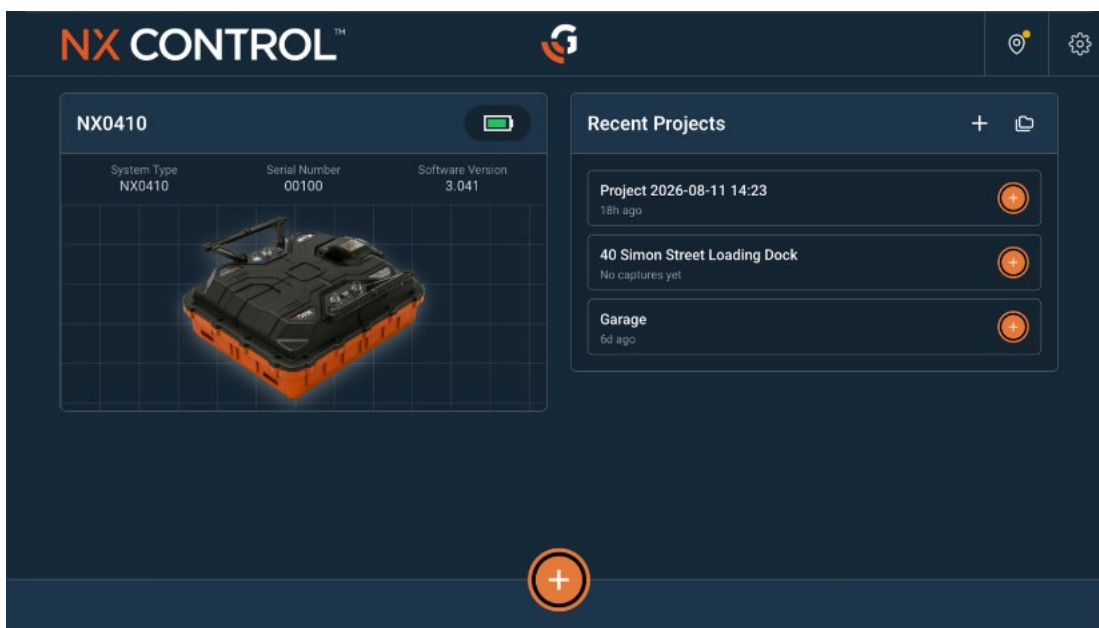


User Guide For **NX CONTROL**TM



AND SUPPORTED SYSTEMS:

COMPASS^{NXTM}
NX04/10

NX15[®]

NX25[®]

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Avis

Cet appareil contient des émetteurs/récepteurs exempts de licence qui sont conformes aux Spécifications sur les normes radioélectriques exemptes de licence d'Innovation, Sciences et Développement économique Canada. Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer d'interférences nuisibles, et (2) cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil.

Canadian Emissions Requirements

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada

GPR UWB Compliance Notice

The FCC has granted Geophysical Survey Systems, Inc. a formal waiver of sections 15.503(d), 15.31(c) and 15.521(d) rules, certifying the NX04/10, NX25, and NX15 systems for GPR UWB transmission. This action related to NX25 and NX15 was adopted and released by the Chief of the Office of Engineering and Technology (OET) on 31 July 2023 and is described in waiver DA 23-650. The NX04/10 system was added to the waiver on 22 April 2026. FCC waiver DA 23-650 is subject to the following conditions:

1. The GSSI NX04/10, NX25, and NX15 systems were certified by an authorized Telecommunications Certification Body. A copy of Waiver DA 23-650 was submitted with the applications for certification.
2. The NX04/10, NX25, and NX15 systems operate with stepped frequency CW modulation in 1-40 MHz steps between 30-6000 MHz.

3. The NX04/10, NX25, and NX15 dwell time on any one frequency does not exceed 2 microseconds.
4. The dwell time during any NX04/10, NX25, and NX15 frequency step does not exceed 0.04 percent of the device's minimum scan/cycle rate.
5. For certification testing, the measurement of emissions from NX04/10, NX25, and NX15 was conducted with the stepping function active for all possible frequency step sizes.
6. NX04/10, NX25, and NX15 comply with all other technical and operational requirements applicable to UWB GPR devices under Part 15, Subpart F of the Commission's rules.
7. The operation of NX04/10, NX25, and NX15 is limited to GPRs and wall imaging systems operated for purposes associated with law enforcement, firefighting, emergency rescue, scientific research, commercial mining, or construction. Parties operating this equipment must be eligible for licensing under the provisions of part 90 of § 15.509.
8. Sales of the GSSI GPR devices authorized under this waiver are subject to an annual limit of 5,000 devices for each of the first two years and 10,000 devices each year thereafter.

NX04/10, NX25, and NX15 are not toys. NX04/10, NX25, and NX15 cannot be used on ships or aircraft.

FCC Class A Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment or residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the introduction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

"Dead Man" Switch: In compliance with FCC regulations NX25 and NX15 are equipped with a "Dead Man" switch that disables the antenna transmitter after 10 seconds of inactivity.

Coordination Requirements

- (a) UWB imaging systems require coordination through the FCC before the equipment may be used. The operator shall comply with any constraints on equipment usage resulting from this coordination.

- (b) The users of UWB imaging devices shall supply detailed operational areas to the FCC Office of Engineering and Technology who shall coordinate this information with the Federal Government through the National Telecommunications and Information Administration. The information provided by the UWB operator shall include the name, address and other pertinent contact information of the user, the desired geographic area of operation, and the FCC ID number and other nomenclature of the UWB device. This material shall be submitted to the following address:

Frequency Coordination Branch, OET Federal Communications Commission, 445 12th Street, SW Washington, D.C. 20554 ATTN: UWB Coordination

- (d) Users of authorized, coordinated UWB systems may transfer them to other qualified users and to different locations upon coordination of change of ownership or location to the FCC and coordination with existing authorized operations.
- (e) The NTIA/FCC coordination report shall include any needed constraints that apply to day-to-day operations. Such constraints could specify prohibited areas of operations or areas located near authorized radio stations for which additional coordination is required before operation of the UWB equipment. If additional local coordination is required, a local coordination contact will be provided.

Notice: Use of this device as a through-wall imaging system is prohibited by FCC regulations.

Ground Penetrating Radar Coordination Notice and Equipment Registration (for U.S. Customers only)

Note: This form is only for domestic United States users. The Federal Communications Commission (FCC) requires that all users of GPR who purchased antennas after 15 July 2002 register their equipment and areas of operation. It is required that you fill out this form and fax or mail to the FCC.

Failure to do this is a violation of Federal law.

1. **Date:**
2. **Company Name:**
3. **Address:**
4. **Contact Name:**
5. **Contact Phone Number:**
6. **Area of Operation [State(s)]:**

7. **Equipment Identification:**

Brand Name: Geophysical Survey Systems, Inc.

List all systems and antennas being registered.

Check Boxes for Included Models	NX Antenna Model	Serial Number	Center Frequency (MHz)	FCC ID
☐	NX04/10		400/1000	QF7NX0410
☐	NX25		2500	QF7NX25
☐	NX15		1500	QF7NX15

8. Receipt Date of Equipment:

Fax this form to the FCC at: 202-418-1944 or mail to:

Frequency Coordination Branch, OET Federal Communications Commission, 445 12th Street, SW
Washington, D.C. 20554 ATTN: UWB Coordination

Do not send this information to GSSI.

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Introduction

Thank you for purchasing a Nexus-based GSSI system! This user guide covers the entire suite of product features for GSSI's NX Control App and guidance for using NX Control with Compass NX, NX25 Small Area System, and NX15 Deep Target System.

Our promise to you is to provide comprehensive training, unrivaled customer support and world-class expertise. That's why Flex systems include our industry-leading two-year warranty, complimentary training, and technical support access. For more information, visit us at www.geophysical.com.



Our team of dedicated technical trainers is ready to work with users of all experience levels, and GSSI Academy classes are offered on a quarterly schedule. Check out the GSSI Academy offerings at www.geophysical.com/gssi-academy or scan the accompanying QR code with your smartphone.

What is NEXUS®?

NEXUS is GSSI's newest and most advanced technology platform, and it is the engine that will drive our future industry-leading innovations. A technological triumph, the core elements of Nexus facilitate a profound leap forward in GPR performance, data stream integration, and user experience. Nexus is the tangible representation of GSSI's Simple, Flexible, and Trusted mission, and its continual evolution will lead to vast improvements in system design, application relevancy, and interoperability of Nexus-cored technologies. We invite you to learn more about Nexus and its capabilities by contacting your GSSI sales representative.

Nexus-Based Systems and GSSI Fusion™

NX Control was designed with GSSI's Fusion platform at the forefront. GSSI Fusion is a comprehensive reporting platform that integrates with our Nexus-based Compass NX, NX25, and NX15 systems. A quick and easy reporting tool, Fusion acts as an efficient organizational system for uploading Results, adding descriptions, integrating field photos, and submitting a professional report branded with your company logo. NX Control enhances the Fusion experience by adding data collection and organization features that lead to more detailed and thorough reporting. These include Project and AOI renaming, importing live or saved camera photos, and clean, report-ready screenshots.

GSSI's mission is the seamless interoperability of our hardware and software platforms. We understand that, in most cases, a report is a procedural bottleneck that must be submitted before you leave the jobsite. To this end, GSSI Fusion's project management environment mirrors the project structure in NX Control. Create new projects with Compass NX, NX25, and NX15, create Areas of Interest, and capture Results. You can then create a .FSN file for easy upload to Fusion, where your project will be set up just like you left it. Enter notes, rename and reorganize, add field photos, and generate a report. Then move on to your next job knowing that your polished and branded report will be digitally available to your client.

We invite you to learn more about GSSI Fusion, and how it can streamline your project reports, by contacting your GSSI sales representative. You can also register for a free GSSI Fusion account by visiting <https://fusion.geophysical.com/>.

GPR Theory Overview

Ground Penetrating Radar (GPR) is a geophysical method that uses radar waves to image subsurface materials. It is commonly employed in construction, geology, archaeology, civil engineering, and environmental studies. Nearly all GPR applications share a common goal: rapid and non-destructive assessment of subsurface targets for mapping, avoidance, or physical inspection. All GPR technology acts as a true remote sensing method, whereby imaging occurs before buried targets are visually inspected. In other words, we cannot know precisely what we are imaging until it is directly observed. However, experience with GPR will improve your interpretation of the resulting data, and knowledge of infrastructure installation and construction techniques will provide even greater insight.

GPR operates on the principles of electromagnetic wave travel and reflection. Basic GPR theory involves an antenna transmitting short waves of electromagnetic energy into the ground, concrete, or other material. The waves travel through different subsurface materials, partially reflecting at boundaries with contrasting physical and chemical properties. The remaining waves travel deeper, reflecting from other boundaries until the waves dissipate. A receiving antenna records the reflections and plots them for display and analysis. The majority of modern commercial GPR systems use antennas containing both transmitter and receiver.

The depth penetration and resolution of GPR depend on several factors, including the frequency of the radar waves and the electromagnetic properties of the medium. Higher-frequency waves provide better resolution but have reduced penetration depth, while lower-frequency waves have greater penetration depth but lower resolution. Materials with high electrical resistance allow deeper penetration, such as air, concrete, and dry sand. Materials with high electrical conductivity, such as curing concrete and wet clay, dissipate the radar waves and vastly reduce penetration depth.

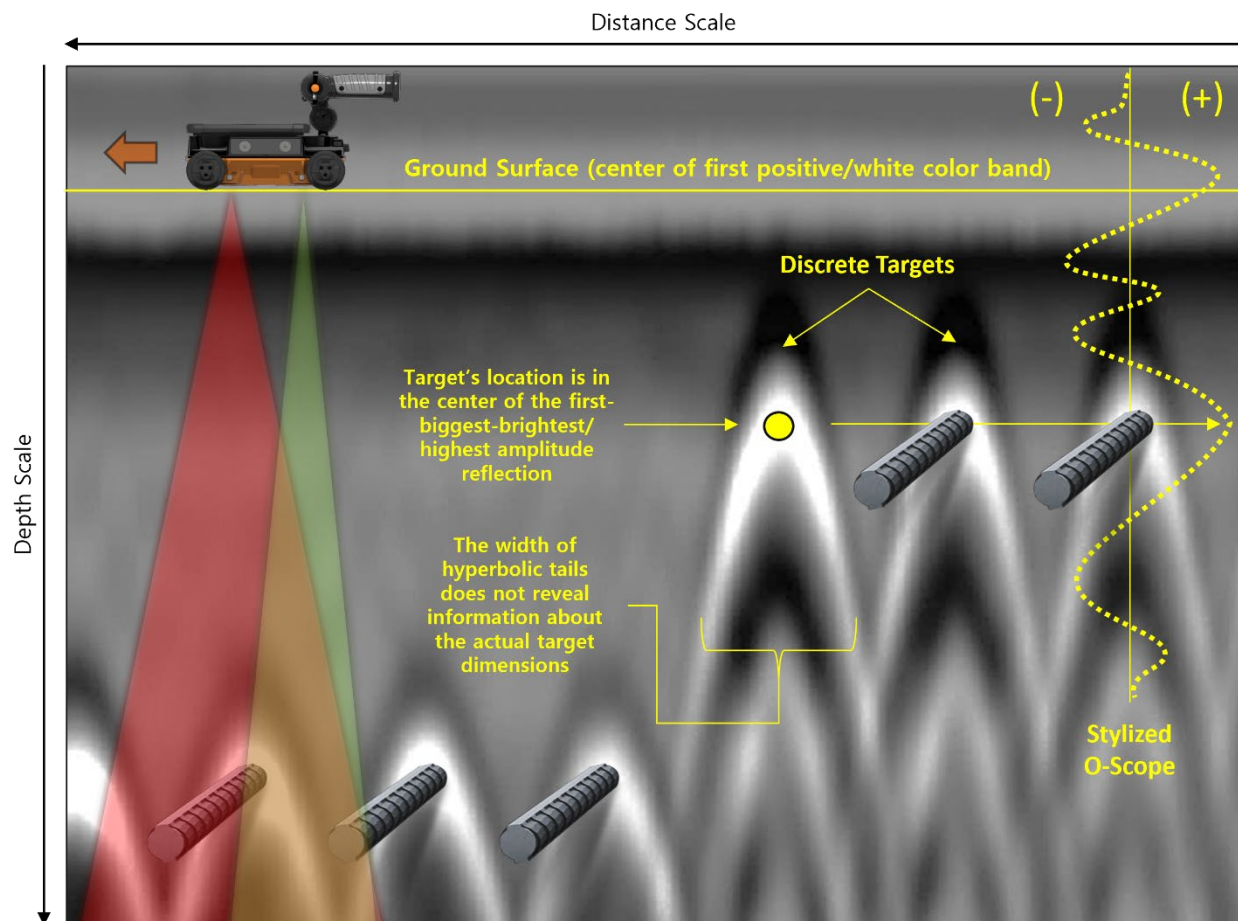
GPR measures the time elapsed between transmission and the return of reflections. The depth of targets or layers is based on the travel time and the speed of the radar waves. As an example, consider airplane detection using ground-based radar. The radar operator must determine the distance to an incoming airplane. To do this, they must use a distance, speed, and time calculation. To solve the problem, only two of the three variables are needed. The radar system records the time elapsed between the transmitted and received signals. Radar waves travel at a constant speed in air. The operator can then determine the distance using the time and speed values. A GPR system works in a similar fashion, though the depth calculation is a bit more complicated. The GPR system precisely records transmit and receive times, so we can easily constrain the time variable. In most cases, the depth of targets is unknown. We must therefore determine the speed of the radar waves to solve for depth. Here's the tricky part: GPR waves travel at different speeds depending on the material they pass through.

To calculate a precise target depth we must determine the speed of the radar waves using a **dielectric constant** value. Multiple methods are available, and in order of least to greatest accuracy these include tables of dielectric values for different materials, hyperbola matching using software, or manually entering a dielectric estimate. In most cases, hyperbola matching is the method of choice; picking a number from a table or guessing the correct dielectric just isn't accurate. Once the dielectric constant is determined, the system calibrates the depth scale accordingly.

The Anatomy of a GPR Profile

NX Control presents scan data as vertical profiles (much like observing the side of a saw cut or a backhoe trench) displaying depth below surface and distance traveled. As discussed above, the depth scale is only as accurate as the current dielectric value. On the other hand, the distance scale is very precise because it is measured with integrated distance encoders. This distance precision ensures accurate mark outs, whether collecting data in forward movement or using backup cursors when traveling in reverse.

As reflections return to the receiving antenna, they are plotted against travel time and assigned a range of colors based on their phase and amplitude. The result is a single scan that is represented by the O-Scope. The antenna collects additional scans as you move it forward, resulting in a continuous GPR profile. All GPR profiles exhibit a series of flat, high amplitude bands that appear



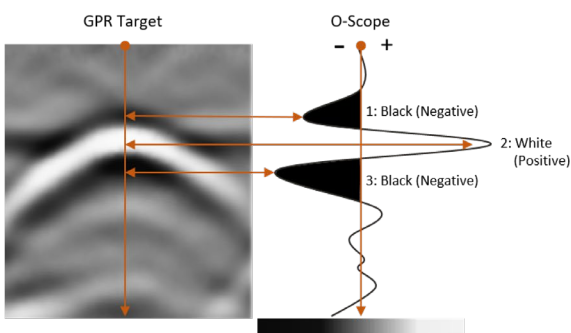
at and just below the ground surface. These reflections represent the direct wave, and they are created when GPR energy travels from transmitter to receiver before it leaves the antenna. The center of the first positive (white) band is the position of the ground surface.

A typical GPR profile contains two categories of reflections: targets and layers. **Targets** are expressed as hyperbolas representing discrete objects, such as rebar and utility lines. These hyperbolas vary in amplitude (reflection strength) based on the material of the object. Metallic objects produce high amplitudes, while synthetic materials generate weaker hyperbolas.

Target hyperbolas will widen with increased depth, and to the untrained eye these deeper targets could be mistaken for larger objects. However, the true diameter of a target cannot be derived from the shape of a hyperbola.

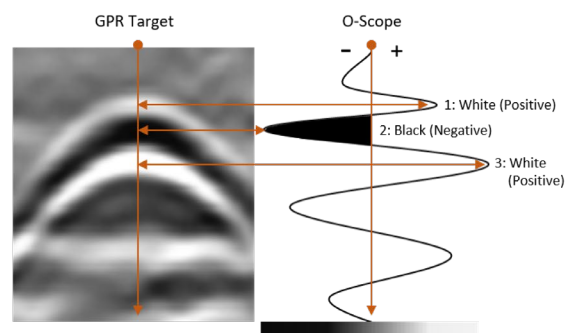
Layers are continuous boundaries, like the base of a concrete slab or an air void under the slab, that you can track along a profile. Like targets, layers can vary in phase and amplitude, but their reflection characteristics are based on the nature of the overlying and underlying materials.

To an experienced GPR operator, the **phase** and **amplitude** of targets and layers reveal additional information to enhance data interpretation. Enabling the O-Scope will assist with advanced interpretations. GPR energy cannot penetrate metallic targets, so a large amount of energy is reflected back to the antenna and registers as a high amplitude target. This is convenient for locating metal pipes, reinforcement and conduit, but solid metal structures like manhole covers and pan decking are impenetrable to GPR energy. GPR energy cannot penetrate metallic targets. Any features of interest on the other side of metal surfaces or inside metal pipes will not be resolvable. Metal targets have a white (normal phase) as their first-biggest-brightest peak. This pattern, along with high amplitudes, typifies metal targets and demonstrates that the energy decreased in speed as it passed from concrete to the metal.



The first reflector is black (negative), but the **first-biggest-brightest reflector** is white (positive). This demonstrates that the GPR energy decelerated at the concrete/target contact. This target could be interpreted as metallic or possibly water-filled PVC.

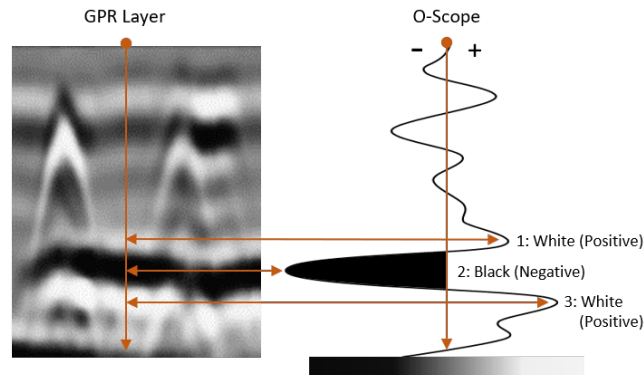
Marking this and other targets on the slab surface would show the broader pattern, improving the interpretation.



The first reflector is white (positive), but the **first-biggest-brightest reflector** is black (negative). This demonstrates that the GPR energy accelerated at the concrete/target contact. This target could be interpreted as air-filled PVC or potentially as a small air void.

Marking this and other targets on the slab surface would show the broader pattern, improving the interpretation.

In other cases, the pattern of reflections will be reversed (white-black-white). This pattern suggests that the energy increased in speed at a material boundary, such as the air void in a PVC pipe or an air void underground or beneath a concrete slab. These reflections will often exhibit lower amplitudes and could be masked by hyperbolas from rocks and reinforcement.



The first reflector is white (positive), but the **first-biggest-brightest reflector** is black (negative). This demonstrates that the GPR energy accelerated at the concrete/layer contact. This target could be interpreted as an air-filled void at the base of the slab.

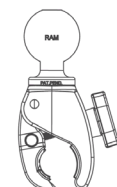
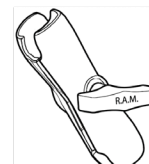
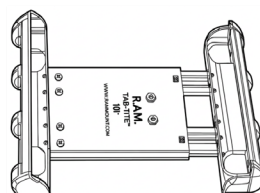
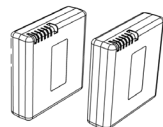
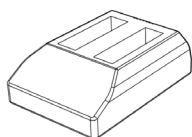
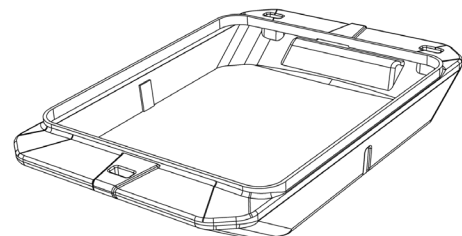
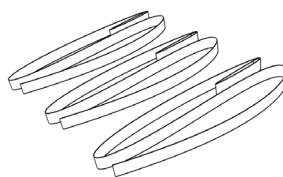
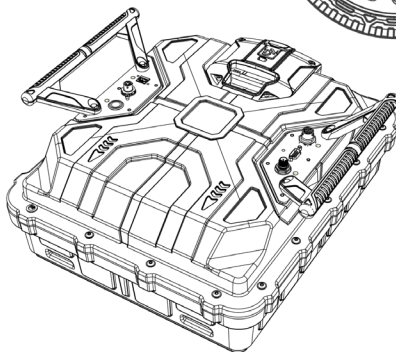
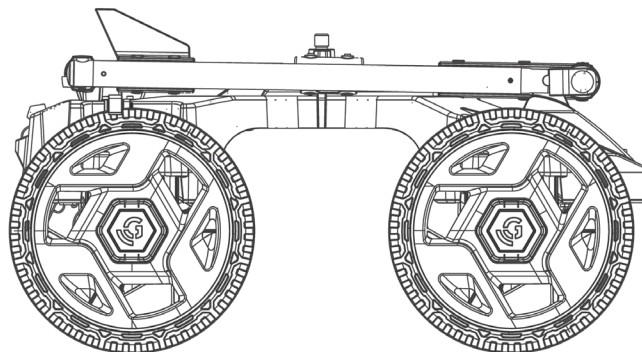
Marking the extents of this layer on the slab surface would show areas of voiding, allowing targeted remediation efforts.

Compass NX: Hardware Overview

Compass NX is the first utility-focused system in GSSI's rugged and ready-for-anything NEXUS lineup. The two integrated antennas inside NX04/10 offer a perfect balance of high resolution for shallow targets and enhanced penetration for deep targets. The Model 661 Rugged Cart is quick to deploy, highly mobile, and built to tackle anything. Powered by the modern and powerful NX Control app, Compass NX is engineered for greatness and will help you locate, map, and deliver like a pro.

What's in the Box: Compass NX

The standard Compass NX system ships with the following hardware, software, and accessories. Additional accessories can be purchased at the time of sale or by contacting your GSSI sales representative.



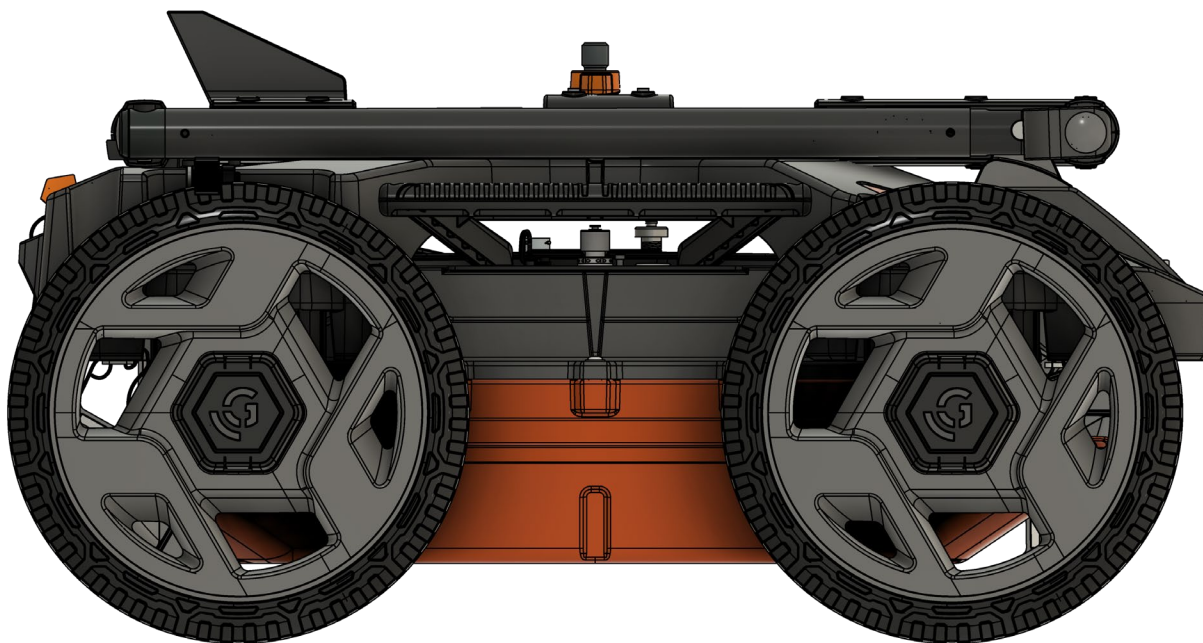
System Specifications: Compass NX (Model 661 Cart, NX04/10 Antenna, NX Control app)

Cart	
Cart Model	Model 661 with floating sled
Sled Clearance	0-5.7 cm (0-2.25 in)
Encoder Technology	Solid-state magnetic; located in rear right wheel
Cart Brake	Foot- or hand-activated
Handle Design	Collapsible; lockable while folded and in-use
GPS Mount	5/8" thread; GPS Pole accessory purchased separately
Controller Mount	Removable RAM standard mount (part #: RAM-HOL-TAB20U) for 9-10.5 in. tablets with rugged cases. See RAM website for details.
Dimensions	Collapsed and no tablet mount: L74 x W57.5 x H39 cm (29.1 x 22.6 x 15.4 in)
Weight	16 kg (35.4 lbs)
Antenna	
Antenna Model	NX04/10
Number of Channels	2 channels - 400 MHz low frequency / 1 GHz high frequency
Available Ports	Survey wheel (4-pin), GPS (9-pin serial), 2 accessory ports, 1 USB
Connectivity	Wireless via local Wi-Fi access point
Data Acquisition	NX Control App available via Apple App and Google Play stores
Data Storage	Local storage on connected mobile device via NX Control App only
Time Range (ns)	200 (LF) / 100 (HF)
Scan Interval	50 scans/meter (15.24 scans/ft)
Samples per Scan	1024 samples
Operating Modes	Continuous (time triggered) or survey wheel (distance triggered)
GPS	Serial port on antenna; Bluetooth to mobile device; Mobile device internal GPS
Environmental Rating	IP65 (fully sealed against dust and low-pressure omnidirectional water)
Operating Temperature	-20°C to 55°C external (-4°F to 131°F)
Battery Performance	5 hours (per battery) in ideal operating conditions
Dimensions	With handles: L48.5 x W44.7 x H22.5 cm (19.1 x 17.6 x 8.9 in) Without handles: L48.5 x W41.5 x H19 cm (19.1 x 16.3 x 7.5 in)
Weight	With battery: 6.4 kg (14.2 lbs) Without battery: 6.1 kg (13.4 lbs)
Hardware Warranty	2-Year Limited Warranty from date of purchase
Software	
App & Device Requirements	NX Control App compatible with modern iOS or Android mobile devices. NX Control App available via Apple App and Google Play stores.
Controller Options	No controller included unless supplied by distributor.

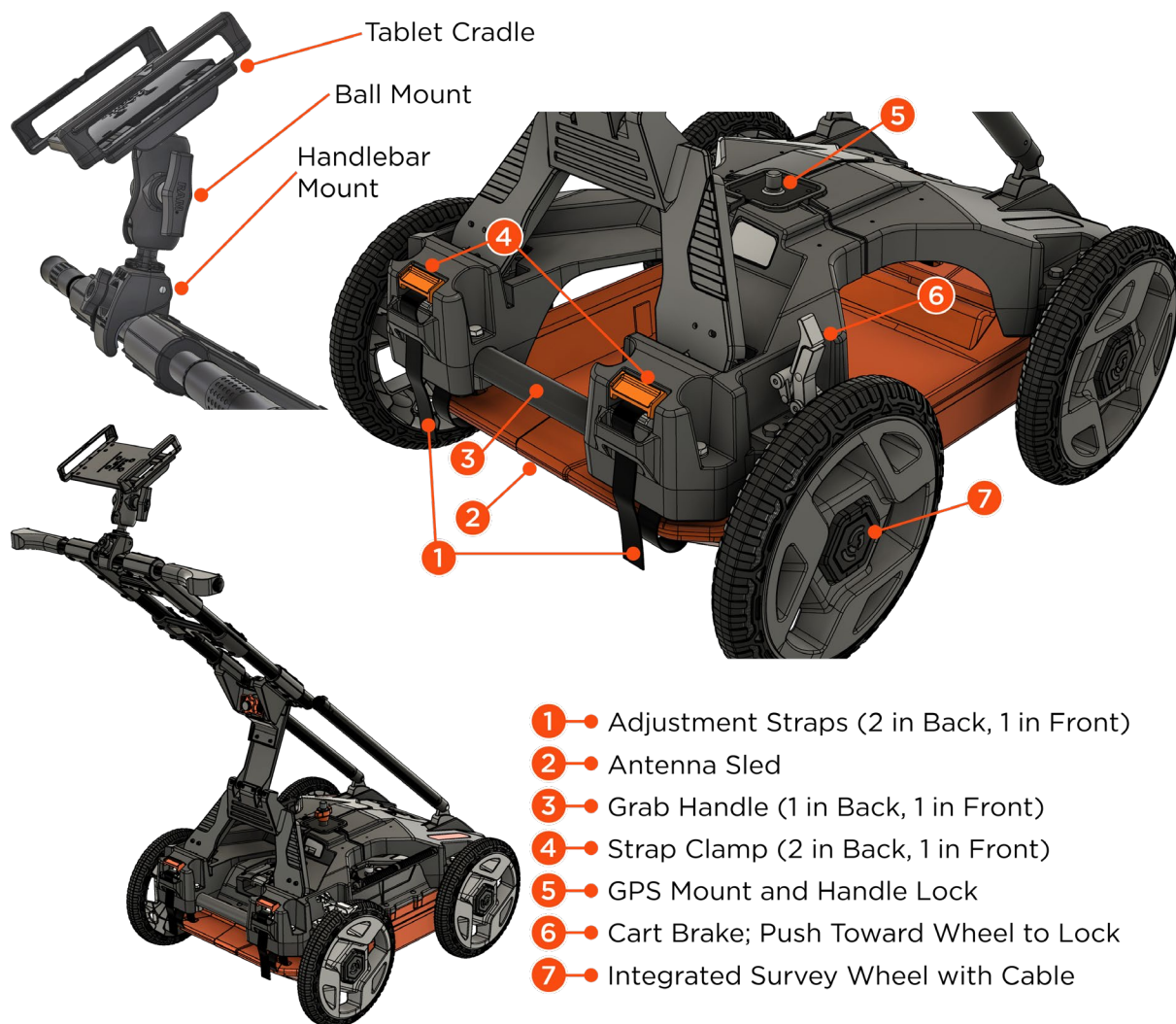
Display Modes	Linescan (Ch1; Ch2; split view) plus O-Scope, Map view
Storage Capacity	Connected device dependent
Post-Processing Support	Geolitix only
Output Data Format	.nx, .kml
Standard Real-Time Filters	Toggleable Background Removal with intensity slider
Advanced Real-Time Filters	Coarse and Fine Detail frequency filters with Boost
Languages	English, Spanish, Japanese, Korean, Chinese, French, Italian, German

Compass NX: Unboxing and Transporting

Your Compass NX hardware will arrive completely assembled, with the sled straps cinched tight and the handle locked. There will not be a battery in the battery compartment, and the encoder cable will not be connected to NX04/10. **We recommend using this configuration any time you pack up Compass NX for transport or storage.**

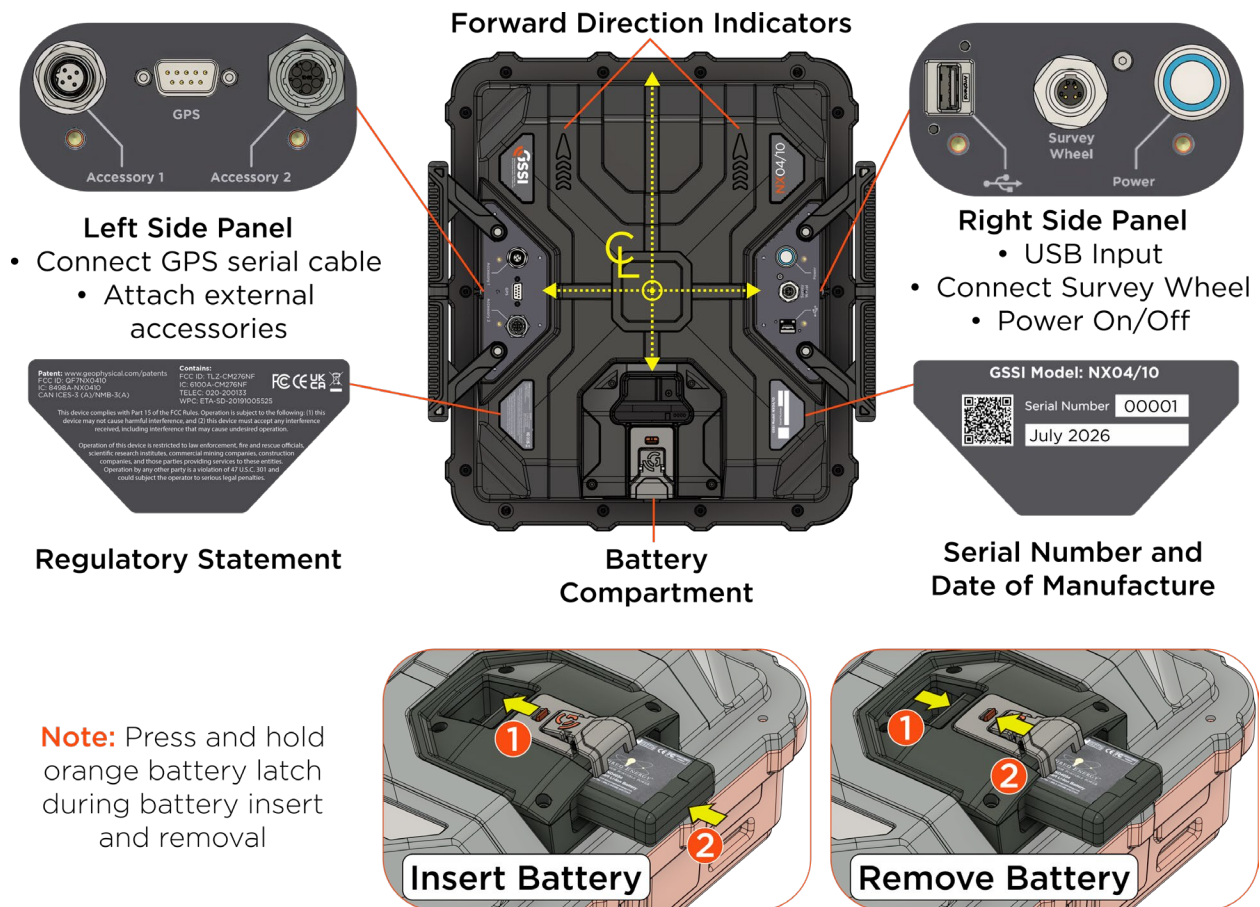


Physical Features: Model 661 Cart



Physical Features: NX04/10 Antenna

NX04/10 houses two integrated antennas. Both antennas share a center point that is clearly indicated on the top housing. When used with the Model 661 Cart the survey wheel cable must be connected to the antenna's Survey Wheel port in order to collect distance-based scans.



