



RADAN[®] for UtilityScan Manual

MN43-202 Rev C

Geophysical Survey Systems, Inc.

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



Limited Warranty, Limitations of Liability and Restrictions

Geophysical Survey Systems, Inc. hereinafter referred to as GSSI, warrants that for a period of 24 months from the delivery date to the original purchaser this product will be free from defects in materials and workmanship. EXCEPT FOR THE FOREGOING LIMITED WARRANTY, GSSI DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. GSSI's obligation is limited to repairing or replacing parts or equipment which are returned to GSSI, transportation and insurance pre-paid, without alteration or further damage, and which in GSSI's judgment, were defective or became defective during normal use.

GSSI ASSUMES NO LIABILITY FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR INJURIES CAUSED BY PROPER OR IMPROPER OPERATION OF ITS EQUIPMENT, WHETHER OR NOT DEFECTIVE.

Before returning any equipment to GSSI, a Return Material Authorization (RMA) number must be obtained. Please call the GSSI Customer Service Manager who will assign an RMA number. Be sure to have the serial number of the unit available.

Copyright © 2015-2017 Geophysical Survey Systems, Inc.
All rights reserved
including the right of reproduction
in whole or in part in any form

Published by Geophysical Survey Systems, Inc.
40 Simon Street
Nashua, NH 03060-3075

Printed in the United States

SIR, UtilityScan, PaveScan RDM and RADAN are registered trademarks of Geophysical Survey Systems, Inc.

Limited Use License Agreement

You should carefully read the following terms and conditions before opening this package. By opening this package you are agreeing to become bound by the terms of this agreement and indicating your acceptance of these terms and conditions. If you do not agree with them, you should return the package unopened to Geophysical Survey Systems, Inc.

Geophysical Survey Systems, Inc. (GSSI), an OYO Corporation, provides the computer software ("RADAN for UtilityScan DF") contained on the medium in this package, and licenses its use. You assume full responsibility for the selection of RADAN for UtilityScan DF to achieve your intended results and for the installation, use and results obtained from the Program.

LICENSE

- a) In consideration of the payment of a license fee, you are granted a personal, non-transferable license to use RADAN for UtilityScan DF under the terms stated in this Agreement. You own the USB or other physical media on which RADAN for UtilityScan DF is provided under this Agreement, but all title and ownership of RADAN for UtilityScan DF and enclosed related documentation ("Documentation"), and all other rights not expressly granted to you under this Agreement, remain in Geophysical Survey Systems, Inc.;
- b) RADAN for UtilityScan DF must be used by you only on a single computer;
- c) You and your employees and agents are required to protect the confidentiality of RADAN for UtilityScan DF. You may not distribute or otherwise make RADAN for UtilityScan DF or Documentation available to any third party;
- d) You may not copy or reproduce RADAN for UtilityScan DF or Documentation for any purpose except you may make one (1) copy of RADAN for UtilityScan DF if RADAN for UtilityScan DF is not copy-protected, in machine readable or printed form for backup purposes only in support of your use of RADAN for UtilityScan DF on a single computer. You must reproduce and include the Geophysical Survey Systems, Inc. copyright notice on the Backup copy of RADAN for UtilityScan DF;
- e) Any portion of RADAN for UtilityScan DF merged into or used in conjunction with another program will continue to be the property of GSSI and subject to the terms and conditions of this Agreement. You must reproduce and include the copyright notice on any portion merged into or used in conjunction with another program;
- f) You may not sublease, assign, or otherwise transfer RADAN for UtilityScan DF or this license to any other person without the prior written consent of GSSI. Any authorized transferee of RADAN for UtilityScan DF will be bound by the terms and conditions of this Agreement; and
- g) You acknowledge that you are receiving only a Limited License to use RADAN for UtilityScan DF and Documentation and GSSI retains title to RADAN for UtilityScan DF and Documentation.

You acknowledge that GSSI has a valuable proprietary interest in RADAN for UtilityScan DF and Documentation.

You may not use, copy, modify, or transfer RADAN for UtilityScan DF or Documentation, or any copy, modification, or merged portion, in whole or in part, except as expressly provided for this Agreement.

If you transfer possession of any copy, modification, or merged portion of RADAN for UtilityScan DF or Documentation to another party, your license is automatically terminated.

TERM

The license granted to you is effective until terminated. You may terminate it at any time by returning RADAN for UtilityScan DF and Documentation to GSSI together with all copies, modifications, and merged portions in any form. The license will also terminate upon conditions set forth elsewhere in this Agreement or if you fail to comply with any term or condition of this Agreement. You agree upon such termination to return RADAN for UtilityScan DF and Documentation to GSSI together with all copies, modifications, and merged portions in any form. Upon termination, GSSI can also enforce any rights provided by law. The provisions of this Agreement which protect the proprietary rights of GSSI will continue in force after termination.

