



RADAN[®] for UtilityScan Manual

MN43-202 Rev D

Geophysical Survey Systems, Inc.

40 Simon Street • Nashua, NH 03060-3075 USA • www.geophysical.com



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Chapter 1: Getting Started

Thank you for purchasing RADAN for UtilityScan®. The RADAN software is delivered via a downloadable link contained in an email from GSSI. Please save the email and the link in case you need to download the software again in the future. The RADAN software is also subject to constant improvement by GSSI Software Engineering, so we recommend checking often for available updates.

System Requirements

- A Core i3 or better processor (2.0 GHz or greater recommended).
- GSSI will only support RADAN for UtilityScan running on Windows Vista SP2, Windows 7, Windows 8, or Windows 10.

Note: While some laptops or desktops will say Vista ready, a Windows Vista Business Edition requires a minimum 1 GHz 32- or 64-bit processor; 1 GB of RAM; 128 MB of graphics memory, and 32 bits per pixel; 40 GB hard drive with 15 GB free space; DVD-ROM drive; audio output capability, and the ability to access the Internet.

- 2 GB of RAM minimum (3 GB or greater recommended).
- 160 GB hard drive with a minimum of 20 GB available space.
- 128 MB graphics chipset with OpenGL drivers (**Note:** We only support NVidia and Intel graphics chipsets.)

GSSI Activation Policies

Your RADAN for UtilityScan license includes one license for installation on one computer.



General Description

RADAN for UtilityScan is designed to process, view, and document data collected with the UtilityScan, UtilityScan HS (HyperStacking), and UtilityScan DF (Dual Frequency) systems. This module can perform the following functions:

- Process data using Focus (Migration), Background Removal, Gain Adjustment, Maximum Depth, and Channel Blending.
- Display 3D images and provide X, Y, and Z coordinates.
- Display LineTrac data.
- Change colors to optimize images for documentation purposes.
- Add interpretations to the data.
- Export information to MS Excel for reports.
- Export a 3D image as a JPG file.
- Export target information to a CSV format.

Included with RADAN for UtilityScan is RADAN Reader, which allows you to:

- View already processed 2D data as profiles and 3D data as depth slices.
- Modify the color table, color transform, and display gain.
- Show targets or picks added in one of the other displays.
- Save displayed data as .jpg images.

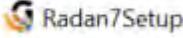
How to Use This Manual

This manual is designed for both experienced and novice users of RADAN for UtilityScan.

We recommend that all users read the entire manual.

Installing RADAN for UtilityScan

GSSI recommends that you are connected to the internet when installing the software so that activation can take place and the program can check for any updates. If you are not, you will need to contact GSSI for other installation instructions.

- 1** GSSI delivers the software via download link. Please save the delivery email as it contains your RADAN serial number and product key. Extract the software to your computer desktop.
- 2** Open the RADAN folder and double click on the RADAN setup launcher: 
- 3** Follow the onscreen instructions to install the software, accept the license, and activate your copy of RADAN.



Important Note: Depending upon the age of your computer and operating system (Windows Vista, Windows 7, Windows 8, or Windows 10), you may get other screens asking you to install other software. You should accept these, or if you have questions, contact your IT person or GSSI.

Launching, Activating and Validating the RADAN for UtilityScan Software

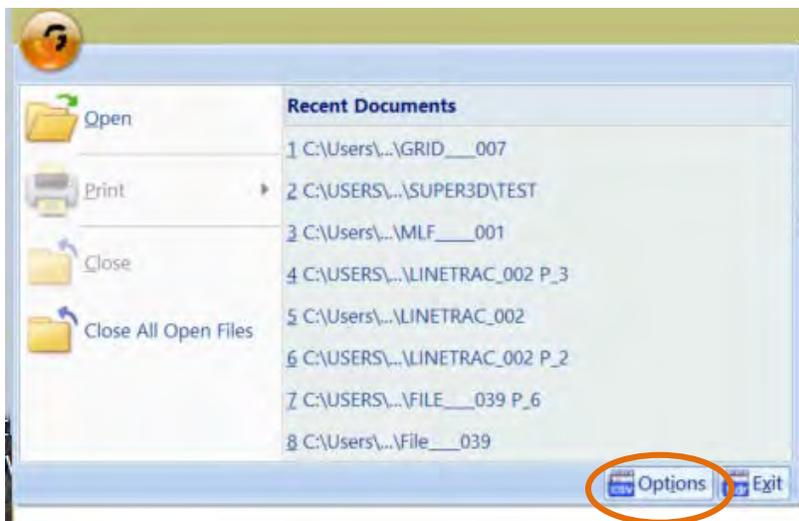
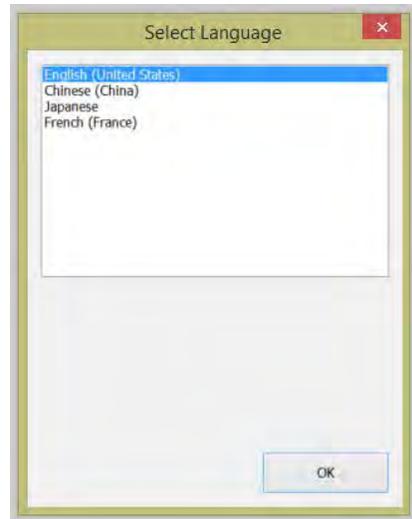
Starting the Software for the First Time

When launching the software for the first time, it will ask which language to use.

1 Highlight the language and click OK.

The language may be changed at any time by:

- 1** Clicking the GSSI Button.
- 2** Clicking on Options.



Activating the Software

After installing the software, RADAN for UtilityScan will automatically start.

The first time the software is run, the user will be asked to activate it. The computer **MUST** be connected to the internet to activate the software.

- 1** Your delivery email will contain the RADAN serial number and product key.
- 2** The Computer Name is pre-filled by RADAN (this is the name of the user's computer from their computer system).
- 3** Enter a valid email address.
- 4** Click Activate/Validate your Product Key.

Note: If the software is not activated at this time, the adjacent screen will appear at the launching of the software until it is activated. After activating the software, an internet connection is not needed to run the software.

Software Demo

If the software is not activated after installation it will run as a demo for 30 days or 32 activations (whichever comes first). If the software is not activated before the demo expires, the user will have access to a Reader version of the software with options to view data in 2D or 3D, change colors, and save the data as jpg image files.

Validating the Software

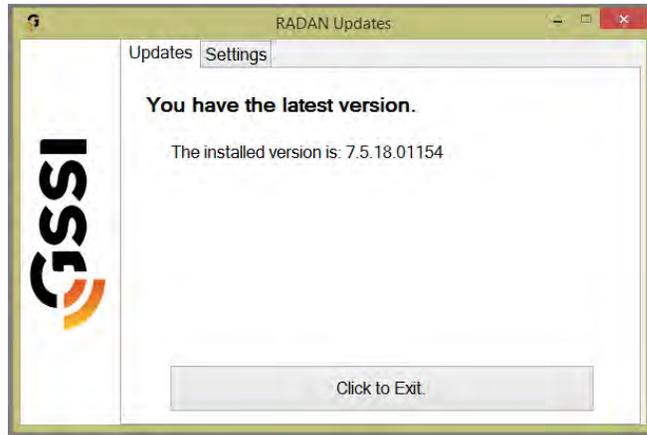
At times, upon launching RADAN for UtilityScan, the software will ask to test the license. Click Yes and a pre-populated screen will appear. Simply click Continue with RADAN for UtilityScan. An internet connection is needed to test the license.

Updating the Software

GSSI can automatically update the software if an update is available. Upon launching RADAN for UtilityScan AND if connected to the internet, it will ask if the user would like to download and install the update. You can check for updates by opening RADAN and selecting Help>Update. Note that you need to be connected to the internet to check for updates.

I will update later to update the software at a later date.

Download and install the latest update to immediately update the software. The installer will then walk you through the download and update procedure.



Chapter 2: Using RADAN for UtilityScan

Setting up Your Laptop/PC and Data Transfer

Create folders on your PC/Laptop. A different folder should be created for each of your projects. To create a new folder, right-click on your Windows Desktop and select New > Folder. Give the folder a unique name. However, if you are comfortable with PCs and Windows, you can organize your folders however you wish.

