



UtilityScan with GS Software

MN71-306 Rev B

Geophysical Survey Systems, Inc.

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UtilityScan® Quick Start Guide

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FCC Notice for U.S. Customer

Canadian Requirements for RSS-220

Declaration of CE Conformance

Introduction

Thank you for purchasing the GSSI UtilityScan with GS Software system. GSSI is re-imagining the standard in underground utility locating by pairing cutting-edge sensors with a powerful Windows-based user interface to create a high-performance product at an affordable cost. The UtilityScan is designed with today's busy subsurface professional in mind. It's a tool that packs a ton of simple-to-learn functionality into a ruggedly reliable package.

What Comes in the Box

- UtilityScan system, pre-assembled
- Panasonic G2 control tablet
- Two (2) rechargeable lithium ion UtilityScan batteries with charger
- Ethernet cable (2 meters long)
- AC power adaptor and set of international plugs for the tablet
- AC power supply for charging the tablet
- USB drive for data transfer
- Mount for the Tablet
- Sun shade
- Quick Start Guide (this document)

About this Quick Start Guide

This document is provided to get you up and running with your new UtilityScan with GS Software & Panasonic G2 tablet. It details field setup and the collection of UtilityScan data in 2D, 3D, and map mode. Note that this is not a complete user manual. The full UtilityScan with GS Software Manual, as well as an electronic copy of this Quick Start Guide, can be downloaded from GSSI's Support site: www.support.geophysical.com

GSSI also recommends that you take advantage of our UtilityScan training opportunities. GSSI offers classroom-based training led by our professional training team. Please visit www.geophysical.com or contact training@geophysical.com for more details.

UtilityScan®

- 1 Ergonomic adjustable handle and tablet mount
- 2 350 MHz HyperStacking antenna
- 3 Survey wheel connector for cart config.
- 4 GPS mount attachment point
- 5 Ethernet connector
- 6 Battery slot
- 7 Power button
- 8 Marking grooves



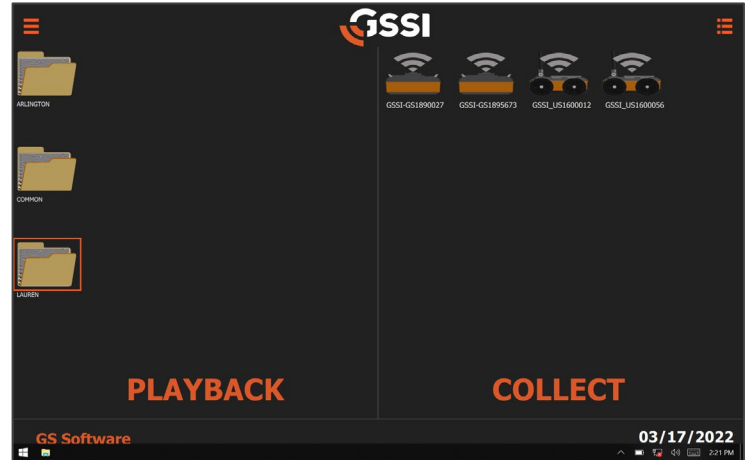
Section 1: Getting Started

- 1** GSSI recommends fully charging the batteries and the tablet prior to use.
- 2** Unfold the UtilityScan cart and place the tablet into the mount.
- 3** Slide a fully charged battery into the battery slot at the top of the UtilityScan until the battery release lever at the front of the battery opening locks into place. The groove along the top side of the battery should face up. To eject the battery, push down on the battery release lever.
- 4** Push the Power button on the top of the UtilityScan housing. A blue ring will illuminate around the button. The UtilityScan is booting up and is ready to connect to the tablet when the blue ring begins to flash.
- 5** Turn on the tablet and tap the GS Software icon. You will briefly see the GS Software splash screen as the GS Software app boots up and then the Playback/Connect screen will appear.

Note: The blue ring around the power button also indicates the Wi-Fi connection status. A flashing blue ring indicates that the UtilityScan Wi-Fi is broadcasting and ready to connect. A solid blue ring indicates that the system is actively connected to the tablet.