LIMITED WARRANTY

GSSI warrants as the sole warranty provided to you that the USB on which RADAN for UtilityScan DF is furnished will be free from defects in materials and workmanship under normal use and conditions for a period of ninety (90) days from the date of delivery to you as evidenced by a copy of your receipt. No distributor, dealer, or any other entity or person is authorized to expand or alter either this warranty or this Agreement; any such representation will not bind GSSI.

GSSI does not warrant that the functions contained in RADAN for UtilityScan DF will meet your requirements or that the operation of RADAN for UtilityScan DF will be uninterrupted or error-free.

Except as stated above in this section, RADAN for UtilityScan DF and Documentation are provided "as is" without warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose. You assume the entire risk as to the quality and performance of the program and documentation. Should the program prove defective, you (and not GSSI or any authorized GSSI distributor or dealer) assume the entire cost of all necessary servicing, repair, or correction.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow the exclusion of implied warranties, so the above exclusion may not apply to you.

LIMITATION OF REMEDIES

GSSI's entire liability and your exclusive remedy will be:

- a) The replacement of any USB not meeting GSSI's "Limited Warranty" explained above and which is returned to GSSI with a copy of your receipt; or
- b) If GSSI is unable to deliver a replacement USB which conforms to the warranty provided under this Agreement, you may terminate this Agreement by returning RADAN for UtilityScan DF and Documentation to GSSI and your license fee will be refunded.

IMPORTANT: If you must ship RADAN for UtilityScan DF and Documentation to GSSI, you must prepay shipping and either insure RADAN for UtilityScan DF and Documentation or assume all risk of loss or damage in transit. To replace a defective USB during the ninety (90) day warranty period, if you are returning the medium to GSSI, please send us your name and address, the defective medium and a copy of your receipt at the address provided below.

In no event will GSSI be liable to you for any damages, direct, indirect, incidental, or consequential, including damages for any lost profits, lost savings, or other incidental or consequential damages, arising out of the use or inability to use RADAN for UtilityScan DF and Documentation, even if GSSI has been advised of the possibility of such damages, or for any claim by any other party. Some states do not allow the limitation or exclusion of liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you. In no event will GSSI's liability for damages to you or any other person ever exceed the amount of the license fee paid by you to use RADAN for UtilityScan DF, regardless of the form of the claim.

U.S. GOVERNMENT RESTRICTED RIGHTS

RADAN for UtilityScan DF and Documentation are provided with restricted rights. Use, duplications, or disclosure by the U.S. Government is subject to restrictions as set forth in subdivision (b)(3)(ii) of the Rights in Technical Data and Computer Software clause at 252.277-7013. Contract/manufacturer is Geophysical Survey Systems, Inc., 40 Simon Street, Nashua, New Hampshire 03060-3075.

GENERAL

This Agreement is governed by the laws of the State of New Hampshire (except federal law governs copyrights and registered trademarks). If any provision of this Agreement is deemed invalid by any court having jurisdiction, that particular provision will be deemed deleted and will not affect the validity of any other provision of this Agreement.

Should you have any questions concerning this Agreement, you may contact GSSI by writing Geophysical Survey Systems, 40 Simon Street, Nashua, New Hampshire 03060-3075 U.S.A.

You acknowledge that you have read this agreement, understand it and agree to be bound by its terms and conditions. You further agree that it is the complete and exclusive statement of the Agreement between you and GSSI which supersedes any proposal or prior Agreement, oral or written, and any other communications between us relating to the subject matter of this Agreement.

Table of Contents

Chapter 1: Getting Started.....	1
System Requirements	1
GSSI Activation Policies	1
General Description	2
How to Use This Manual.....	2
Installing RADAN for UtilityScan DF	3
Installation Instructions.....	3
Chapter 2: Using RADAN for UtilityScan DF	7
Setting up Your Laptop/PC and Data Transfer	7
Transferring the Files	7
3D Data Collection and Processing Options.....	7
Launching and Navigating the Software	8
Launching the Software	8
Navigating Through the Main Screen	9
Viewing and Processing the Data	10
Preparing the Software.....	10
Opening a File	11
Processing the Data.....	12
Initial Process (automatically done by the software).....	12
Ribbon Options.....	13
UtilityScan DF Applications.....	13
File.....	13
Processing Options	13
Data Windows.....	17
Other Windows.....	17
Interactive 2D.....	17
Display Parameters.....	17
Export 2D.....	18
Clipboard	18
Print	18
Help.....	18
View Ribbon	19
Google Earth® Ribbon	19
Display/Save Options	19
Export Items.....	19
Layer Options	20
Settings.....	20
Mouse Functions.....	20
3D Volume Options Ribbon	21
X-Slice, Y-Slice, Z-Slice.....	21
View Options	21
Export.....	22
UtilityScan DF Processing Tutorial.....	23
3D Viewing with RADAN for UtilityScan DF	26

Chapter 1: Getting Started

Thank you for purchasing RADAN for UtilityScan DF™. The packing list included with your shipment lists all of the items in your order. The RADAN for UtilityScan DF program and example files are stored on a single USB flash drive. While the RADAN for UtilityScan DF program is pre-loaded on a standard USB drive, GSSI recommends that you not delete the USB drive after installing, in the event that you need to reinstall in the future.