Transferring the Files

Copy the files you wish to view and/or process from your UtilityScan system to the PC/Laptop. You will need a USB Drive for data transfer.

For UtilityScan DF:

- 1 With the UtilityScan DF up and running, make certain you are on the Setup screen and that your USB is plugged in.
- 2 Select Output Options > Manage Files > Copy or Move to USB.
 - Copy will copy files to the drive while leaving them on the UtilityScan DF computer.
 - Move will copy files to the drive and delete them from the UtilityScan DF computer.

For UtilityScan:

- 1 With the UtilityScan up and running, make certain you are on the ScanMax/ScanEZ screen and that your USB is plugged in and formatted properly. You may need to reformat the USB on your tablet to communicate with Android.
- 2 Select Playback or Playback Setup > Files > Copy or Move to USB.
 - Copy will copy files to the drive while leaving them on the UtilityScan tablet.
 - Move will copy files to the drive and delete them from the UtilityScan tablet.

3D Data Collection and Processing Options

3D data may be created either by using 3D Mode during data collection with the G1 tablet (not available with UtilityScan) or by assembling a 3D grid in the full version of RADAN.

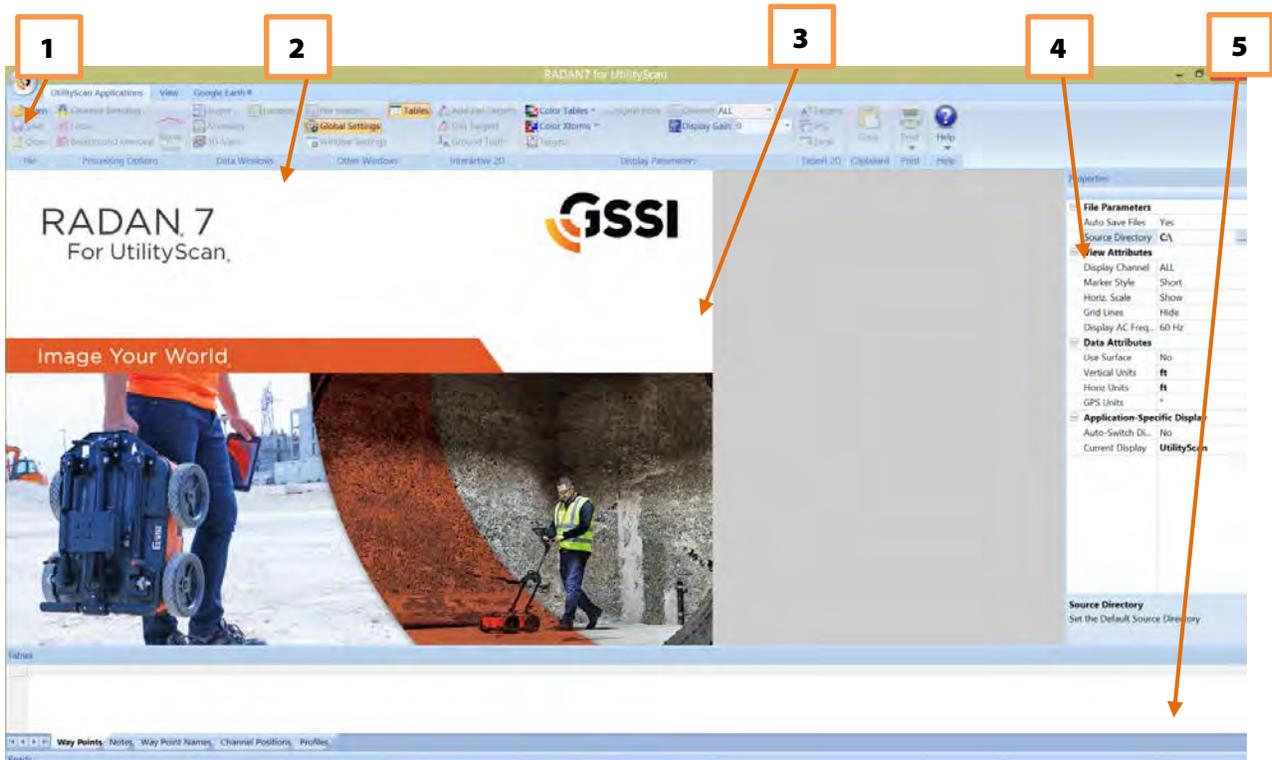
If you purchased the full version of RADAN along with RADAN for UtilityScan and want to build a 3D grid in the software, switch to Standard Processing under the Application-Specific Display and refer to the RADAN 7 manual.

Launching and Navigating the Software

Launching the Software

Launch RADAN for UtilityScan by double-clicking the RADAN G icon: 

The following screen is displayed:



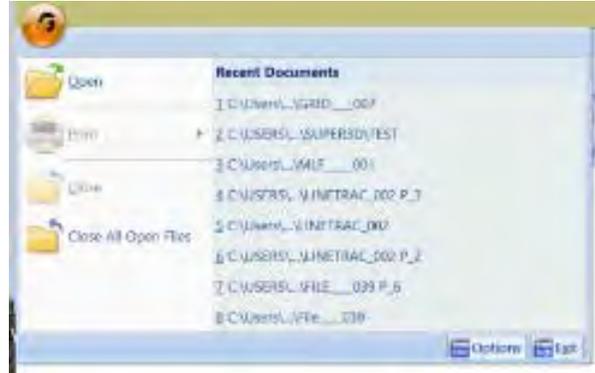
- 1** GSSI Button
- 2** Ribbon
- 3** Data Pane
- 4** Properties Pane
- 5** Tables Pane

Navigating Through the Main Screen

1. GSSI Button

Clicking on the button allows you to:

- Open a File
 - **.dzt:** a single profile or a 3D grid created in Standard Processing (default).
 - **.bzx:** a 3D file or formally created batch file. Batch files are created in Standard Processing and are a group of .dzt files to be viewed and processed together.
 - **.s3d:** a formally created Super 3D Project file, which contains information on how to create a Super 3D file from individual 3D files. These files can be opened in RADAN for UtilityScan, but are created in the full version of RADAN.
 - **.m3d, .b3d:** a 3D project file, created either by the system or manually. These files can be opened in RADAN for UtilityScan, but are created in the full version of RADAN.
- Print your data
- Close a File
- Close All Open Files
- Open a previously processed File
- Use Options to change the language
- Exit RADAN for UtilityScan Software



2. Ribbon

This area contains all the options and processes you can do with your data. This is also where you may open, save, or close a file/project. This is detailed more in the Viewing and Processing the Data section.

3. Data Pane

This is where your data is displayed when you open a file.

4. Properties Pane

This area will display Global Settings for all your files, as well as Header and Properties information about a specific file (when opened).

5. Tables Pane

This pane will display database information about the currently active file. Tabs are displayed depending on the type of application or process underway.

Viewing and Processing the Data

Preparing the Software

Before opening a file, you will need to set up some Global Settings located on the right side of the screen. If the Settings info (at right) is not shown, click the Global Settings button from the Other Windows section of the Home tab. Click on the following to change the parameters:

Auto Save Files: Click here, then click on the down arrow to select one of the following values:

- **Yes:** Automatically save a processed file. RADAN will automatically create a folder called “Proc” inside your source directory and save processed data there.
- **No:** You will be prompted to save a processed file.

Source Directory: Click here, then click on the three dots to browse to the source folder where you copied your source (original) data.

Output Directory: Click here, then click on the three dots to browse to the output folder you created from your source folder. You will not see this option if you have set your Auto Save File to Yes.

Display Channel: Select which channel to display/process if multiple channels are available. For the DF, Channel 1 will display the 800 MHz frequency data and Channel 2 will display the 300 MHz data. You may also leave it on ALL to display both.

Marker Style:

- **Short:** Display user marks extending down a short distance from the top of the scan.
- **Long:** Display user marks extending through entire scan.
- **None:** Hide all marks.

Horiz. Scale:

- **Show:** Display horizontal scale.
- **Hide:** Do not display horizontal scale.

Grid Lines:

- **Show:** Display grid lines.
- **Hide:** Do not display grid lines.

Display AC Frequency: Select which LineTrac frequency data you would like to display. You can also toggle this on/off when the file is open.

Vertical Units: Units for the vertical scale.