Connecting to the UtilityScan with Wi-Fi

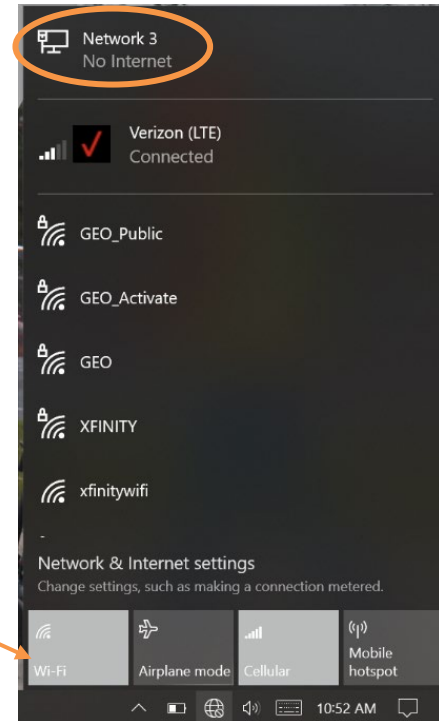
- 1** Make sure that the UtilityScan is turned On prior to launching the GS Software application on your tablet. After a short splash screen, you will see the Playback/Collect screen. The antennas broadcasting Wi-Fi signal will be displayed on the right-hand side.
- 2** Double-click the antenna icon that lists the serial number of the antenna you would like to connect to. If you do not see your antenna listed, navigate to the Global menu stack (left-hand ☰ icon) and select **Rescan** next to the List of Antennas setting in the Antenna menu.
- 3** The connection will establish after a few seconds, and the setup/preview screen will open once connected.



Connecting to the UtilityScan via Ethernet

- 1** Make sure the UtilityScan antenna is powered off and that the GS Software app is not launched on the tablet.
- 2** Unscrew the protective cap covering the antenna Ethernet connector and connect the Ethernet cable to the antenna. Connect the other end of the Ethernet cable to the tablet.
- 3** Power on the antenna and wait for the blue light around the antenna power button to flash.
- 4** Verify the ethernet connection by pressing the network icon on the Windows taskbar. The network should show an Ethernet icon with “No Internet” listed under the network name.
- 5** Launch the GS Software application.

Note that the Wi-Fi radio on your tablet will remain on. If you are in an environment where Wi-Fi is not permitted, you can turn it off by tapping the Wi-Fi icon so it is no longer highlighted.



Connecting/Disconnecting to Another Wi-Fi Network and Navigating Wi-Fi

There may be times when you want to connect your tablet to another network. Note that you should treat this tablet as part of the GPR data collection instrument and avoid loading unnecessary apps such as games, etc.

To connect to a wireless network:




- 1 Turn your UtilityScan antenna Off.
- 2 From the Windows tablet desktop, select the Wi-Fi icon from the bottom right side of the control bar.
- 3 Select your desired network from the list of available Wi-Fi networks.
- 4 Input the network password if applicable.



If you need to reset Wi-Fi configuration to connect with the UtilityScan antenna:

- 1 On the Windows desktop screen, tap the Windows icon (☰) in the bottom left of the control bar.
- 2 Select the application icon (📁) and navigate to the GSSI folder. Click on the folder to expand.
- 3 Select GS Network Defaults
- 4 Your network settings are now configured to be compatible with connecting to the UtilityScan antenna and you can connect normally.

First Time Setup



- 1** Prior to connecting to your antenna, you will want to configure one-time global settings. If you have already connected to your antenna and see the setup/preview screen, tap the Back arrow () in the lower left corner to return to the Collect/Playback screen.
- 2** Tap the Global/Project stack button in the top left corner (). This will expand the portion of the menu pertaining to global settings, which do not vary from file to file in a single project.
- 3** Scroll to the Project section of the stack.
- 4** Tap the current Project folder name (this will be called “COMMON” if using the system for the first time) next to Project to select or create a new project folder. This will designate the folder in which your data files will be saved.
 - a)** You can create a new folder by tapping the New Project Name field and typing the desired name of your new folder. Press the **Enter** key () on the keyboard to save the new folder. Each data file you collect while in that project will take the new project name as its root name.
 - b)** To select an existing project, simply tap it from the list of saved folders. You may need to swipe left/right if you have more project folders than can be displayed on the screen at once.
- 5** Navigate to the **GPS** option in the Project menu. To change your GPS setting click **None** then scroll and select the name of the GPS you would like to use.
 - a)** If you do not plan to use GPS, leave this set to **None**.
 - b)** If you plan to use the Panasonic G2 internal GPS, select **G2-GPS**.