IMPORTANT: Electronic devices may consume battery life when powered off, or unintentionally powered on during transport. GSSI suggests removing the battery when NX04/10 is not in use.

Battery Charging Station Instructions

Assemble the battery charger's AC adapter by inserting the power plug into the AC adapter. Next, plug the AC adapter into the battery charger and then plug the AC adapter into an approved electrical outlet.

Insert a battery into one or both of the charger slots. Note that the battery must be inserted with the terminals facing downward and aligned with the receiving board in the charger slot.

NX04/10 antenna batteries are equipped with a fuel gauge feature for quickly determining the remaining charge. Over time, the fuel gauge may become less accurate and will need to be recalibrated. To recalibrate, place a battery into one or both charger slots and press the button next to each occupied charger slot. For chargers with an Inspired Energy

LED Status	LED Color	Battery Status
NO LED	N/A	No Battery Detected
	Blinking Green	Fast Charging
	Solid Green	Fully Charged
	Blinking Yellow	Battery Recalibrating
	Blinking Yellow to Solid Green	Battery Recalibrated
	Solid Yellow	Standby or Suspend
	Blinking Red	Error

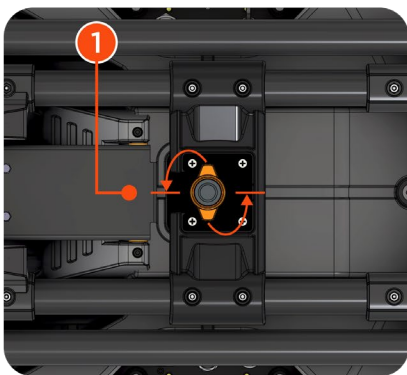
label, there is a black button near the front of each charger slot. Other charger models will have "Push to Recalibrate" buttons near the front of the charger. Regardless of the charger model the recalibration could take up to 9 hours; please plan accordingly.

Compass NX: System Deployment

We designed Compass NX to be quick to deploy and easy to use. Setting up for scanning requires a few simple steps. You'll be scanning in no time!

Use the following steps to deploy your Compass NX system.

Release central handle lock by turning the orange knob.



Lift the rear legs until they lock in place.



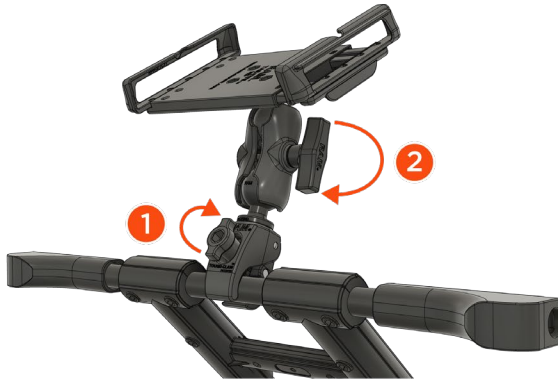
Extend the upper handle, placing the handle support plate behind the orange locking mechanism.



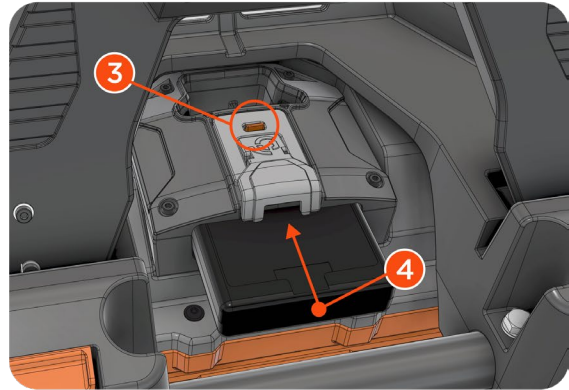
Ensure that the orange locking plate is oriented horizontally; turn the orange knob clockwise to tighten.



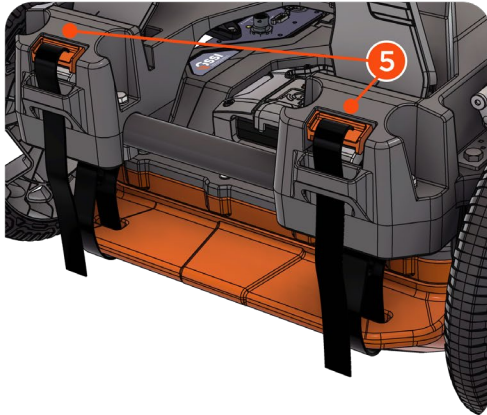
Attach the RAM Tough-Claw to the handlebar and tighten the knob. Adjust the Socket Arm and cradle for optimal viewing. Tighten the knob on the Socket Arm.



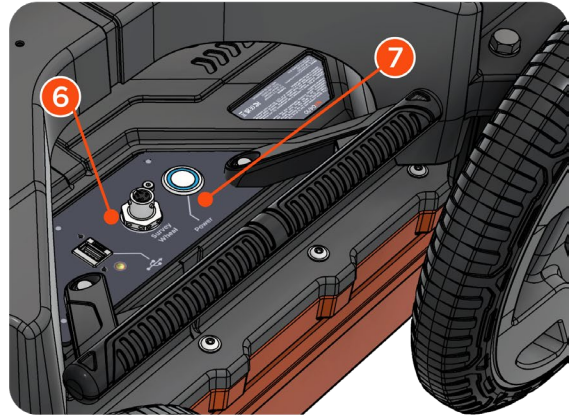
Insert a 4-cell battery. Press the orange locking tab forward, lift the locking latch with the battery, and insert the battery until the latch locks.



Press front (1x) and rear (2x) clips until sled rests on ground.



Connect Survey Wheel cable to Survey Wheel port. Press power button.



When scanning on pavement, concrete, or other hard and rough surfaces, raise the antenna sled slightly above the ground surface. This will prevent undue wear on the sled and will be much quieter. Note that raising the sled more than an inch above the ground surface will adversely impact data quality.

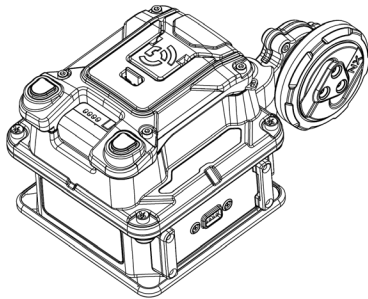
NX25 and NX15: Hardware Overview

The NX25 Small Area System and the NX15 Deep Target System are handheld antennas designed for concrete investigation. The NX25 System is ideal for scanning coring and drilling locations, tight spaces, and overhead or elevated areas such as walls and ceilings. The NX15 System offers increased depth penetration and is perfect for thick concrete and targets in the subgrade below concrete slabs.

What's in the Box: Small Area and Deep Target Systems

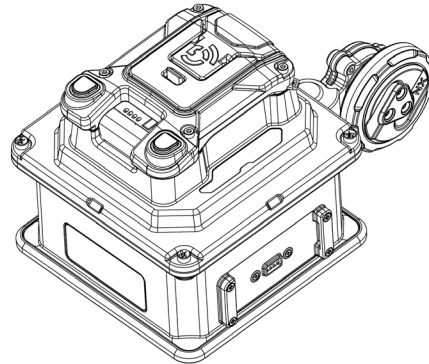
The standard NX25 Small Area System and NX15 Deep Target System ship with the following:

NX25 Small Area System



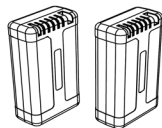
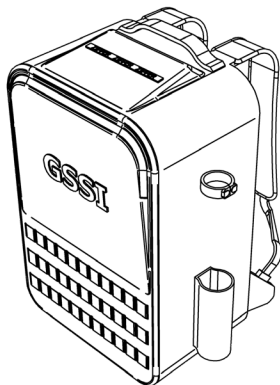
NX25 Antenna

NX15 Deep Target System

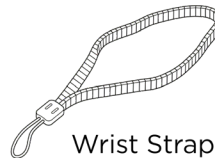
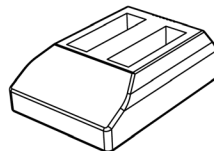


NX15 Antenna

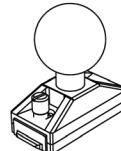
Accessories included with Small Area and Deep Target Systems



Li-Ion Batteries



Wrist Strap



NX Control App

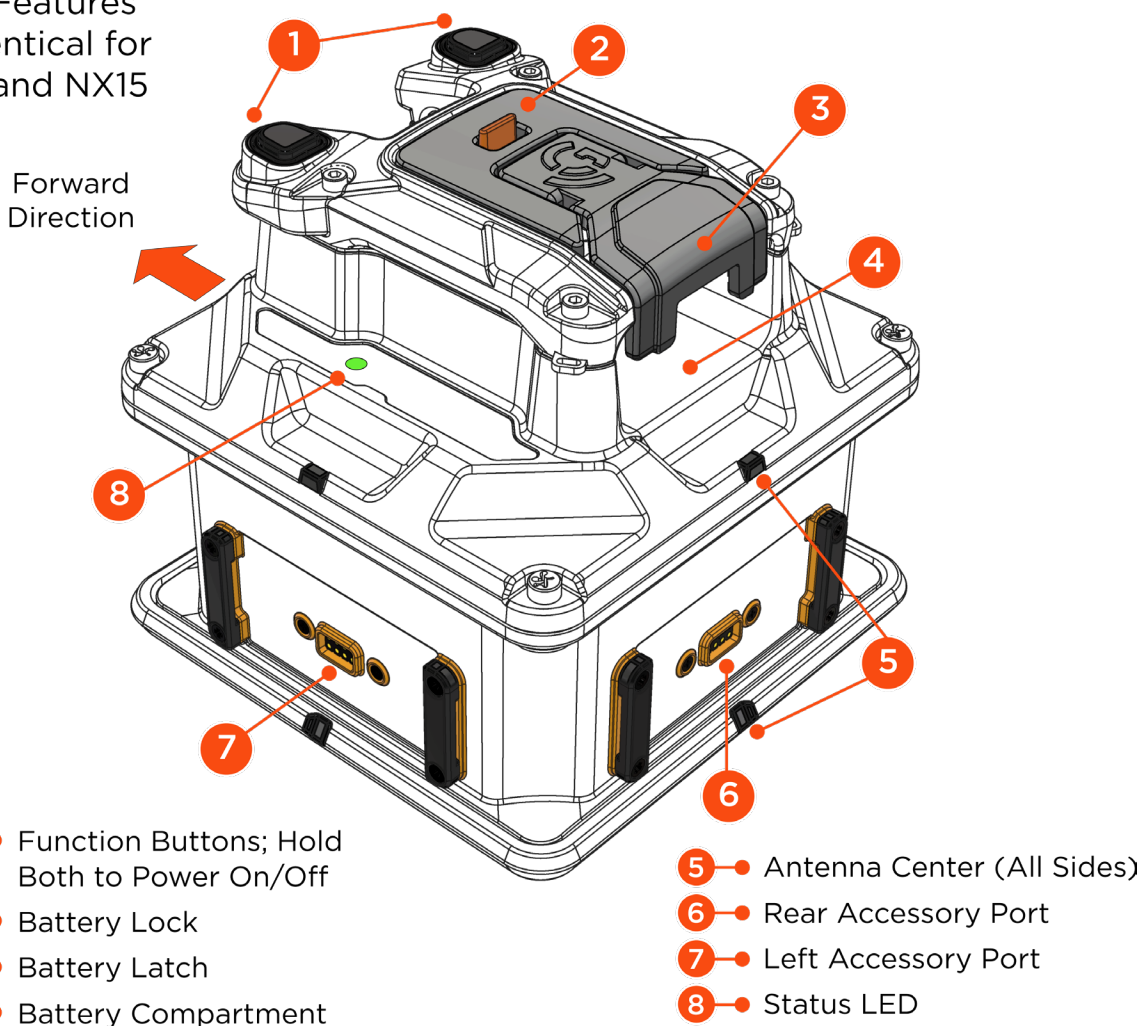


System Specifications: NX25 and NX15

Antenna	
Antenna Models	NX25 Small Area System; NX15 Deep Target System
Number of Channels	1 channel
Available Ports	Two interchangeable ports for survey wheel and RAM accessories
Connectivity	Wireless via local Wi-Fi access point
Data Acquisition	NX Control App available via Apple App and Google Play stores
Data Storage	Local storage on connected mobile device via NX Control App only
Max Depth	NX25: 0-75 cm (0-30 in); NX15: 0-150 cm (0-60 in).
Scan Interval	50 scans/meter (15.24 scans/ft)
Samples per Scan	1024 samples
Operating Modes	Continuous (time triggered) or survey wheel (distance triggered)
GPS	Bluetooth to mobile device; Mobile device internal GPS
Environmental Rating	IP65 (fully sealed against dust and low-pressure omnidirectional water)
Operating Temperature	-20°C to +50°C (-4°F to +122°F)
Battery Performance	5 hours (per battery) in ideal operating conditions
Dimensions	NX25: 11.2 x 11.2 x 10.4 cm (4.4 x 4.4 x 4.1 in)
	NX15: 13.9 x 13.9 x 13.2 cm (5.2 x 5.5 x 5.5 in)
Weight	NX25: 0.8kg (1.8lbs) with battery
	NX15: 1.2kg (2.8lbs) with battery
Hardware Warranty	2-Year Limited Warranty from date of purchase
Software	
App & Device Requirement	NX Control App compatible with modern iOS or Android mobile devices. NX Control App available via Apple App and Google Play stores.
Controller Options	No controller included with NX25 or NX15; must be supplied by user
Display Modes	Single channel Linescan plus O-Scope, Map view
Storage Capacity	Connected device dependent
Post-Processing Support	Geolitix only
Output Data Format	.nx, .fsn
Standard Real-Time Filters	Toggleable Background Removal with intensity slider
Advanced Real-Time Filters	Coarse and Fine Detail frequency filters with Boost
Languages	English, Spanish, Japanese, Korean, Chinese, French, Italian, German

Physical Features: NX25 and NX15 antennas

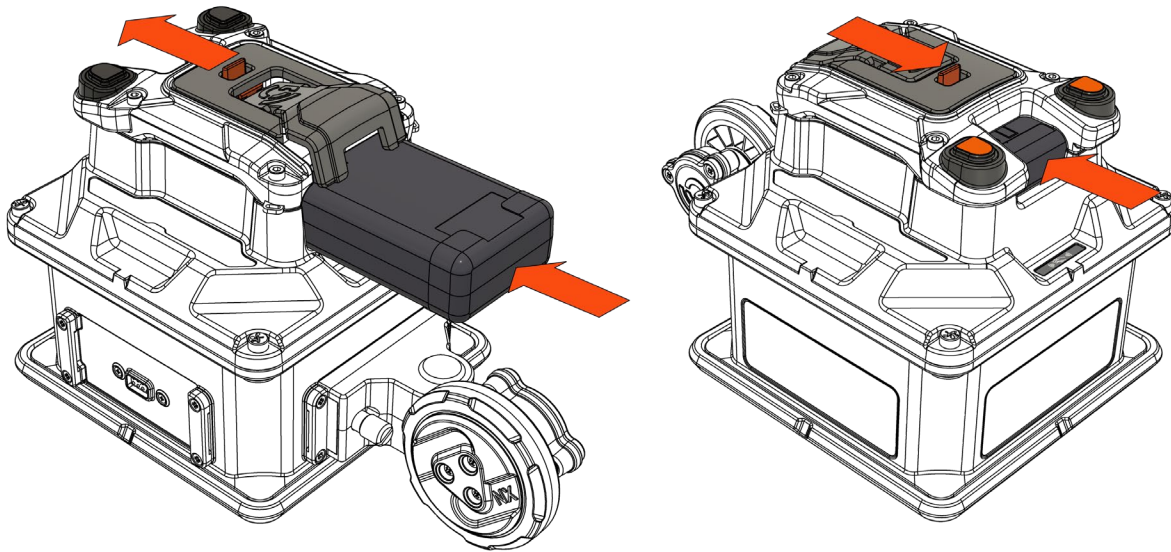
Note: Features are identical for NX25 and NX15



NX25 and NX15: Battery Usage

To insert the battery, orient the battery contacts downward and toward the antenna. Next, slide the battery latch lock forward and use the battery to push up on the battery latch. The latch will snap into place once the battery is fully inserted.

To eject the battery, use your index finger to slide the battery latch lock, then insert your thumb into the front access window and push the battery out of the battery compartment.



IMPORTANT: Electronic devices may consume battery life when powered off. GSSI suggests removing the battery when NX25 and NX15 are not in use.

Battery Charging Station Instructions

Assemble the battery charger's AC adapter by inserting the power plug into the AC adapter. Next, plug the AC adapter into the battery charger and then plug the AC adapter into an approved electrical outlet.

Insert a battery into one or both of the charger slots. Note that the battery must be inserted with the terminals facing downward and aligned with the receiving board in the charger slot.

NX25 and NX15 batteries are equipped with a fuel gauge feature for quickly determining the remaining charge. Over time, the fuel gauge may become less accurate and will need to be recalibrated. To recalibrate, place a battery into one or both charger slots and press the button next to each occupied charger slot. For chargers with an Inspired Energy label, there is a black button near the front of each charger slot. Other charger models will have "Push to Recalibrate" buttons near the front of the charger. Regardless of the charger model the recalibration could take up to 9 hours; please plan accordingly.

For **LED status**, **LED color**, and related **system status** information please refer to the accompanying LED chart.

LED Status	LED Color	Battery Status
NO LED	N/A	No Battery Detected
	Blinking Green	Fast Charging
	Solid Green	Fully Charged
	Blinking Yellow	Battery Recalibrating
	Blinking Yellow to Solid Green	Battery Recalibrated
	Solid Yellow	Standby or Suspend
	Blinking Red	Error

NX25 and NX15: Powering On



Insert a fully charged battery, then press and hold the two top housing buttons to power on NX25 and NX15. To power down the system, hold both buttons until the LED turns off. GSSI does not recommend ejecting the battery to power down.

NX25 and NX15: Attaching Accessories

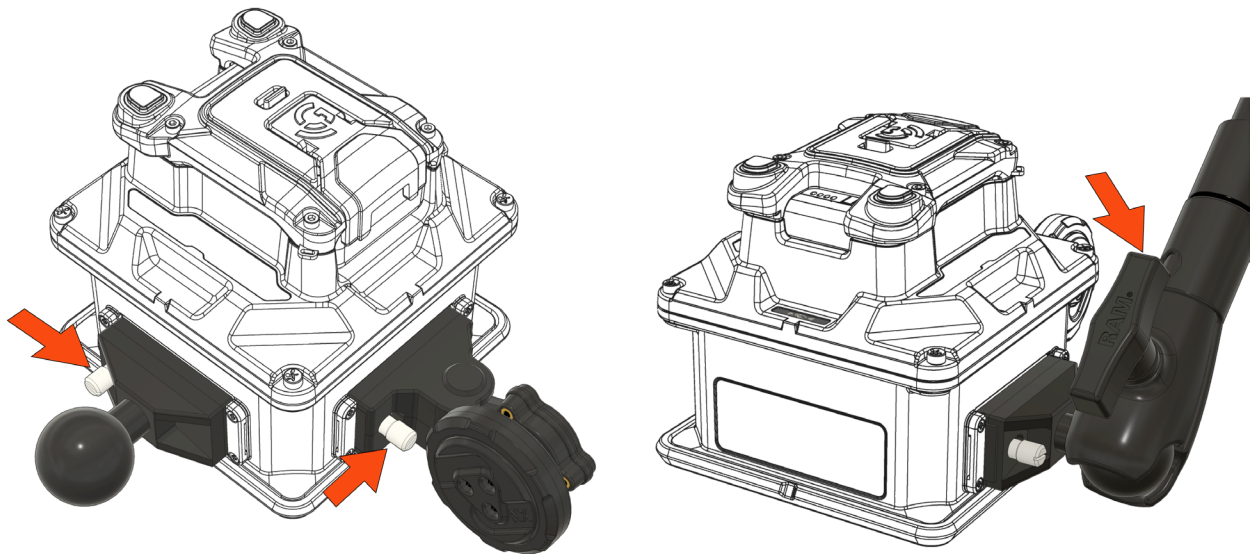
Antenna accessory ports are located on the left and rear sides. Both ports are designed for attaching and securing a survey wheel or a RAM ball adapter. The RAM adapter is designed for GSSI accessories, but it can also be used with a custom RAM solution.

Attaching Accessories to the Rear and Side Accessory Ports

A survey wheel can be attached to either port based on personal preference. In common practice, the survey wheel is attached to the rear port for typical scanning situations and attached to the left port for “side car” scanning next to walls. The survey wheel arm locks when the antenna is fully in contact with the scanning surface and can be turned 90-degrees for cross-polarized scanning.

To attach accessories, slide the locking pin inward and insert the right side into the accessory port with the locking pin to the left. Next, insert the locking pin side and release the locking pin.

To attach the Telescoping Pole Accessory, loosen the knob then slide the jaws over the RAM adapter ball and tighten the knob.

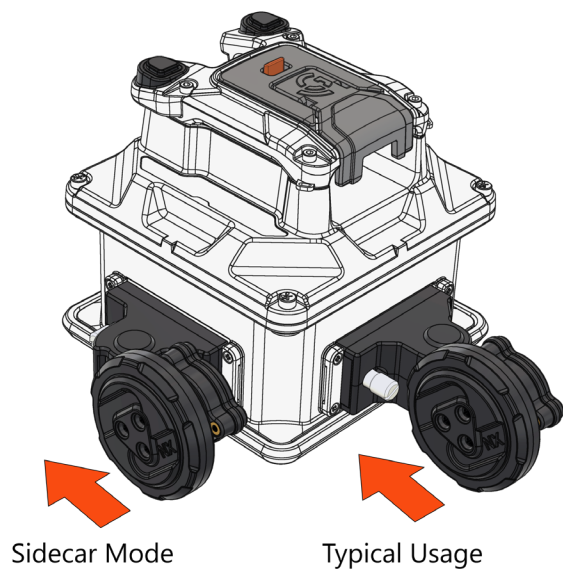


NX25 and NX15: Encoder Configurations

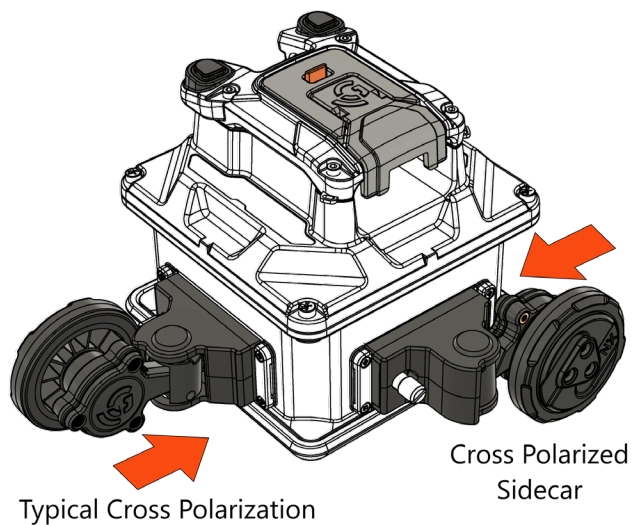
Survey wheels are highly configurable based on your current needs. For Standard Orientation scanning there are two options: rear accessory port with the arm fully extended, and side car mode using the left accessory port and the survey wheel arm folded to the side. For cross-polarization there are also two options: rear accessory port with the arm folded to the side, and side car mode

using the left accessory port and the survey wheel arm fully extended. Note that for cross-polarized scanning the movement direction is not aligned with the front of the antenna. Refer to the orange arrows in the figure below to see which direction to move the antenna for each encoder configuration. Use sidecar mode for tight spaces, columns, and scanning next to walls.

Standard/Normal Polarization

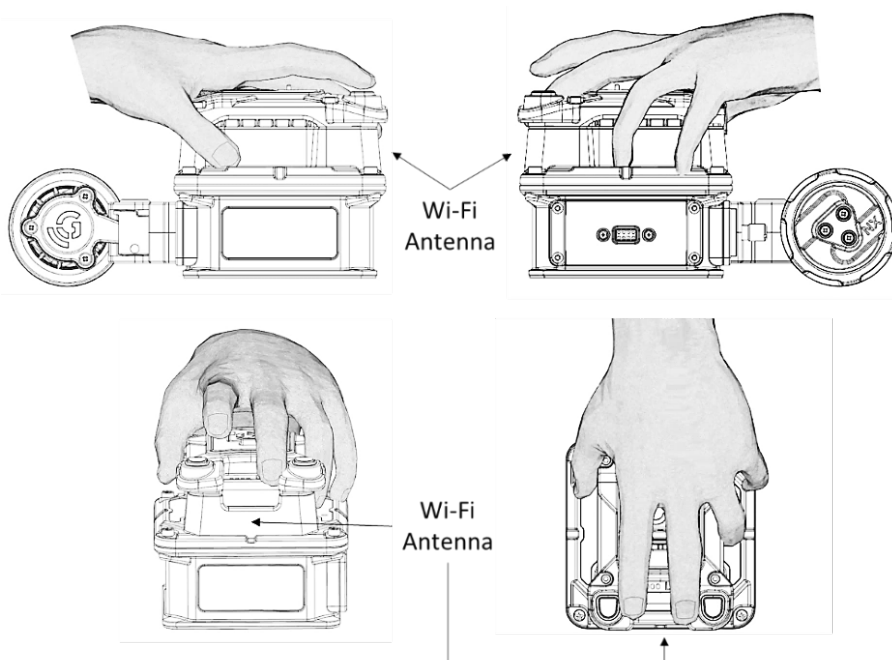


Cross Polarization



Wi-Fi Safety and Holding NX25 and NX15

GSSI highly recommends observing safe Wi-Fi exposure habits when operating NX25 and NX15. Please consult the following images and grip the antennas according to our recommendation.



NX25 and NX15: Interface Options

NX25 and NX15 operate using one of three interfaces: Nexus, Nexus Elements, and the NX Control app. The **Nexus Interface** requires connecting an NX25 or NX15 to Flex NX or Flex LT as an accessory. The **Nexus Elements Interface** connects via mobile device and web browser; it does not require Flex NX or Flex LT or save scan data. The **NX Control App** is a native iOS and Android app, downloadable from the Apple and Google app stores, that requires an NX Control license.

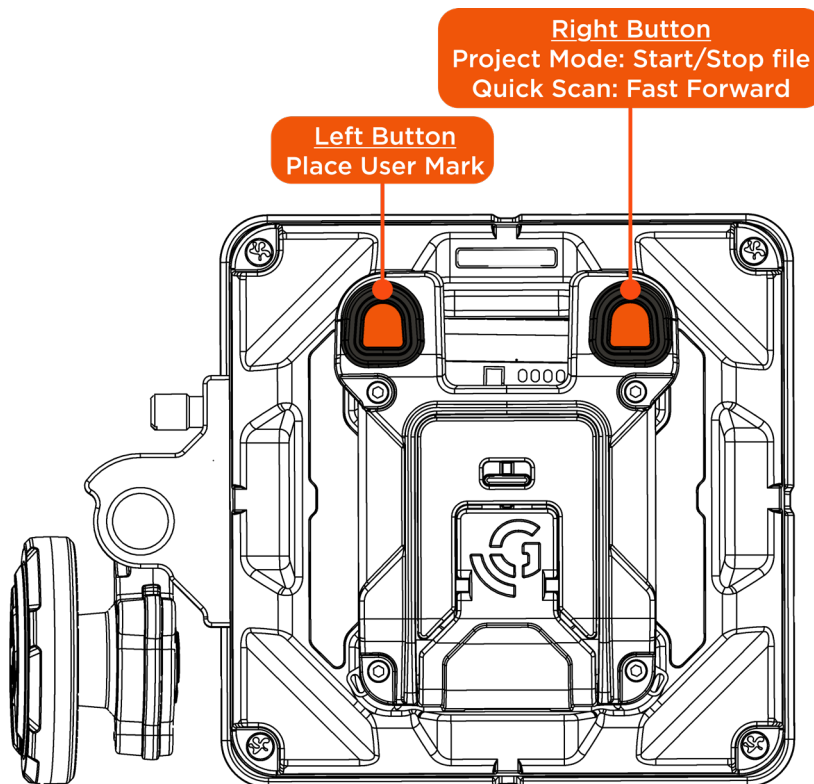
This User Guide focuses on the **NX Control App**. Please refer to the Flex NX/LT User Guide for additional information on the Nexus Interface and the Nexus Elements Interface.

Antenna LED Indicators

NX25 and NX15 antennas are equipped with an LED indicator displaying the current system status. To use NX Control with NX25 and NX15, power on the antenna and wait for the red LED to transition to blinking yellow/green. If the LED transitions to blinking blue the antenna is in accessory mode (last paired with Flex NX or Flex LT). Simply wait 90 seconds for the LED to flash magenta; it will then transition to blinking yellow/green.

Hard Button Quick Actions

During data collection the hard buttons on NX25 and NX15 are assigned **quick actions**. The left button places a User Mark in Project Mode and Quick Scan. The right button starts and stops a file in Project Mode, and for Quick Scan the button activates the Fast Forward feature.



NX Control App

NX Control is GSSI's newest scan controller app. It is compatible with modern Android and iOS smartphones and tablets that are Wi-Fi enabled, and it is available through the Google Play Store and Apple App Store. Please note that older mobile devices may be compatible with NX Control but they are not supported by the GSSI software team and may experience performance issues.

NX Control: Mobile Device Recommendations

NX Control is designed for modern iOS and Android mobile devices. The app is compatible with tablets and smartphones, but GSSI recommends using a 9-10.5" tablet for most scanning tasks. For best performance, use a recent device with a current operating system, fast processor, a minimum of 6 GB RAM and 128 GB storage, strong Wi-Fi/Bluetooth performance, good battery health, and a bright display suitable for outdoor use.

Recommended device age

For best performance, use a current or recent-generation tablet or smartphone. GSSI highly recommends using the current or previous 1-2 generations of mobile device models. At the very minimum the tablet should be no more than 2-3 model years old and must still be eligible for current operating system and security updates. Use devices older than 3 years at your own risk; GSSI cannot guarantee optimal or even adequate app performance on outdated devices.

iPad guidance

For iPad, use a model that supports the current iPadOS release. Recommended models include recent iPad, iPad Air, iPad mini, and iPad Pro models. Avoid iPads that are no longer eligible for current iPadOS updates. For best field performance, use iPad Pro or iPad Mini Pro models, standard iPad 10th generation/A16 or newer, iPad Air 3rd generation or newer, or iPad mini 6th generation or newer.

Android guidance

For Android, use a recent tablet from a major manufacturer that is still receiving operating system and security updates. GSSI recommends using a Samsung Galaxy Tab Active, Samsung Galaxy Tab S-series (S9-S11), or recent Galaxy Tab FE-series rugged tablets. Avoid older Android tablets, low-cost tablets with limited memory or storage, and devices that are ineligible for operating system and security updates.

NX Control: Downloading and Installation

The NX Control app is required for using Compass NX, NX25, and NX15. Download and install NX Control from the Google Play Store or the Apple App Store using the QR codes below or your mobile device's app store. The provided QR codes will open the NX Control landing page in your app store. Alternatively, visit the app store and search for NX Control.