Properties	
File Parameters	
Auto Save Files	No
Source Directory	C:\Users\OharaK\Desktop...
Output Directory	C:\Users\OharaK\Desktop...
View Attributes	
Display Channel	ALL
Marker Style	Long
Horiz. Scale	Show
Grid Lines	Hide
Display AC Frequency	60 Hz
Data Attributes	
Use Surface	Yes
Vertical Units	m
Horiz Units	m
GPS Units	°
Application-Specific Display	
Auto-Switch Display	No
Current Display	UtilityScan

Note: Once you open a file, you cannot change any of the Global Settings. You must close all files to make changes.

Horiz Units: Units for the horizontal scale.

GPS Units: Different options to display GPS information, if it is available: (1) decimal degrees; (2) degrees, minutes, seconds; (3) decimal degrees and minutes; and (4) UTM.

Auto-Switch Display:

- **Yes:** The display will change based on the data file opened.
- **No:** Data will open in the currently selected display.

Current Display:

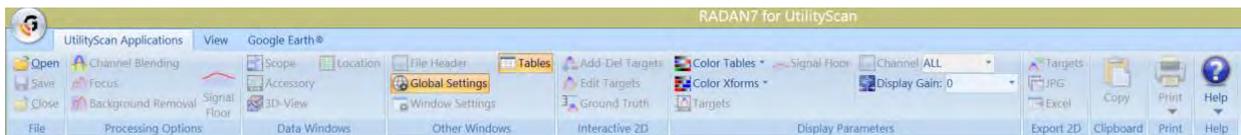
- **Reader:** Opens the RADAN Reader display, which allows you to view already processed 2D data as profiles and 3D data as depth slices. The color table, color transform, and display gain can also be modified. If targets or picks were added in one of the other displays they can be displayed as well. Displayed data can be saved as .jpg images. This display is available with any purchase of RADAN 7 and will become the only way of viewing data once the demo version of the software expires without activation.
- **UtilityScan:** This is display that is designed specifically for data collected with the UtilityScan suite of GSSI products and includes the ability to instantly process data, perform some additional processing, add interpretations, and export to a jpg or excel to quickly generate a report.

If any other RADAN modules have been purchased, they will appear here as additional display options.

Opening a File

Click the Open icon located on the left side of the Ribbon. This will display a screen defaulted to the folder you set in the Global Parameters > Source Directory or click on the GSSI Button.

- Select a file to view/process and click Open.
- Or double-click on the Output Folder or Proc Folder to open a previously processed file.



Processing the Data

Initial Process (automatically done by the software)

Once a file is opened, the software will automatically process the original, raw data and create a new processed file so that it is viewable. The processes done are Time Zero Correction and Filtering.

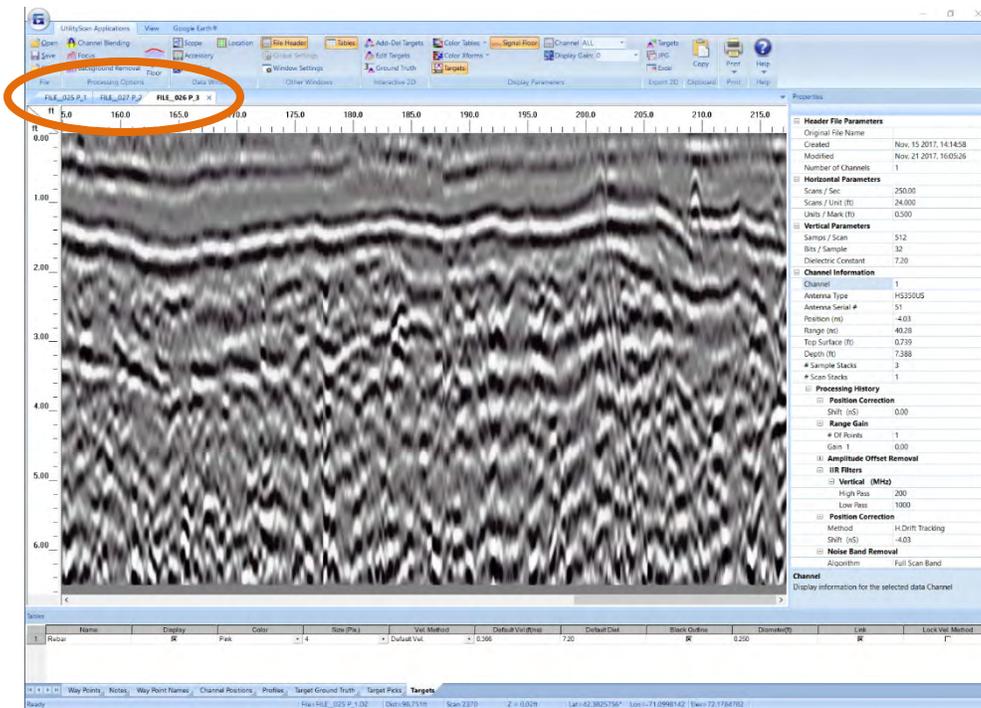
If you have Auto Save File set as **Yes**, the software will process the original file, save the processed file to the Output Directory, and name the new file as FileName+P_X, where X represents the number of times the original file was opened and processed.

If you have configured Auto Save file set as **No**, the software will process the file and ask you to save the processed file.

- You may save the file using the software’s naming style.
- You may rename the file to your style and save the file.

In either case, the processed file will be saved to the folder you indicated as the Output Directory. The original file still exists in the Source folder. This file remains untouched.

- Note the tabs (orange circle), these display the name of the file being displayed.



- The Properties Screen now displays Header information, which is information about the file.
- If a 3D grid is opened, you may click on the left and right arrows located at the bottom of the scale to toggle through the different profiles of your data.



Ribbon Options



UtilityScan Applications

File

Open: Opens the currently selected project folder to open additional files.

Save: Saves the selected data file. If multiple files are open it saves the tab that is active. Any new targets or picks added to the data will be saved.

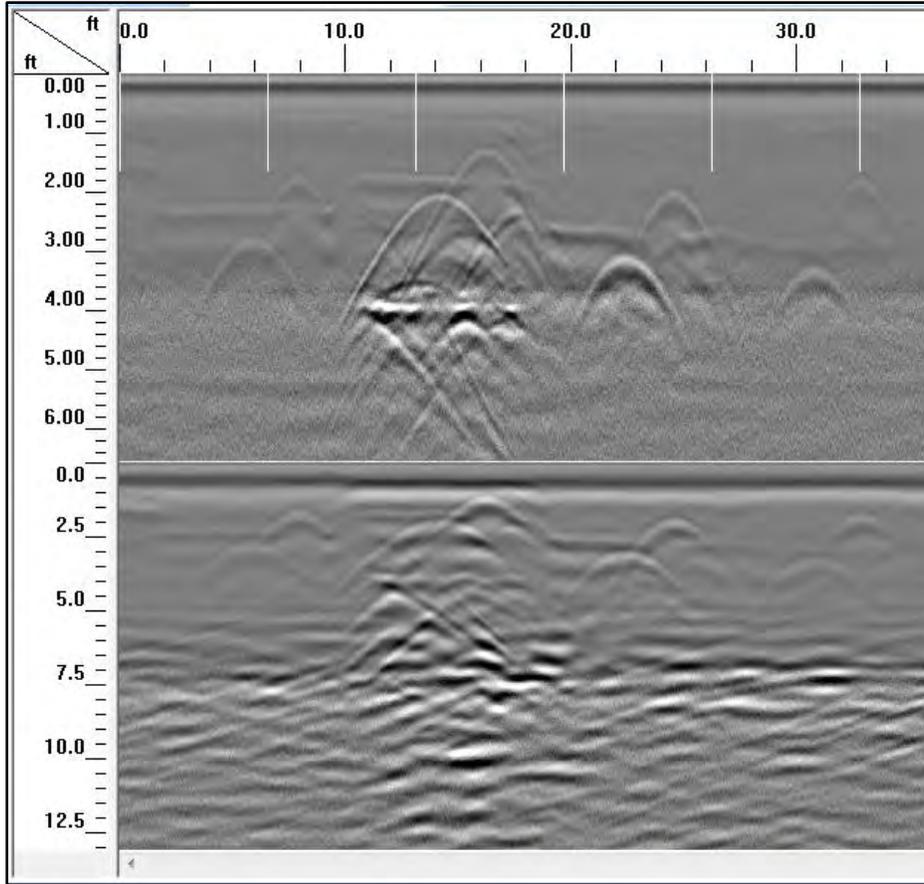
Close: Closes the currently selected data file. If multiple files are open it closes the tab that is active.