- c)** For an external GPS connection, follow the GPS connection instructions in Appendix A, then reopen the GS Software application to have your GPS appear as an option on the list.
- 6** Next, navigate to the **GPS Offset** option. This is the distance that your GPS is offset from the threading on the top portion of the antenna near the handle attachments.
 - a)** If your GPS is mounted on a pole using the threading on the antenna, your GPS Offset value will be zero.
 - b)** If your GPS centered closer to the front of the antenna, your offset (cm/in) will be positive. If your GPS is centered closer toward the handles of the antenna, your offset (cm/in) will be negative.
 - c)** If you are using the Panasonic G2 internal GPS, measure the horizontal distance from the threads on the antenna to the center of the tablet.
 - d)** If you are not using GPS, this value can be zero.
- 7** Navigate to the System menu to **Units** and **Language** options.
- 8** **Tap the selected parameter to change.** For example, if you wish to change the Units from Imperial to Metric, tap the word **Imperial**. These settings will remain from session to session unless changed.
- 9** The choices you have made here will carry over to the scan setup/preview screen.

Scan Setup

- 1 After configuring your global settings, connect to your antenna using the instructions above. Once connected you will see the setup/preview screen. You can now adjust your scan settings.



- 2** Expand the Global/Menu project stack by tapping the () button in the upper left corner. Note that many of the settings will carry over from the Playback/Collect screen. The key items to adjust in the Global/Menu project stack prior to collecting data include:
- a) Project Folder** (Project submenu → Project [Folder Name]): Tap the project folder name to change your desired project folder.
 - b) GPS** (Project submenu → GPS): Ensure that the GPS you selected in the Playback/Collect screen is displayed, or “none” is displayed if you are not using GPS. Also confirm the correct GPS offset is displayed.
 - c) Export to KMZ** (Project submenu → Export to KMZ): Toggle this on if you’d like to export a KMZ file showing your data location and target pick attributes. See the UtilityScan with GS Software Manual for a full explanation of KMZ files.
- 3** The File Parameters menu stack can be expanded by tapping the () icon in the upper right corner. The key items to adjust in the File Parameters stack prior to collecting data include:
- **Collect Mode (Scan submenu):** Select between Time, Distance, and Point mode. Changing between modes will change the parameters listed in the Scan submenu. For a full description of settings, see the full UtilityScan with GSI Software Manual (www.geophysical.com/support#resource-center)
 - **Time:** No survey wheel, emitting scans/second continuously.
 - **Distance:** Using a survey wheel, transmitter triggered by wheel movement.
 - **Point:** Collecting one scan at a time when prompted, able to stack many scans together to reduce noise.



The status indicator shows (from left to right): **1**) Antenna battery status
2) Overspeed indicator (Slowest = Grey, Green, Yellow, Orange, Red = Too Fast)
3) GPS Data Validity (Green = Good, Yellow = Adequate, Red = Invalid)

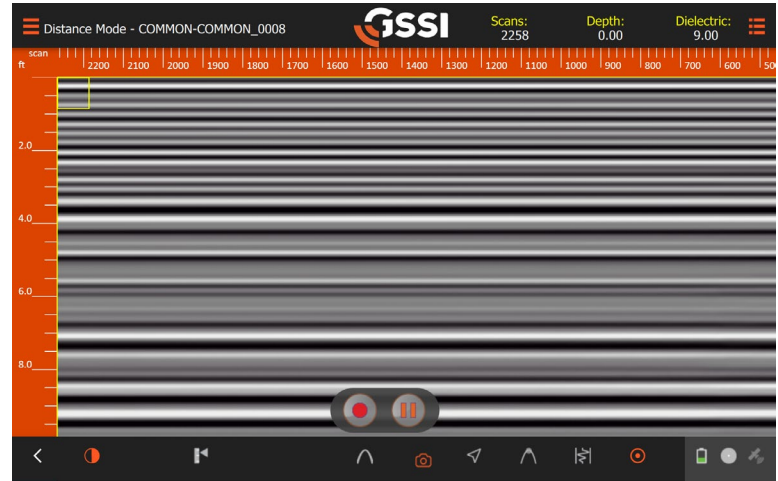


The control bar shows (from left to right):