System Requirements

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

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 DF license includes one license for installation on one computer.



General Description

RADAN for UtilityScan DF is designed to process, view, and document data collected with the UtilityScan DF (dual frequency) system. 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.
- 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 DF 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 DF.

We recommend that all users read the entire manual.

Installing RADAN for UtilityScan DF

It is highly recommended 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** Insert the RADAN for UtilityScan DF Installation USB drive into your computer's USB port.
- 2** The installation program should start automatically. Follow instructions on screen. If the program did not start automatically, skip to step 5.
- 3** Using Windows Explorer, double-click the drive letter that contains the RADAN for UtilityScan DF USB drive.
- 4** Find the RADAN Start Icon and double-click it. 
- 5** Follow on-screen instructions:
 - **Install RADAN for UtilityScan DF:** Select this option to install the software onto your computer.
 - **Technical Support Web Site Info:** This will open a PDF file and has excellent information about our support web site and how to use this site. **It is highly recommended that you open, save and print this file.**
 - **GSSI Contacts:** This will open a PDF file on essential contacts for you here at GSSI. **It is highly recommended that you open, save and print this file.**



Installation Instructions

Click Install, Accept, Next, OK or Finish through all the screens.

Important Note: Depending upon the age of your computer, your operating system (Windows XP, Windows Vista, Windows 7, or Windows 8), and the age of your operating system, 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 DF Software

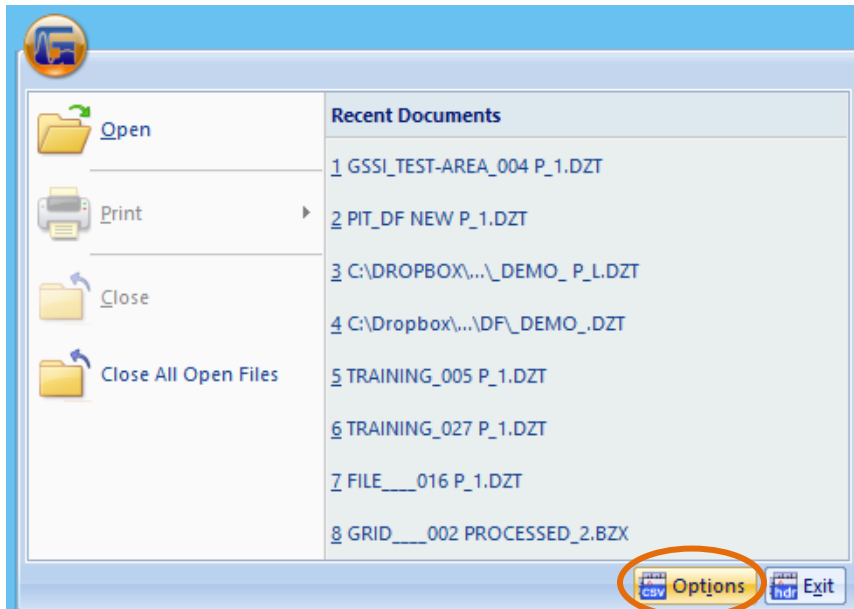
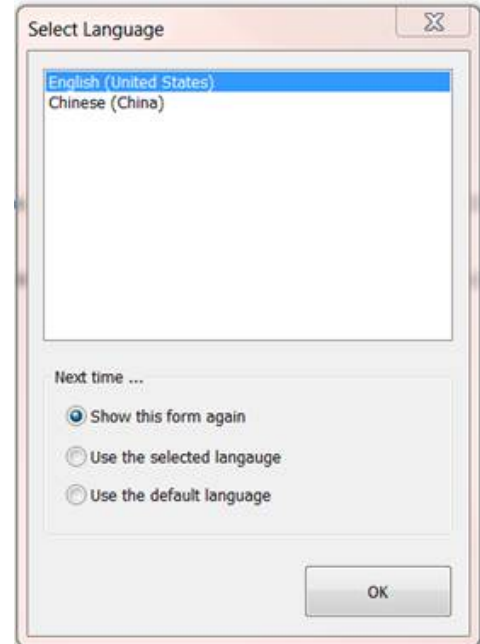
Launching the Software for the First Time

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

- 1 Highlight the language.
- 2 Select either:
 - **Show this form again:** English will be the default language, and a prompt will appear the next time the software is launched.
 - **Use the selected language:** The language that is highlighted will be used on subsequent launches of the software.
 - **Use the default language:** English is the default language and will be used on subsequent launches of the software.