Processing Options

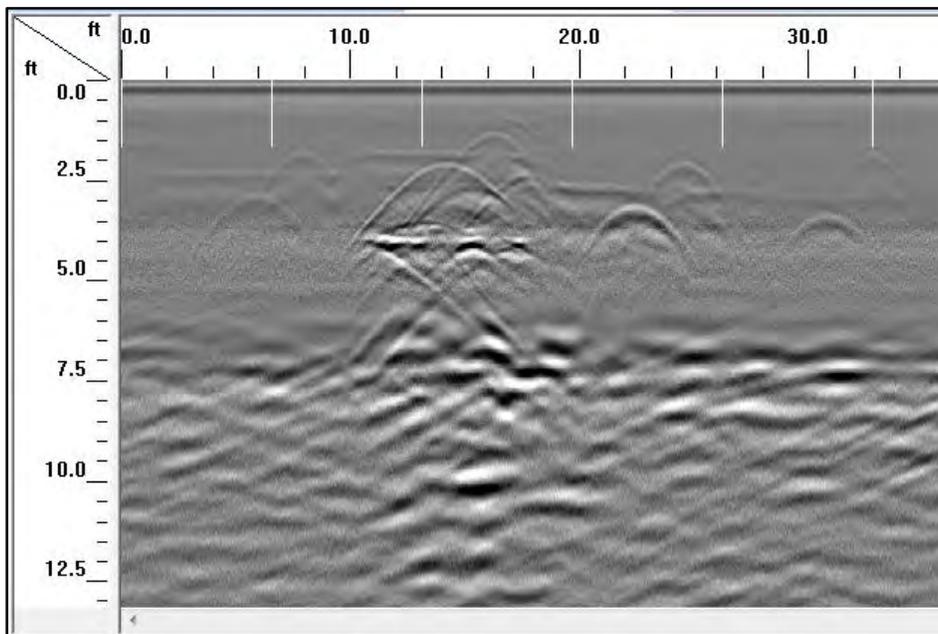
Channel Blending

The Channel Blending function serves to blend two separate channels of data into one profile. When the Channel Blending icon is selected it blends the two channels of data together using an 80% position on Channel 1 and a 20% blending width. This process is specifically for the UtilityScan DF.

Note: The output from Channel Blending is placed in both Channels 1 and 2.



Prior to Channel Blending.

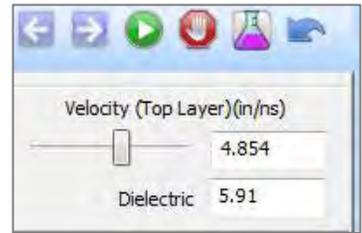


Following Channel Blending.

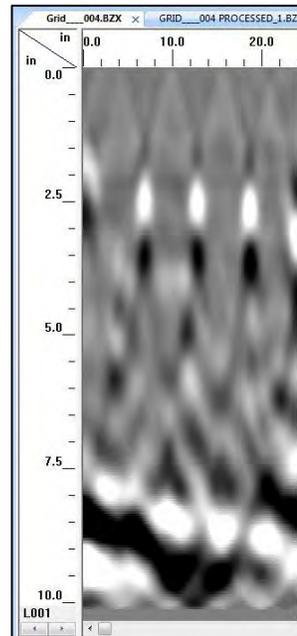
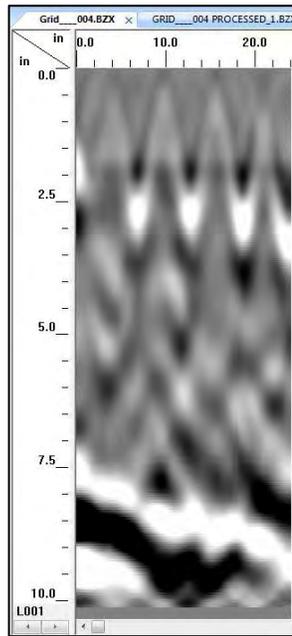
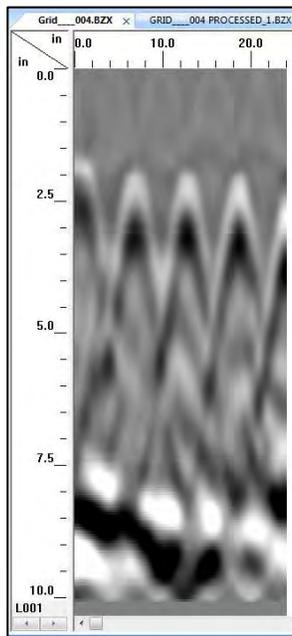
Focus

You can use the Focus option to re-adjust the dielectric for better depth accuracy and a better 3D display.

- 1** Click on Focus from the Processing Options Window.
- 2** Adjust the slider bar to increase or decrease the velocity (thus increase or decrease the dielectric) and click on the Test Icon .
- 3** Continue to make adjustments and press the Reset  and Test Icons until the hyperbolas become dots.



- The below image on the left has hyperbolas. Increase the velocity bar by sliding it to the right. This will automatically decrease the dielectric.
- The below image in the middle has upside-down hyperbolas. Decrease the velocity by sliding it to the left. This will automatically increase the dielectric.
- The below image on the right has no hyperbolas. Dots are present.



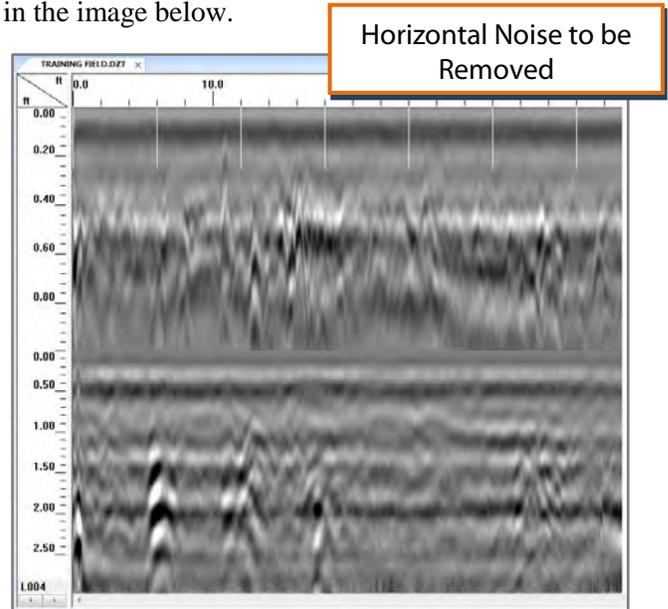
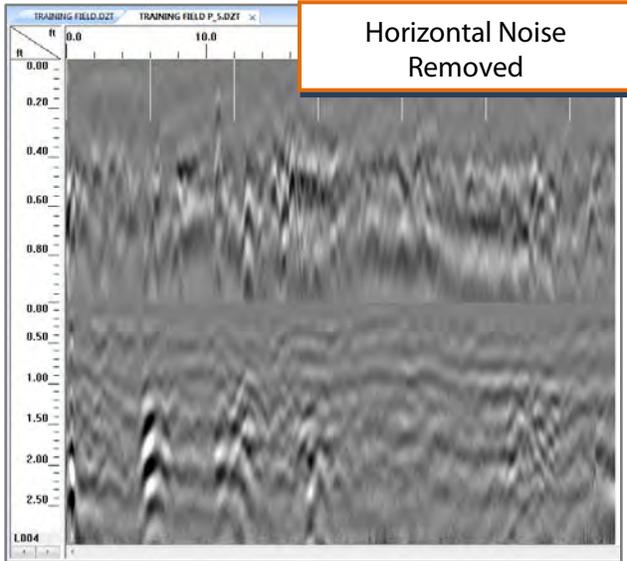
- 4** Once you have dots click on the Process Icon to process the data.
- 5** Save the data if prompted to do so.

Note: The focusing is only applied to channel 1 of a blended file. This means, both focused and unfocused data can be viewed simultaneously, which can be useful for detecting targets.

Background Removal

Background Removal is a filter, formally called a Horizontal Background Removal FIR Filter, which removes horizontal bands of noise similar to those seen in the image below.