- 1 Back Arrow:** Return to Playback/Collect screen.
- 2 Contrast:** Adjust gains, color table, color stretch, and color slide
- 3 Calibrate Survey Wheel:** Recalibrate SW or reset to factory value, see Appendix B for instructions for recalibrating the survey wheel. Note that this icon is only visible when you pause data preview or file collection.
- 4 Set Depth:** Allows you to calibrate the depth scale using a target of known depth.
- 5 3D Mode:** Toggling on 3D mode launches the 3D data collection module, see 3D Data Collection section of this guide for details. Note that this icon is only visible when you pause data preview or file collection.
- 6 Set Dielectric:** Allows you to calibrate the dielectric and depth scale using migration / hyperbola fitting.
- 7 Take Screenshot:** Saves a screenshot of the current screen image.
- 8 Map Mode:** Launches map view, see Collecting Data with GPS: Map Mode section of this guide for instructions.
- 9 Focus Mode:** Performs a migration process on your data.
- 10 O-scope:** Displays the oscilloscope.
- 11 Mark/Target:** Allows you to apply a user mark or target pick to your data, see Marking Targets section for instructions.

Section 2: 2D Data Collection

- 1** To start data collection, press the Record icon (●) in the bottom center of the screen. Your file name and number will be displayed at the top of the screen. When you hear a beep the system is ready to collect.
- 2** Data will begin to scroll right away if in Time Mode. If in Distance Mode, data will appear when the survey wheel starts to spin.
 - If you are collecting data with GPS, you can see your collection path in real time by selecting the Map Mode icon from the control bar (see Collecting Data with GPS: Map Mode section).
- 3** While collecting data, the Record icon (●) will become a Stop icon (●). Pressing Stop will end file collection and either save it automatically (Save Prompt = OFF) or ask you to save or delete (Save Prompt = ON). After you have stopped collecting a file, simply select the Record icon again to begin another file.
- 4** The icon next to Record/Stop are the Pause/Resume (●/●) functions. Pressing Pause (●) will allow you to pause data collection and move the antenna to a location where you intend to resume data collection. When you are in position, press Resume (●) to continue.



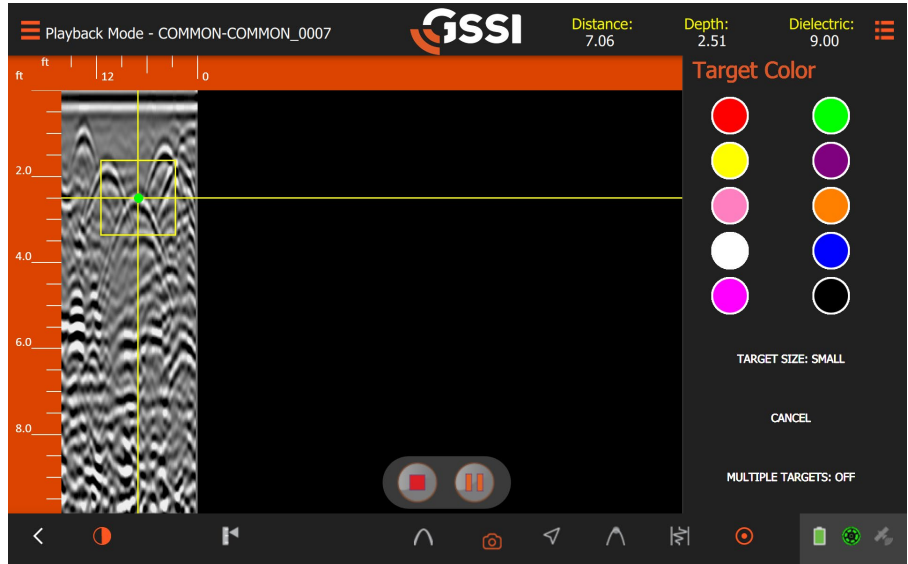
- 5** To return to the scan preview screen, press the Stop icon (⏹), then press Resume(▶) .
- 6** The control bar at the bottom has all the same functionality as it does during setup. For more information, please refer to the Control Bar section above.
- 7** Pressing the right File Stack icon will allow you to adjust the vertical scale by changing the dielectric constant. Please note that changing the dielectric will result in the depth scale adjusting, but your signal penetration will not go any deeper or shallower. To collect deeper data, you will need to stop data collection and adjust depth/time range in the Setup screen. You can also access gains and filters while collecting data.