🔍 NX Control



NX Control App for Android

Scan to download from the Google Play Store



🔍 NX Control



NX Control App for iOS

Scan to download from the Apple App Store

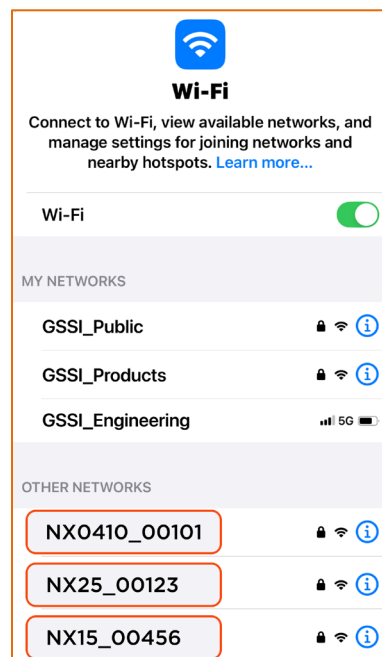
NX Control: Connecting to an Antenna

Follow these steps to connect a mobile device to NX04/10, NX25, and NX15:

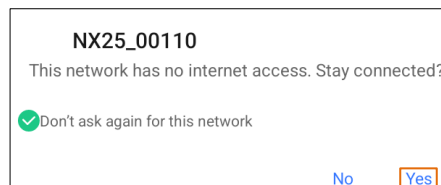
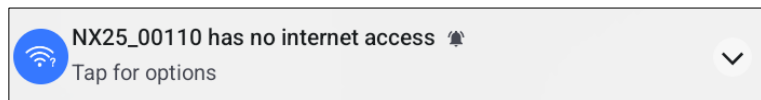
Insert a fully charged battery into NX04/10, NX25 or NX15. The LED on NX04/10 will flash red, then blue, and then transition to green when the antenna is ready to connect. The LED on NX25 and NX15 will flash red and then yellow/green. If the NX25 or NX15 LED flashes blue, wait 90 seconds for the antenna to change modes. The LED will transition from blue to magenta, and then it will display flashing yellow/green.

- 1) Open Wi-Fi settings on your phone or tablet. Tap on the wireless network name that matches your antenna's model number and serial number (e.g. NX0410_00101; NX25_00123; NX15_00456).

- If prompted to enter a password, type in **geophysical**



- Android devices may display a notification when connecting to the antenna's Wi-Fi network, such as: "network has no internet access". The notification may or may not appear on the screen, so make sure to swipe down from the top left of the screen to view notifications. Tap the notification and then select "**Don't ask again for this network**" and tap "**Yes**" to stay connected.



2) Tap the NX Control app icon. Done!

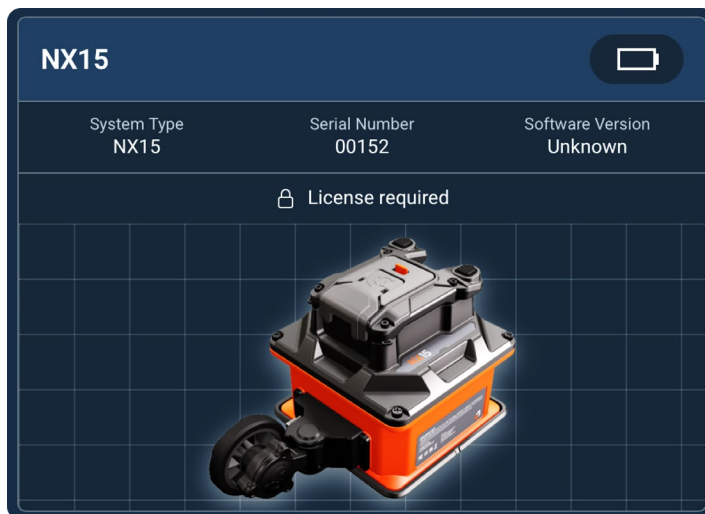


NX Control: Installing a License File

NX Control is a free download from the Apple and Google app stores, but a GSSI antenna must be licensed to unlock data collection features. For your reference, all NX04/10 antennas are licensed at GSSI before shipment. NX25 and NX15 antennas may or may not be licensed, depending on their purchase date and whether NX Control was purchased with the antennas as a bundled package. An NX25 or NX15 purchased prior to August 2026 will most likely not have an NX Control license, and to use NX Control you'll need to purchase an NX Control upgrade for each antenna you currently own.

An NX04/10, NX25, or NX15 antenna will connect to NX Control only when firmware version 3.044 (released August 2026) or later is installed. Follow the steps described above to connect to your antenna's Wi-Fi network, then launch NX Control. You'll see your antenna displayed on the Main Dashboard's Device Panel, and a notification above the antenna stating **License required**.

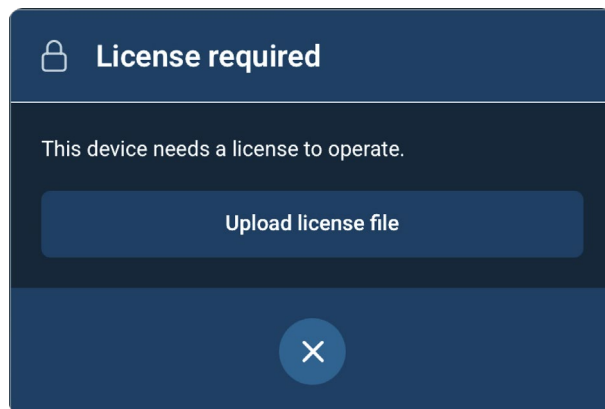
If GSSI has already electronically delivered an NX Control license file, please proceed to the license file upload steps below. If you do not have an NX Control license, please contact your GSSI sales representative to purchase an NX Control upgrade.



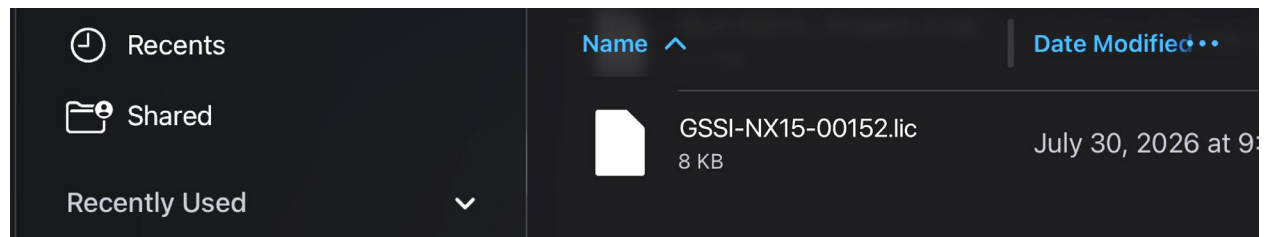
Uploading an NX Control License File

To begin the license upload, download the GSSI-supplied license file to the mobile device you intend to use with NX Control. Alternatively, the license file can be on an inserted USB flash drive that is compatible with your mobile device's operating system.

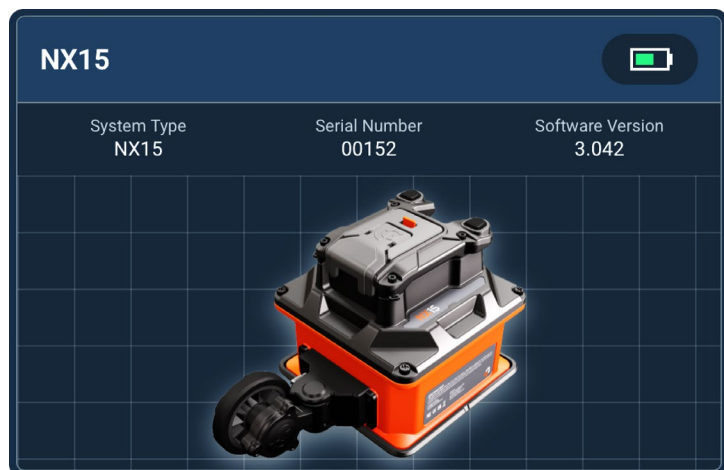
1. Tap the **License required** text to begin the license file upload process.
2. A **License required** popup window will appear. Tap **Upload license file**.



3. Browse your device storage to find and select the license file. The filename will follow the format of GSSI-[*antenna model*]-[*antenna serial number*].lic.

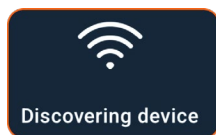


4. Selecting the file will return NX Control to the Main Dashboard and your antenna will be licensed. Note that the NX Control license is stored on your antenna, and your antenna will now connect to NX Control on other mobile devices with NX Control installed.



NX Control: Main Dashboard

NX Control will first display a startup screen featuring the GSSI logo and will then transition to the Main Dashboard. From here you can view the Device Panel, check GPS status, open System Settings, start a Quick Scan session, or interact with the Recent Projects panel.



If Discovering Device appears, please check that your mobile device is connected to the antenna's Wi-Fi network.

Top Navigation Bar

The Top Navigation Bar is present across the NX Control experience, and it displays information relevant to the current screen. The Main Dashboard's Top Navigation Bar features an interactive GPS Status icon and a gear icon that opens System Settings.



Device Panel

The Device panel identifies the system type (antenna model), along with the antenna serial number, antenna firmware version, and battery status. When contacting GSSI Technical Support you may be asked for your antenna firmware version. Antenna firmware can be updated through System Settings > About (see System Settings > About section below). GSSI recommends occasional visits to your antenna's technical support website to compare your firmware version with the newest listed version. If a newer firmware version is listed, we encourage you to update the antenna at your earliest convenience.

Compass NX: www.geophysical.com/support/compass-nx

NX25 and NX15: www.geophysical.com/support/flexnxsupport

Quick Scan

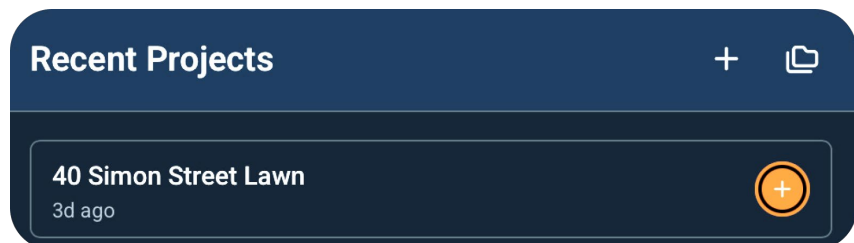


Quick Scan is intended as a one-button, "start scanning immediately" solution for mark-and-go projects that **do not require** saving Scan Data and Results. If you need a few screengrabs of Scan Data, but you do not want to create a formal project, save images simply by capturing a screengrab with your mobile device (typically a combination of power and volume buttons).

Tapping the Quick Scan icon opens the Collection Screen with Start Scan already active; just push your system forward to view live Scan Data.

Recent Projects Panel

The Recent Projects Panel provides options for creating a new Project, opening the Projects Portal, and quickly interacting with your three most recently used projects.



Create a new Project to use **Project Mode**. Enter a Project Name (required), Client Name, and Job Code using your mobile device's on-screen keyboard. Project Mode creates a formal project that is organized by Areas of Interest (AOIs), and each AOI stores saved Results and Scan Data for playback, review, and export.



Open the **Projects Portal** to view and interact with all saved projects.

40 Simon Street Lawn

3d ago



40 Simon Street Lawn

3d ago

Tap the Project name to open the **Project Profile**. From there, you can view and open Results images, playback Scan Data, and export the Project.



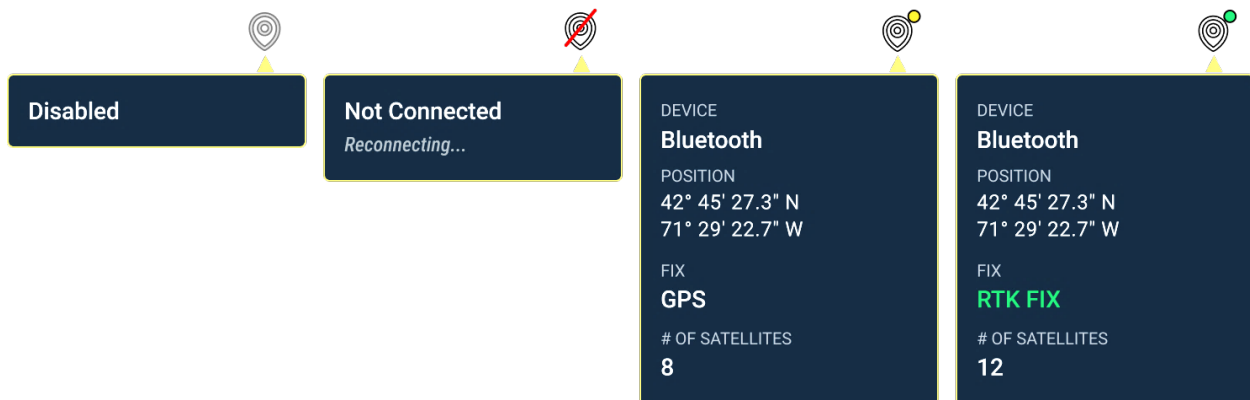
Resume a recent project and open the Collection Screen. Resuming a project does not start data collection automatically; you must tap the Start Scan icon to begin.

Quick Scan vs. Project Mode

	When to use	Project and File Management
Quick Scan	Fast mark-and-go scanning.	No Project is created. Scan Data and Results are not saved and cannot be recovered.
Project Mode	Projects that require Scan Data playback, quality review, archiving, report creation, or post-processing of Scan Data.	Scan data are saved within the selected Project and Area(s) of Interest and are stored on your mobile device.

GPS Status Icon

Tap the GPS status icon to display GPS connection status (disabled, not connected/ reconnecting) and the GPS connection device (Bluetooth, serial, or internal). The info box also shows the current latitude and longitude, fix type, and the number of satellites in use; these values may change depending on environmental conditions such as tree cover, nearby buildings, or other factors. The GPS status icon will change depending on the connection status and fix type and may update frequently in areas with poor GPS reception.



System Settings

Use System Settings to customize your scanning experience, connect and configure a GPS, download offline basemaps, perform an encoder calibration, and access app and technical support information. Settings persist between sessions unless reset or changed.

Top Navigation Bar

The Top Navigation Bar is present across the NX Control experience, and it provides heads-up information and quick actions relevant to the current screen.

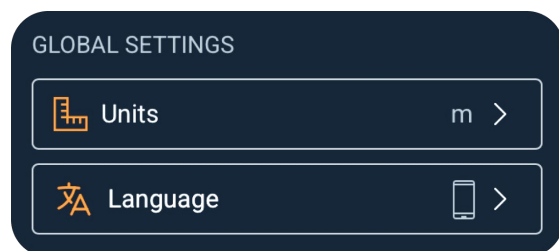


Global Settings

Units and Language

Select centimeters, meters, inches, or feet to set your preferred distance and depth units. The selected units will be used throughout NX Control.

NX Control supports English, Spanish, French, German, Italian, Japanese, Korean, and Chinese. Select the System option (mobile device icon) to use your mobile device's current language if translation strings are available.

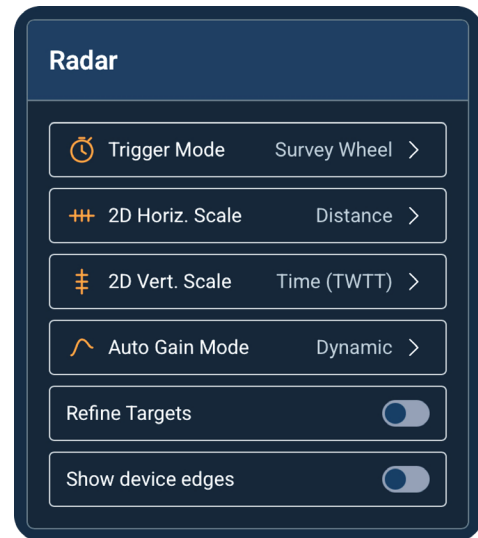


Radar Settings

Use Radar Settings to customize important data collection parameters. These settings affect displayed Scan Data but do not alter saved raw data.

Trigger Mode

Trigger Mode offers a choice between **Survey Wheel** or **Time**-based acquisition of Scan Data. Survey Wheel relies on distance measurements from a connected distance encoder. Time-based collection relies on a set time interval and provides no distance measurements unless the data are corrected in post-processing software. For most users, **Survey Wheel** is the recommended Trigger Mode option.



	Description	Typical Usage
Survey Wheel	Acquires Scan Data based on precise distances measured by the connected survey wheel.	All projects that require accurate distance measurements for target markout, target relocation, and data recording.
Time	Acquires Scan Data at a set time interval that is not tied to distance traveled.	Research projects, stationary testing, and waterborne or snow surveys where a survey wheel cannot be used.

2D Horizontal Scale

Select **Distance** to show traveled distance or **Scans** to show scan count. Distance requires connected and calibrated Survey Wheel. Scans will display the traces from survey wheel increments or the traces captured from Time Mode increments. Horizontal pinch gestures change the displayed scale without changing the underlying saved data.

2D Vertical Scale

Select Depth to display an estimated depth scale or Two-Way Travel Time (TWTT) to display elapsed radar travel time in nanoseconds. Depth scale accuracy depends on the current dielectric value. TWTT is measured directly and does not change when dielectric is adjusted.

Auto Gain Modes

NX Control provides two Auto Gain options: Dynamic and Static. **Dynamic** continuously monitors Scan Data and updates the Auto Gain curve based on new scans. **Static** applies an Auto Gain curve using the first few scans and then locks the gain curve.

Use **Dynamic** when outdoor surface conditions change quickly over short distances, such as parking lot to lawn transitions.

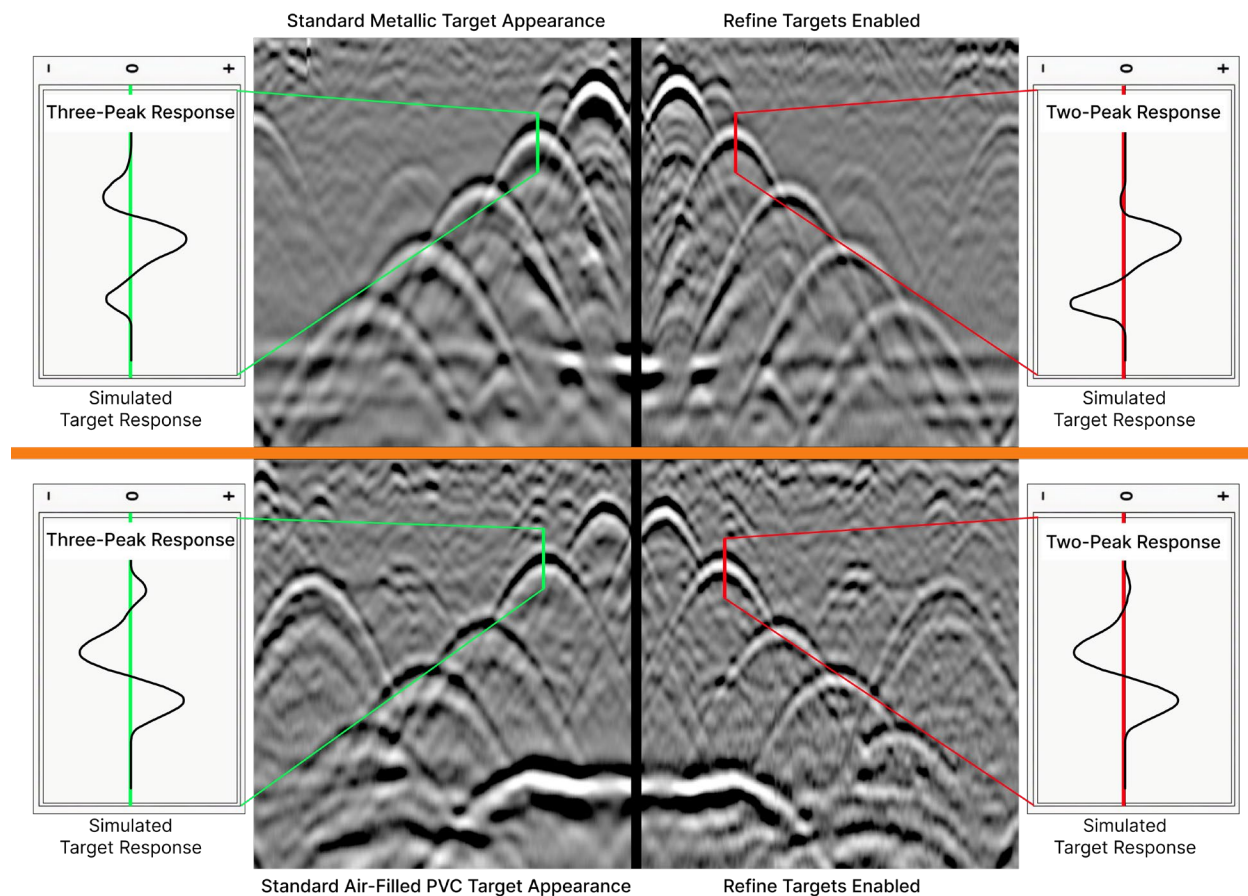
Use **Static** when surface and subsurface conditions are expected to be consistent across a scan, such as when scanning a concrete slab.

Refine Targets

Refine Targets applies target display augmentation intended to improve target interpretability. Standard hyperbolic targets exhibit three reflection peaks, comprising one smaller “halo” first peak, a very large second peak, and a medium-sized third peak. The general rule of thumb for evaluating target material type, such as plastic vs. metal, is to use the first-biggest-brightest peak as the interpretation focus. In most cases, the “halo” first peak is ignored and the second peak is interpreted.

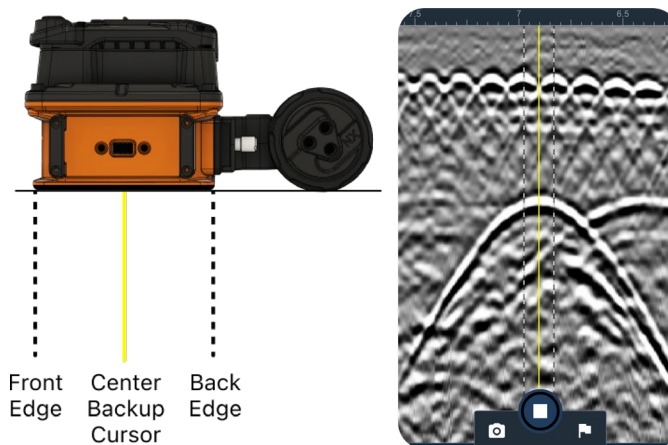
Refine Targets suppresses or sometimes removes the first “halo” peak and simplifies target interpretation for some users. Evaluate the effect on representative data before relying on the changed appearance for interpretation. New users should become familiar with typical target reflections before using Refine Targets.

Refine Targets is for display only and does not alter saved raw Scan Data.



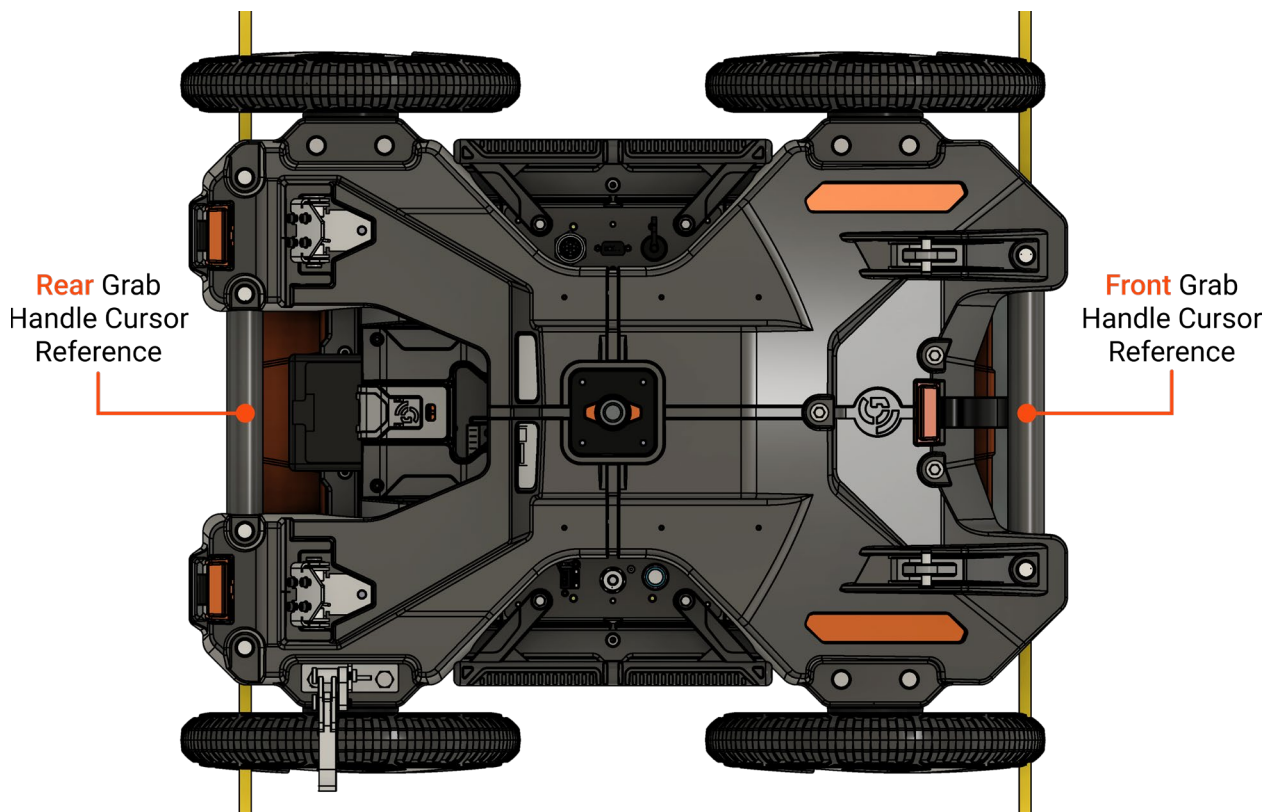
Show Device Edges

Show Device Edges adds additional antenna references to support efficient target markout. For NX25 and NX15 the front and rear edges are displayed. For Compass NX and NX04/10, the Device Edges reference the front and back grab handles of the Model 661 Cart. The center reference remains the primary target-location tool for all antennas, but you can use the Device Edges cursors to mark targets across the full front or rear of the antenna. Using Device Edges could save markout time by allowing a single mark to be placed, as opposed to marking the left/right sides of the antenna and backing up to mark the antenna center.



Above left: NX25 and NX15 Edge References.

Above right: Display of Device Edges in the Scan Data Window



Above: Compass NX and NX04/10 Edge References.

GPS Setup

Use **GPS Setup** to select a GPS connection method, configure GPS offsets, and display GPS receiver status.

You must use a GPS model that is compatible with your mobile device's operating system. Modern iOS devices only support the Bluetooth Low Energy (BLE) protocol; please verify that your GPS is supported by iOS. Android devices support Bluetooth Classic and BLE.

Most GPS models perform poorly indoors, next to buildings, and under thick tree canopy. For best results, power up and test your GPS outdoors in an open environment.

Selecting a Connection Type

Available connection methods are **Disabled**, **Bluetooth**, **Serial**, and **Internal**. Choose **Disabled** if you do not have a GPS connected. Use **Bluetooth** to wirelessly connect a GPS to your mobile device even when a GPR antenna isn't connected to NX Control. Connecting a GPS using a **serial** cable is supported through the NX04/10 serial port. **Internal** uses your mobile device's built-in GPS. Note that some tablet models do not include internal GPS capability.

Bluetooth:

1. Power on your GPS.
2. Select **Bluetooth** from the Connection Type dropdown menu.
3. Tap Device to view a list of nearby Bluetooth devices. You may need to refresh the list.
4. Select a Bluetooth device to automatically pair and connect.
5. Verify that the GPS Status panel is reporting position information.

Serial Cable:

1. Power on your GPS.
2. Select **Serial** from the Connection Type dropdown menu.
3. The NX04/10 antenna includes a 9-pin RS232 serial port (male) on the top left side panel. Attach a female 9-pin serial cable (typically offered by the GPS manufacturer) to the serial port and tighten the securing screws.
4. Connect the other end of the serial cable to your GPS.
5. NX Control automatically detects the GPS baud rate.
6. Verify that the GPS Status panel is reporting position information.

The screenshot displays the GPS Setup interface with three main sections: Connection, Offset, and Status.

- Connection:** Contains two dropdown menus. The first, 'Connection Type', is set to 'Bluetooth'. The second, 'Device', is set to 'RS2-Rover' with a 'BLE' label and a chevron icon.
- Offset:** Contains three input fields with units in meters (m). 'Height Above Ground' is set to 0. 'X Offset' and 'Y Offset' are both set to 0.
- Status:** Displays the following information:
 - FIX: GPS
 - POSITION: 42° 45' 27.3" N, 71° 29' 22.7" W
 - ALTITUDE: 52.0 m
 - HDOP: 4.4
 - # OF SATELLITES: 5

Internal:

1. Verify that your mobile device has **internal** GPS capability.
2. Select Internal from the Connection Type dropdown menu.
 - a. Certain mobile devices may require location permissions to use the internal GPS.
3. Verify that the GPS Status panel is reporting position information.

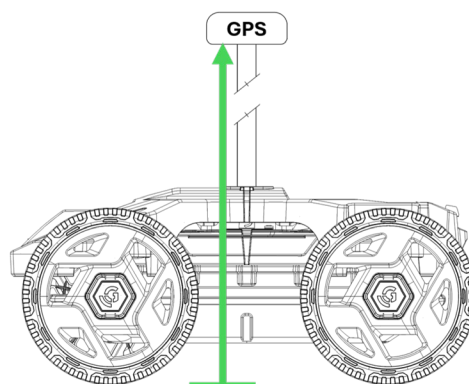
GPS Offsets

Entering accurate GPS offsets eliminates errors in the reported GPS position. This is especially important for Real-Time Kinematic (RTK) survey grade GPS units, but offsets should also be entered for non-RTK GPS units. Refer to the figures below for a visual guide to GPS offsets.

Height Above Ground

Height above ground is the most critical offset for most surveys. This offset represents the straight-line distance from the ground surface to the base of the GPS (where it mounts to a GPS pole). This value is saved with Scan Data.

Due to positioning issues and possible signal blocking a GPS should not be mounted at ground level. A GPS should be mounted at least 1-meter (3ft) above the ground, and mounted higher in areas with moderate vegetation height. GSSI recommends using a 1-meter GPS mounting pole for most surveys.



Height Above Ground

X Offset

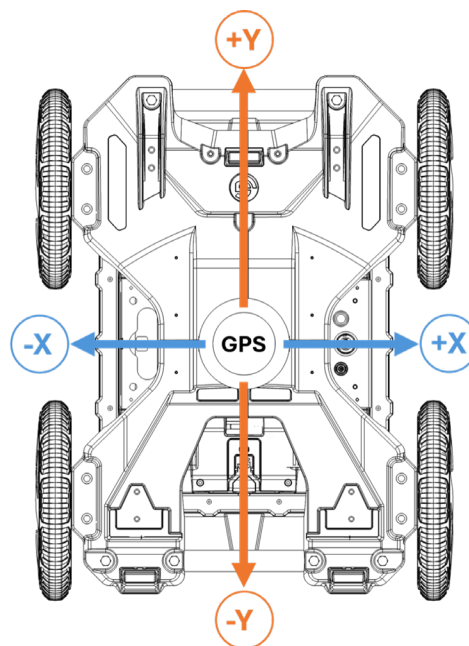
Enter an X Offset when your GPS is mounted to the right or left of the Model 661 cart's GPS mounting point. Use positive values for a right side offset and negative values for a left side offset.

When using the Model 661 Cart's GPS mounting point you will not need to enter an X Offset; the mounting point is directly over the center of NX04/10.

Y Offset

Enter a Y Offset when your GPS is mounted in front of or behind the Model 661 cart's GPS mounting point. Use positive values for a forward offset and negative values for a reverse offset.

When using the Model 661 Cart's GPS mounting point you will not need to enter a Y Offset; the mounting point is directly over the center of NX04/10.



X and Y Offsets

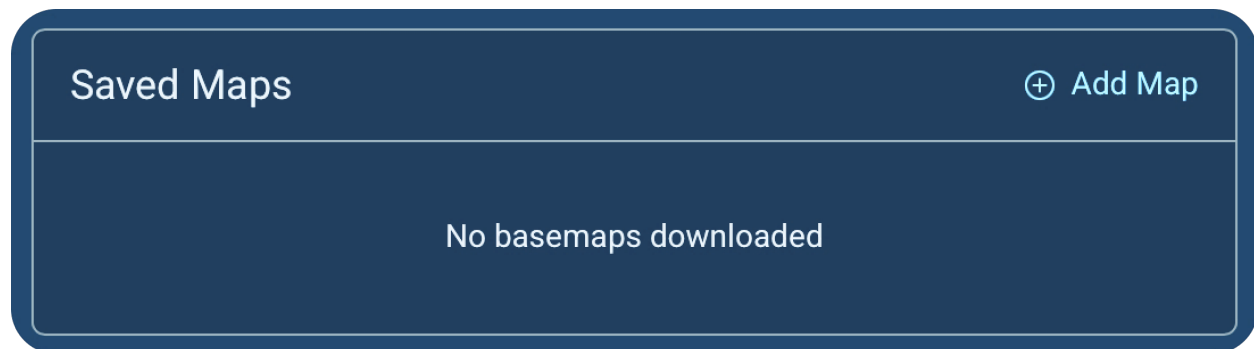
GPS Status Panel

Use the GPS Status Panel to connect to a GPS and to verify that your GPS is correctly configured and is reporting latitude, longitude, and altitude values. The other information is useful for evaluating the quality of the GPS positions by referencing the number of satellites used and the HDOP. Note that the GPS Status Panel provides more information than the GPS Status icon on the Top Navigation Panel.

GPS Status Panel	
Fix	Displays the GPS fix quality. GPS is the base level and represents most non-survey-grade GPS units. RTK is displayed when a RTK GPS is connected and has an RTK solution.
Position	The current latitude and longitude position of the GPS.
Altitude	The GPS's current height above mean sea level.
HDOP	Horizontal Dilution of Precision: a unitless indicator of satellite geometry. Lower values generally indicate stronger horizontal geometry. HDOP is not a direct accuracy measurement.
# of Satellites	The number of satellites currently in use by the GPS. A higher number is typically better than a lower number. This number may change throughout the day and across different survey areas.

Map Settings

Use Map Settings to download and manage offline basemaps. Offline basemaps require an internet connection for download but not for field use.



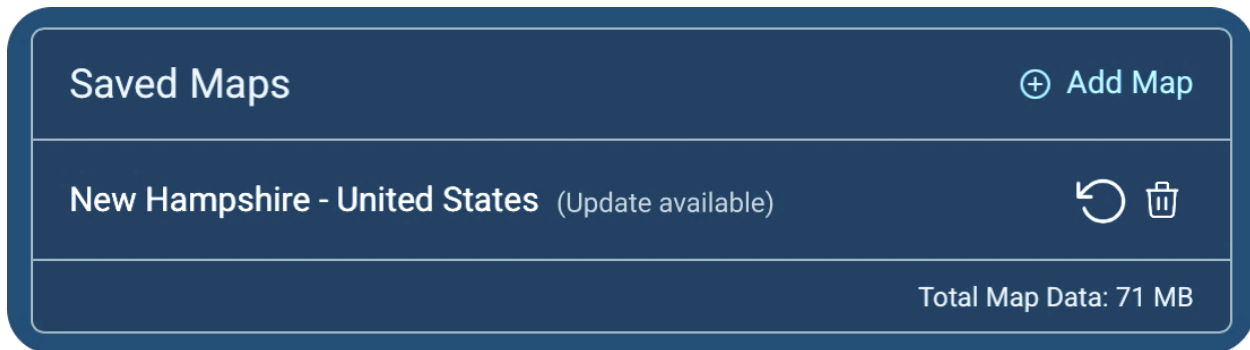
Downloading Offline Basemaps

Connect your mobile device to an internet connection before downloading offline basemaps.