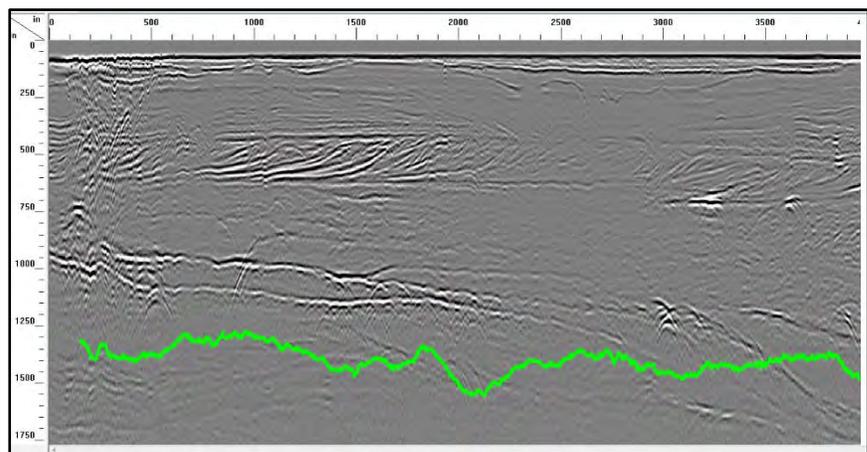
- 1** Click on the Background Removal icon from the Processing Options Window.
- 2** The process will immediately begin.
- 3** If prompted save the file.



Signal Floor

This function analyzes the noise and signal loss (attenuation) from scan to scan and provides estimate of the effective depth penetration. Real reflectors may still be located beneath the Signal Floor if they are strong enough. The output of this function is shown as a green line on the screen, as seen below, and saved as a .BII binary file.

- 1** When the Signal Floor icon is clicked, the left pane will display the Signal Floor Process Bar.
- 2 Signal Floor Estimator:** If multiple channels of data were collected, choose which channel to use to estimate signal floor.
- 3** Simply click Apply and Reset to test this processing function. Click OK to accept the setting and generate the binary file.



Data Windows

Scope: Toggle on and off to display the O-Scope RADAR signal. You may hold the left mouse button down on the data and move the mouse to view the RADAR signal at that position.

Accessory: Toggle on and off a window that shows LineTrac data.

3D View: Toggle on and off a window that shows the data in 3D.

Location: Used primarily for 3D Grid files or individual profiles with GPS data, location will display a grid showing the location of each profile.

Other Windows

File Header: Header information about the displayed file.

Global Settings: Display Global Parameters for all files prior to opening any files and allow you to switch between available Application Displays. Once a file is open, the Global Parameters cannot be changed.

Window Settings: The Properties Pane automatically updates based on which data display, 2D or 3D is currently selected.

Tables: This pane will display database information about the currently active file. Tabs are displayed depending on the type of application or process underway.

Interactive 2D

Perform the following steps on the 2D profile and not on the 3D View.

Add/Del Targets: This will allow you to “tag” targets with a dot. Simply turn this on and click on a target to insert a dot. Right click on a dot to delete the dot. These dots will contain information about the target such as horizontal distance, depth, and velocity. The information can be exported as a comma delimited ASCII file. Also, note that the “dots” will appear on the 3D Grid as well.

Edit Targets: This will allow you to click on a dot to change the color and size of the dot.

Ground Truth: This will allow you to click on a target and enter the KNOWN DEPTH of that target. This will adjust the scale accordingly.

Display Parameters

Color Tables: Change the color of your data.

Color Xforms: Change how the colors of your chosen color table are distributed.

Display Gain: Change the contrast (brightness) of your data. This changes the display only; it does not change the actual data.

Targets: Turn the display of the targets (dots, pipes, or drill holes) On or Off.

Signal Floor: Toggles Signal Floor On or Off.

Channel: Toggles the active display channel. Used with the UtilityScan DF.

Export 2D

Targets: Export targets (dots) information (distance, depth and layer velocity) to a comma delimited ASCII file. The name of the file is “FileName”+”X”.csv located in the output folder.

JPEG: Save the current file as a JPEG file (Picture File). This file will be named “FileName”+”X”.jpg located in the output folder.

Excel: Create a report in MS Excel with user entered information, data information and a picture of the 3D Grid.

- 1** Enter information if needed. Click on OK when done.
- 2** Open the Excel by clicking at the bottom of the screen if it did not automatically open.
- 3** In Excel move the picture and adjust the size of the picture as needed.
- 4** Print the report.

Clipboard

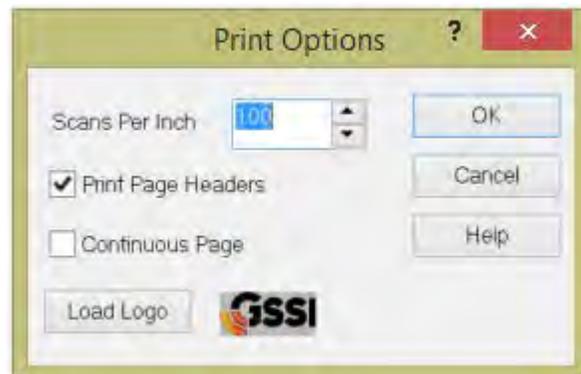
Copy: Click this to copy the current window display to the clipboard. This image then can be pasted to any other 3rd party software (PowerPoint, Word, etc.).

Print

Quick Print: Print the file as it is displayed in the linescan window.

Setup: Configure the printout.

- **Scans Per Inch:** Number of scans per inch.
- **Print Page Headers:** Print Header information.
- **Continuous Page:** If data takes more than one page, print data on multiple pages or one page.
- **Load Logo:** Load and print your own logo, or GSSI logo.



Help

Index: Opens the RADAN for UtilityScan Manual.

About: Display the current version of the software.

Update Notes: Retrieves notes related to the most recent available version of the software. An internet connection is required.

Update: Update the software to the latest version. You MUST be connected to the internet to do this.

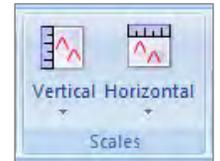
View Ribbon

This tab contains menu options that are used while displaying 2D or 3D data and using Interactive Mode.

Scales Group

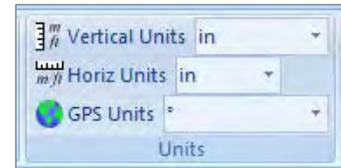
Vertical Scale: Select between Time (ns), Depth, or Samples.

Horizontal Scale: Select between Distance, Coordinates (GPS if available), Scans, or None.



Units Group

Select between English or Metric units for the vertical and horizontal scales.
Select units for GPS Coordinates.



Coordinates Group

Toggle between Local or GPS coordinates display.



Google Earth® Ribbon

The Google Earth Ribbon provides viewing and exporting options for data collected with GPS. Options include viewing GPS Tracks, User Marks, Layers, Targets, and Ground Truth in Google Earth, exporting to a KML file, and launching and refreshing Google Earth.



Display/Save Options

There are three options in this group for saving or displaying export items in Google Earth.

KML File: Click this button to save selected export items to a KML File. A KML file is a file type used to display geographic data in an earth browser, such as Google Earth and Google Maps. KML files have a tag-based structure with names and attributes used for specific display purposes.

Google Earth: Click this button to launch Google Earth with the selected export options. A Temporary Place will be added to Google Earth.

Google Earth Refresh: Press this button to refresh Google Earth with any changes made to the exported items. A new Temporary Place will be added to Google Earth and will have the same file name as the original file.

Note: Google Earth must be installed on the user's computer for either the Google Earth or the Google Earth Refresh icons to work.

Export Items

This group allows the user to choose which items will be exported as part of a KML file. Only the displayed layers and targets associated with the displayed channel are exported.

Layers: Currently displayed layer(s). Select which Layer(s) is displayed by checking the Display box in the Layers Tab of the Table.

Targets: Currently displayed target(s). Select which Target(s) is displayed by checking the Display box in the Targets Tab of the Table.

User Marks: Export User Marks as they appear in the Way Points Tab of the Table.

GPS Path: The GPS Path associated with Channel 1.

Ground Truth: Currently displayed Ground Truth data for Layers or Targets.

Layer Options

This group allows the user to customize how the displayed layers are exported.