Marking Targets



If you encounter a feature of interest while collecting or playing back data, you can apply a user mark or target pick to it. These user marks and target picks contain location information and will be saved with your data file. If using a GPS, all user marks and targets will be reflected on the collection path in Map Mode. The target pick color options reflect the APWA Uniform Color Code.

APWA Uniform Color Code:



- **Blue:** Potable water.
- **Purple:** Reclaimed water, irrigation, slurry.
- **Pink:** Temporary survey markings.
- **White:** Proposed excavation.
- **Red:** Electric power.
- **Orange:** Communication or telephone.
- **Yellow:** Gas, oil, steam.
- **Green:** Sewer and drain lines.
- **Magenta:** Other (not an APWA color).
- **Black:** Other (not an APWA color).



Marking Targets while Collecting Data

- 1** Start collecting a file and push the UtilityScan across your survey area in a straight line. The horizontal axis will display the distance traveled (if collecting in distance mode). The vertical scale will show an approximate depth, with the ground surface being at the top of the window
- 2** Once you see a target that you would like to mark, be sure to survey past it by a few feet. Back up the UtilityScan in a straight line. You will see a vertical line (the backup cursor) appear. Continue to back up the system until the backup cursor bisects the hyperbola. You are now over the center of the object.
- 3** Use your finger or the stylus to drag the yellow box until the crosshairs are centered on the feature of interest to get a depth readout in the upper right corner of the collection screen.
 - a)** To apply a user mark, tap the Mark/Target () icon on the Control Bar.
 - b)** To apply a target pick, double-click the Mark/Target icon () to open the target marking tool. You can select the color and size of the mark applied to your target. Turning Multiple Targets to ON in the target menu will keep the menu on the screen during data collection for easier target marking.
 - c)** Note that no additional data will be collected until you push the system forward so that the vertical cursor is at the edge of the collection screen.

Marking Targets while Playing Back Data

- 1 Open your file in Playback mode (see Playing Back Data section for instructions).
- 2 Play the entirety of your file or hit the Pause button when you see your feature of interest.
- 3 Use your finger or the stylus to drag the yellow cursor box until the crosshairs are centered on the feature of interest.
 - a) To apply a user mark, tap the Mark/Target icon () on the Control Bar.
 - b) To apply a target pick, double-click the Mark/Target icon () to open the target marking tool.


Marking Targets in Real-Time



- 1 Push the UtilityScan across your survey area in a straight line. The horizontal axis will display the distance traveled (if collecting in distance mode). The vertical scale will show an approximate depth, with the ground surface being at the top of the window.
- 2 Once you see a target that you would like to mark, be sure to survey past it by a few feet. Back up the UtilityScan in a straight line. You will see a vertical crosshair (the backup cursor) appear. Continue to back the system until the backup cursor bisects the hyperbola. You are now over the center of the object.
- 3 Mark the ground in line with the marking grooves on the side of the UtilityScan. GSSI recommends marking both sides of the cart.
- 4 Move the UtilityScan back a little more and draw an **"X"** between your side marks. The **"X"** represents the point that caused the hyperbolic reflection on the UtilityScan screen. Note that you have only one point, so you will need more markouts of the same target before you can consider it a utility line (or other linear target).