1. Start by tapping Add Map.
2. Tap Country and select from the list.

3. Select a Subregion/ State/ Province.
4. Tap Download and wait for the download to finish.
5. Repeat this process to download additional basemaps (if needed).

Basemaps appear in the Saved Maps panel once downloaded. They are stored locally on your mobile device, and to help manage storage NX Control displays the size of each map and the total size of all your downloaded basemaps. NX Control will alert you when **map updates** are available by displaying a circle arrow icon. Tap the icon to download a new version of the basemap.

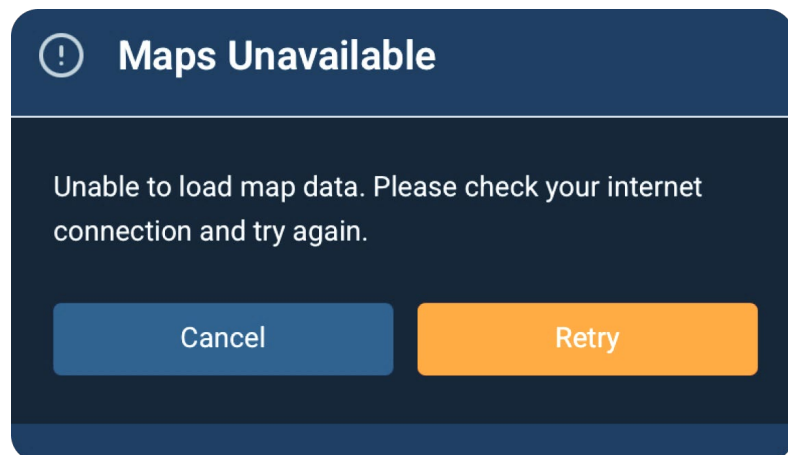


Downloaded basemaps automatically appear in the Collection Screen's Mapping Window during live data collection, provided that:

- 1) A GPS is connected and receiving position information
- 2) The current GPS position falls within the coverage area of a saved basemap

In Playback, basemaps will appear if your saved scans were acquired with GPS positions.

Downloading and updating basemaps is not possible while connected to an antenna's Wi-Fi network. You'll see a **Maps Unavailable** warning if your mobile device does not have internet access. Before downloading or updating basemaps, disconnect from the antenna Wi-Fi network and connect your mobile device to an internet-enabled network.



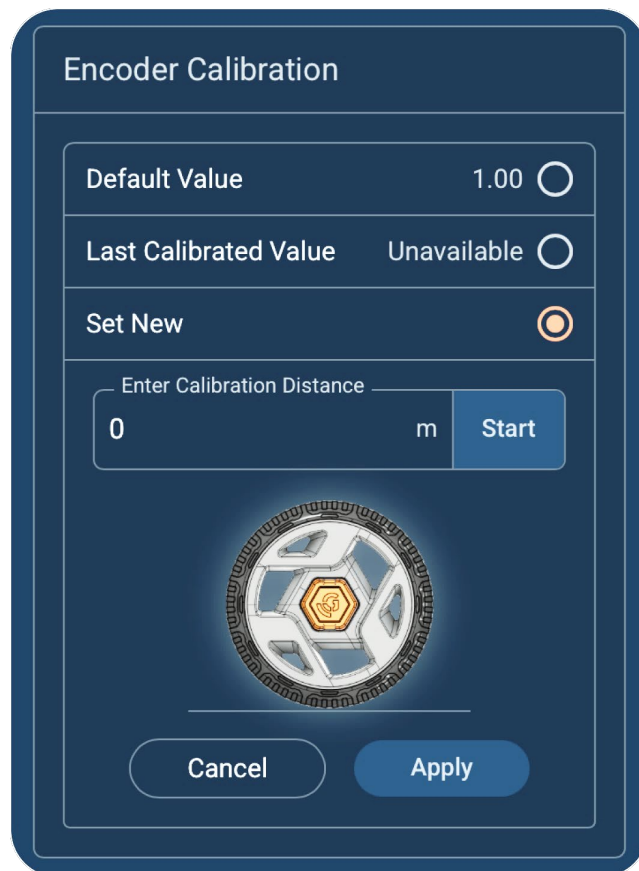
Similarly, to check for basemap updates you must be connected to an internet-enabled network. Connect to the network first, then launch NX Control and navigate to Settings > Map Settings.

Encoder Calibration

The Model 661 Cart survey wheel and NX25/NX15 survey wheel accessories are calibrated at GSSI before shipment. Use the Default Value for most scanning projects. Recalibration is normally unnecessary unless a distance check indicates error, the wheel configuration changes, or accuracy across longer than average distances is needed.

Choose a flat surface with no obstructions (such as a parking lot or concrete slab) and measure an exact calibration line using a tape measure. Extend the tape measure at least 5 m / 15 ft for Compass NX and at least 2 m / 6 ft for NX25 or NX15. A longer calibration distance can improve a calibration intended for long scans.

Survey wheel calibration requires **precision**. Please do not pace off or estimate the calibration distance.



The image shows a software dialog box titled "Encoder Calibration". It contains three radio button options: "Default Value" (set to 1.00), "Last Calibrated Value" (set to Unavailable), and "Set New" (which is selected). Below these options is a section labeled "Enter Calibration Distance" with a text input field containing "0" and a unit selector set to "m". A "Start" button is to the right of the input field. In the center of the dialog is a circular image of a survey wheel. At the bottom are "Cancel" and "Apply" buttons.

Follow these steps to set a new survey wheel calibration value:

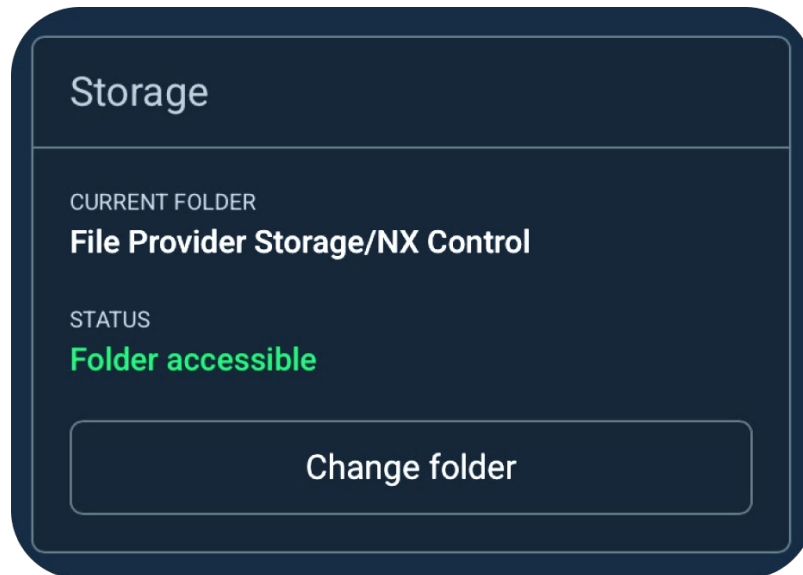
- 1) From the Main Dashboard, tap the Settings icon.
- 2) Tap the Survey Wheel Calibration card and tap Set New.
- 3) Extend a tape measure to the desired calibration distance.
- 4) Enter the calibration distance.
- 5) Align the antenna's center reference marks with the 0.0 end of the tape measure and tap Start.
- 6) Move straight forward until the antenna's center mark reaches the correct distance mark on the tape measure.
- 7) Tap Apply and confirm that Last Calibrated Value is selected.

New users may want to verify their calibration value to ensure that no positioning errors occurred. To confirm your encoder calibration:

- 1) Place the antenna's center mark at the 0.0 mark on the tape measure
- 2) Return to the Main Dashboard and tap the Quick Scan icon
- 3) Move the antenna to the original calibration distance value on the tape measure
- 4) Verify that the distance reading is correct; if not, perform another encoder calibration

Storage

On first use of Project Mode, NX Control will require you to select a **storage folder** and allow access to mobile device storage. GSSI does not recommend selecting a cloud-based or external storage folder. **Please accept all requested storage access permissions.** Use Storage settings to view the current storage folder and to change the storage directory.



Note: Project files, Scan Data, Results, and exports consume mobile-device storage. Monitor free space and export important projects before deleting local copies.

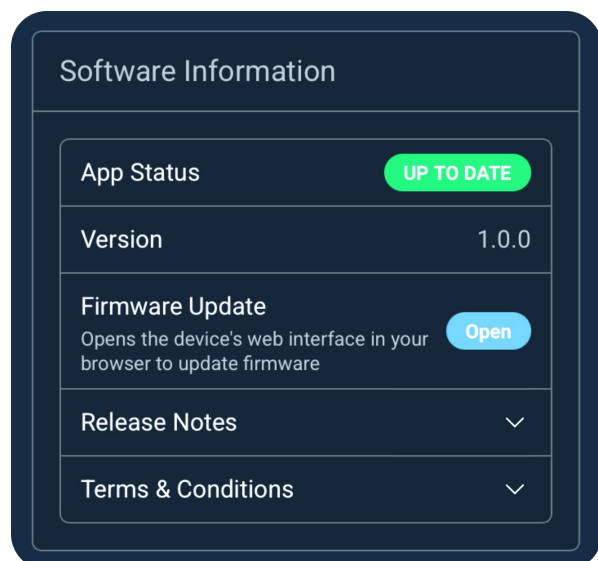
About

The **About** panel provides app version information, antenna firmware update controls, release notes, Terms and Conditions, Technical Support information, and system log download.

Software Information Panel

This panel displays the current App Status, Version, Release Notes, and Terms & Conditions. It also provides a workflow for performing an antenna Firmware Update.

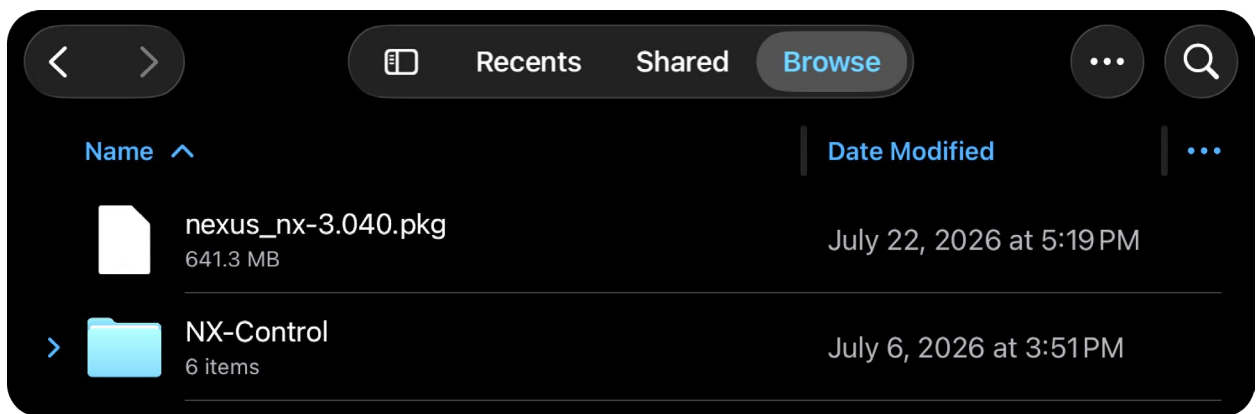
App Status, **Version**, and **Release Notes** will be updated when a new NX Control version is released. NX Control will be updated periodically, and GSSI recommends allowing automatic app updates through your iOS or Android operating system. If automatic updates are disabled, you will be notified on the App Status card and you can also monitor your mobile device's notifications to install a new app version.



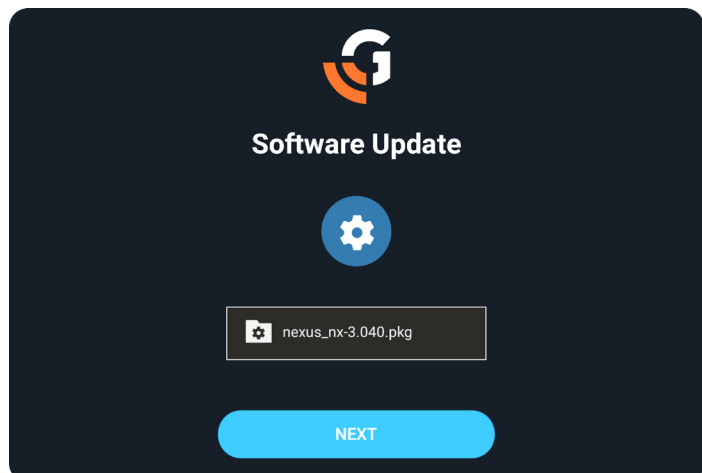
Use **Firmware Update** to install new antenna firmware. When a new firmware version is released you will receive an email from GSSI if you opted in to email notifications. Alternatively, you can compare the Firmware Version from the Main Dashboard with the version listed on GSSI's website.

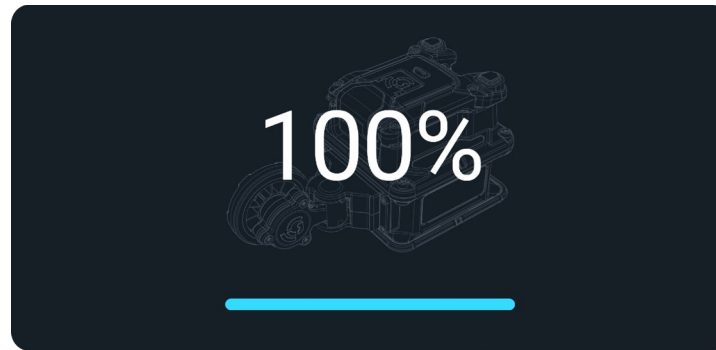
Follow these steps to update your antenna's firmware:

- 1) Compare your current firmware version with the version listed on the technical support page for your antenna.
 - a. **Compass NX:** www.geophysical.com/support/compass-nx
 - b. **NX25 and NX15:** www.geophysical.com/support/flexnxsupport
- 2) Download the latest firmware update to your mobile device and place it in an accessible directory (such as Downloads).



- 3) Insert a fully charged battery into your antenna, power on the antenna, and connect your mobile device to the antenna's Wi-Fi network.
- 4) Launch NX Control, open Settings, tap the About card, and tap Open on the Firmware Update card.
- 5) NX Control will open **nx.local** in a web browser window. Select Choose File, browse to the location of the firmware update .zip, and select the firmware update file.
- 6) Tap Next.
- 7) Wait for the transferring percentage to reach 100%.
 - a. The firmware transfer process may take up to 10 minutes. **Do not** power down your antenna or mobile device and **do not** close NX Control or your web browser.





- 8) On the next screen, tap Confirm Install to continue the firmware update.
- 9) Your antenna's LED will flash purple during the remaining update procedure – **do not power down your antenna.**
- 10) The **Software Update Extracting** screen will display a completion percentage. Once it reaches 100% it will transition to the **Software Update Installing...** screen, and then to **Next Steps** once the installation is complete.
- 11) You may need to reconnect to your antenna's Wi-Fi network once the update is complete.



Next Steps:

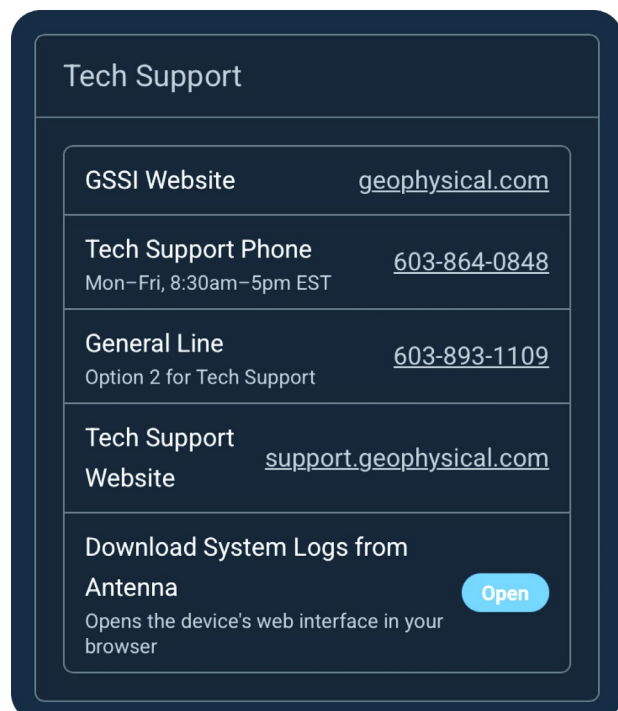
1. Do not power down while the system is updating.
2. Close this browser window.
3. When the antenna flashes yellow, connect as normal.

Tech Support Panel

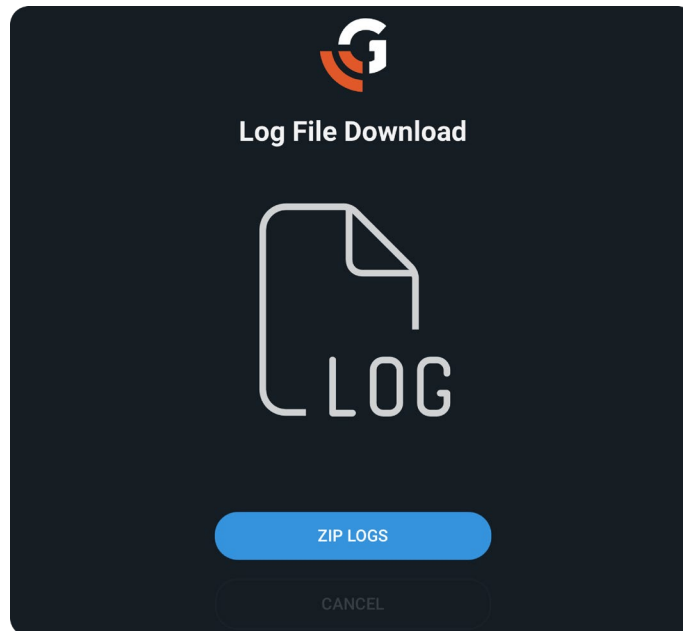
Refer to the **Technical Support panel** if you need to contact GSSI for technical support, general questions, or for other needs. GSSI's technical support team may ask you for your antenna's **system logs**; download the system logs using Download System Logs from Antenna.

Follow these steps to download your antenna's **system logs**:

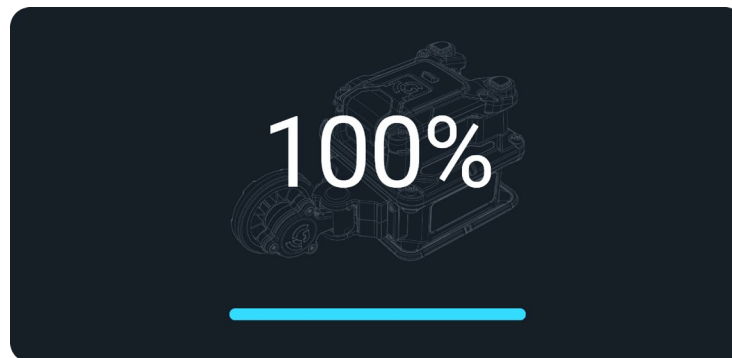
- 1) Insert a fully charged battery into your antenna, power on the antenna, and connect your mobile device to the antenna's Wi-Fi network.
- 2) Launch NX Control, open Settings, tap the About card, and tap **Open** next to Download System Logs from Antenna.



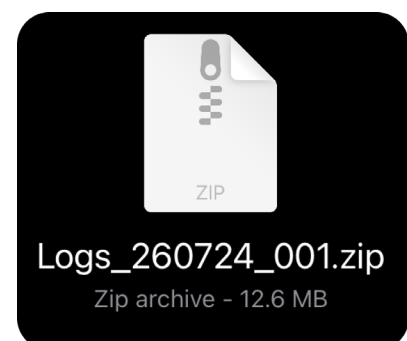
- 3) NX Control will open **nx.local** in a web browser. Tap Zip Logs and wait for the completion percentage to reach 100%.



- 4) Tap Next/continue.
- 5) Wait for the transferring percentage to reach 100%. This process may take several minutes.



- 6) The next screen will display a compressed archive icon, the name of the system logs file, and the size of the file. The file name will follow the format of Logs_YYMMDD_xxx.zip.
- 7) Tap Download Logs and select a download location. You may then share the system logs .zip file using options available on your iOS or Android mobile device.



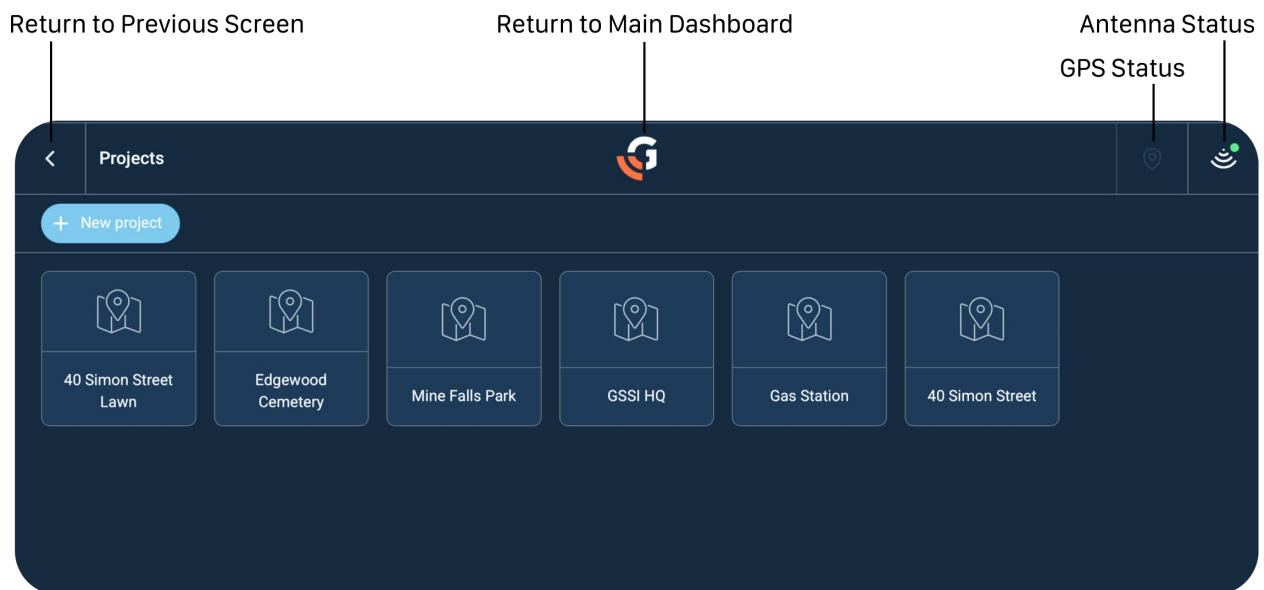
Projects and Data Management

NX Control includes **Project and File Management** solutions for streamlining Project organization, creating and interacting with Areas of Interest (AOIs), and transfer of Results and Scan Data. You may skip this section if you plan to use Quick Scan (no file saving) exclusively.

Projects Portal

The **Projects Portal** displays a list of all Projects saved in your current Storage Folder. If you do not see a list of your saved Projects in the Projects Portal, please verify that you are using the correct Storage Folder.

Open the Projects Portal from the Main Dashboard to create, open, select, share, download, or delete projects. Projects are stored locally on your mobile device, so managing Projects and files does not require an active antenna connection.



Create a New Project from the Projects Portal

Create a new **Project** to use **Project Mode**, where you can store Results and Scan Data for use in reporting, archiving, or post-processing software. Tap **New Project** to launch the creation form.



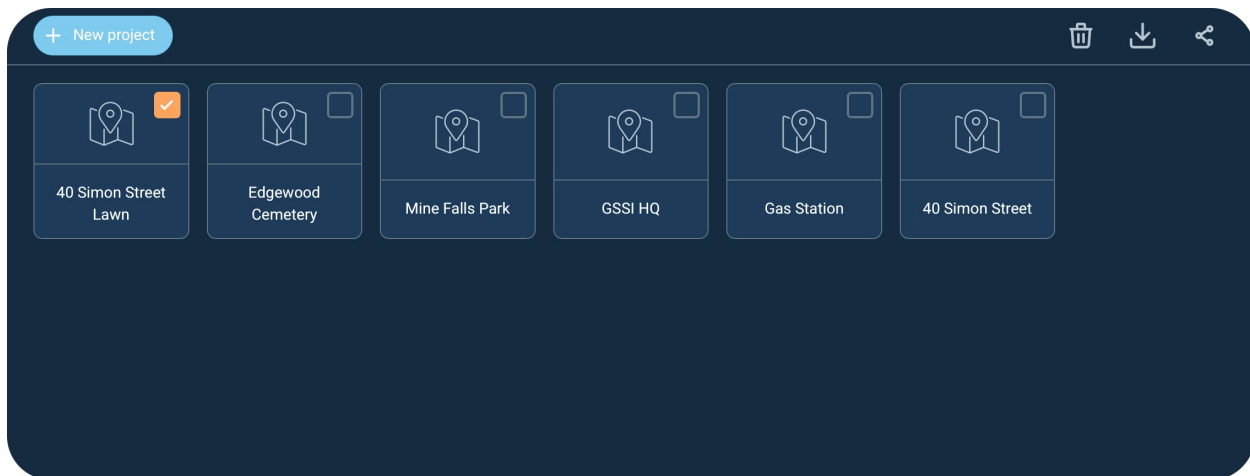
Enter a Project Name (required), Client Name, and Job Code using your mobile device's on-screen keyboard. Project Mode creates a formal project that is organized by Areas of Interest (AOIs), and each AOI stores saved Results and Scan Data for playback, review, and export.

Tap Confirm to create the Project and Cancel to return to the Projects Portal.

A dark blue dialog box titled "Create New Project" with a checkmark icon. It contains three input fields: "Project Name" with the text "40 Simon Street", "Client Name" with the text "GSSI", and "Job Code" with the text "GSSI-01". At the bottom are two buttons: "Cancel" and "Confirm".

Long-Press for Projects Portal Options

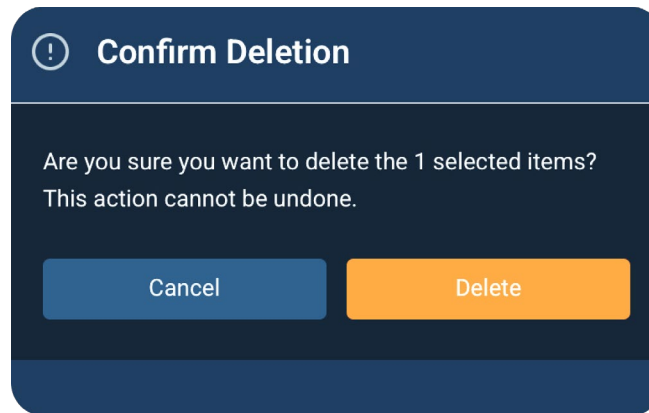
Long-press on a Project tile to display selection boxes. Selecting one or more Projects reveals Delete, Download to Device, and Share options.



Deleting One or More Projects



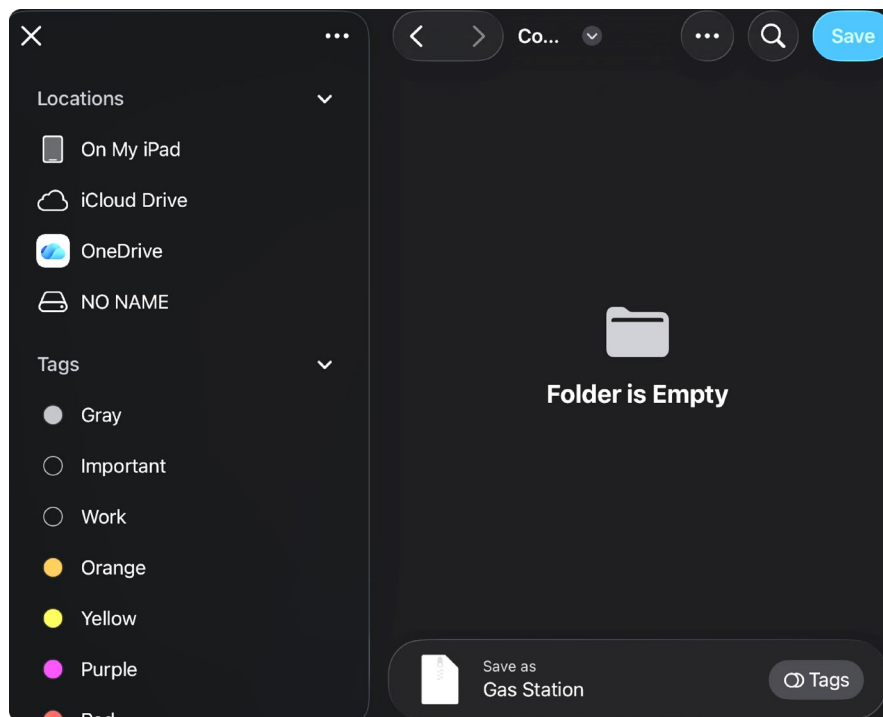
Select one or multiple Projects and tap the **Delete** icon. NX Control will display Cancel and Delete options; choose Cancel to return to the Projects Portal and Delete to permanently delete the Project(s). This action **cannot be undone**, and deleted Projects **cannot be recovered**.



Downloading One or More Projects to Device



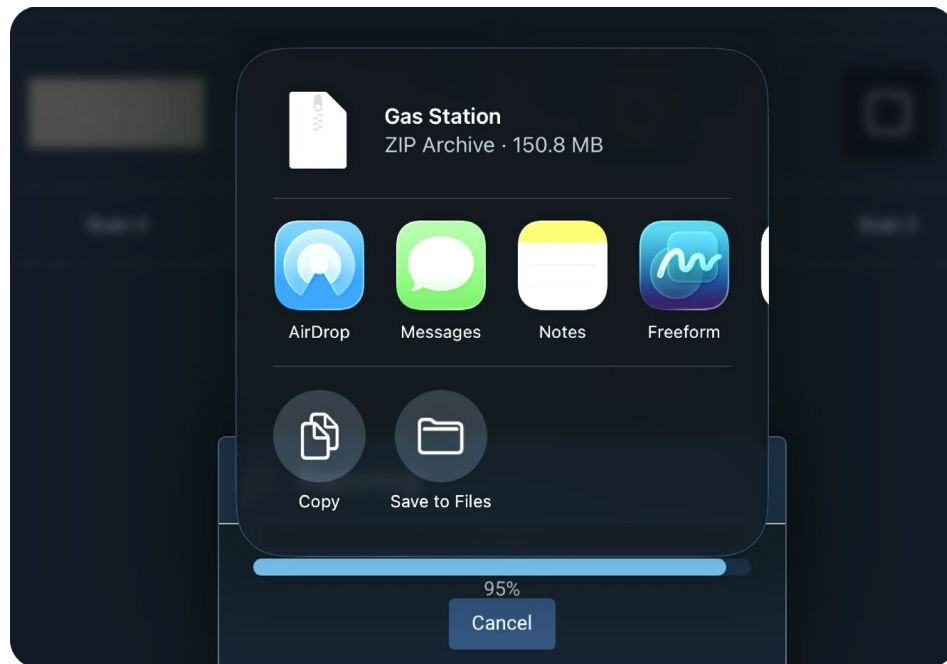
Select one or multiple Projects and tap the **Download to Device** icon. NX Control will save the Project(s) to your mobile device's Downloads folder



Sharing One or More Projects



Select one or multiple Projects and tap the **Share** icon. The available sharing options will change depending on your mobile device's installed apps and its operating system. You may also save the Project(s) to a different directory an external USB drive.

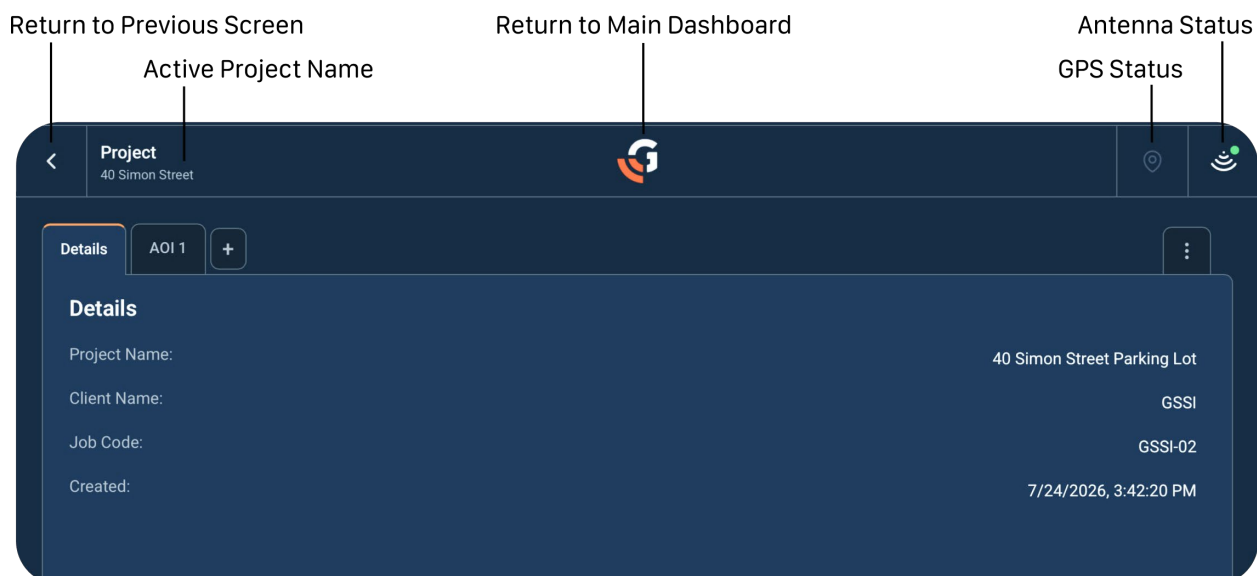


Project Profile

The **Project Profile** organizes Project Details, Areas of Interest (AOIs), Results, and Scan Data. It is available without an antenna connection, although you'll need an antenna connected to collect new Scan Data. From here, you can interact with saved Results and Scan Data, add new Scan Data and Results, create and manage AOIs, and delete, download or share the Project.