The language may be changed at any time by:

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



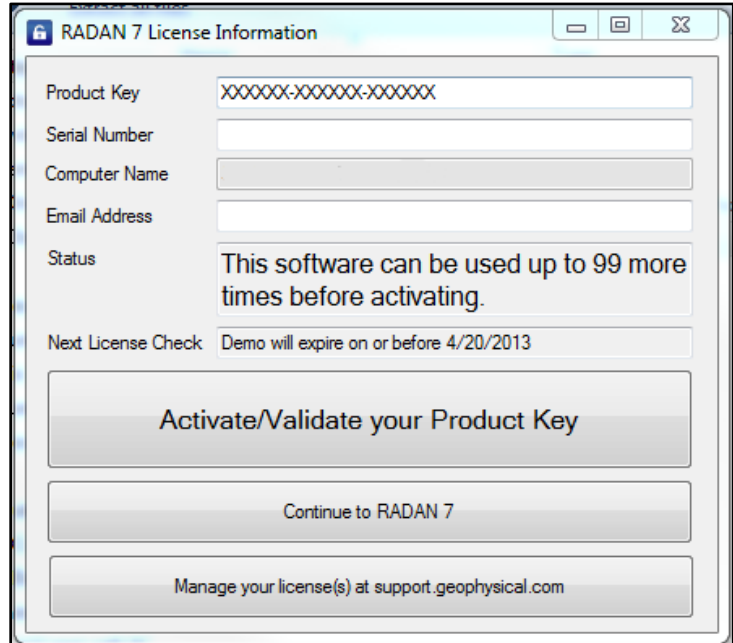
Activating the Software

After installing the software, RADAN for UtilityScan DF 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** From the label located on the back of the USB case, input the Product Key and the Serial Number into the appropriate fields.
- 2** The Computer Name is pre-filled by GSSI (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.

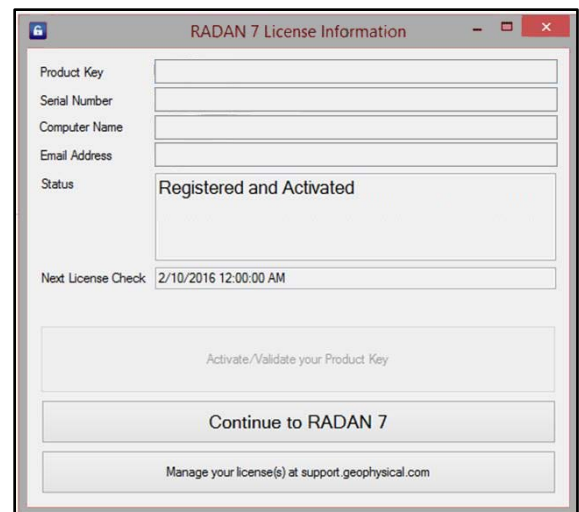
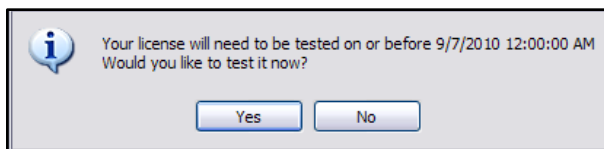


Software Demo

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

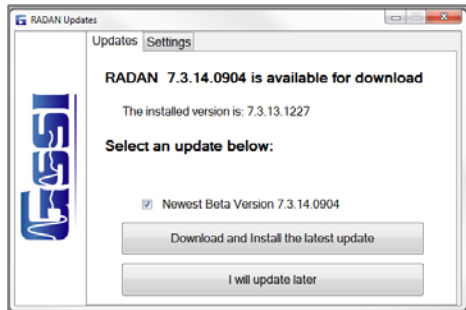


Updating the Software

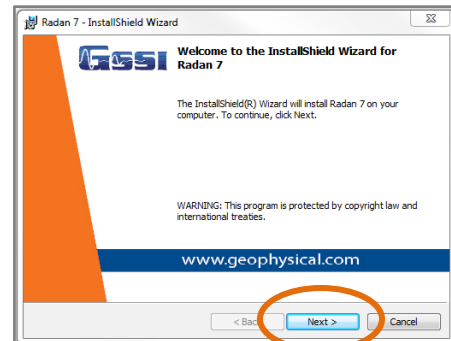
GSSI can automatically update the software if an update is available. Upon launching RADAN for UtilityScan DF AND if connected to the internet, it will ask if the user would like to download and install the update.

