaeological and forensic targets are often subtle and variably preserved. RADAN provides intuitive processing methods for optimizing GPR data and removing noise and other unwanted data components. Creation of gridded time slice data is quick and straightforward, allowing you to rapidly assemble data and spend more time on analysis and interpretation. Exporting data to other software is just as easy; you can integrate your data into a geospatial framework or develop report and publication graphics.

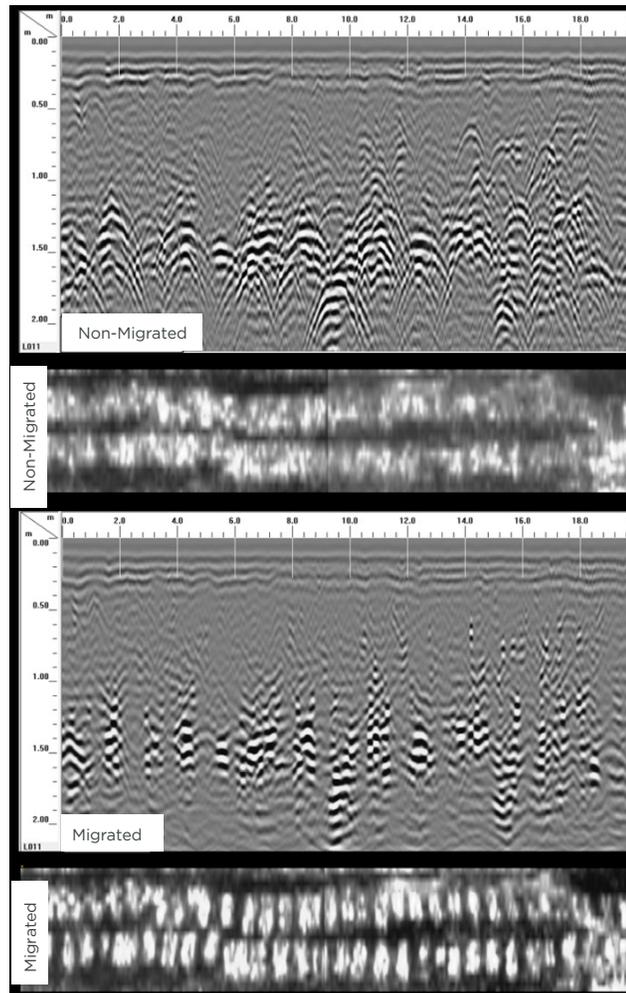
## RADAN BENEFITS

- Powerful and intuitive processing methods for optimizing 2D and 3D GPR data
- Multiple methods for importing, displaying, and interpreting data
- Simultaneously process multiple profiles and entire gridded 3D datasets, even for multi-grid surveys
- GSSI Academy RADAN 7 classes (Nashua, NH) provide detailed explanation of features

# ADVANCED FEATURES

- Enhanced, easy-to-use 3D capabilities (with 3D Module), GPS and 3D data integration, and multiple export methods
- Powerful 2D profile processing, including advanced Migration, Frequency Filtering, Background Removal, and numerous Range Gain options
- 2D Interactive environment for digitizing targets and layers for export
- Interconnected 2D and 3D data for enhanced analysis
- Google Earth export for GPS-encoded GPR tracklines and 3D time slices