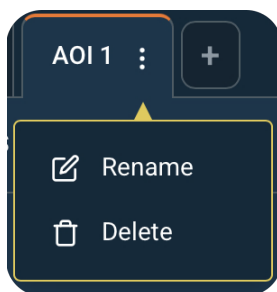
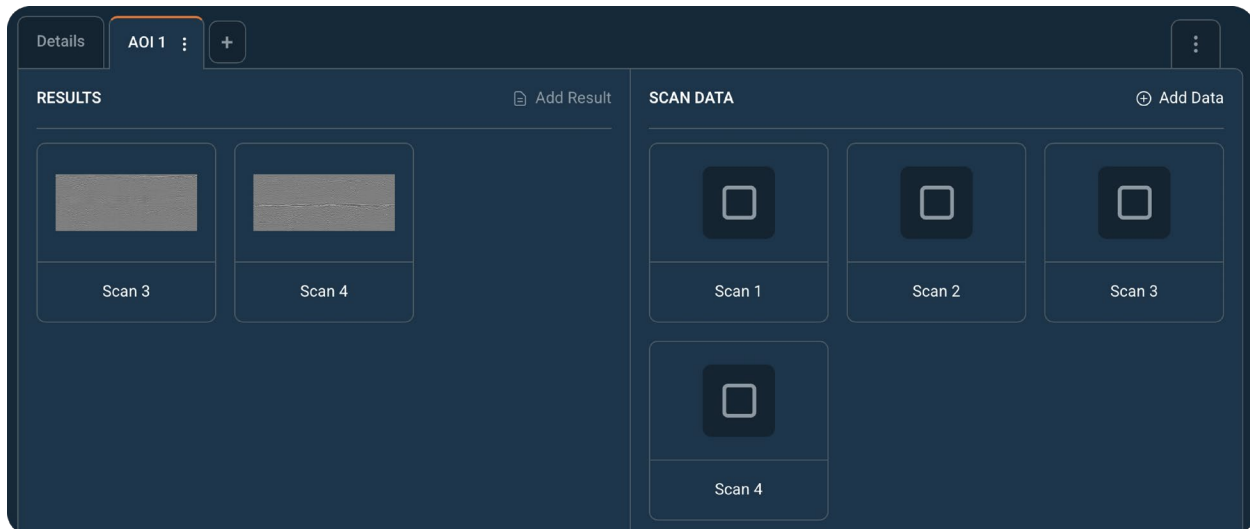
Project Details

The **Project Details** tab stores the information entered during new Project creation and the date and time the Project was created. Project Name, Client Name, and Job Code are editable.



Areas of Interest

AOIs are organizational subareas within a Project that contain related Results and Scan Data from specific work areas. AOI 1 is created automatically for each new Project. Exported Projects are organized into separate AOI subfolders containing Results and Scan Data.



Tap the **three dot icon** to rename or delete an AOI.

Tap the **Plus Sign** icon to create and name a new AOI.

When **renaming** an AOI, use your mobile device's on-screen keyboard to enter a meaningful name. Tap Cancel to stop the AOI creation or Confirm to save the new AOI.

Deleting an AOI **cannot be undone** – use with caution!

Results Panel

The **Results Panel** is a container for Screenshots, Live Photos, and Imported Photos that are associated with the current AOI. Tap on a Result card to preview the image, and long-press for operating system-specific (Android or iOS) downloading and sharing options.

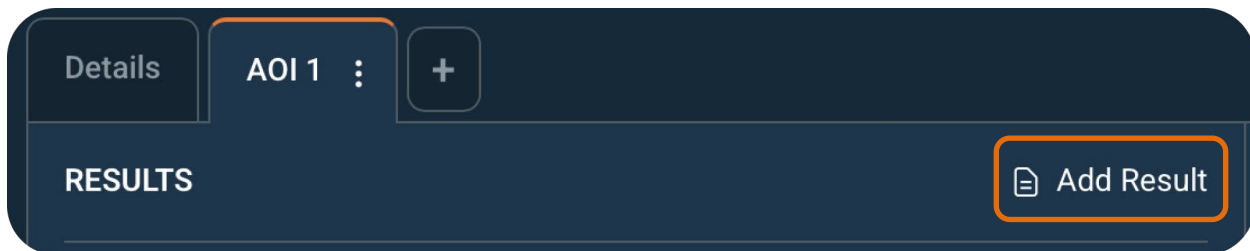
Screenshots are captured during live data collection or Playback using the Screenshot Icon on the Lower Control Bar. These screenshots are typically taken for reference, reporting, or technical support. NX Control creates a clean, report-ready image by preserving the Scan Data, Target Marks, and distance/depth scales and removing non-essential user interface components such as the Top Navigation Bar, Lower Control Bar, and Menus.

Screenshots captured using your **mobile device** (such as pressing the power and volume buttons simultaneously) are not stored in an AOI; they will be saved in your device's image gallery. These device-based screenshots will capture everything on the screen. They can be imported to an AOI using Add Result (see below) but they may not be ideal for report creation. Use the Screenshot tool in the data collection window to capture clean screenshots that display the most important Scan Data Window elements.

Results also include **Live Photos** from your mobile device's camera and **Imported Photos** from your mobile device's image gallery. These photos are typically field photos that record site conditions at the time of scanning, as well as pictures of complete markouts on the ground or a concrete surface.

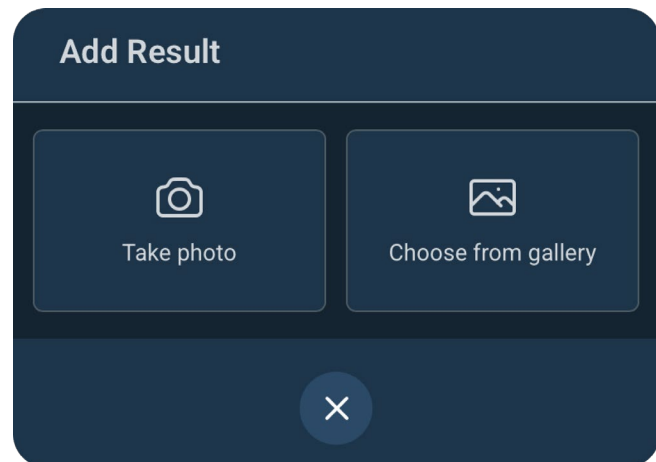
Add Result

Use the **Add Result** tool to import a Live or Saved Photo into the current AOI's Results Panel.



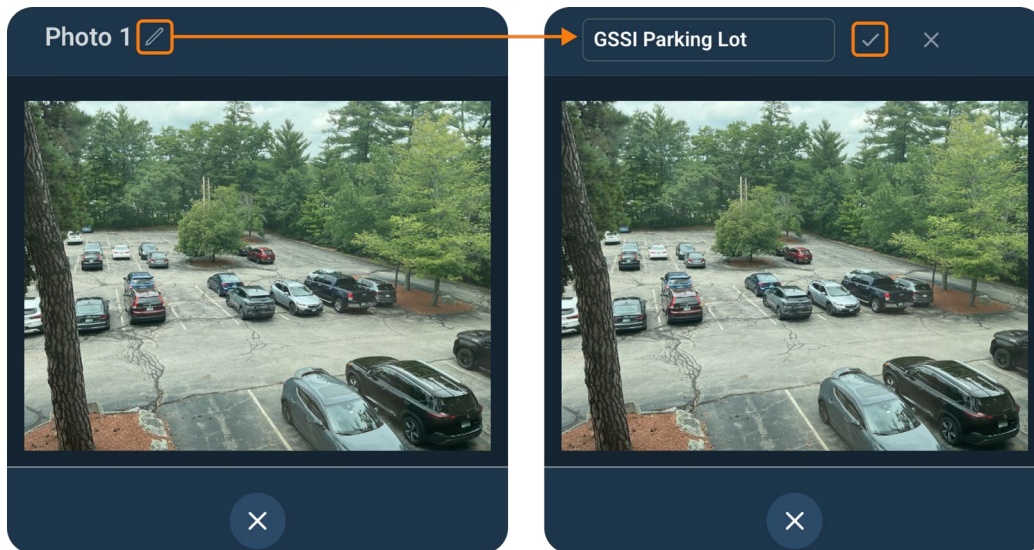
Tap **Take Photo** (using your mobile device's camera) or **Choose from Gallery** (saved photos).

Take Photo: On the first use of Take Photo you will need to grant NX Control access to your mobile device's camera; you **must allow access** to take a live photo! After allowing camera permissions you can take a photo just like when using your device's built-in camera app. Once you choose to keep the photo it will appear in the active AOI's Results Panel and can be previewed by tapping once.



Choose from Gallery: On the first use of Choose from Gallery you will need to grant NX Control access to your device's image gallery; you **must allow access** to import a saved photo! After allowing image gallery permissions you can browse saved images and add one or more to the Results Panel.

Live Photos and Imported Photos will be added to the Results Panel, and they will automatically be named Photo 1, Photo 2, etc. in the order they were imported. To rename a photo, tap the image to open a preview. Next, tap the pencil icon beside the image's current name. Use your mobile device's keyboard to enter a new name, and then tap the checkmark icon to save or the X icon to cancel. Close the preview by tapping the larger X icon at the bottom of the window.

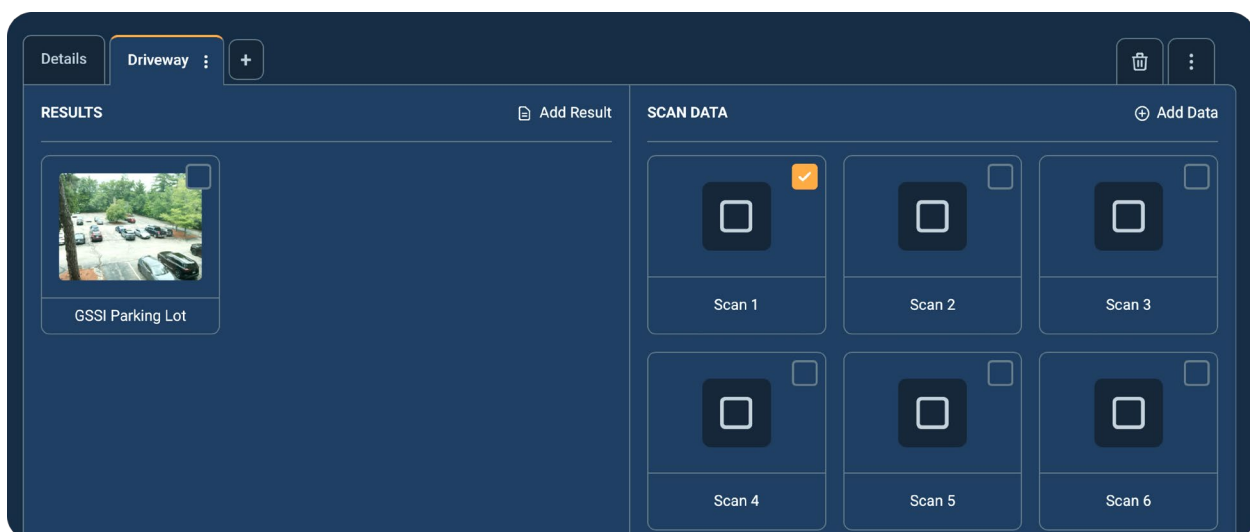


Scan Data Panel

The **Scan Data Panel** is a container for individual scans that are associated with the current AOI. Scans are listed in numerical order starting from Scan 1 and individual scans cannot be renamed. Tap a Scan tile to open the scan in **Playback** (see NX Control: Data Collection). Note that you do not need a NX04/10, NX25, or NX15 antenna connected for Scan Data Playback because Scan Data are stored on your mobile device. However, you will need to connect an antenna to use the Add Data feature.

Add Data

Tap **Add Data** to open the collection screen and acquire new Scan Data. Add Data will be greyed out when no antenna is connected. You can also open the collection screen from the Main Dashboard's Recent Projects Panel.

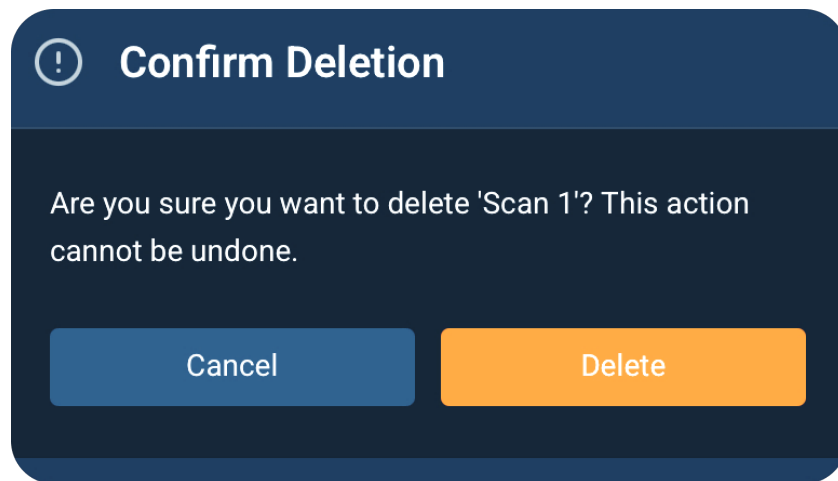


Long-Press for Project Profile Options

Performing a long-press on the title of a **Scan Data** or **Results** card selects that file and also displays selection boxes on all other Scan Data and Results cards. This will also display the **Delete** icon.

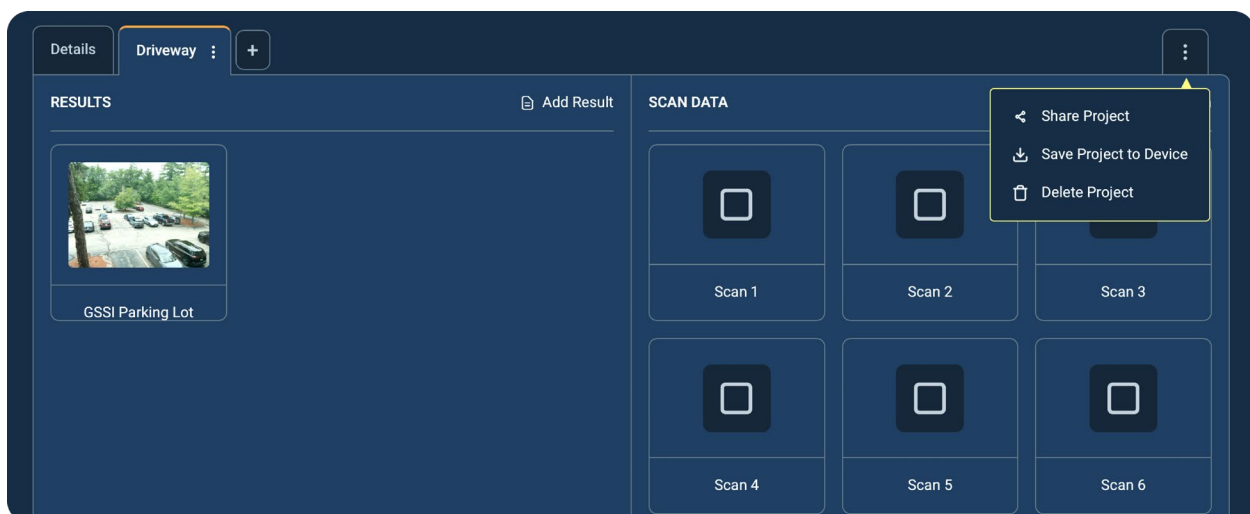
Deleting Scan Data and Results

Use the Delete icon remove one or more Scan Data files or Results images. File and image deletion **cannot be undone**, and deleted items **cannot be recovered**. NX Control will ask you to confirm or cancel; choose wisely!



Sharing, Downloading, and Deleting the Current Project from the Project Profile

Tap the **three dot icon** to display a list of sharing, downloading, and deleting. These options only apply to the current Project, and it is not possible to export a single Result or Scan Data file.

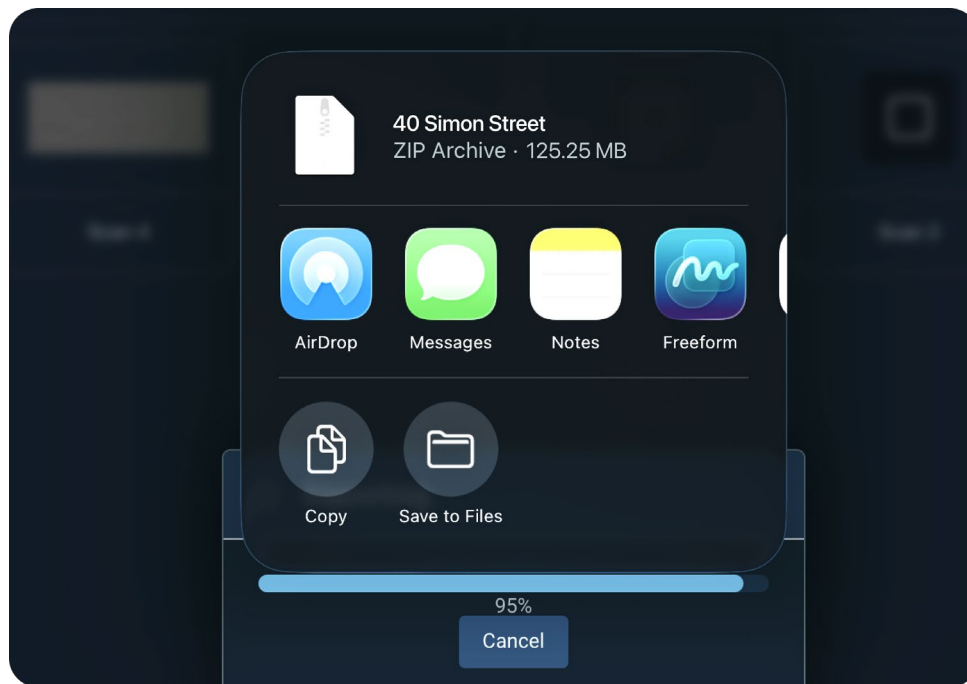


Sharing the Current Project from the Project Profile



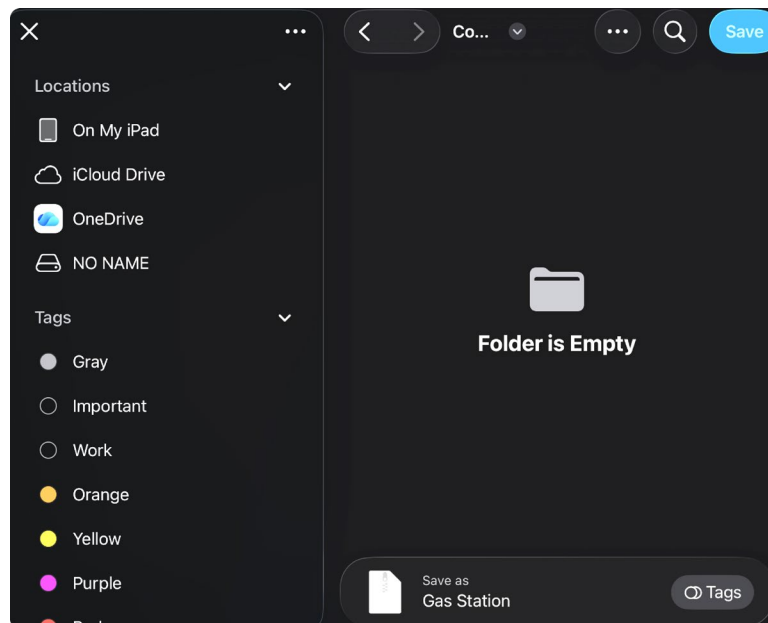
Share Project

NX Control will list sharing options based on your operating system and the available apps. You may also save the Project to a different directory or to an external USB drive.



Save Project to Device

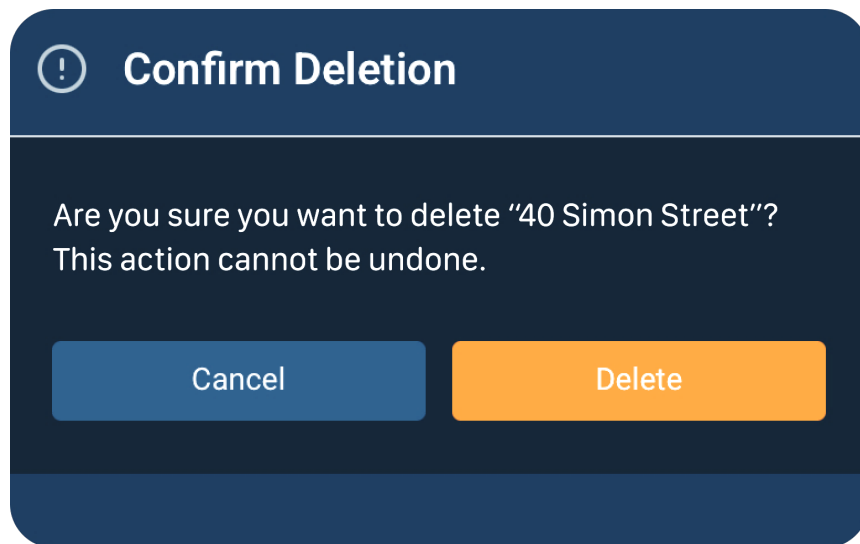
NX Control will create export files and compress the current Project into a .zip archive. Choose a storage directory for the .zip and tap Save or Cancel.



Delete Project from Project Profile



Use this option to **delete** the current Project. NX Control will display Cancel and Delete options; choose Cancel to return to the Project Profile and Delete to permanently delete the Project. This action **cannot be undone**, and a deleted Project **cannot be recovered**.



NX Control: Data Collection

Collection Screen Overview

The **Collection Screen** displays live Scan Data and Mapping Data during acquisition. It is also used for Scan and Mapping Data review during Playback. The main components are the Top Navigation Bar, one- or two-channel radar profiles with horizontal and vertical scales, a Lower Control Bar, and floating menus for display and data optimization.

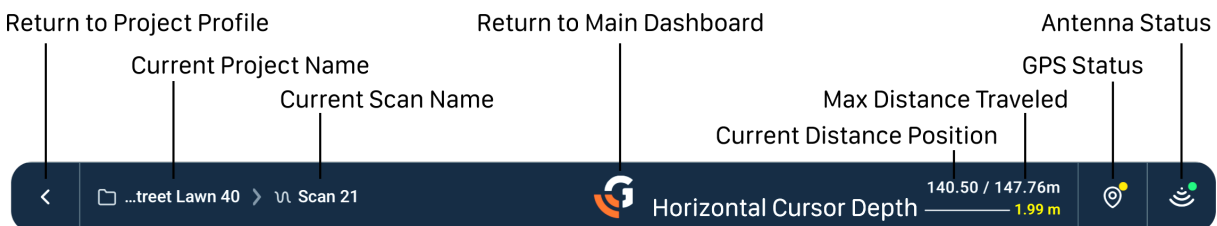
Quick Scan and Project Mode use the Collection Screen, and though the two Modes share many features there are significant differences that this section will cover.

Scan Data Window: Project Mode

When entering **Project Mode** from the Main Dashboard or Project Profile, the Scan Data Window will display the Top Navigation Bar, horizontal and vertical scales, the Lower Control Bar, and the floating menus in their collapsed state.

Top Navigation Bar: Project Mode

In **Project Mode** the Collection Screen's Top Navigation Bar includes additional features specific to data collection and Playback. ***Project Mode saves Scan Data and Results.***



Back arrow: Saves and closes a live or Playback scan, then returns to the Project Profile.

Project name: Identifies the active Project. Long Project names may become truncated.

Current scan name: Heads-up display of the currently active live or Playback scan. Tap to open a list of scans in the current AOI. Selecting a scan from the list saves and closes the active scan before Playback of the saved file.

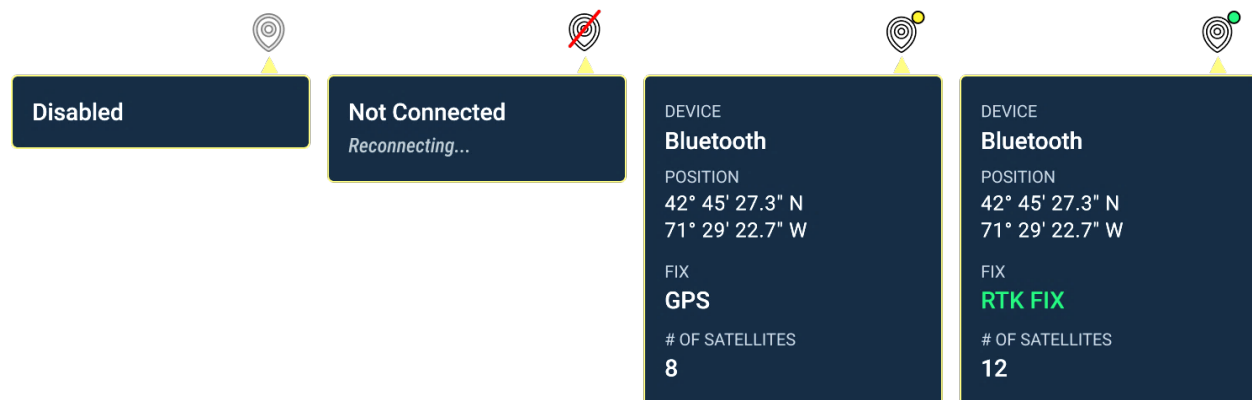
GSSI logo: Saves and closes a live or Playback scan, then returns to the Main Dashboard.

Max Distance / Current Position: Max Distance displays the total length of the current live Scan and is always visible when collecting Scan Data. Max Distance will increase as new Scan Data are added to the file. Current Position updates during live Scan Data collection when moving the antenna in reverse.

Horizontal Cursor Depth: Indicates the depth position of the horizontal cursor. The depth is based on the current dielectric value and may not be accurate if your dielectric is incorrect.

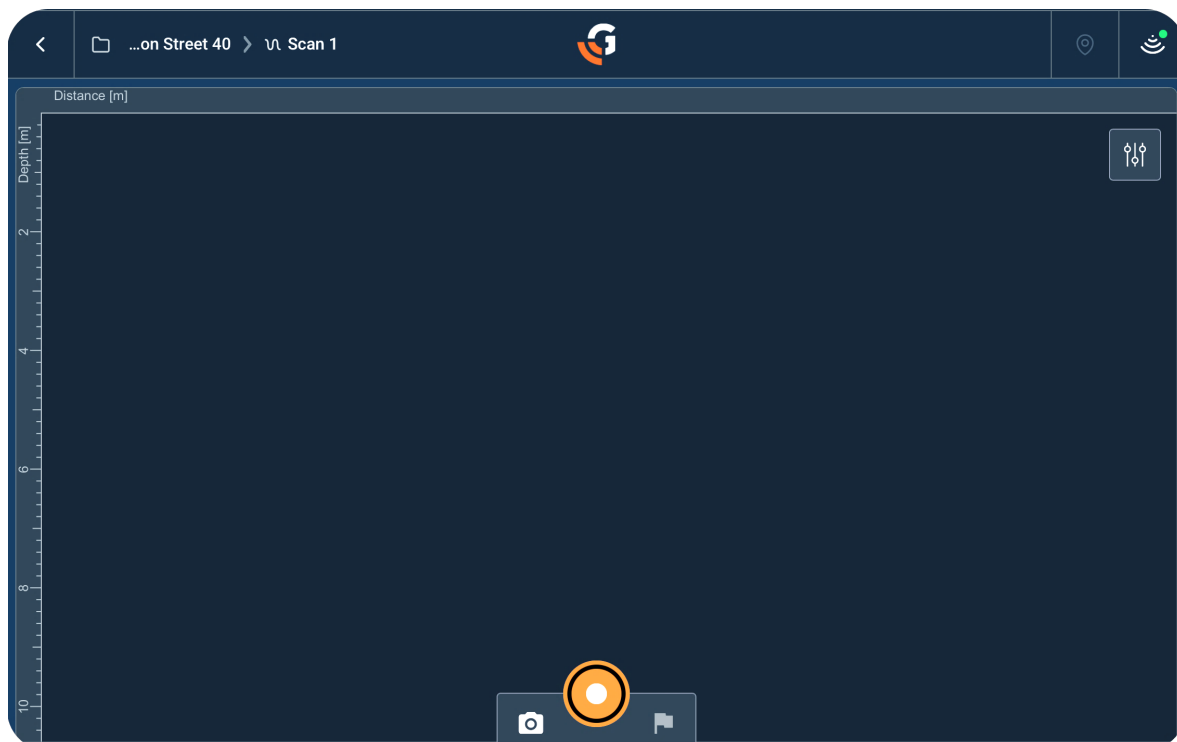
Antenna Status: Tap to view the connected antenna's model number and battery status.

GPS Status: Tap the GPS status icon to display GPS connection status (disabled, not connected/reconnecting) and the GPS connection device (Bluetooth, serial, or internal). The info box also shows the current latitude and longitude, fix type, and the number of satellites in use; these values may change depending on environmental conditions such as tree cover, nearby buildings, or other factors. The GPS status icon will update depending on the connection status and fix type and may do so frequently in areas with poor GPS reception.



Scan Data Window

The **Scan Data Window** is always empty when resuming a Project from the Recent Projects Panel or tapping Add Scan from the Project Profile. Opening a saved Scan in Playback automatically



loads the Scan Data. New Scans are not automatically started in Project Mode. Tap Start scan to begin data collection. Scan Data will scroll from left to right as the system is moved forward.

Horizontal and Vertical Scales

The **Scan Data Window** always displays **vertical** and **horizontal scales**, though the units and values displayed will change based on customizations made to System Settings > Units and System Settings > Radar Settings. The horizontal scale remains unpopulated until Scan Data are collected or a saved file is opened in Playback. Most users will use Distance for the horizontal scale and Depth for the vertical scale.

Vertical Scale: Depth

The **vertical scale** displays **depth below surface** using the units (cm, m, in, ft) selected in System Settings > Global Settings. Displayed depths are based on the current dielectric value. The depth scale will update as dielectric adjustments are made. **Depth** is the most commonly used style for the vertical scale. This scale style will be identical for Survey wheel and Time-based Trigger Modes.

Vertical Scale: Time (TWTT)

The **vertical scale** displays **Two Way Travel Time** [TWTT] in nanoseconds (ns). TWTT references the elapsed time between the transmission of the GPR signal from the transmitting antenna and the arrival of the signal at the receiving antenna. Advanced users will prefer this vertical scale style, while most users should set the vertical scale to **depth**. The TWTT scale **will not update** as dielectric adjustments are made. This scale style will be identical for Survey Wheel and Time-based Trigger Modes.

Horizontal Scale: Distance Traveled

The **horizontal scale** displays **distance traveled** using the units (cm, m, in, ft) selected in System Settings > Global Settings. The spacing of distance marks on the horizontal scale will change when using gestural controls to stretch or compress the Scan Data Window. Most users will prefer to use **distance traveled** for the horizontal scale. This scale style will be identical for Survey Wheel and Time-based Trigger Modes, although distance readings from Time-based Trigger Mode should not be used for measurements.

Horizontal Scale: Scans

The **horizontal scale** displays the number of accumulated **scans/traces** instead of distance traveled. Scans/traces are acquired at a fixed, distance-based intervals when using the survey wheel, and in Time Mode they are based on the trigger interval. Most users will prefer to use **distance traveled** for the horizontal scale. The spacing of scan marks on the horizontal scale will change when using gestural controls to stretch or compress the Scan Data Window.

Lower Control Bar

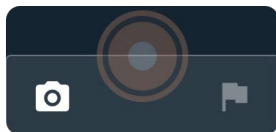
The Lower Control Bar provides access to quick actions that are commonly used during scanning. These include Start/Stop Scan, Screengrab, and User Mark placement. There are three possible states for the Lower Control Bar:



Antenna connected and waiting for Start Scan. Screengrab is available but User Mark placement is not.



Start Scan initiated / live scan data are being collected. Stop Scan, Screengrab, and User Mark placement are available.



Scan Data Playback with no antenna connected. Screengrab is available but Start Scan and User Mark placement are not.

Start/Stop Scan

Start Scan and Stop Scan are only available when an antenna is connected. Start Scan is not automatically triggered when entering the Collection Screen using Project Mode.



Antenna connected; tap to start a new Scan.



Tap to stop collection and save the current scan. Scans cannot be continued once they are saved.



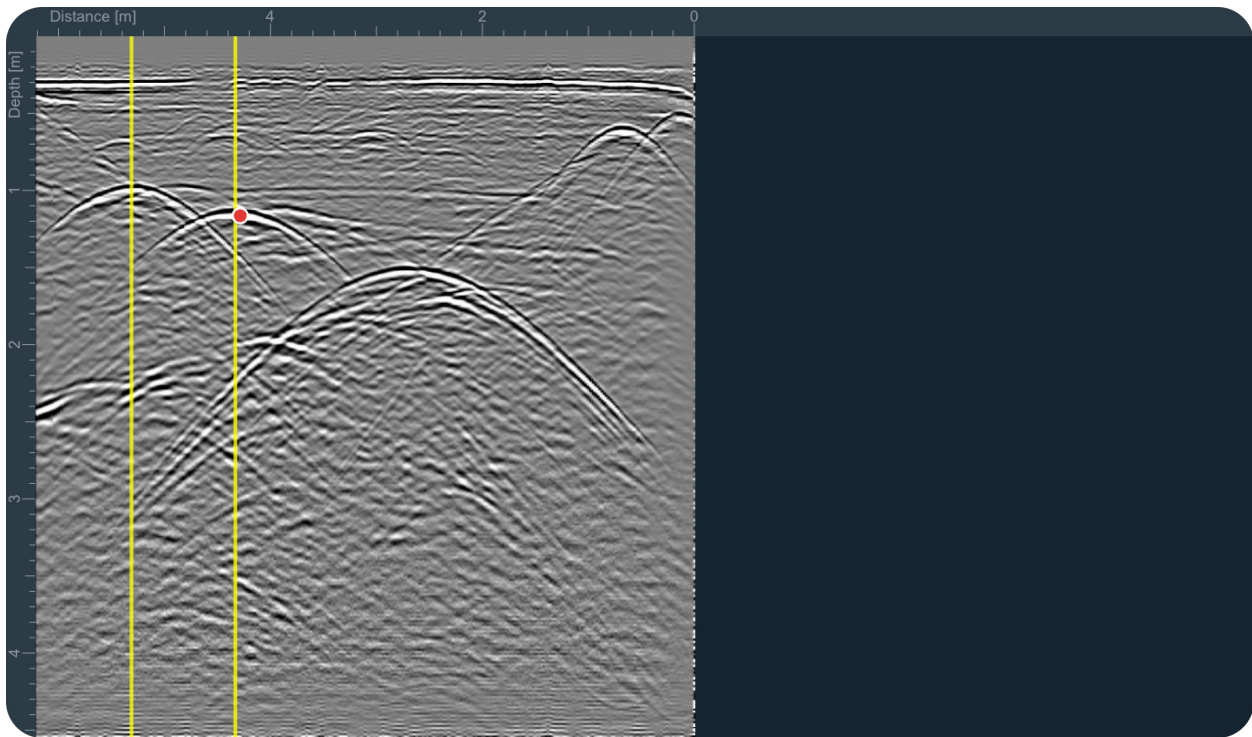
Playback Mode with no antenna connected. Start Scan is unavailable.