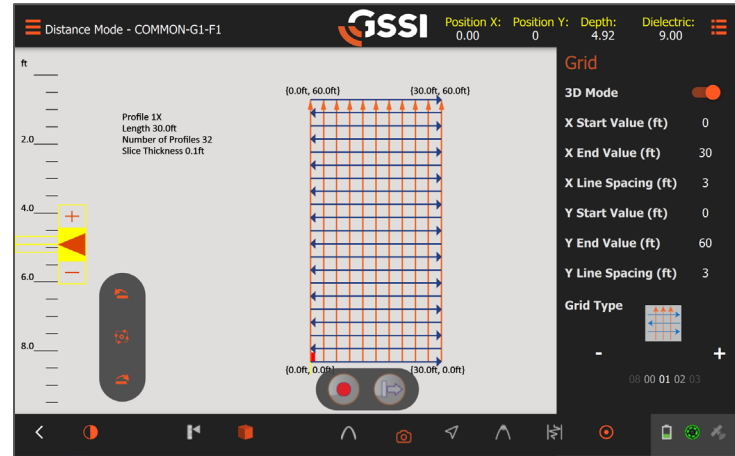
- 5** Continue to push the UtilityScan forward in a straight line, retracing your steps, to mark additional targets in that file or to collect more data. No additional data will be collected until you push the system forward so that the vertical cursor is at the edge of the collection screen.
- 6** Collect more data lines parallel to your previous lines. As you make additional marks you will begin to see a pattern develop.






Section 3: 3D Data Collection

The 3D Grid Collection icon () will only be visible when you hit the Pause button in the scan preview screen. Selecting the 3D icon will display the 3D collection module. Toggle 3D Mode on, then the 3D module will appear.

- 1 Enter your 3D collection parameters, including grid dimensions, line spacing, and collection direction. The 3D grid image will tell you where to begin collection and what line you are collecting.
 - a) The X spacing can be different from the Y spacing, but the spacing must be regular.
 - b) You cannot start your grid and change your line spacing interval part way through the grid.
- 2 Once the antenna is centered over the grid baseline at the starting coordinate, press the Record icon (). This initiates data collection of Line 1. Data will start collecting when the survey wheel starts moving in a forward direction (or whichever direction was used during SW calibration), and you will see the line progress across the screen.
- 3 After traveling the distance that you specified in 3D Setup, the system will automatically stop collecting data. The file will Save and the system will automatically increment to the next line. Set up the system for Line 2 and hit the Record Icon () to start collection. Continue until the grid is complete.




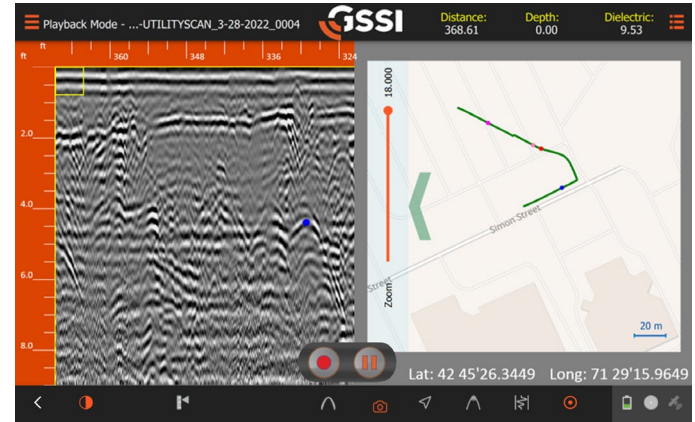
- a)** If you need to recollect a line, use the previous line and next line buttons (/) to navigate to the correct line to recollect.
- b)** Use the View icon () to toggle between different views during 3D collection.
- 4** You can view your grid in Playback mode after it has been collected. For more information on viewing a 3D grid in Playback mode, see “Playing Back Data” section below.

Section 4: Collecting Data With GPS: Map Mode





If you are collecting data using GPS, you have the option of using Map Mode. In Map Mode, you can see your collection path and any user marks or target picks displayed on an aerial map in real time.

Using Map Mode

- 1** Ensure that you are connected to GPS (see Appendix A for connecting to an external GPS and First Time Setup section above for instructions).
- 2** If you would like a KMZ file to be exported for your data, toggle on Export to KMZ in the Project section of the Global menu stack (see UtilityScan with GS Software Manual for more information about exporting to KMZ).
- 3** If you would like to pre-load map tiles prior to survey, see Appendix C for instructions.
- 4** Start collecting a file or open a file in Playback mode.
- 5** Select the Map Mode icon () from the control bar. This opens a map window that will display your travel path and any user marks or target picks.