Output Parameter: There are four Output Parameter options to choose from when exporting layers. Although depth is the typical output parameter, there are applications where other values such as velocity (e.g. new pavement) or amplitude (e.g. bridge deck) provide valuable information.

- Depth**
- Amplitude**
- Velocity**
- Time**

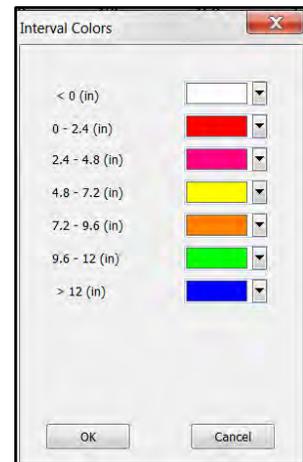
Line Width: Display width of the line in Google Earth.

Number of Intervals: Exported values can be broken into different colors to denote different ranges. The user can specify from 0 to 8 intervals.

Minimum Value: The minimum value for the interval range. For example, if the user chooses Amplitude for the output parameter, the Minimum Value is the minimum amplitude.

Maximum Value: The maximum value for the interval range. For example, if the user chooses Amplitude for the output parameter, the Maximum Value is the maximum amplitude.

Interval Colors: Opens the Interval Colors dialogue box, which allows the user to select a color for each interval. Click on the down arrows to select a different color or choose Other to open a color editor window.



Settings

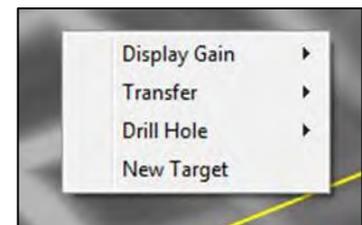
Recall Settings: Press this button to recall the current export settings (Export Items and Layer Options) that have most recently been saved by pressing the Save Settings icon.

Save Settings: Press this button to save the current export settings (Export Items and Layer Options) as the default settings for all files.

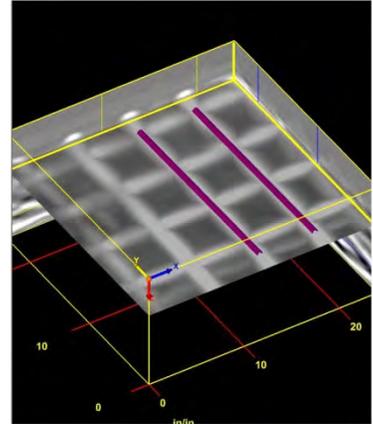
Mouse Functions

Before we begin with the 3D Volume Options Ribbon, there are mouse functions that can be helpful while displaying 2D data or a 3D Grid.

- 1** Right-click on the data area of a 3D Grid to:
 - **Display Gain:** Adjust the contrast of the screen display.
 - **Transfer:**
 - **None:** Display normally.



- **Absolute:** Change all to positive.
- **Negate:** Change negative to positive and positive to negative.
- **Drill Hole:** Enter a tube to represent a hole or core.
- **New Target:** Click here to add targets to your 3D Grid.
 - Click on New Target.
 - Double click on one end of a target.
 - Double click on the other end of a target.
 - Repeat process for more targets.



- 2** Right-click on a Target to:
- **Delete:** Delete the target.
 - **Target Properties:** Name the target, change the color and/or the size of the target.

- 3** Point the mouse to the surface or any one of the walls, hold down the Ctrl key and the left mouse button and move the mouse to move the surface or walls.

Note: Display Gain and Transfer (1a and 1b) can be adjusted on 2D profiles as well as in a 3D grid.

3D Volume Options Ribbon



X-Slice, Y-Slice, Z-Slice

Drag the slide bar or press the “-” “+” to move the slices of the 3D Grid accordingly. You may also animate the slices individually by clicking on the Animation icon. This icon will turn animation on and off.

Thickness (Z-Slice): Adjust the thickness of the Z-Slice.

Sync to Profile (Z Slice): When toggled on, left-clicking in your 3D grid will immediately display the appropriate 2D scan in the left pane.

View Options

Targets: Toggle between displaying the targets.

GPR Data: Toggle between displaying the data of the 3D Grid.

Display Gain: Adjust the display gain (contrast).

Background: Toggle between a black background and white background.

Export

JPG: Export the 3D grid as a JPG file.

Excel: Create a report in MSEXcel with user entered information, data information and a picture of the 3D Grid.

- 1** Enter information if needed. Click on OK when done.
- 2** Excel will automatically start. Open it by selecting the icon that appears at the bottom of the screen.
- 3** In Excel move the picture and adjust the size of the picture as needed.
- 4** Print the report.

2D CAD (*.dxf): Exports the data as a 2D AutoCAD file.

3D CAD (*.dxf): Exports the data as a 3D AutoCAD file.

Z-Slice Google Earth (*.kml): Exports the currently displayed z-slice as a kml file that will open in Google Earth as a layer.

Report Details	
Project Name:	Downtown Parking Garage
Location:	Park Avenue
Reason for Survey:	Rebar Location
Data Collection Comments:	Data collected on all floors
Customer:	ABC Costruction
Survey Performed by:	Rob Sommerfeldt
Data Processing Comments:	Processed by Rob

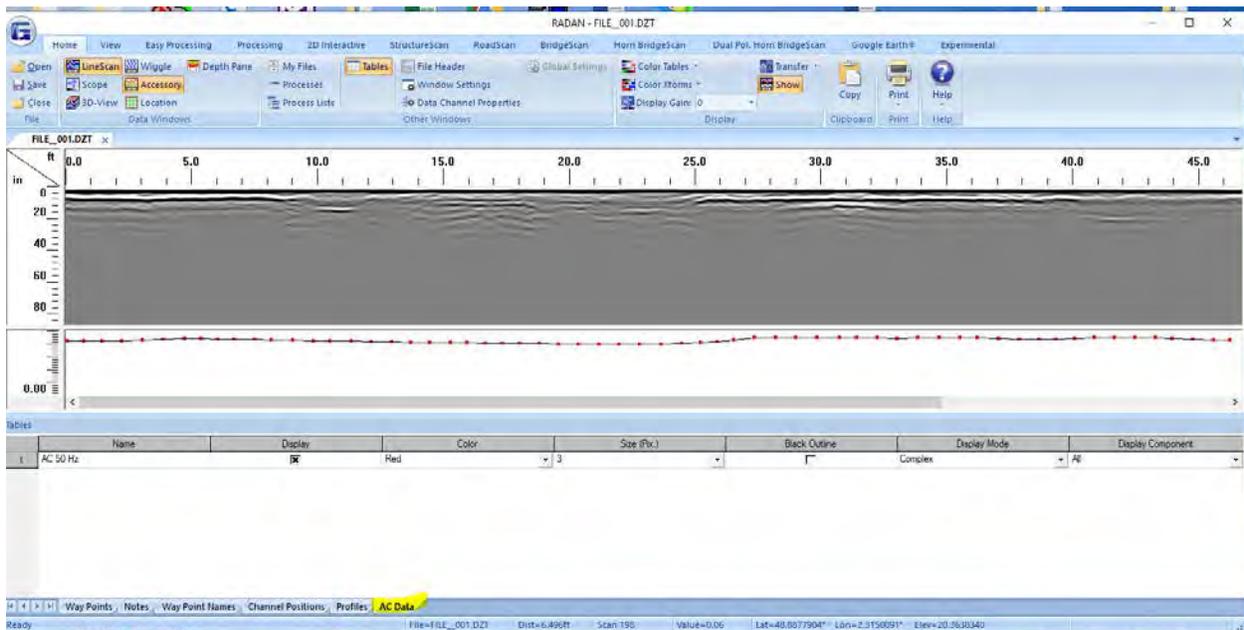
Displaying LineTrac Data with the Accessory Display Option.

Displaying LineTrac Data

LineTrac Data is shown in a window below the linescan data. The scroll bars of both windows are tied, so the AC data is always synchronized with the linescan data. The data are shown in the “Accessory” data window, which is toggled on and off by pressing the button in the “Data Windows” category.

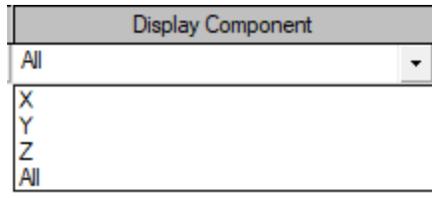


Clicking on the AC data window with the left mouse button makes the “AC Data” tab appear on the bottom in the “Tables” window. Clicking on the “AC Data” tab shows the different display options associated with the data.