Screengrab

Tap to capture images of the current Scan Data Window and Mapping Window. **Screengrabs** of the Scan Data Window are high-resolution, report-ready images that preserve Scan Data, Target Marks, User Marks and horizontal/vertical scales and remove user interface components such as the Top Navigation Bar, Lower Control Bar, and Menus. The Mapping Window must be visible to be captured, and the resulting images are saved separately and display geo-located features and

basemaps. Screengrab is available in live data collection and in Playback. An example of an NX Control screengrab is provided below.

Screengrabs are saved in the Results panel of the currently active Project and AOI and named in reference to the currently active live scan or the scan in Playback. In contrast, screengrabs captured using your mobile device (such as pressing the power and volume buttons simultaneously) capture everything on the screen. Device screengrabs are not stored in an AOI; they will be saved to your device's image gallery.



User Marks

User Marks are vertical reference lines intentionally placed while moving forward or in reverse. When moving forward, a User Mark will be placed at the current distance position (at the left edge of the Scan Data Window). As you continue to move forward the User Mark will remain at its original distance position, but it will scroll along with the Scan Data. When moving in reverse, a User Mark will be placed at the location of the backup cursor. User Marks are not limited to one per Scan – place as many as you want!

A typical use case for User Marks is to record the location of an above ground target and reference it in your Scan Data. For example, you could place a User Mark every time you walk past a fire hydrant or a crack in the pavement. When reviewing data in Playback, you'll have a location reference for the above-ground feature of interest and it might help with data interpretation.

Gestural Controls : Scan Data Window

Gestural Controls are supported during live data collection and Playback. These include pinch/zoom actions and left/right panning of Scan Data.

Horizontal/Vertical Scaling, Zoom, and Panning

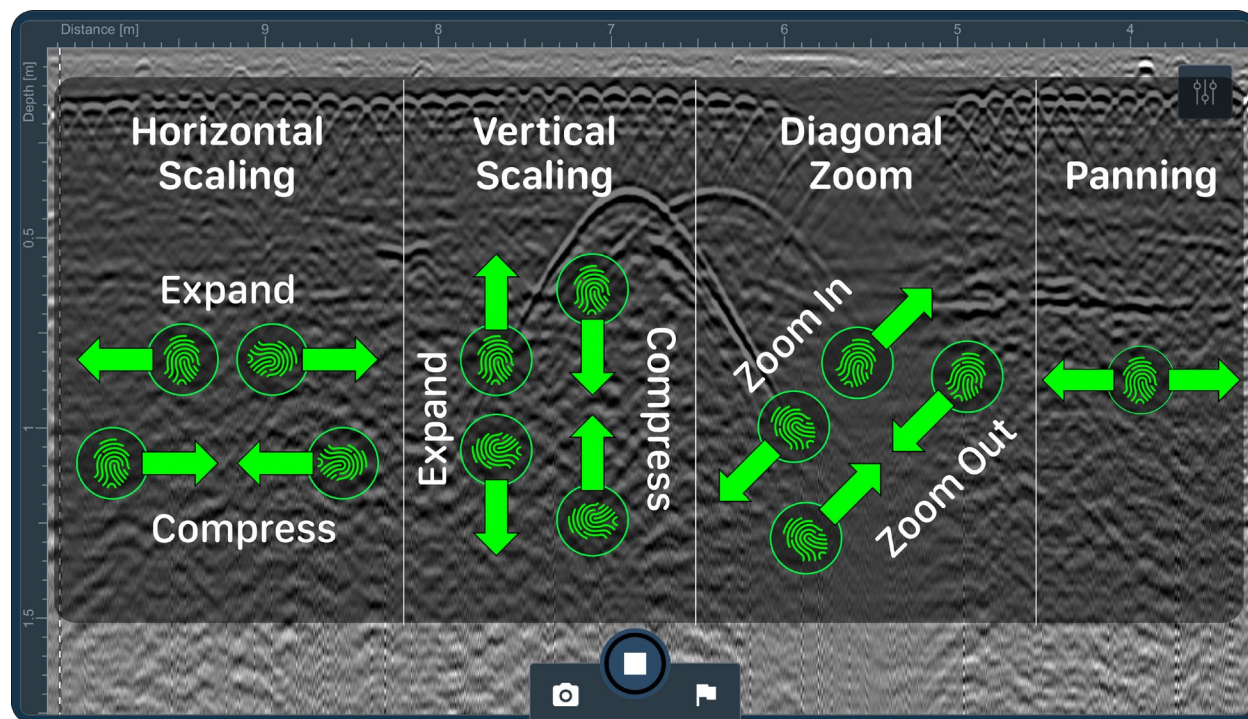
Horizontal Scaling: Touch the Scan Data Window with two fingers to expand or compress the horizontal scale. When using NX04/10 this action will horizontally scale both Scan Data windows.

Vertical Scaling: Touch the Scan Data Window with two fingers to expand or compress the vertical scale. When using NX04/10, the vertical scale for each Scan Data Window scales independently.

Zoom: Touch the Scan Data Window with two fingers and move them diagonally to zoom in or out using a fixed aspect ratio. When using NX04/10 this action will zoom both Scan Data Windows.

Panning: Use one finger to slide the Scan Data left or right. This action is not available until Scan Data extend beyond the right side of the screen, such as when Scan Data are horizontally expanded or zoomed. When using NX04/10 this action will pan both Scan Data Windows.

Horizontal scaling, Vertical scaling, and Zoom persist between sessions.



Pan to Max Distance Location: Project Mode

The most recently collected scan data may not be visible on the screen when using Gestural Controls or moving in reverse on long files. NX Control provides an on-screen feature for quickly panning to the Max Distance location.



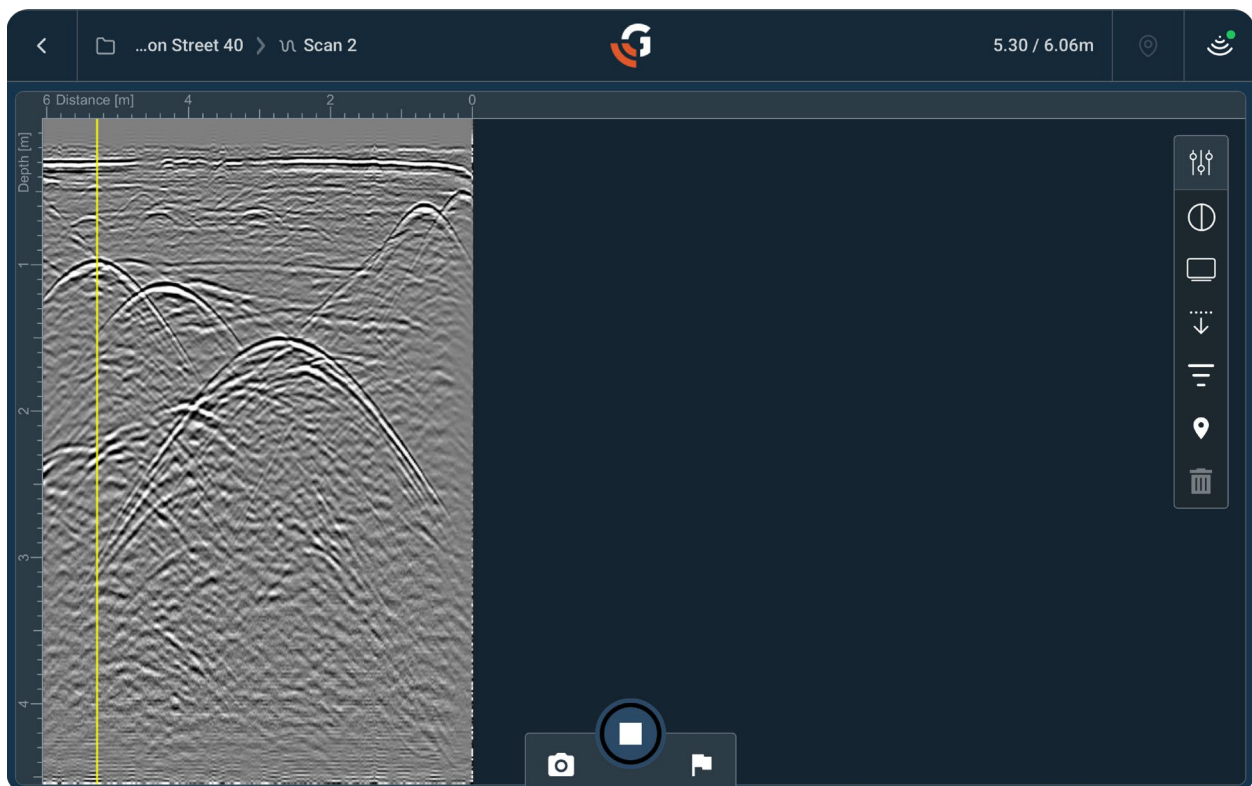
Pan to Max Distance: This icon appears near the vertical scale when the backup cursor is active, or when panning backwards, such that the most recently Scan Data are not visible on the screen. Tap the icon to automatically pan the Scan Data Window to the most recent data.

On-Screen Cursors and Target Marks

NX Control provides multiple cursor options for different scanning scenarios. The **Backup Cursor** displays the center of your antenna and is the traditional method for pinpointing targets. The **Show Device Edges Cursors** identify the edges of your antenna and are a newly developed tool for streamlining markouts. The **Horizontal Cursor** acts as a visual reference for depth-based investigations. All three Cursors can be used simultaneously.

Backup Cursor

The **Backup Cursor** appears when moving your antenna in reverse. It is referenced to the clearly marked centerline indicators on the top housing of NX04/10, NX25, and NX15. Activating the Backup Cursor updates the Distance Traveled status on the Top Navigation Bar.



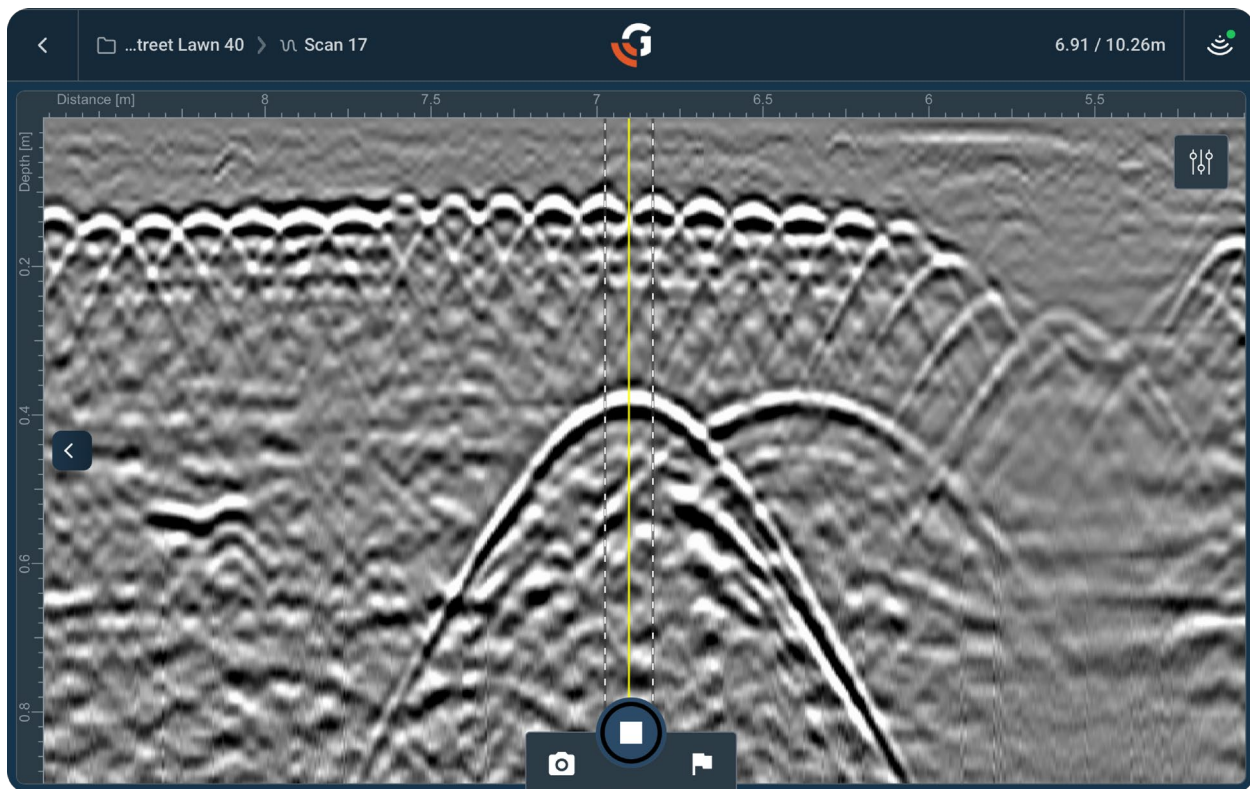
Note: To use the Backup Cursor, Trigger Mode: **Survey Wheel** is required. Survey Wheel readings are needed for tracking distance in reverse, so the Backup Cursor will not appear when using Trigger Mode: Time.

Show Device Edges

Show Device Edges displays cursors at the front and back of your antenna, along with the Backup Cursor. Enable Show Device Edges from Settings > Radar Settings.

During data collection you'll see the rear edge marker at all times. Move the antenna in reverse to see the Backup and front edge cursors as well. The Edge Cursors may improve markout speed by requiring a single mark at the front center or rear center of the antenna, as opposed to the traditional three marks at left center, right center, and the center point between the two.

Note: To use Show Device Edges, Trigger Mode: **Survey Wheel** is required. Survey Wheel readings are needed for tracking distance in reverse. The rear edge cursor will be visible in Trigger Mode: Time but moving in reverse will not display the Backup Cursor or Device Edges.



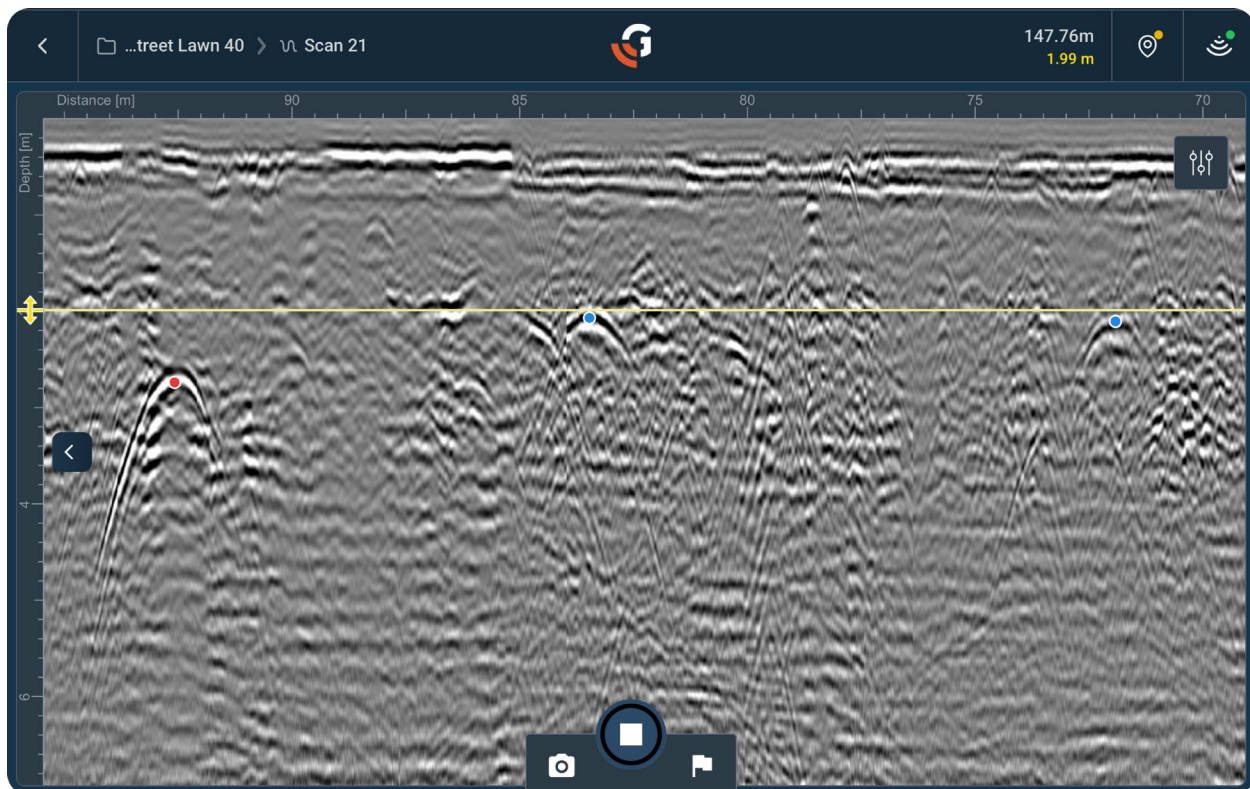
Horizontal Cursor

Overlay a **Horizontal Cursor** to create a fixed depth reference for visual guidance. In typical usage the Horizontal Cursor is placed at the top of a target of interest. As the user continues tracing out the target they will have a quick reference to identify if the target is changing depth. Many targets exhibit consistent depth across their length, so deviations in depth could indicate irregularities or

suggest you are tracing a different target. The Horizontal Cursor can be especially helpful when separating tree roots from utility targets, or when identifying targets that are expected to change depth such as post-tensioned cables in concrete.

Long-press on the vertical scale to display the Cursor, then use the grab arrows to move it up or down. When the Cursor is activated there will be a depth reading displayed in yellow on the Top Navigation Bar.

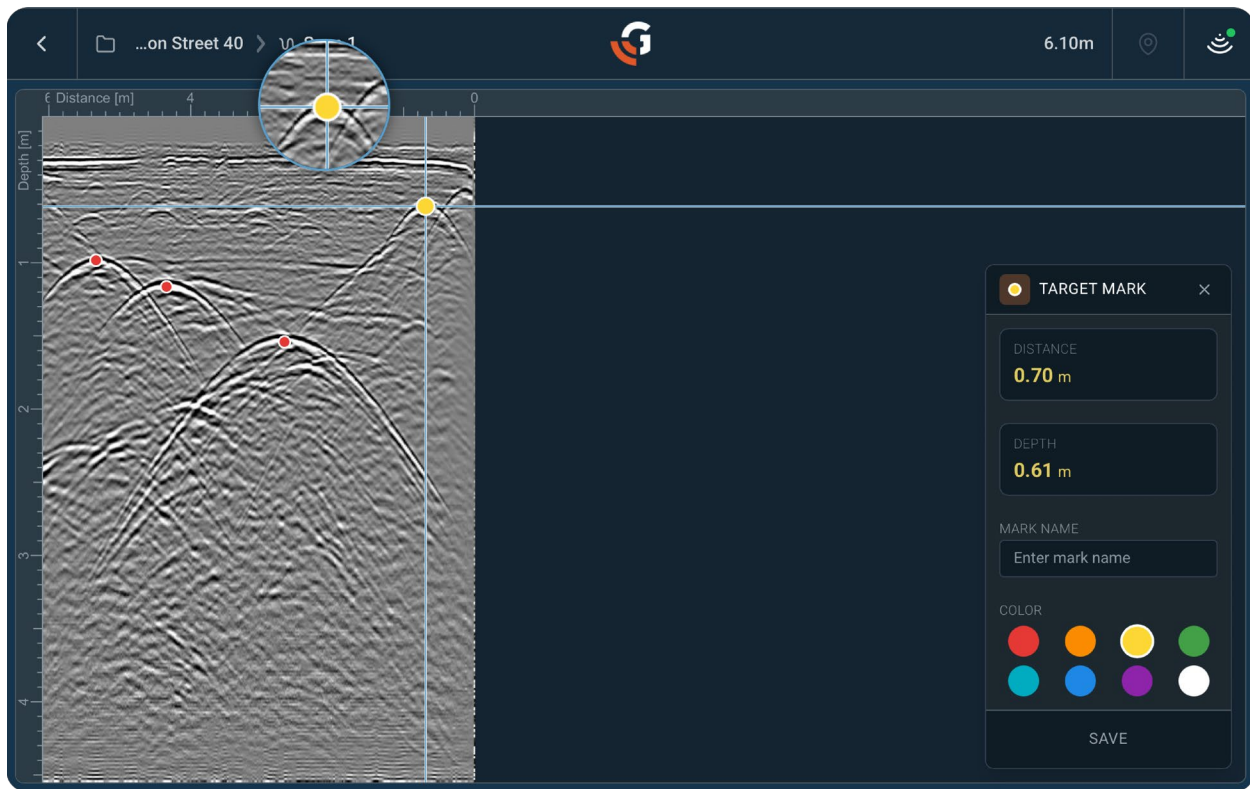
Long-press on the grab arrows to hide the cursor.



Target Marks and Crosshair Cursors

Target Marks are intended as visual indicators for reference and reporting. They are typically placed on targets of interest with colors that correspond to the interpreted target's origins, such as red for live electrical conduits. To place a Target Mark, long-press on the Scan Data Window with one finger. Crosshairs will appear at the touch location with a Target Mark in the center, as will a magnifying lens that displays a close-up view of the area under your finger.

Long-pressing will also open the Target Mark properties window, where Target Marks can be named and assigned a color. The properties window displays the distance and depth of the crosshairs' crossing point. Note that the accuracy of the Depth reading is wholly dependent on the accuracy of the current dielectric value. When in doubt, use the Depth Menu to perform a hyperbola match and refine the dielectric and depth calibration.



The crosshairs and Target Mark will remain in place when you remove your finger, and the magnifier will disappear. To adjust Target Marks, tap the Mark and hold until you see the magnifier and then move the Mark to the preferred location. Use the magnifier to accurately position the Mark relative to a target. Consider using the O-Scope to further improve placement accuracy.

Tap Save to store the Target Mark or tap the X to cancel. Tap a saved Target Mark to reopen the Target Mark Properties window; from there you can move the Target Mark, rename it, change its color, or delete it.

Target Marks will appear in the Mapping Window during live scanning or Playback, but only if a GPS is/was active during Scan Data collection. Additionally, Target Marks are saved with your Scan Data and persist into post-processing software such as Geolitix.

Floating Menus



The Scan Data Window includes a floating and collapsible/expandable menu tree for customizing and optimizing live Scan Data and saved data viewed in Playback. The menu options are Gain, Display, Depth, Filters, Open Mapping Window, and Delete Scan. Tap the Menu icon to expand it; tap again to collapse.

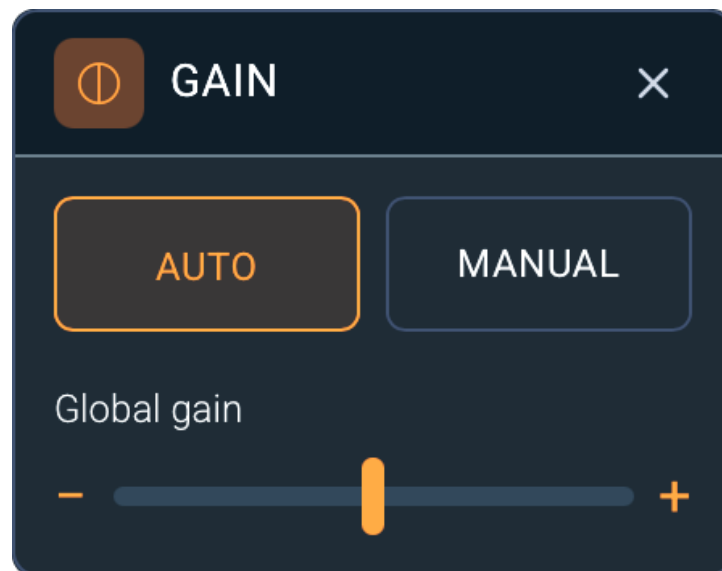
Gain Menu



Tap the **Gain Menu** icon to view Auto Gain and Manual Gain options during live scanning and Playback. New users should start with **Auto Gain** until they are comfortable with display gain and can recognize properly gained Scan Data.

Gain affects the brightness and contrast of your scan data and is the most important setting to adjust. If Gain is too low, the targets won't "pop"; too high, and targets are lost in the background.

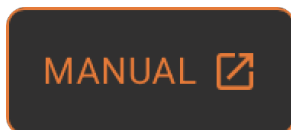
Auto Gain: NX Control will automatically determine the ideal gain curve and apply it to live scans and Playback. Use Auto Gain in conjunction with **Dynamic** or **Static Gain** settings (Settings > Radar Settings) based on your scanning environment. Dynamic is best for surface conditions that vary across the landscape, such as parking lot to lawn transitions. Static is best for general scanning in non-variable surface environments such as concrete slabs.



Manual Gain: NX Control does not automatically determine the gain curve, and Auto Gain Mode (Settings > Radar Settings) is ignored. Set Manual Gain using gain adjustment points overlain on the O-Scope window. When switching from Auto Gain to Manual Gain, Manual Gain inherits the Auto Gain curve. From there, you can optimize the gain to suit your needs.



Start by enabling Manual Gain from the Gain Menu. If the O-Scope window is open, you'll see the Gain adjustment points overlaying the O-Scope.

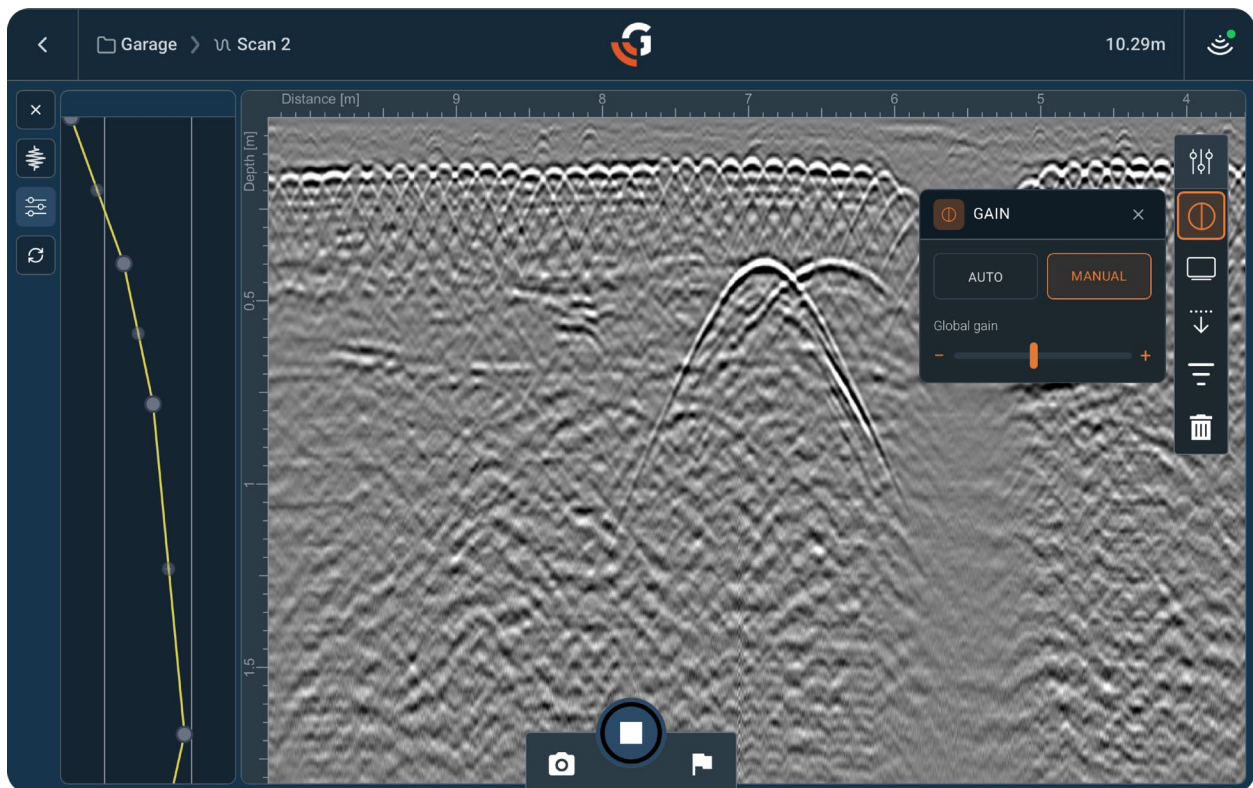
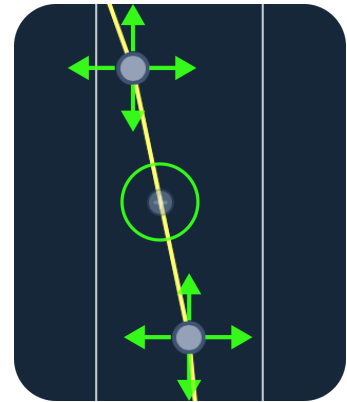


If the O-Scope window is closed, you'll see an option on the Manual Gain button to open the O-Scope window.

Activating Manual Gain will update the O-Scope window by displaying multiple active and passive gain adjustment points along a gain curve line.

The larger grey points are active and can be moved in all directions. Moving points to the right will increase gain for that region, and moving to the left will decrease gain. Move points up or down to optimize the gain in complex scanning scenarios.

Activate passive gain points by long-pressing on a smaller grey point. Additional passive gain points are then added for further fine tuning.



Gain Slider: Adjusts the overall gain level for Auto and Manual gain. Use this to globally increase or decrease gain once your gain curve is optimized. Think of it like the sound settings on a stereo; the equalizer (Auto or Manual Gain) makes the music sound great, and the volume knob (Gain Slider) controls how loud the music is.



The **O-Scope window** contains the following O-Scope and Gain-related features:



Close the O-Scope window. Feel free to close the O-Scope window when you are satisfied with the gain curve.



Toggle O-Scope on or off. GSSI recommends toggling on the O-Scope when adjusting Manual gain so you can view the impact of gain updates on the underlying Scan Data traces. In most cases, you should keep the O-Scope peaks inside the window.



Toggle the gain curve and adjustment points on or off. Tapping this icon with Auto Gain active will trigger a Manual Gain activation popup; Confirm to switch to Manual Gain or Cancel to continue using Auto Gain.



Sync Channels: For **NX04/10** only. Sync the gain curve for both antenna channels. Moving a gain adjustment point on one curve adjusts the corresponding gain adjustment point for the other channel.



Reset the gain curve to zero. Removes all applied gain enhancements, including any passive gain points that were activated, turning the gain curve into a flat line and shifting it to the left side of the O-Scope window.

Display Menu

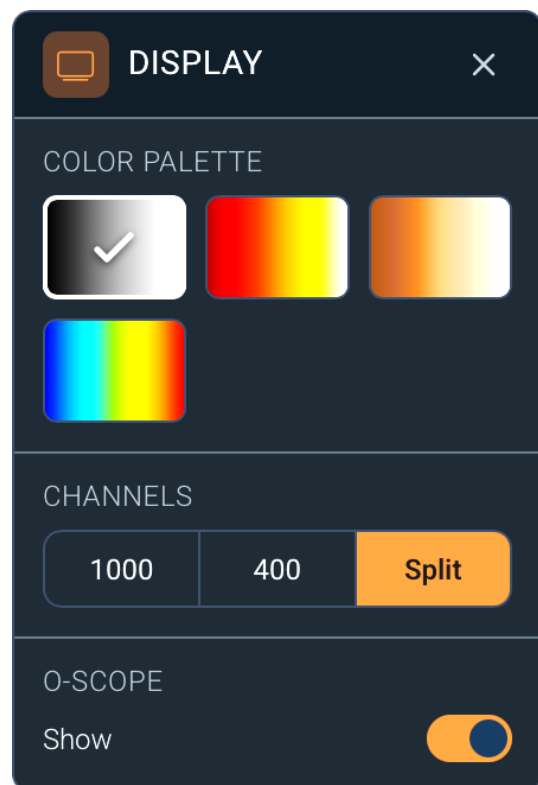


The **Display Menu** offers a range of color table choices, a toggle for the O-Scope window, and channel options (for NX04/10 only).

Color tables change the overall color ramp for Scan Data. In some cases, certain color tables may be beneficial when searching for specific types of targets. For most scanning tasks GSSI recommends using the black-to-white color table.

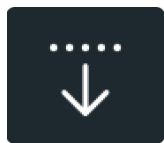
Toggling the **O-Scope** will open the O-Scope Window or close it. Leave the window open to view the O-Scope for the current position, the backup cursor's position, or the Target Mark crosshairs' position.

Use **Channel Selection** (for NX04/10 only) to display Channel 1 (1000MHz), Channel 2 (400MHz), or a top-and-bottom split view of both channels. In Split View the cursors, such as the Backup Cursor, are synced between channels and each channel will display its own depth or time scale.



Close the Display Menu by tapping the X or the Display Menu icon on the floating menu tree.