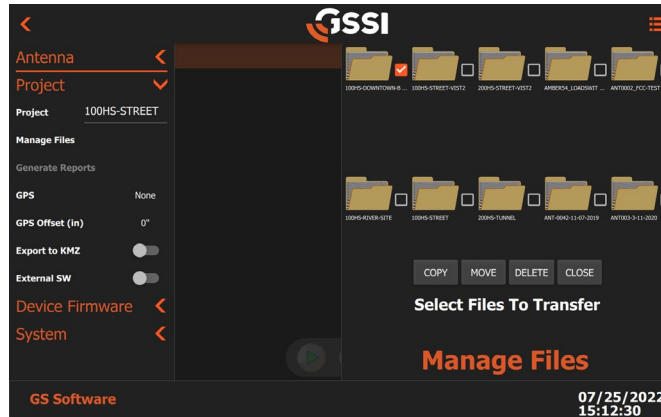
Section 5: Playing Back Data

- 1** Playback is available when the application is first opened, or by selecting the white back arrow in the bottom left of the collection screen to take you back to the Playback/Collect screen.
 - On the Playback/Collect screen, you will see all the project folders containing data on the left side.
 - Tapping **once** on a folder will open a file browser. Your files will be organized in three areas:
 - Data collected Today
 - Data collected in the Last 2 Weeks
 - Older files
 - In each section they will be further organized from left to right, where left is the newest data in that section.
- 2** Tap the file(s) you would like to see and press the Play icon () to playback the data.
 - The 2D data will scroll along the screen. If multiple files are selected, one file will be displayed at a time. To display the next file, you will need to press the Stop icon () , then the Play icon () to playback the next file.
 - To play back a 3D file, select the appropriate grid file from its folder. Once loaded, you can slice up and down the grid's z-axis to display data at different depths by using the slider on the left side of the screen. You can use the + / - on the slider to make slices thicker or thinner. Use the Contrast setting () on the control bar to change your 3D grid's color table.

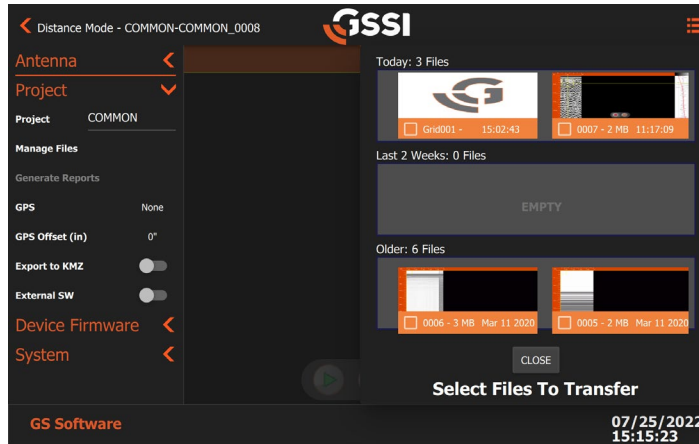
-
- While the file is playing back, you have full access to dielectric adjustments and gain/filters. This will allow you to perform basic processes on your data for reports and target detection in the field. You can also utilize functions found on the Control bar, including changing the Contrast settings, applying user marks and target picks, taking screenshots, and Map Mode.
 - For more advanced processes, the data will need to be transferred to a PC with GSSI's RADAN software. Please refer to our website or your direct GSSI sales associate for more information on RADAN.

Section 6: Data Transfer to a PC

This section describes the transfer of data from the tablet to a PC for processing and interpretation, and how to clear unwanted data from the system's memory. These functions are accomplished under the Global Menu Stack using Manage Files.





- 1 To transfer data, open the menu stack and tap **Manage Files**.
- 2 The Manage Files section will open on the righthand side. Select the folder you would like to transfer from and select your files. You can also transfer an entire folder by adding a check next to the desired folder.



- **Copy Files** will copy to a USB while keeping selected files on the device. (Recommended)
 - **Move Files** will copy to a USB and delete selected files from the device.
 - **Delete Files** will delete selected files.
 - **Close** will bring you back to the project folder select screen.
- 3** Make sure to insert a USB before selecting Copy/Move Files. Any screenshots taken of your files during collection will transfer with the GPR data.