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

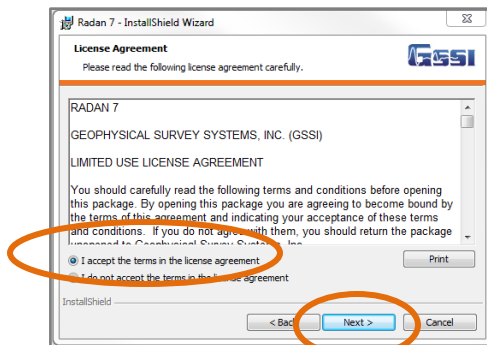
Download and Install the latest update to immediately update the software. After selecting this option the following screens will appear:



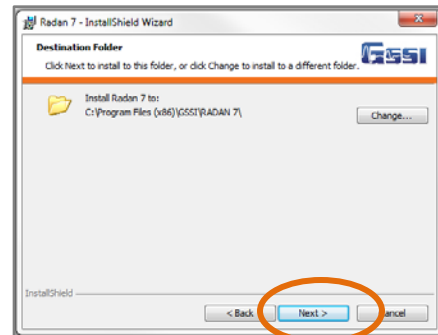
1



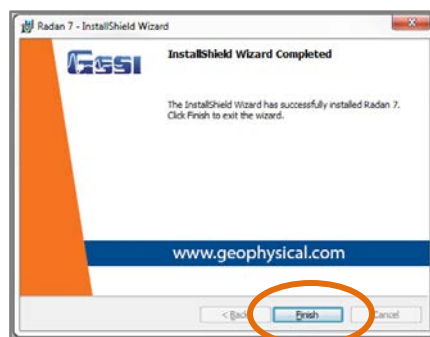
2



3



4



5

Chapter 2: Using RADAN for UtilityScan DF

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 the UtilityScan DF to the PC/Laptop.

- 1** You need a USB Drive.
- 2** With the UtilityScan DF up and running, make certain you are on the Setup screen and that your USB is plugged in.
- 3** 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.

3D Data Collection and Processing Options

3D data may be created either by using 3D Mode during data collection or assembling a 3D grid in the full version of RADAN.

If you purchased the full version of RADAN along with your RADAN for UtilityScan DF 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.

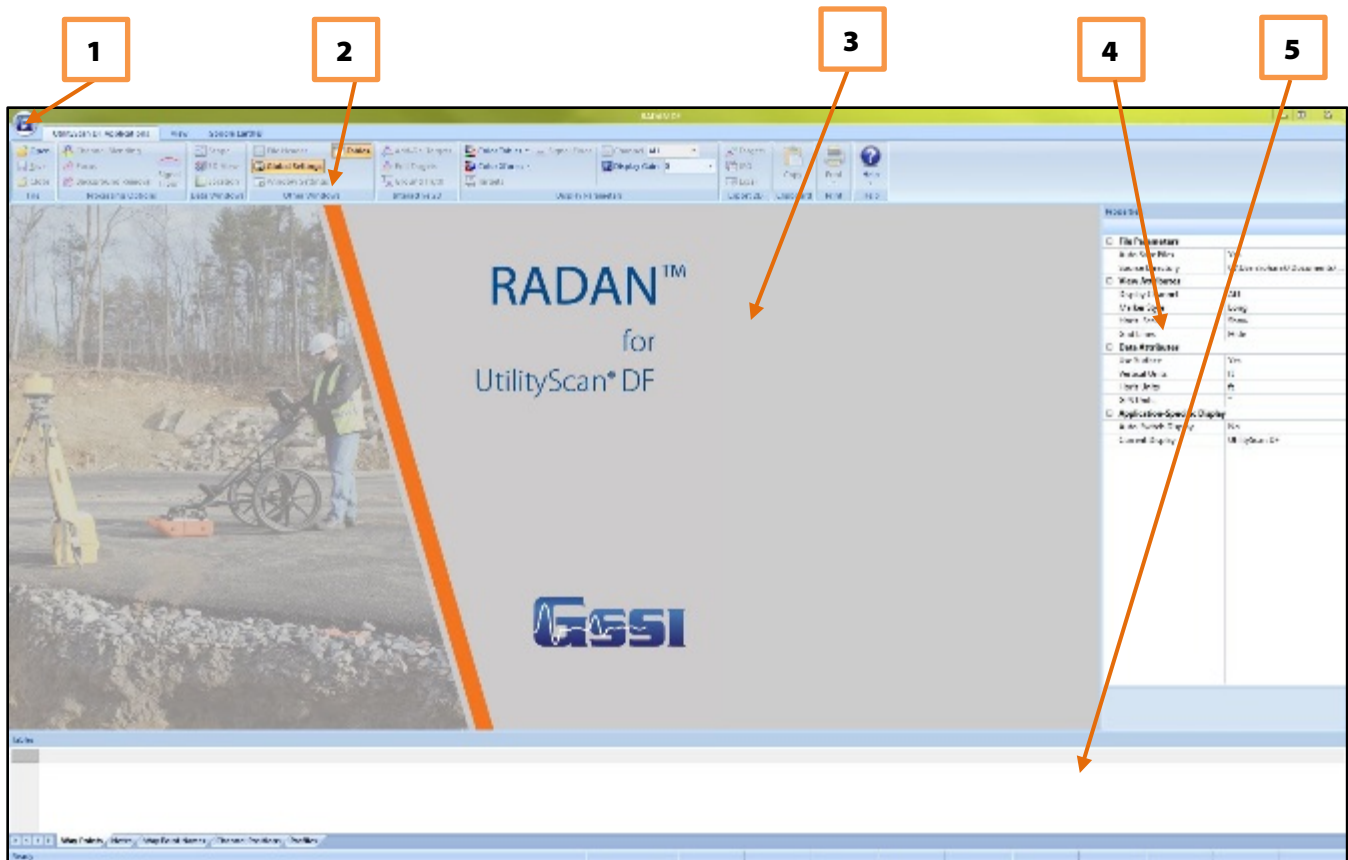
Launching and Navigating the Software

Launching the Software

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



The following screen is displayed:



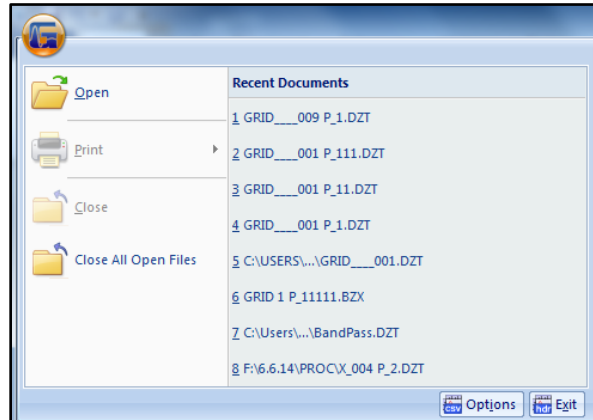
- 1** GSSI Button
- 2** Ribbon
- 3** Data Pane
- 4** Properties Pane
- 5** Tables Pane

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 DF, 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 DF, 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 DF 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.

Properties	
[-] File Parameters	
Auto Save Files	No
Source Directory	C:\Users\oharak
Output Directory	C:\Users\oharak\Desktop ...
[-] View Attributes	
Display Channel	ALL
Marker Style	Short
Horiz. Scale	Show
Grid Lines	Hide
[-] Data Attributes	
Vertical Units	ft
Horiz Units	ft
GPS Units	'
[-] Application-Specific Display	
Auto-Switch Display	No
Current Display	UtilityScan DF

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

Grid Lines:

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

Vertical Units: Units for the vertical scale.

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.

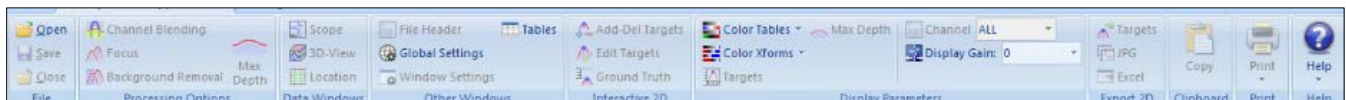
Current Display:

- **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 DF:** This is display that is designed specifically for data collected with the UtilityScan DF and includes the ability to instantly process data, do 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

- 1 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.



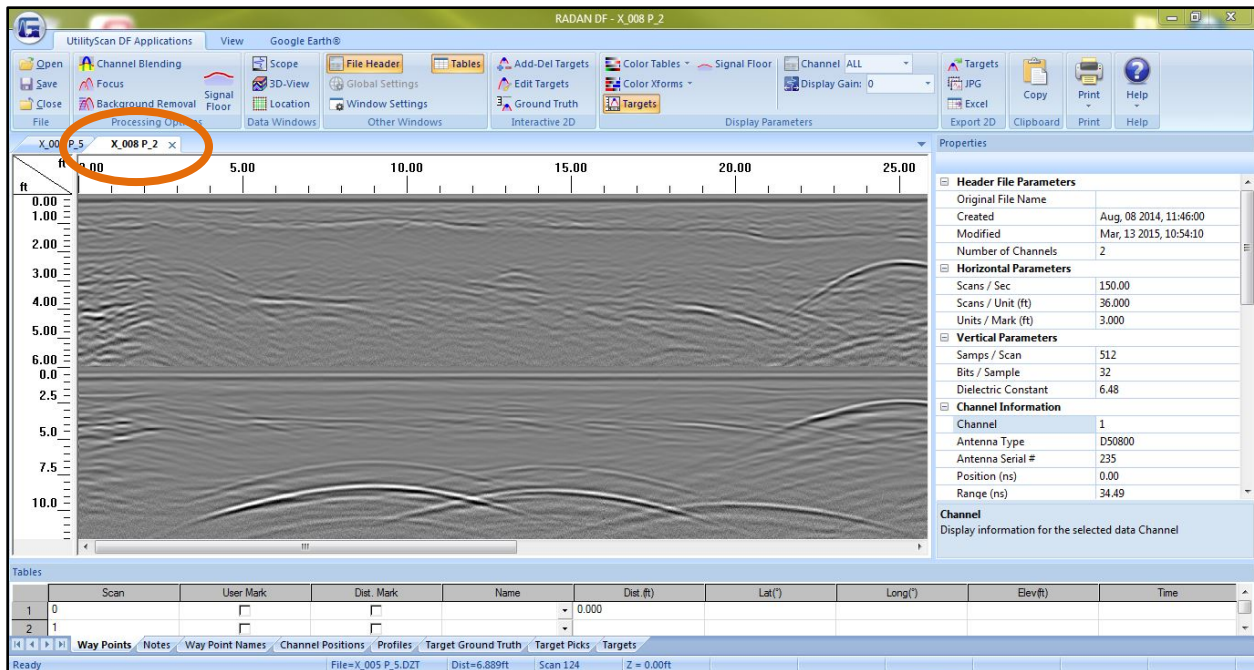
Processing the Data

Initial Process (automatically done by the software)