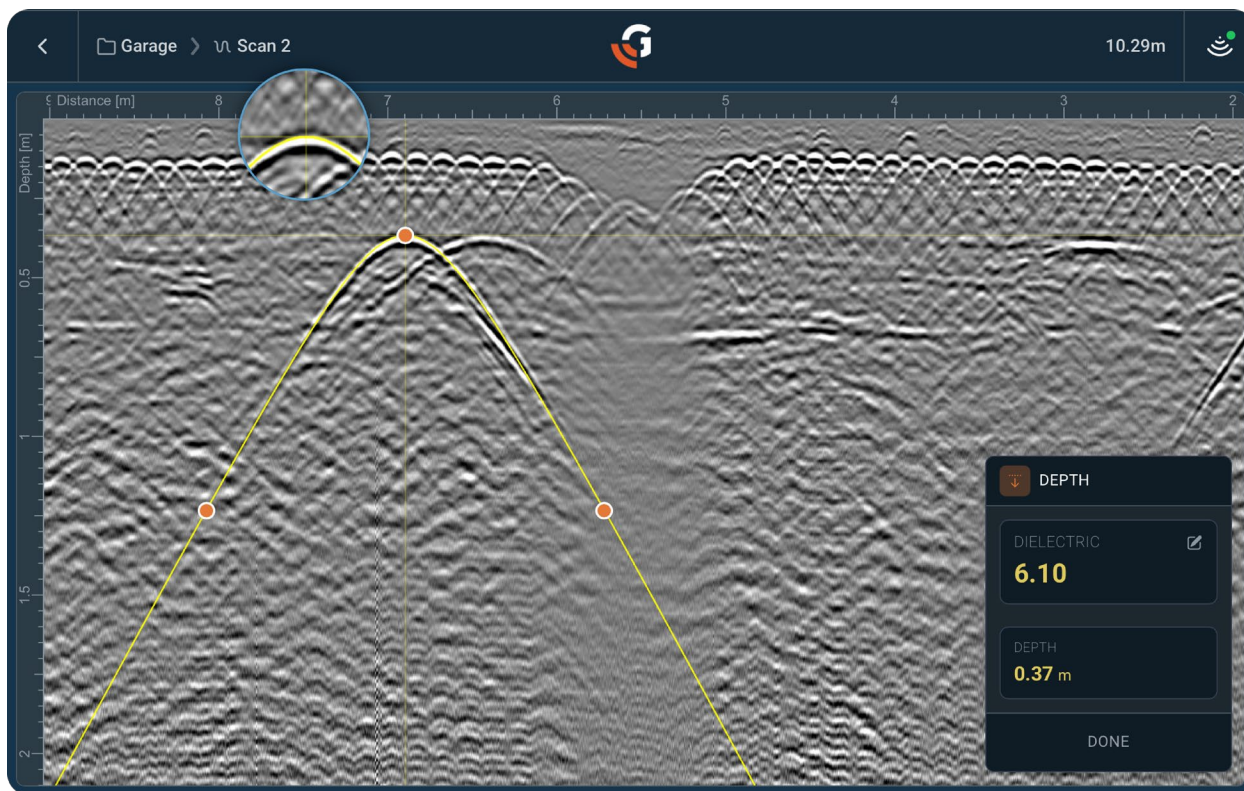
Depth Menu



Tapping the **Depth Menu** icon activates the **Hyperbola Matching** tool. Use Hyperbola Matching to fit a yellow hyperbolic curve to a target in your Scan Data. Doing so will calculate the dielectric of the subsurface and update the depth scale calibration. This is critically important if you require accurate depth readings. GSSI recommends using Hyperbola Matching on a target that was crossed at 90-degrees to its long axis; this will result in the most accurate dielectric calculation.

Dielectric, also known as Dielectric Constant or Relative Dielectric Permittivity (RDP), is a number from 1 to 81 that represents the velocity of the radar wave as it travels through a material. Air has the lowest dielectric (1) and water has the highest (81). Lower dielectric values represent higher velocity, and higher values signify lower velocity. Dielectric is used in tandem with Two-Way-Travel-Time (TWTT) to calculate a depth calibration.

Note that the Depth scale will update when using Hyperbola Matching, and the TWTT scale will not update.

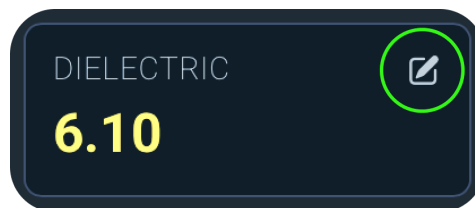


Follow these steps to perform Hyperbola Matching:

- 1) Tap the Depth Menu icon on the floating menu tree.
- 2) The Depth window opens and a yellow hyperbolic curve appears in the Scan Data Window.

- 3) Tap and hold the point at the peak of the yellow curve, then move your finger to drag the curve near a target in your data. This will display a magnifier to assist with accurate placement.
- 4) Place the curve over a target, using the magnifier to place the top of the curve in the center of the first strongest reflection peak.
- 5) Use one of the curve's side points to reshape the curve and fit it to the target's tails. Note that the depth scale will update as the curve is reshaped.
- 6) Tap Done.

The Depth window also allows manual entry of a dielectric value. Tap the edit icon in the upper right of the Dielectric box and use your mobile device's on-screen keyboard to enter a value between 1 and 81. This is useful when the dielectric of a material is already known. Most users should perform Hyperbola Matching when scanning a new area.



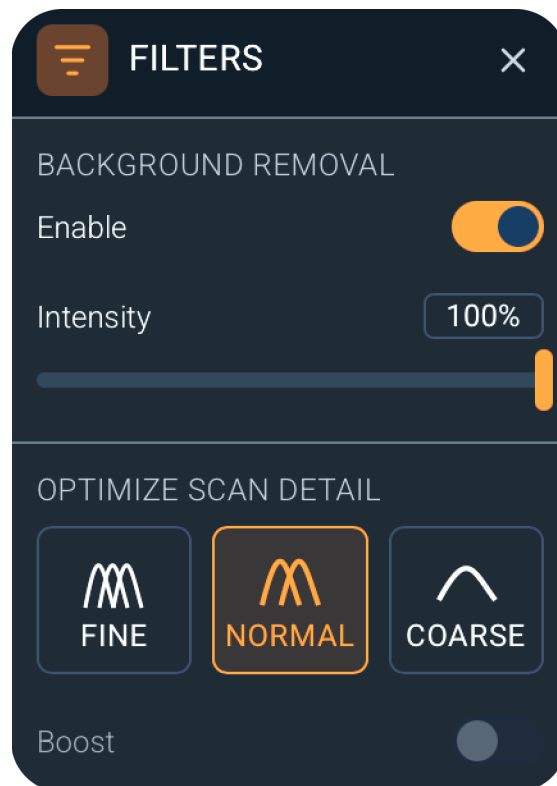
Filters Menu



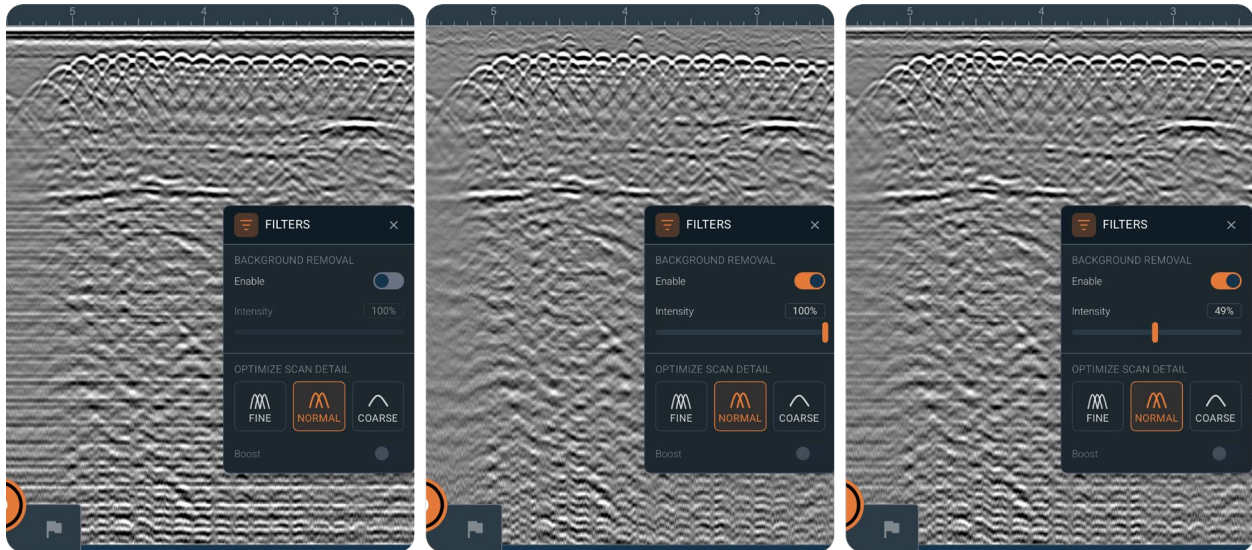
The **Filters Menu** includes **Background Removal** for suppressing horizontal noise bands and **Optimize Scan Detail** for Coarse and Fine filtering. Scan Data are typically most informative when filter options are off. However, these filters are available for on-the-fly adjustments and for dealing with site-specific environmental and soil-related noise. Feel free to experiment; you might see something you would have missed otherwise!

Background Removal and Optimize Scan Detail are available during live Scan Data Collection and when viewing saved Scan Data in Playback. These filter options are for display only and **do not** affect saved raw Scan Data.

Background Removal: A standard GPR filter that removes flat-lying, continuous noise bands from radio and other electromagnetic broadcasts. Toggle Background Removal on or off and use the Intensity slider to adjust the strength level.



Sources of external electromagnetic noise are everywhere, and the resulting banding often overprints, obscures, or alters important Scan Data features. Background Removal effectively suppresses noise bands and improves the interpretability of Scan Data. However, this filter can also remove real flat-lying targets such as the bottom of a concrete slab or soil layers. GSSI therefore recommends using Background Removal only when noise bands become problematic.

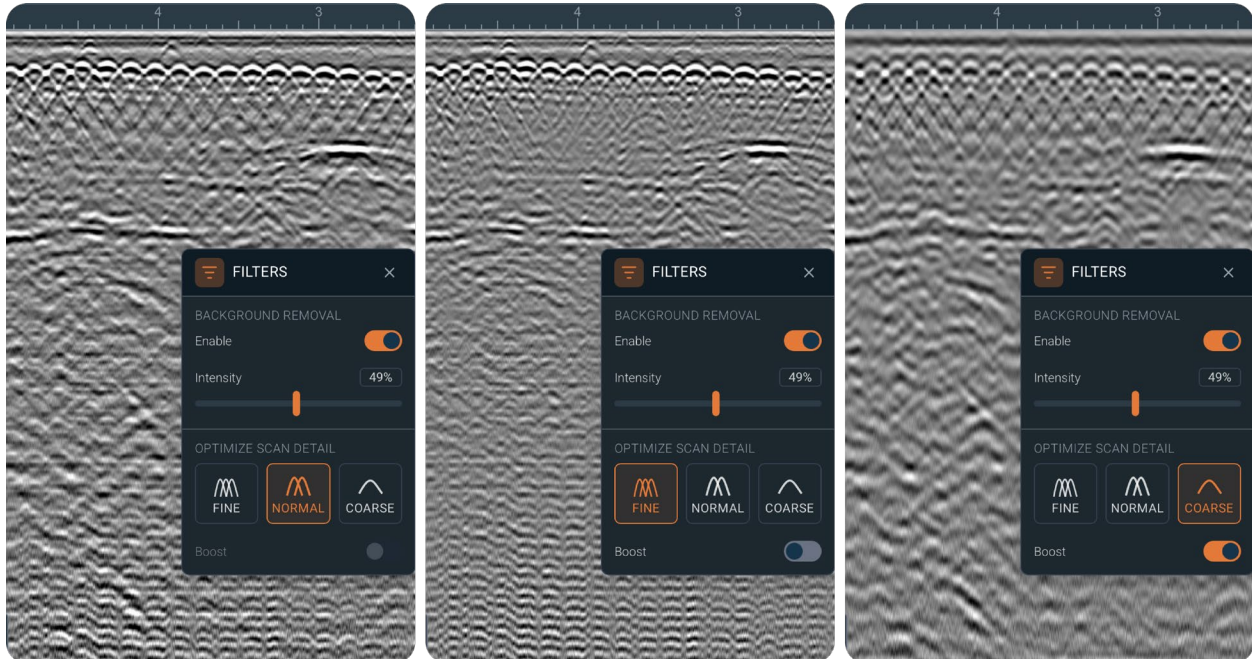


The images above demonstrate the impact of **Background Removal** on Scan Data. Background Removal has been toggled off in the left image, toggled on with full Intensity in the center image, and toggled on with 50% intensity in the right image. The noise bands in the left image are not causing major data quality issues in the shallow data, though the deeper data are somewhat difficult to interpret. In the center image the noise bands have been completely removed and the data are easy to interpret; had there been any indication of the slab bottom it probably would have been removed along with the noise bands. The left image shows a good compromise that balances the need for Background Removal with a desire to preserve real, flat-lying features.

Optimize Scan Detail: Provides three options for adjusting the level of detail in Scan Data.

- 1) **Normal:** The standard display method showing the entirety of the Scan Data. It is important to establish a baseline knowledge of complete subsurface conditions before using the other Scan Detail filters. GSSI recommends starting most scanning tasks using the Normal setting.
 - **Boost** is unavailable for the Normal option.
- 2) **Fine:** Focus on the fine details to see small and closely spaced targets and thin layers. This will reduce depth penetration in exchange for highlighting features that would be obscured by larger targets and thick layers. Toggle **Boost** to further accentuate fine details.
 - **Pro Tip:** Try the Detail option when scanning reinforced concrete. In most cases it will reduce the amount of data noise generated by the reinforcement, allowing a clearer view of what is below. Just remember: using Detail will reduce depth penetration.

- 3) **Coarse:** Reduce clutter from small targets and soil or concrete inclusions and focus on larger targets and broad changes in the subsurface. Resolution of small targets and layers is sacrificed in exchange for clutter reduction. Toggle **Boost** to further reduce clutter.
- **Pro Tip:** Try the Coarse option when scanning in less-than-ideal soil conditions. In most cases it will reduce the amount of data noise generated by soil characteristics, such as ringing and other problems from clay and silt, allowing a clearer view of what is below. Just remember: using Coarse will reduce the ability to image small targets and finer details.



The images above demonstrate the impact of **Optimize Scan Detail** on Scan Data from a wire mesh-reinforced concrete slab. Scan Detail is set to Normal in the left image, Fine in the center image, and Coarse with Boost in the right image. The data in the left image provide a baseline, full data range view for the scanning environment. The center image reveals many fine details, and data noise below the reinforcement has been removed, but depth penetration has been greatly reduced. The data in the right image exhibit a large reduction in clutter and depth penetration, but resolution is much lower.

Open Mapping Window



Tap the **Mapping Window** icon to open the map and view downloaded offline basemaps and datasets for GPS-enabled Projects. The Mapping Window is accessible during live scanning and in Playback. A GPS is required for displaying location-based information for live scanning, and for Playback the saved data must have been collected with GPS positions.

Delete Scan



The **Delete Scan** icon is disabled during live data collection, but it is available after tapping Stop Scan.

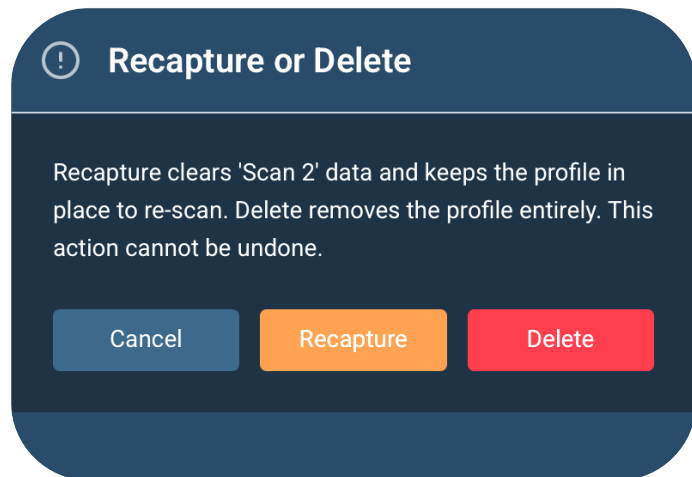
Delete Scan is always accessible when viewing saved files in Playback.

Tap the Delete Scan icon to display a notification window. You will see options to recapture the Scan, Delete the Scan, or cancel.

Recapture is a time saving option that will re-collect the Scan and reuse the file name.

For example, you collect Scan 5 and decide to recollect it. Selecting **Delete** would delete the Scan and display the previously saved Scan (Scan 4). Selecting recapture would bring you back to the Scan Data Window with Scan 5 listed on the Top Navigation Bar. You could then tap Start Scan, collect the Scan, and tap Stop Scan. The newly collected Scan would be named Scan 5.

Deleting or recapturing a Scan **cannot be undone** and deleted or overwritten Scans **cannot be recovered**.

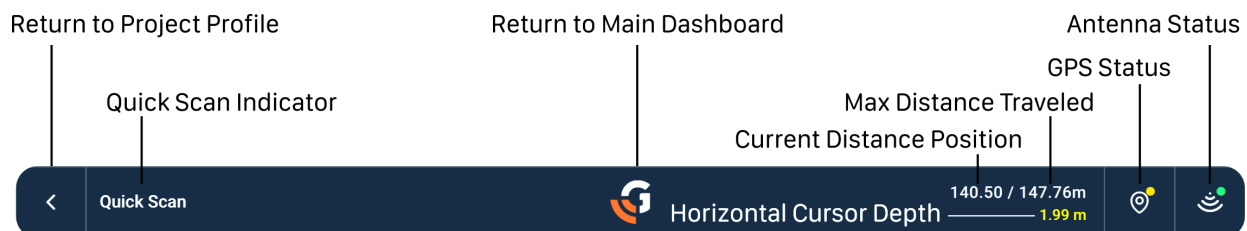


Scan Data Window: Quick Scan

In Quick Scan Mode, the Scan Data Window displays live Scan Data as your antenna moves but the Scans are discarded when stopped. Quick Scan shares many features with Project Mode, but there are notable differences.

Top Navigation Bar: Quick Scan

In **Quick Scan** the Collection Screen's Top Navigation Bar displays Quick Scan and does not include Project Name or Current Scan name. **Quick Scan** is for fast mark-and-go scanning and **does not save Scan Data or Results**.



Back arrow: Closes a live Scan and returns to the Main Dashboard.

Quick Scan: Visual indication that Quick Scan Mode is active. If you intend to save Scan Data and Results, please return to the Main Dashboard and enter Project Mode.

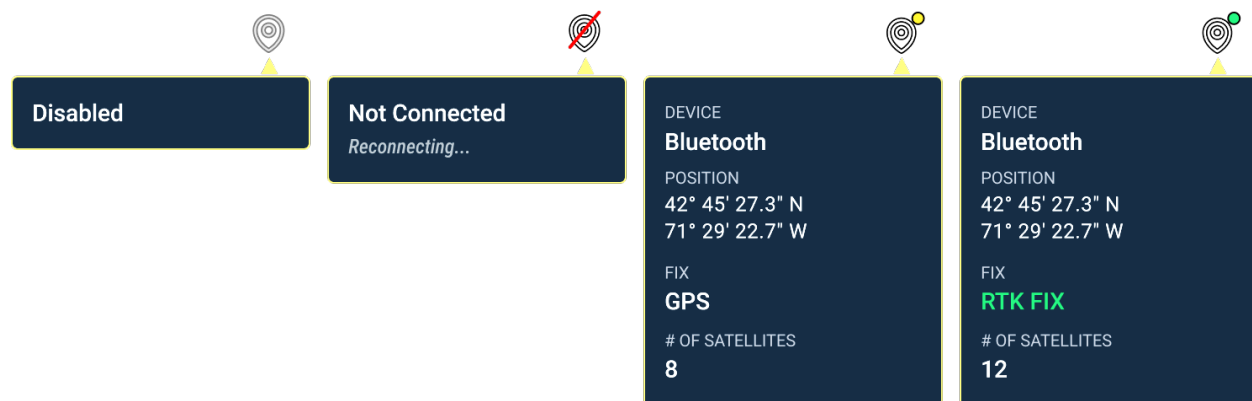
GSSI logo: Closes and discards a live Scan and returns to the Main Dashboard.

Max Distance / Current Position: Max Distance displays the total length of the current live Scan and is always visible when collecting Scan Data. Max Distance will increase as new Scan Data are added to the file. Current Position is displayed when moving the antenna in reverse and the backup cursor is active.

Horizontal Cursor Depth: Yellow numbers displaying the Horizontal Cursor's depth.

Antenna Status: Tap to view the connected antenna's model number and battery status.

GPS Status: Tap the GPS status icon to display GPS connection status (disabled, not connected/reconnecting) or the GPS connection device (Bluetooth, serial, or internal). The info box also shows the current latitude and longitude, fix type, and the number of satellites in use; these values may change depending on environmental conditions such as tree cover, nearby buildings, or other factors. The GPS status icon will update depending on the connection status and fix type and may do so frequently in areas with poor GPS reception.



Aside from differences in the Top Navigation Bar, **Quick Scan** differs from Project Mode in multiple ways.

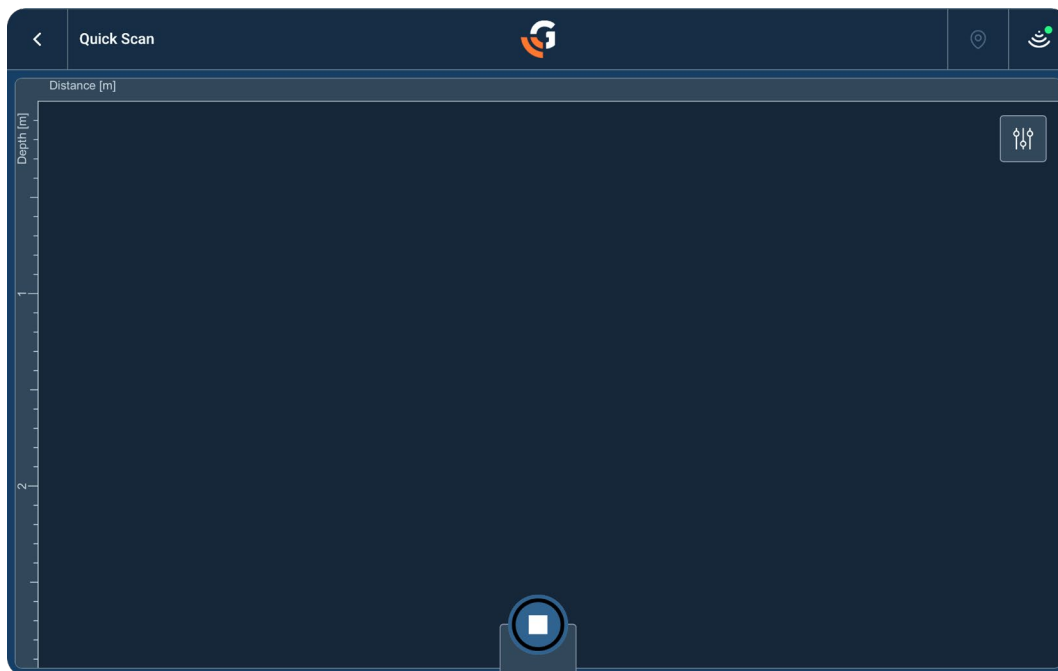
- 1) Quick Scan's Lower Control Bar displays only the Start/Stop Scan icons.
- 2) Start Scan is automatically activated when Quick Scan's Collection Window is opened; simply push your system forward to view live Scan Data. Stop Scan stops data collection and discards the Scan Data once Stop Scan is tapped. Tap Start Scan to begin a new Scan.
- 3) The placement of Target Marks is not possible in Quick Scan, though long-pressing in the Collection Window will display the Crosshairs, magnifier and the Distance and Depth status panel.
- 4) The most recently collected scan data may not be visible on the screen when using Gestural Controls or moving in reverse on long files. Unlike Project Mode, Quick Scan provides a **Fast Forward** icon (centered on the vertical scale) that automatically moves the

backup cursor to the most recently collected data. This time saving feature assists with markouts by removing the need to roll the survey wheel to reset the backup cursor.

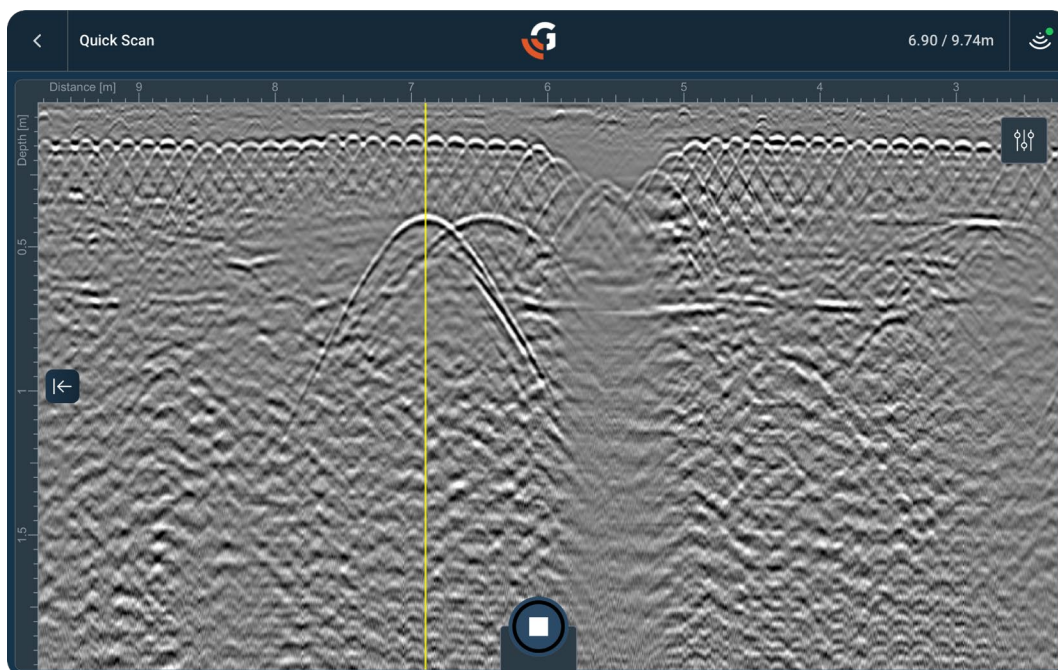


Fast Forward: This icon appears in Quick Scan when the backup cursor is active. Tap the icon to automatically move the Backup Cursor to the most recently collected data position.

The remaining Collection Window features are identical for Quick Scan and Project mode.



Above: New Quick Scan Collection Window. **Below:** Backup Cursor and Fast Forward icon.



Mapping and GPS Point Collection

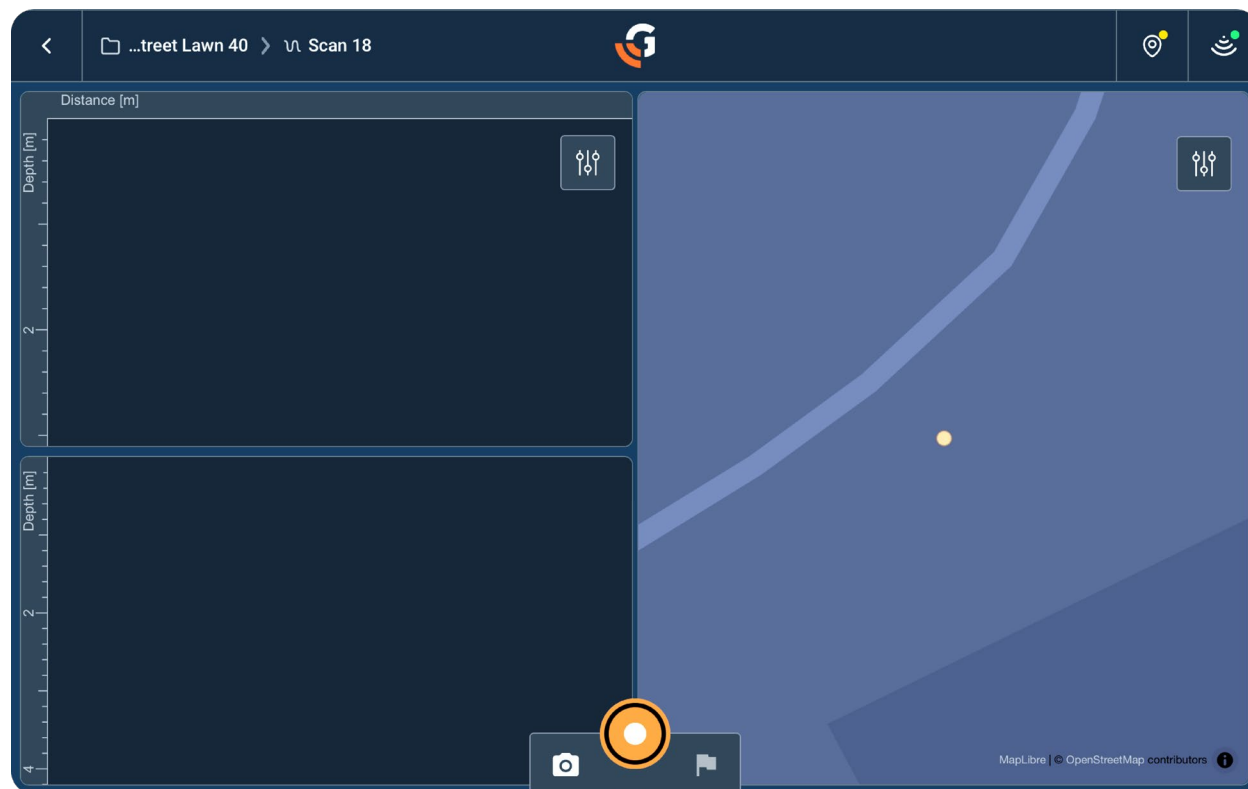
The **Mapping Window** displays GPS-located features associated with the active Project and AOI. A connected GPS is required for acquiring real-time mapping data and displaying offline basemaps during collection. Reviewing a saved Project in Playback will display all data that were collected using an active GPS and downloaded basemaps.

During live collection the map displays GPS-derived features such as GPS tracklines for Scans, Target Marks and User Marks that were placed on Scan Data. These features are overlain on any downloaded basemaps that overlap with your current location. Downloaded basemaps are not required for map use, but they do add significant and helpful contextual information.

Mapping Window Overview



Open the Mapping Window by tapping the floating menu's Map icon. The map can be opened during live scanning and Playback with or without an active GPS connection or downloaded basemap. GPS positions are required for viewing live or saved location-based data on the map.



The Mapping Window will cover 50% of the screen when first opened during Scan Data collection. If a GPS is active, you'll see your current position as an orange circle and any downloaded basemaps that correspond with your location. When opened in Playback the Mapping Window will return to its last Layout Mode, Position setting, and size.

Map Menu

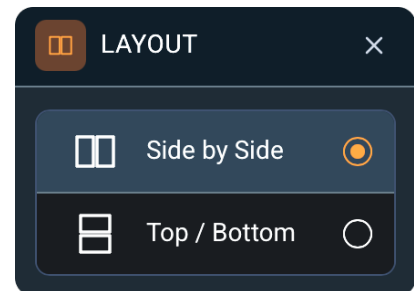


The Mapping Window includes a floating and collapsible/expandable menu tree for map-specific controls. Tap the Map Menu icon to expand it; tap again to collapse.

Map Layout Menu



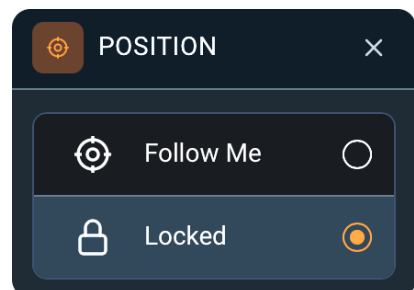
The Map Layout Menu provides controls for positioning the Mapping Window. Choose Side by Side to place the Mapping Window to the right side of the Scan Data Window. Select Top / Bottom to move the Mapping Window below the Scan Data Window.



Map Position Menu



The **Map Position Menu** lets you control whether the Mapping Window centers on your position or allows free panning. Choose **Follow Me** to lock your current position to the center of the Mapping Window. Use this mode when collecting Scan Data so your location is always visible on the screen. Select **Locked** to allow map panning, where your current position is not locked to the center of the Mapping Window. Use this mode when you want to explore the map and see previously collected Scan and map data.



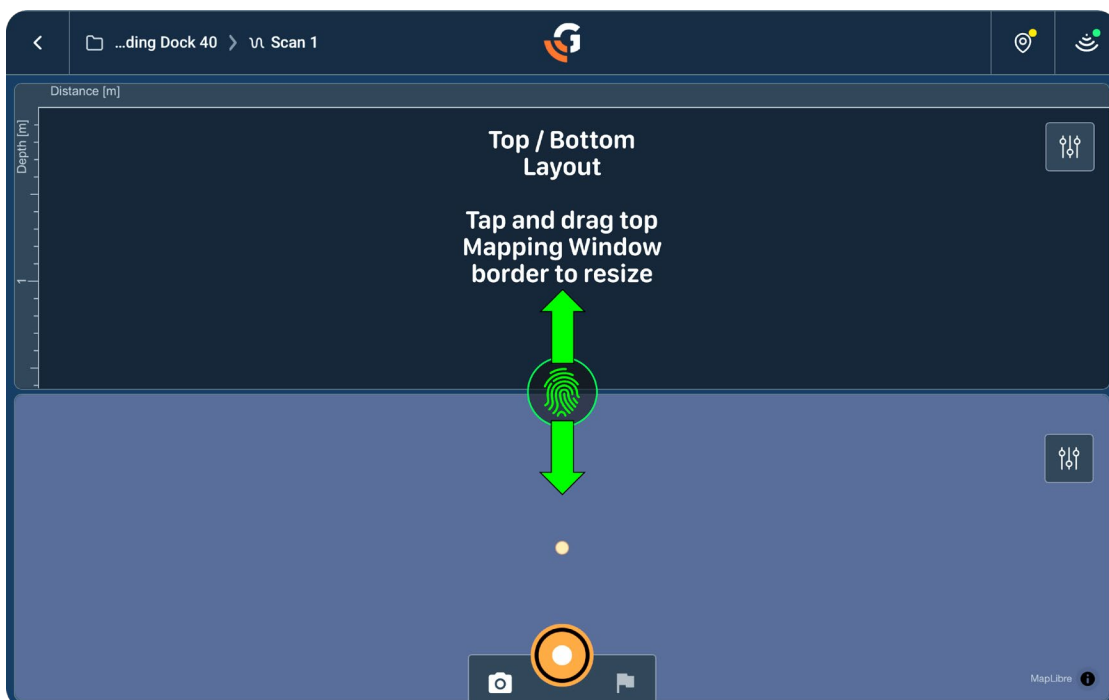
Hide Map



Tap the **Hide Map** icon to close the map.