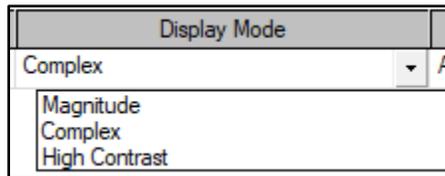
Multiple frequencies can be displayed. The frequency displayed is shown in the “Name” column. The different display options are the same as for interactive interpretation picks with the addition of two other options, which are explained below:

Display Component: The LineTrac device obtains data from three vector directions, the X-, Y-, and Z-axes. You can choose which component to display. The most common components are the Z- component and a combination of components obtained by selecting “All”.

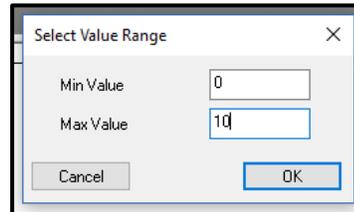
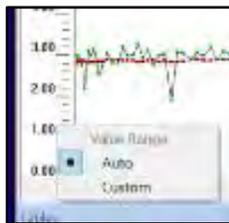


Display Mode: There are several ways to display the component(s) selected:

- a) Magnitude:** Display value is $\log_{10}(\text{abs}(v))$, where v = displayed component and if displayed component is “All”, $v = \sqrt{v_x^2 + v_y^2 + v_z^2}$, where v_x , v_y , and v_z are the X-, Y-, and Z- components.
- b) Complex:** Display value is the $\log_{10}(\text{abs}(v_{\text{max}}))$, where v_{max} is the highest absolute amplitude of the X-, Y-, and Z- components. This means that “Complex” display mode really operates on all three vector values independent of the user’s selected display component.
- c) High Contrast:** Display value is the $\log_{10}(\text{abs}(V_{\text{hc}}))$, where V_{hc} is value calculated on the specific SIR-system used to obtain the GPR data.

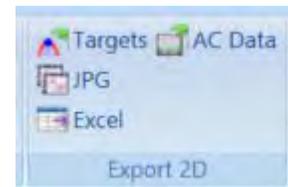


The displayed values are logarithmic. The displayed value range is 0 – 5 by default. This can be changed by right-clicking with the mouse button on the vertical scale and selecting “Custom” from the pop-up menu. When this is done, a window will appear prompting you to enter the desired value range.



Exporting LineTrac Data

To export LineTrac numerical values as a CSV file that can be read in other software packages (such as Excel), click on the AC data button from the Export 2D item set on the toolbar.



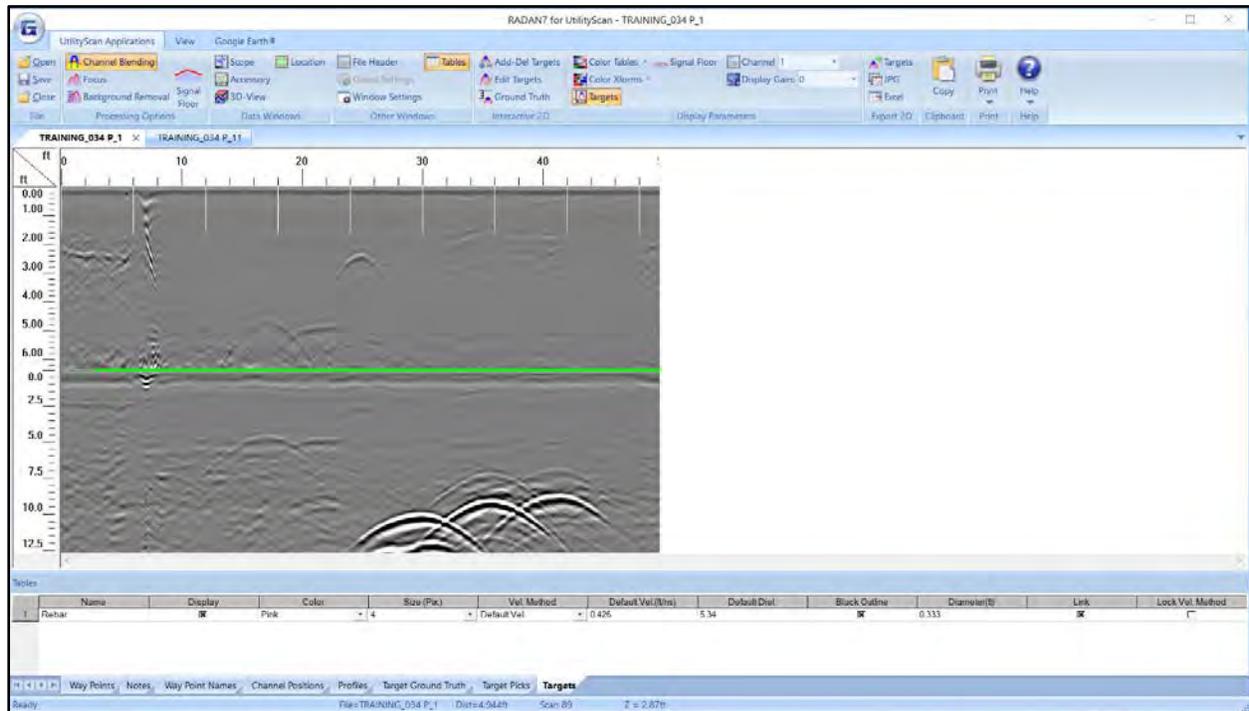
Data values will be stored in the current output or process folder.

Note that this will also export Frequency mode data as well.

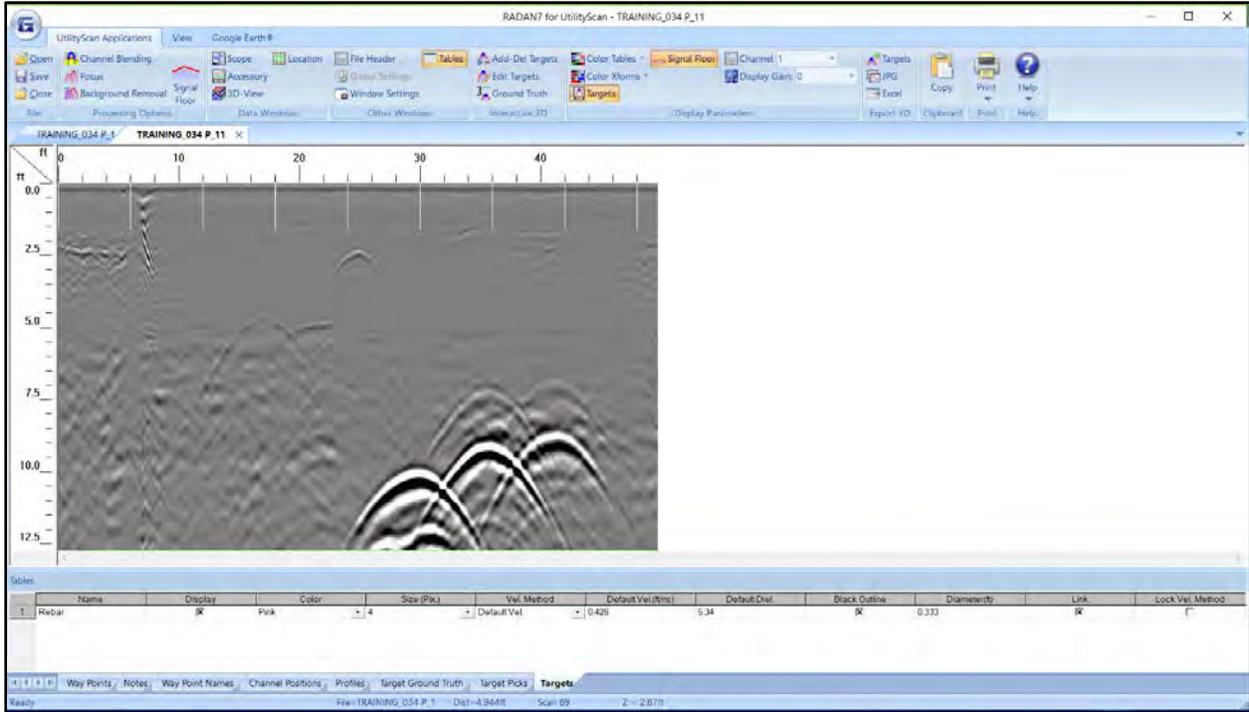
UtilityScan DF Processing Tutorial

If this is your first time opening and processing UtilityScan DF data, we strongly suggest reviewing the following tutorial. This tutorial will cover both 2D and 3D processing. The 3D files must be created during data collection using 3D Mode or in RADAN Standard Processing with the 3D module.