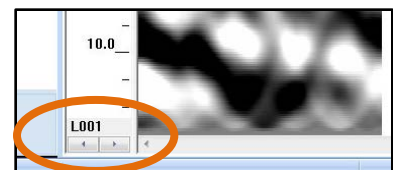
Once a file is opened, the software will automatically process the original, raw data and create a new processed file so that it is viewable. The process done was Time Zero correction and Filtering.

If you have configured Auto Save File set as **Yes**, the software will process the original file, save the processed file to the Output folder, 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, however will ask you to save the processed file.
 - You may save the file using the software’s naming style.
 - Or 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 DF 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.

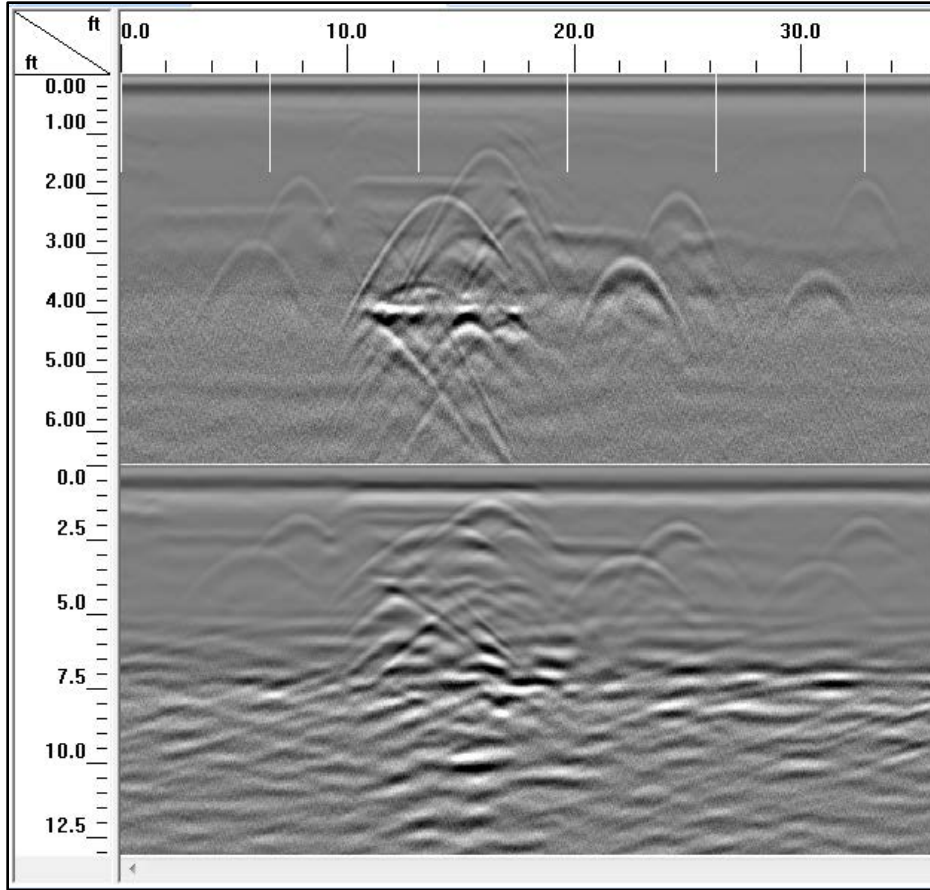
Close: Closes the currently selected data file. If multiple files are open it closes the tab that is active.