Resizing the Mapping Window

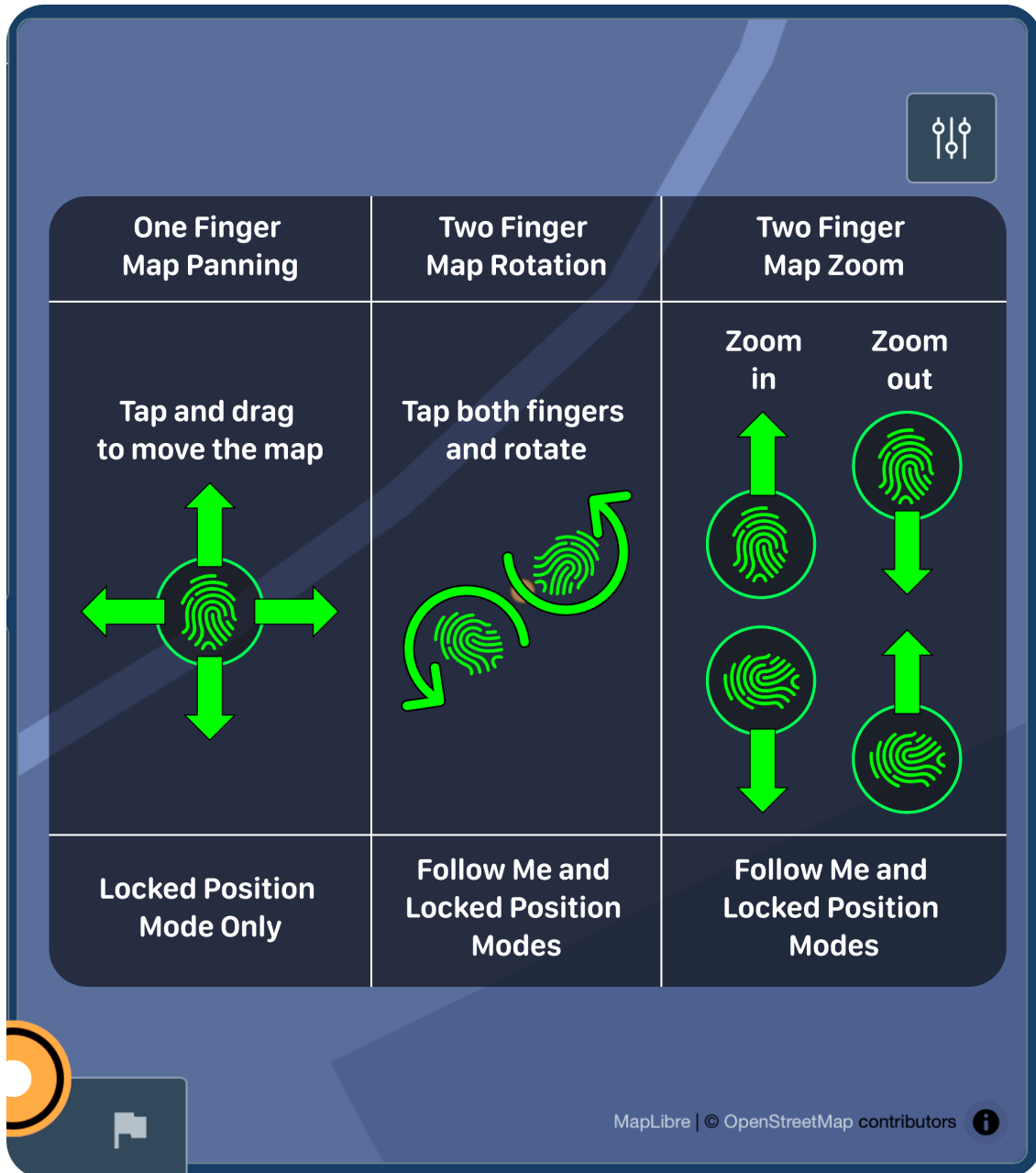
The default Mapping Window position is to the right side of the Scan Data Window and at 50% width. You can resize the Mapping Window using one finger to long-press on the window border and then drag to resize. In Side by Side mode, long-press on the left Mapping Window border and then slide the window to the right to make it smaller and to the left to make it larger. The maximum Side by Side Mapping Window width is 80% and the minimum is 20%.



In Top / Bottom Mode, tap and hold the top Mapping Window border and then slide the window up to make it larger and down to make it smaller. The maximum Top / Bottom Mapping Window height is 80% and the minimum is 20%.

Mapping Window Gestural Controls

Use common **gestural controls** to zoom, pan, and rotate the Mapping Window. Zooming and rotating are available for the Follow Me Map Position mode, but panning is not. All gestural controls can be used for the Locked Map Position Mode.

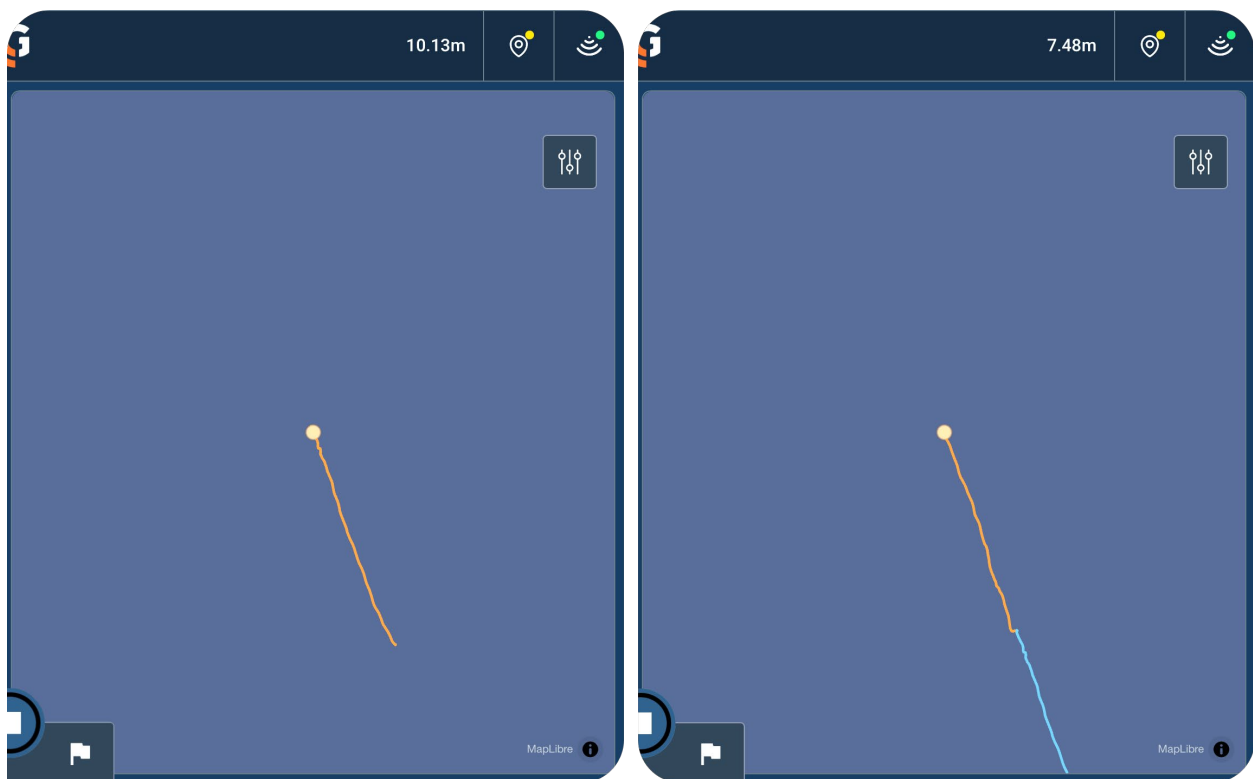


Display of Geolocated Features

The Mapping Window displays geolocated features associated with the current Project and the active AOI. When starting a new Project with an active GPS the Mapping Window will display only your current position and any basemaps that overlap with your current location.

GPS Tracklines

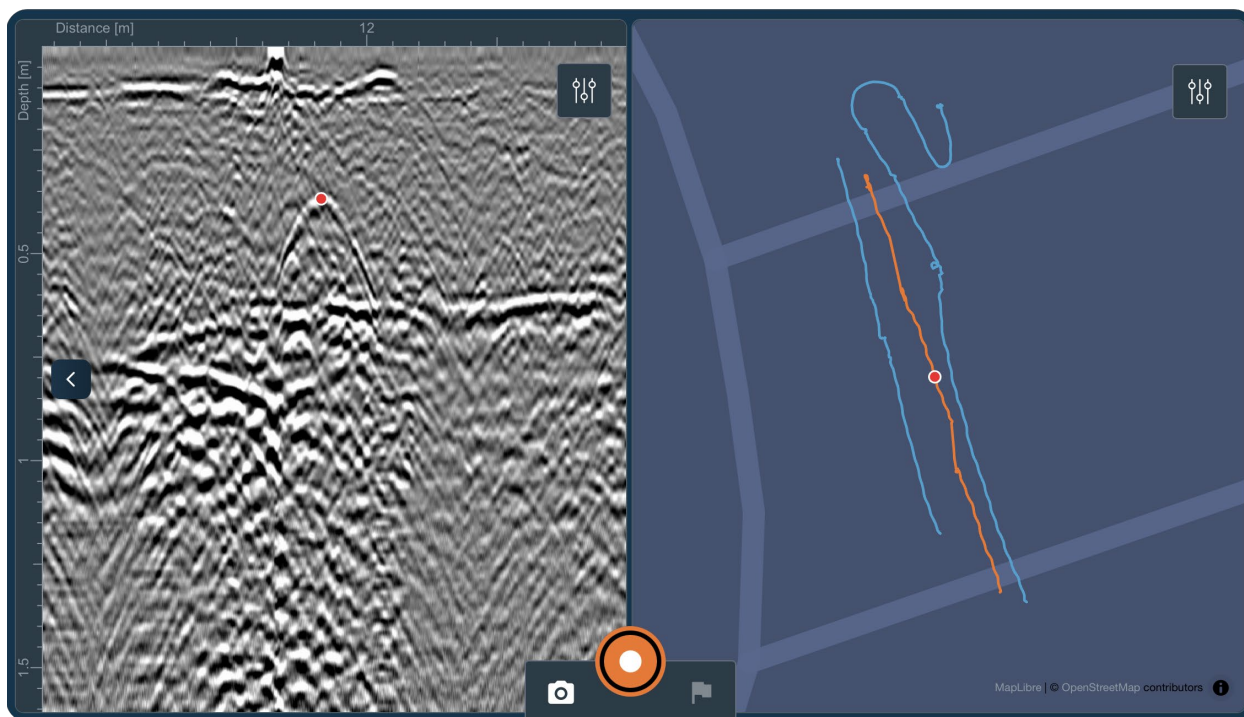
GPS Tracklines are created during live Scan Data collection. As you scan, you'll see your current location move and an orange line that traces your walking path. The GPS positions are saved with your Scan Data. Starting a new Scan will create a new orange Trackline and the saved Scan's Trackline will change to blue. The Mapping Window displays all tracklines from the current AOI.



GPS Tracklines are also visible during Playback. The Trackline for the currently displayed Scan will be orange and the other Tracklines will be blue. Tap the Scan number on the Top Navigation Bar to select a different Scan. The corresponding Trackline will change color to orange and the other Tracklines will be blue.

Target Marks

The Mapping Window displays the location and color of **Target Marks** placed on GPS-encoded Scan Data. During live collection the Target Marks are placed once they are saved, and in Playback they are always visible.



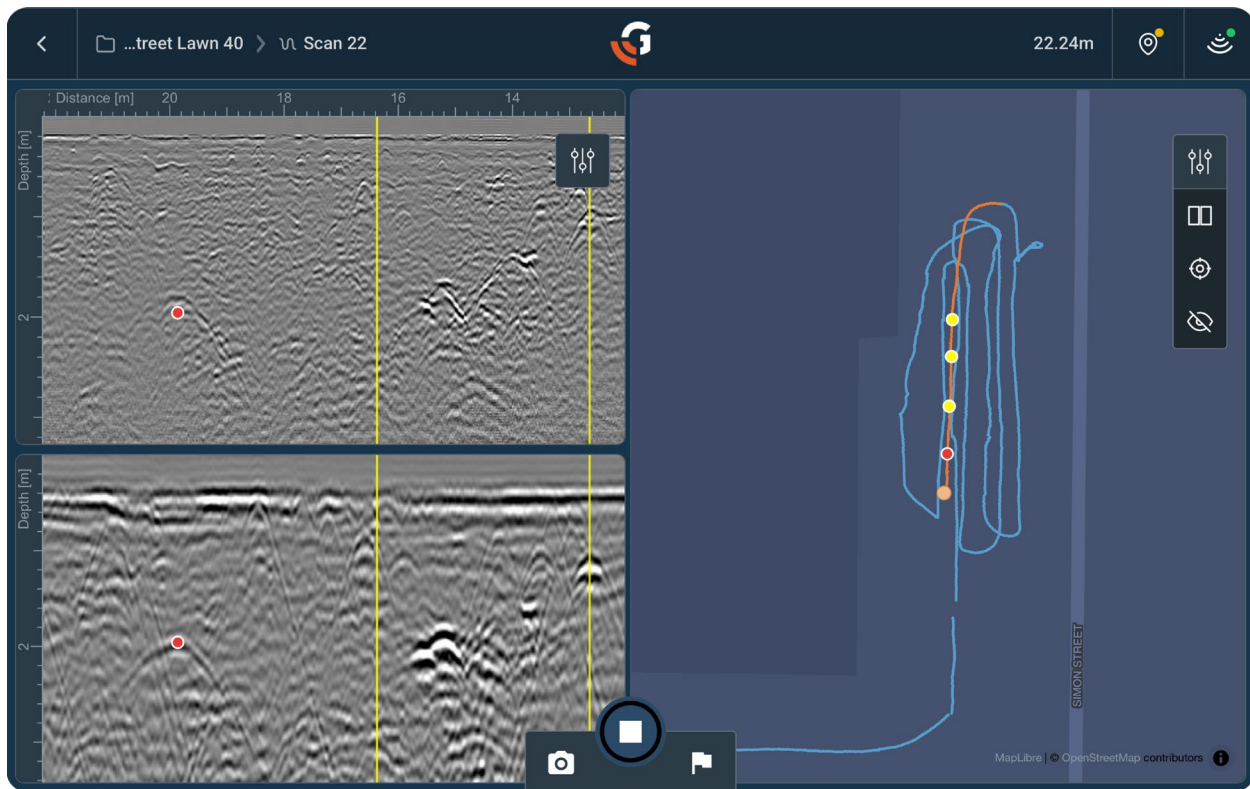
Tap a Target Mark in the Scan Data Window to open Target Mark properties. Tap and drag the Target Mark to adjust its position; in the Mapping Window you will see the Target Mark move along the corresponding GPS Trackline.

User Marks

User Marks are vertical reference lines intentionally placed while moving forward or in reverse. These Marks are visible in the Scan Data Window as vertical yellow lines, and as yellow points in the Mapping Window.

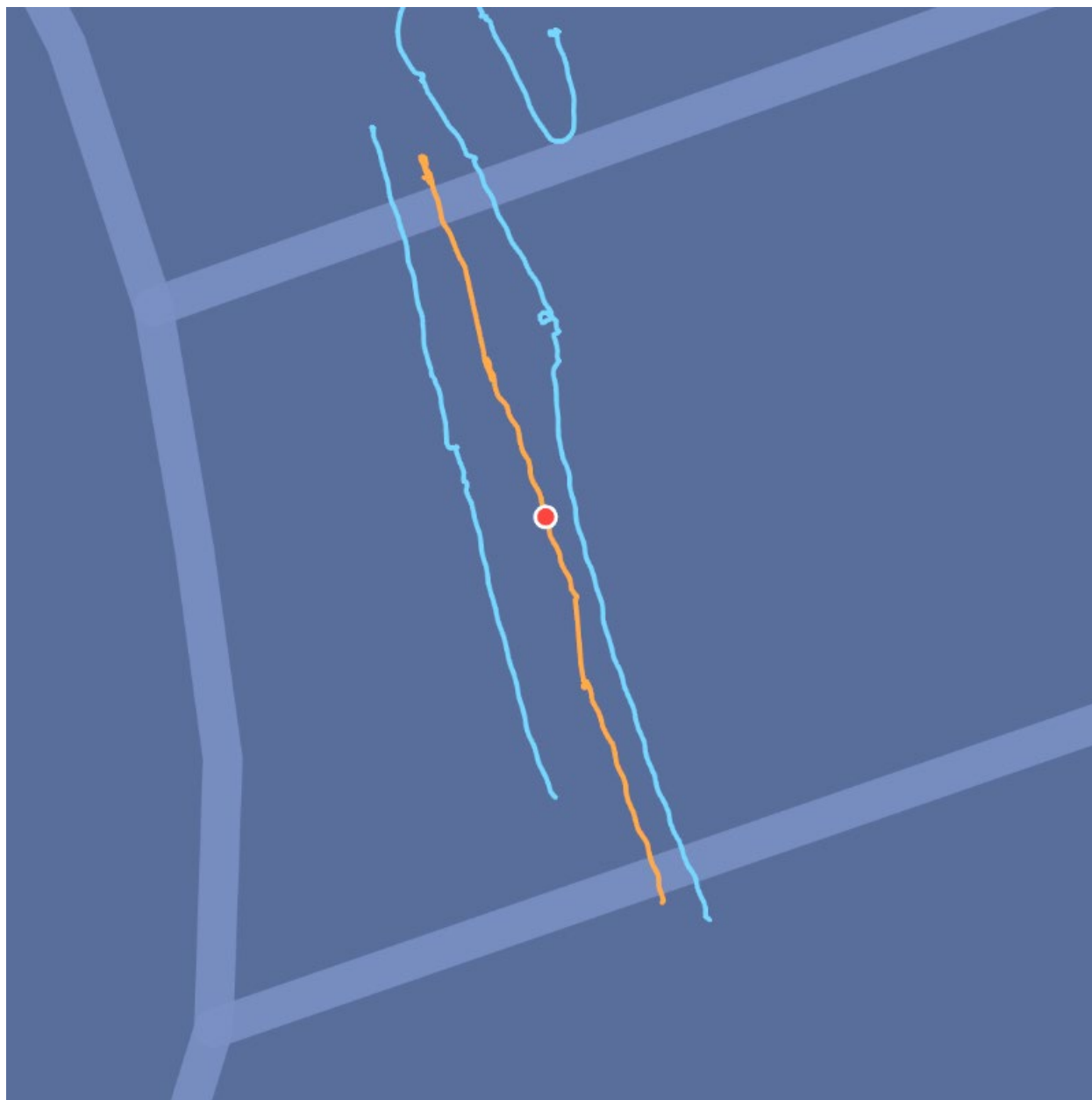
A typical use case for User Marks is to record the location of an above ground feature and reference it in your scan data. For example, you could place a User Mark every time you walk past a fire hydrant or pass over a crack in the pavement. When reviewing data in Playback, you'll have a location reference for the above-ground feature of interest and it might help with data interpretation.

This image below displays the different visual style for the Current Position Indicator (orange), Target Marks (red, in this example), and User Marks (yellow).



Mapping Window Screenshots

Use the Lower Control Bar's **Screengrab** icon to capture separate images of the current Scan Data Window and Mapping Window. The resulting images will be saved in the Project Profile's Results Panel under the currently active AOI. Like Scan Data Window Screenshots, the images from the Mapping Window are high-resolution, report-ready images. The Mapping Window Screenshots preserve geo-located features, the Current Position indicator, and visible basemaps while removing user interface components such as the Top Navigation Bar, Lower Control Bar, and Menus. The Mapping Window must be visible to be captured, and only what is displayed will appear in the screenshot. An example of a Mapping Window screenshot is provided below.



Glossary of Terms

Term	Definition
Accessory Mode	An operating state used when an NX25 or NX15 antenna is paired with Flex NX or Flex LT instead of NX Control or the Nexus Elements Interface.
Add Data	A Project Profile option that opens the Collection Screen so new Scan Data can be acquired for the current Project and AOI.
Add Result	A Project Profile tool used to add a live camera photo or saved image to the Results Panel for the current AOI.
Amplitude	The strength of a reflected radar signal. Higher amplitude reflections appear stronger in Scan Data.
Antenna	The GPR component that transmits radar energy into the material being scanned and receives reflected signals for display and recording.
Antenna Firmware	Embedded software running on the antenna. Firmware updates may improve performance and add new features.
AOI	Area of Interest. An organizational subarea within a Project that stores related Results and Scan Data from a specific work area.
Attenuation	The weakening of radar energy as it travels through a material. Highly conductive or wet materials generally increase attenuation and reduce penetration depth.
Auto Gain	A display mode in which NX Control automatically applies a gain curve.
Background Removal	A display filter that suppresses flat, horizontal noise bands. It can improve interpretability but may also reduce or remove real flat-lying features such as soil layers or slab bottoms.
Backup Cursor	An on-screen cursor that appears when the antenna moves in reverse. Indicates the antenna centerline location for target pinpointing.
Basemap	A map layer displayed behind collected GPS-based data to provide location context in the Mapping Window.

Battery Gauge	A battery hardware feature that displays remaining charge. The gauge may require periodic recalibration for improved accuracy.
BLE	Bluetooth Low Energy. A Bluetooth protocol commonly used by modern mobile devices and supported by many GPS receivers. iOS devices require GPS units to connect via BLE Bluetooth.
Bluetooth Classic	A Bluetooth protocol supported by many Android devices and some external GPS receivers.
Boost	An optional enhancement used with Fine or Coarse Optimize Scan Detail filters to further emphasize the selected display effect.
Channel	An individual GPR antenna. NX04/10 includes two separate antennas: a 1 GHz high-frequency channel and a 400 MHz low-frequency channel.
Clutter	Unwanted signals, small-object responses, or complex patterns that obscure important targets and make them harder to identify.
Coarse Detail	An Optimize Scan Detail option that reduces small-scale clutter so larger targets and broad subsurface changes are easier to see.
Collection Screen	The NX Control screen used for live scanning and Playback. It displays Scan Data, controls, cursors, floating menus, and optional mapping information.
Color Table	A display color ramp applied to Scan Data. Different color tables can make certain reflection patterns easier to identify.
Crosshair Cursor	A precise placement aid displayed when adding or moving a Target Mark in the Scan Data Window.
Data Storage	The location where NX Control saves Projects, Scan Data, Results, and exports on the connected mobile device.
Dead Man Switch	A safety feature on NX25 and NX15 that disables the antenna transmitter after a period of inactivity.
Depth Menu	The floating menu used to access Hyperbola Matching and manual dielectric entry for depth-scale calibration.
Depth Scale	The vertical scale that estimates depth below the scanning surface based on TWTT and the current dielectric value.

Device Edges	Optional cursors that show antenna or cart edge positions to support faster target markout.
Device Panel	The Main Dashboard panel that identifies the connected antenna, serial number, firmware version, and battery status.
Dielectric Constant	A material value used to estimate radar-wave velocity and convert TWTT into depth. Air has a low dielectric value, while water has a high dielectric value.
Direct Wave	The first strong signal recorded near the top of the profile, created by energy traveling directly through or near the antenna before deeper reflections arrive.
Display Menu	The floating menu used to change color tables, open or close the O-Scope, and select channels on NX04/10.
Distance Triggered Acquisition	Scan Data collection controlled by a survey wheel or encoder so traces are acquired at distance-based intervals.
Encoder	A distance-measuring component that tracks antenna movement for distance-based scanning.
Encoder Calibration	The process of setting or verifying the survey wheel distance value so distance measurements in Scan Data are accurate.
Fast Forward	A Quick Scan feature that moves the Backup Cursor to the most recently collected data position.
FCC	Federal Communications Commission. The U.S. agency responsible for regulating radio-frequency emissions and UWB GPR operation requirements.
Fine Detail	An Optimize Scan Detail option that emphasizes small targets and closely spaced reflections, often resulting in reduced penetration depth.
Firmware Update	The process of installing antenna firmware through NX Control and the antenna's local web interface.
Fix Type	A GPS status value that indicates the type or quality of the current position solution, such as GPS or RTK.

Floating Menu	A collapsible on-screen menu tree that provides access to the Gain, Display, Depth, Filters, and Mapping options.
Gain	A display adjustment that changes the brightness and contrast of reflected radar signals so targets are easier to see.
Gain Curve	The shaped gain profile applied across depth or time to balance shallow and deep signal amplitudes.
Gain Slider	A control that globally increases or decreases gain after the Auto or Manual Gain curve has been applied.
Geolitix	Supported post-processing software for NX Control Scan Data.
Geolocated Feature	A map element with saved GPS position information, such as a GPS Trackline, Target Mark, or User Mark.
GNSS	Global Navigation Satellite System. A general term for satellite positioning systems, including GPS and other satellite constellations.
GPS	Global Positioning System. Satellite-based position information used by NX Control for mapping, Tracklines, and geolocated marks.
GPS Offset	A user-entered distance that corrects the reported GPS position for the physical placement of the GPS receiver relative to the antenna or cart reference point.
GPS Status Icon	An icon in the Top Navigation Bar that summarizes GPS connection status, position information, fix type, and satellite usage.
GPS Status Panel	Displays GPS status details such as fix type, latitude, longitude, altitude, HDOP, and number of satellites used.
GPS Trackline	A line created from GPS positions during scanning that shows the path followed while collecting Scan Data.
GPR	Ground-Penetrating Radar. A non-destructive geophysical method that uses radar waves to image subsurface materials, targets, and layers.
HDOP	Horizontal Dilution of Precision. A unitless GPS quality indicator related to satellite geometry; lower values are generally preferable.
Horizontal Banding	Flat, continuous bands in Scan Data commonly associated with external electromagnetic interference or other persistent noise sources.

Horizontal Cursor	A user-positioned depth reference line used to visually track whether a target remains at a consistent depth along a scan.
Hyperbola	The curved reflection pattern produced when a GPR system passes over a discrete target such as rebar, conduit, pipe, or utility infrastructure.
Hyperbola Matching	A depth-calibration method that fits a curve to a target hyperbola to estimate dielectric value and improve depth accuracy.
Imported Photo	A saved image selected from the mobile device gallery and added to an AOI's Results Panel.
Internal GPS	The GPS receiver built into a mobile device (if available) used as a position source for NX Control.
ISED	Innovation, Science and Economic Development Canada. The Canadian authority referenced in license-exempt radio compliance notices.
LED Indicator	A colored light on the antenna that communicates system state.
License File	A GSSI-supplied file uploaded through NX Control to license an antenna for NX Control data collection features.
Linescan	A two-dimensional GPR profile display showing reflected radar data over distance or scan count and depth or TWTT.
Live Photo	A photo captured with the mobile device camera from within NX Control and saved to the current AOI's Results Panel.
Lower Control Bar	The bottom control area of the Collection Window containing quick actions such as Start/Stop Scan, Screengrab, and User Mark placement.
Main Dashboard	The first NX Control screen after startup, providing access to device status, GPS status, System Settings, Quick Scan, and recent Projects.
Manual Gain	A user-adjustable gain mode with multiple gain adjustment points.
Map Layout Menu	A Mapping Window menu used to choose Side by Side or Top/Bottom map placement relative to the Scan Data Window.
Map Position Menu	A Mapping Window menu used for selecting Follow Me or Locked behavior for map centering and panning.

Map Settings	System Settings options for downloading, storing, updating, and managing offline basemaps.
Mapping Window	The NX Control mapping environment that show current GPS position, basemaps, Tracklines, Target Marks, and User Marks when location data are available.
Mapping Window Screenshot	A report-ready image capture of the visible Mapping Window that includes geolocated features and basemap content while removing non-essential interface elements.
Max Distance	The total length of the current live scan, displayed during data collection and updated as new Scan Data are added.
Mobile Device	The iOS or Android phone or tablet used to run NX Control, connect to the antenna, display Scan Data, and store Projects.
NEXUS	GSSI's technology platform supporting Compass NX, NX25, NX15, Flex Systems, and related hardware/software integration.
Nexus Elements Interface	A browser-based interface for NX25 or NX15 that connects through a mobile device and does not save scan data.
Nexus Interface	The interface used when NX25 or NX15 operates as an accessory connected to Flex NX or Flex LT.
Noise Band	A persistent unwanted band in Scan Data, often caused by external electromagnetic sources or site-specific conditions.
Normal Detail	The standard Optimize Scan Detail setting that shows the full Scan Data display without emphasizing Fine or Coarse features.
NTIA	National Telecommunications and Information Administration. A U.S. federal agency involved in coordination of UWB equipment operation.
.NX File	An NX Control data file format used for saved Scan Data and related data.
NX Control	GSSI's native iOS and Android app. Connects to supported GSSI antennas for collecting Scan Data, managing Projects, viewing maps, and exporting data.
NX04/10	The dual-channel antenna used with the Compass NX system, containing 400 MHz and 1 GHz GPR channels.

NX15	A Nexus-based handheld GPR antenna designed for increased penetration in concrete and subgrade applications.
NX25	A Nexus-based handheld GPR antenna designed for concrete investigation in tight spaces, walls, ceilings, and elevated areas.
OET	Office of Engineering and Technology. The FCC office referenced in UWB GPR waiver and coordination information.
Offline Basemap	A downloaded map package stored on the mobile device for field use without an internet connection.
O-Scope	A single-scan waveform display that shows signal response versus depth or TWTT at the current cursor or antenna position.
Pan to Max Distance	A Project Mode feature that moves the visible Scan Data Window to the most recently collected data location when the view has been panned backward.
Panning	A gesture used to move the visible Scan Data or map view left, right, or across the screen when content extends beyond the current view.
Penetration Depth	The maximum depth from which useful radar reflections can be observed under the current antenna, material, frequency, and noise conditions.
Phase	The polarity pattern of a reflected radar signal. Phase can help experienced users interpret material contrasts, such as metal versus air-filled features.
Playback	Review mode used to open and inspect previously saved Scan Data without collecting new data.
Post-Processing	Reviewing, analyzing, or modifying saved Scan Data after collection using supported software such as Geolitix.
Project	A saved NX Control workspace containing Project Details, AOIs, Scan Data, Results, and exportable data.
Project Mode	An NX Control data collection mode that saves Scan Data and Results inside a formal Project and AOI structure.
Project Profile	The screen used to manage Project Details, AOIs, Results, Scan Data, and project-level sharing, downloading, and deletion.

Projects Portal	The NX Control screen that lists saved Projects and provides options to create, open, select, share, download, or delete Projects.
Quick Action	A function assigned to an antenna hard button during data collection, such as placing a User Mark or starting/stopping a scan.
Quick Scan	A fast scanning mode for immediate viewing and mark-and-go work. Quick Scan does not save Scan Data or Results.
Raw Scan Data	The saved underlying radar data collected by the antenna. Display settings and real-time filters do not alter raw Scan Data.
RDP	Relative Dielectric Permittivity. Another name for dielectric constant, used for radar velocity and depth calculations.
Recent Projects Panel	The Main Dashboard area used to create a new Project, open the Projects Portal, or resume recently used Projects.
Recapture	A Delete Scan option that allows a scan to be collected again while reusing the same scan name.
Refine Targets	A display-only feature that suppresses or reduces the first halo-like peak of some target reflections to simplify interpretation.
Relative Dielectric Permittivity	A material property controlling radar-wave velocity. Also called RDP or dielectric constant.
Resolution	The ability of a GPR system or display setting to distinguish small targets and thin layers.
Result	A saved image associated with an AOI, including NX Control screengrabs, Live Photos, and Imported Photos.
Results Panel	The Project Profile area that stores Screengrabs, Live Photos, and Imported Photos for the active AOI.
RMA	Return Material Authorization. A number required before returning equipment to GSSI for service or evaluation.
RS232	A serial communication standard used by the NX04/10 9-pin serial port for supported GPS connections.

RTK	Real-Time Kinematic. A survey-grade GPS method that uses corrections to improve position accuracy.
Sample	A single measured value within a scan. Multiple samples make up one radar trace or scan.
Samples per Scan	The number of measured samples stored in each radar scan or trace.
Scan Data	Radar data collected by the antenna and displayed in the Scan Data Window during live collection or Playback.
Scan Data Panel	The Project Profile area that lists scan data saved in the current AOI.
Scan Data Window	The primary radar display area showing one or more Linescan profiles, scales, cursors, Target Marks, and User Marks.
Scan Interval	The spacing between acquired scans, typically expressed as scans per meter or scans per foot.
Screengrab	A report-ready image generated by NX Control that captures Scan Data and/or Mapping Window content while removing non-essential interface components.
Serial GPS	A GPS receiver connected by serial cable to the NX04/10 antenna's RS232 port.
Sidecar Mode	A survey wheel configuration for NX25 and NX15 that uses the side accessory port for scanning tight spaces, next to walls, or around obstacles.
Static Gain	An Auto Gain mode that creates a gain curve from initial scans and then locks the curve for consistent surface or subsurface conditions.
Storage Folder	The selected local mobile-device directory where NX Control stores Projects and related files.
Subgrade	The material below a concrete slab or pavement surface, such as soil, base material, or fill.
Survey Wheel	A wheel-based distance encoder used to collect distance-triggered Scan Data and support accurate markouts and reverse tracking.
Survey Wheel Trigger Mode	The recommended Trigger Mode for most work, acquiring scans based on distance measured by the survey wheel.

Sync Channels	An NX04/10 Manual Gain option that makes gain adjustments to one channel apply to the corresponding points on the other channel.
System Logs	Diagnostic files downloaded from the antenna and used by GSSI Technical Support for troubleshooting.
Target	A discrete subsurface object displayed in Scan Data as a hyperbola. Examples include rebar, conduit, pipes, or utilities.
Target Mark	A saved marker placed on Scan Data to identify an interpreted target or feature of interest.
Time-Based Trigger Mode	A Trigger Mode that acquires scans at a fixed time interval instead of using a distance encoder.
Time Range	The vertical recording window for radar travel time, typically expressed in nanoseconds.
Time Zero	The timing reference point used to align radar signals and establish the start of the usable depth or TWTT scale.
Top Navigation Bar	The upper screen area that shows context-specific information such as Project name, scan name, GPS status, antenna status, and current/max distance position.
Trace	A single radar measurement at one location.
Trackline	The GPS-derived path displayed in the Mapping Window while collecting a scan.
Trigger Mode	The acquisition setting that determines whether scans are collected by distance using a survey wheel or by fixed time interval.
TWTT	Two-Way Travel Time. The elapsed time for radar energy to travel from the transmitting antenna to a reflector and back to the receiving antenna.
UWB	Ultra-Wideband. Radio technology that uses a wide frequency range and is subject to specific regulatory requirements for GPR systems.
User Mark	A vertical reference mark intentionally placed during scanning to record the location of an above-ground feature or field observation.

Vertical Scale	The Scan Data Window scale showing either estimated depth or measured TWTT.
X Offset	A lateral GPS offset value representing receiver position to the left or right of the antenna or Model 661 cart reference point.
Y Offset	A forward or rearward GPS offset value representing receiver position ahead of or behind the antenna or Model 661 cart reference point.
Zoom	A gesture used to enlarge or reduce the visible Scan Data or map scale for closer inspection or broader context.