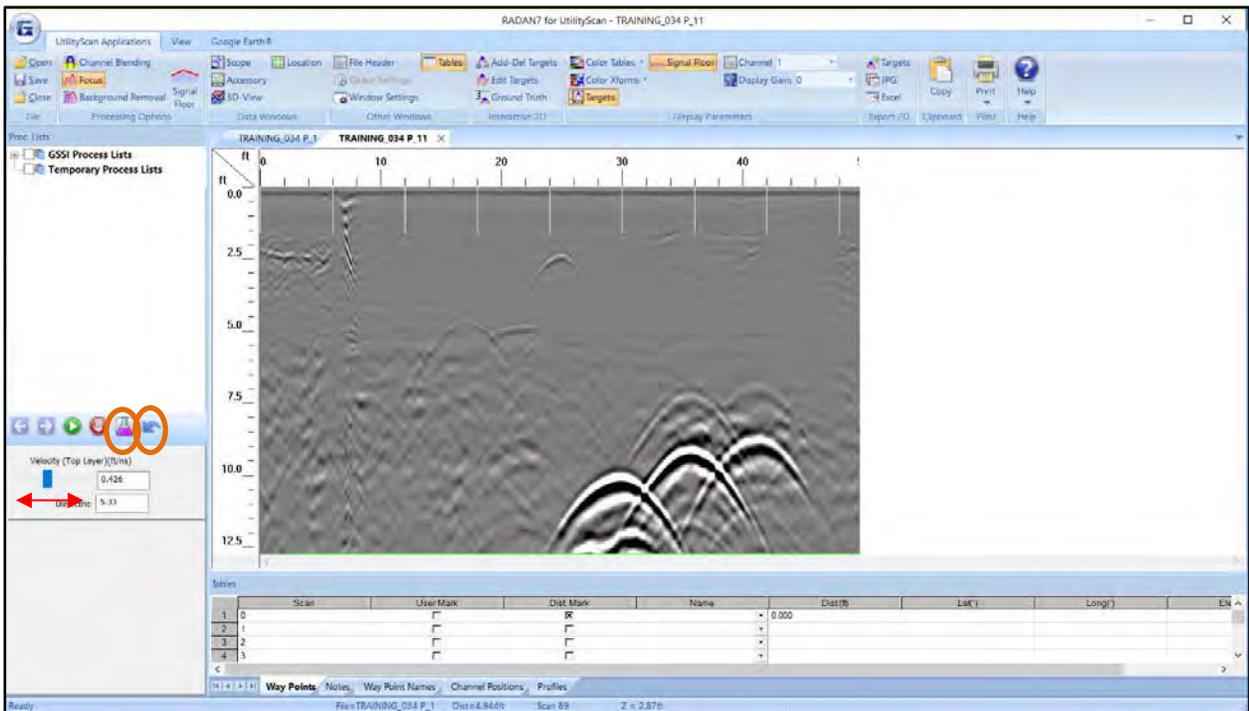
- 1 Open the unprocessed 2D or 3D file. It'll automatically process using the filters specified during data collection on the UtilityScan DF unit. The raw file will be closed and the processed file will appear.



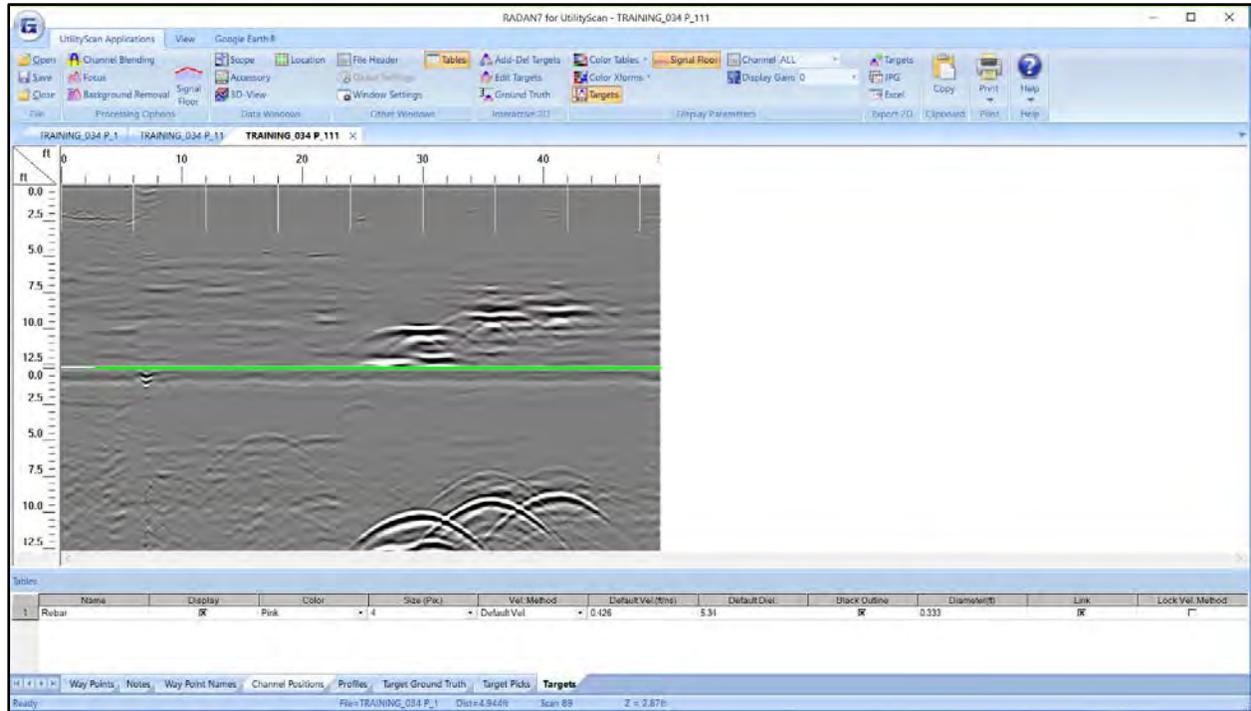
- 2 Click on **Channel Blending**. Channel blending is automatically performed (using 80% of the top channel as the blending point). The blending result is then written to both output channels. The output is a two channel file with identical data in both channels. The output file display will default to channel 1 (which you will observe by looking at the channel item in the display properties). But switching over to channel 2 will now display the same data as channel 1.



- Next, press the focus button to migrate the hyperbolas. “Hmmm, I may like them unmigrated” you may be thinking. That’s ok, migrate anyway after changing the slider position in the window on the left and repeatedly pressing the test and reset buttons, and then pressing the run button when you’re ready to apply the correct velocity and create an output file.



- 4 Next, adjust the display channel to view all the channels of the migrated file. This is available under Window Settings.



- 5 You'll see that the migration was only performed to channel 1. This allows you to really compare the pre-and post-migrated data! Targets can be added as described earlier. You also have access to the target properties from the Tables window.

3D Viewing with RADAN for UtilityScan

When a 3D UtilityScan file is processed using the sequence described above and is opened in 3D, the 3D cube display will differ depending on the displayed channel as described in the table below.

Display Channel	3D Cube X- and Y-Slice Data	3D Cube Z-Slice Data
1	Channel 1 (migrated data)	Channel 1 (migrated data)
2	Channel 2 (unmigrated data)	Channel 2 (unmigrated data)
<i>ALL</i>	<i>Channel 2 (unmigrated data)</i>	<i>Channel 1 (migrated data)</i>

There is nothing different until you reach the last row, which indicates that when All is selected, the vertical slices in the 3D cube show the unmigrated data and the Z-Slice shows the migrated data. This may provide some assistance in distinguishing between hyperbolas that associated with long linear targets (pipes!) or point-targets (rocks?).