Appendix A: Connecting to External GPS

To connect to an external GPS, you will need to utilize the Windows Bluetooth & devices menu outside of the UtilityScan app.


- 1** If you have already launched the UtilityScan/GS application, hold down the Windows key in the center of the bottom buttons on the Panasonic G2 tablet and navigate to the Windows icon () in the bottom left corner of the screen. If you have not yet launched the application, you can simply tap the Windows icon in the bottom left corner of the screen.
- 2** Navigate to Settings () , then select **Devices** (Bluetooth, printers, mouse).
- 3** Ensure that the tablet Bluetooth is toggled to **On** and that your GPS device is turned on and Bluetooth enabled.
- 4** If you have never paired your GPS with the tablet, select **Add Bluetooth or other device** and then select **Bluetooth**. This will search for devices available to pair and your GPS should be visible on the list. Select your GPS device in the list to pair it with your tablet.
- 5** If you have previously paired your GPS with the tablet, it will appear in the Paired Devices field. If you have multiple devices paired, select the appropriate one from the dropdown before continuing. Please note, you can only have a maximum of 5 devices paired.
- 6** Open the GS Software application on the tablet.
- 7** Navigate to the Project menu to the GPS setting and select the correct GPS device.

- 8** Ensure that the GPS offset value is set correctly in the Project menu. Note that the GPS position offset is based off the threads that a GPS pole would be connected to on the antenna. If you are utilizing a GPS mounted on a pole using these threads, your offset will be zero. From this point, any GPS mounted closer to the front of the antenna will have a positive offset value, and anything toward the back of the antenna will have a negative offset value.
- 9** Connect to the appropriate antenna to access Collect mode.
- 10** Once in Collect mode, open the menu stack to ensure that the correct GPS unit is displayed in the GPS section of the Project menu.

You are now fully connected to the external GPS.

Please note that our system will only read the NMEA GPGGA or GNGGA strings from your external GPS. You may need to toggle these on manually within your external GPS settings.

Appendix B: Survey Wheel Calibration

The Calibrate Survey Wheel icon () will only be visible when you pause the data preview in collect mode or pause while actively collecting a data file. Once selected you will have the option to use the factory default survey wheel value, use the last calibration value, or recalibrate the survey wheel. To recalibrate the survey wheel:

- 1** Select **Recalibrate SW**.
- 2** Set the desired calibration distance.
 - For Imperial units the distance options are 5, 10, 15, 30, or 100 feet.
 - For metric units they distance options are 1, 5, 10, 15, 20, or 30 meters.
- 3** Press **Start Calibration**.
- 4** Move the system the desired distance (it is helpful to mark out the distance on the ground, or to walk alongside a measuring tape).
- 5** Press **Stop Calibration**.
- 6** Press **Accept**.

It is recommended that you recalibrate your survey wheel every time the antenna is switched to a different cart, or if you are working on terrain that is drastically different from the last collection site's terrain. You can check the accuracy of your survey wheel calibration by collecting a data file and walking the length of your calibration distance, then looking at the distance readout in the top right of the collection screen. If the distance is the same as your calibration distance, you have successfully recalibrated. If the distance is drastically different than your calibration distance, it is recommended that you recalibrate the survey wheel again.

Appendix C: Pre-Loading Map Tiles

- 1** Ensure that your tablet is connected to the internet via ethernet or Wi-Fi. Check your connection by opening Microsoft Edge and navigating to any website.
- 2** Open the GS Software application.
- 3** Open a playback folder – from here you can:
 - Select a file collected with GPS and press the green playback arrow. Once the file is playing back hit the location icon on the control bar. This will load a street view map corresponding to the location the file was collected in. You can add targets and user marks while in playback that will be reflected in the map display.
 - Do not select any files (this is the best option if you want to pre-load a basemap for a site you have not yet collected data at) and press the white “back” arrow (🏠) in the bottom left corner of the screen. This will bring you to a blank playback screen. You can select the location button to open Map View, which will display your current location. You can then use the zoom and navigate with your fingers until the location you wish to pre-load is displayed.
- 4** Once the imagery for the area you are interested in loads and is visible, it will be automatically cached on the system for future use. Now when you collect data with a GPS connected in your location of interest, the base map will automatically load in your map view.



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