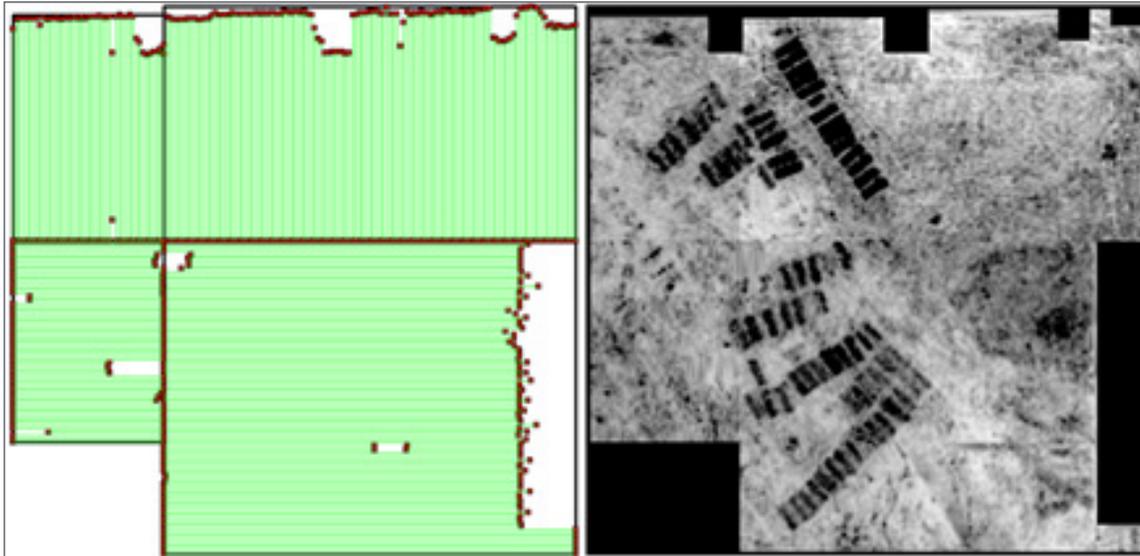
Advanced  
Data Migration

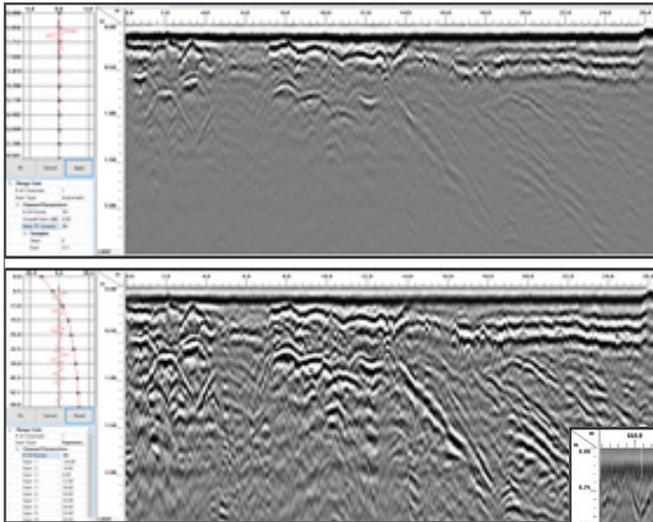


# THE RADAN ADVANTAGE

- Complete solution for GPR data analysis, display, and interpretation
- Powerful features for data customization
- RADAN 7 classes taught by GSSI Academy professional Trainers
- One-time purchase, no yearly fee
- Need RADAN Help? Free technical support is available!

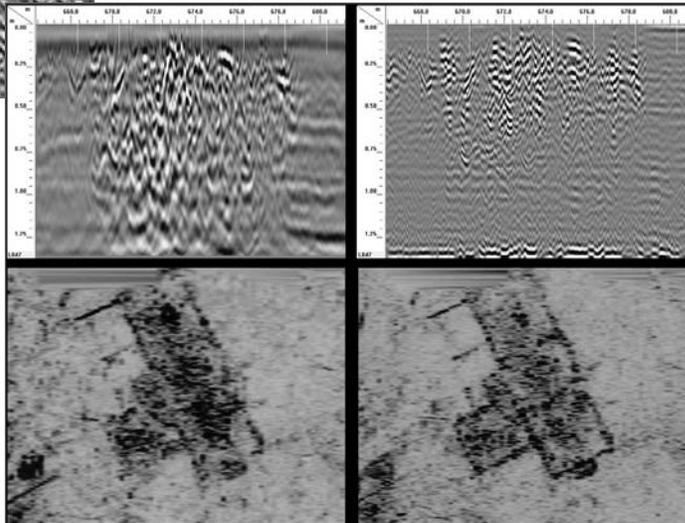
## Integration of Multiple 3D Grids with Super 3D



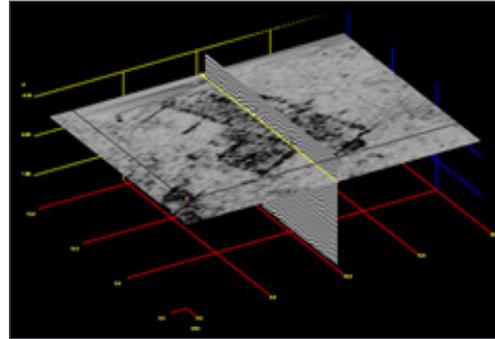


Optimize Data with  
Intuitive Processes

Powerful Filters to  
Enhance Data Quality  
& Interpretation



Integration of 2D & 3D Data













Geophysical Survey Systems, Inc.  
[www.geophysical.com](http://www.geophysical.com) • [sales@geophysical.com](mailto:sales@geophysical.com)

08.17.2022  
40 Simon Street  
Nashua, NH 03060-3075 USA