Processing Options

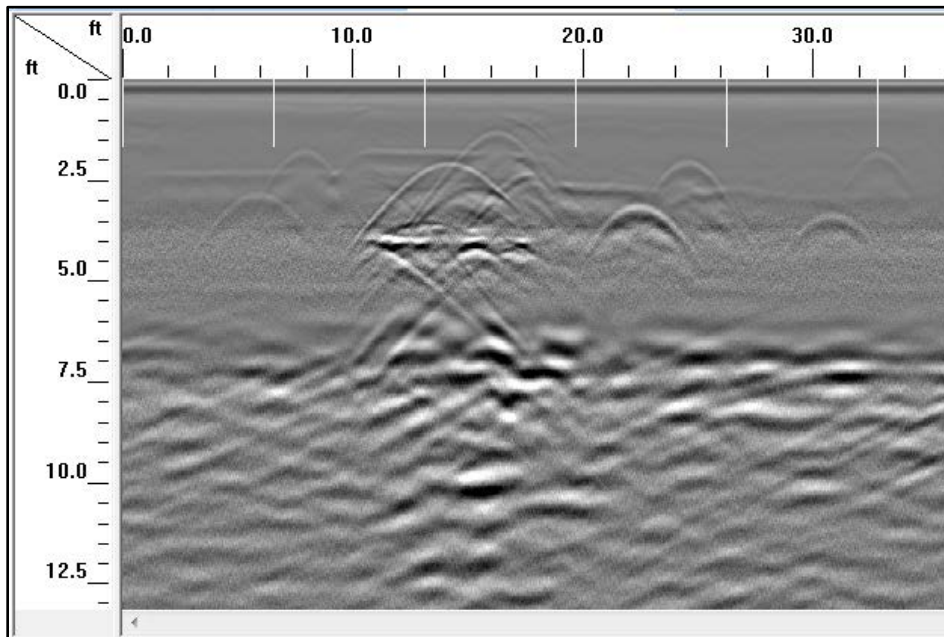
Channel Blending

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.

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



Prior to Channel Blending.





Following Channel Blending.

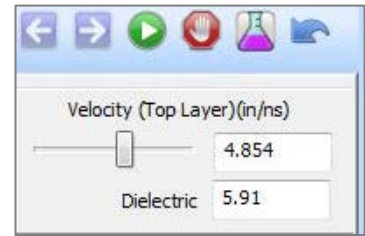
Focus

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

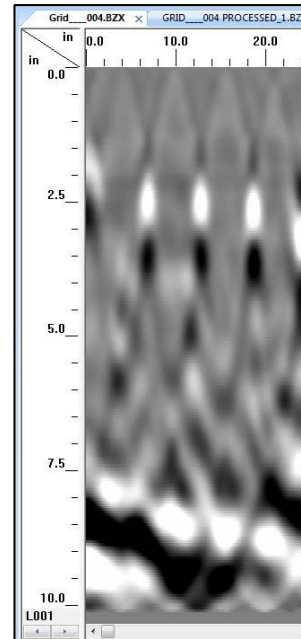
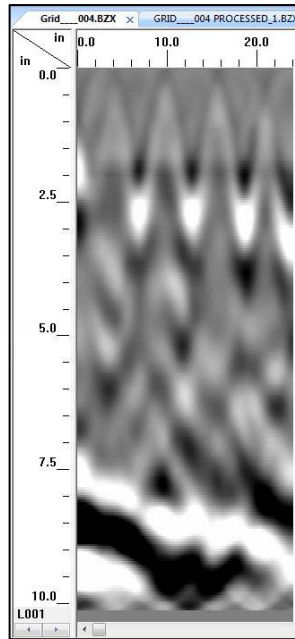
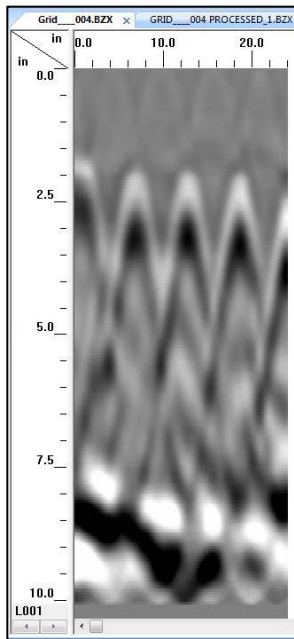
1 Click on Focus from the Processing Options Window.

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.

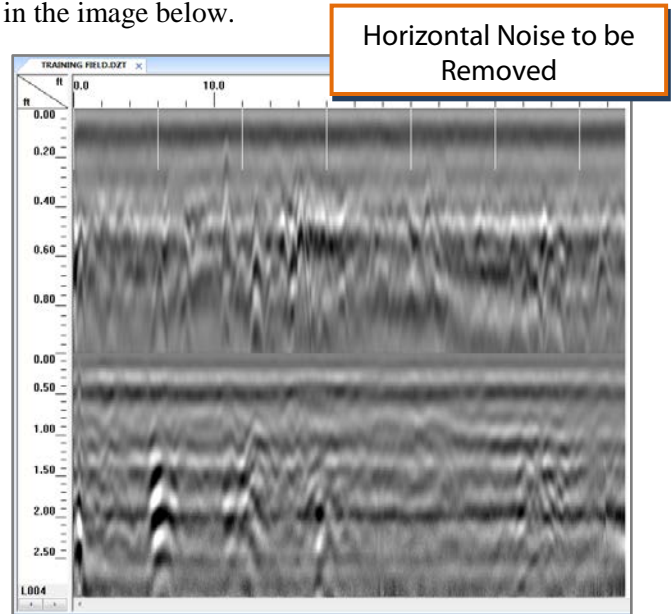
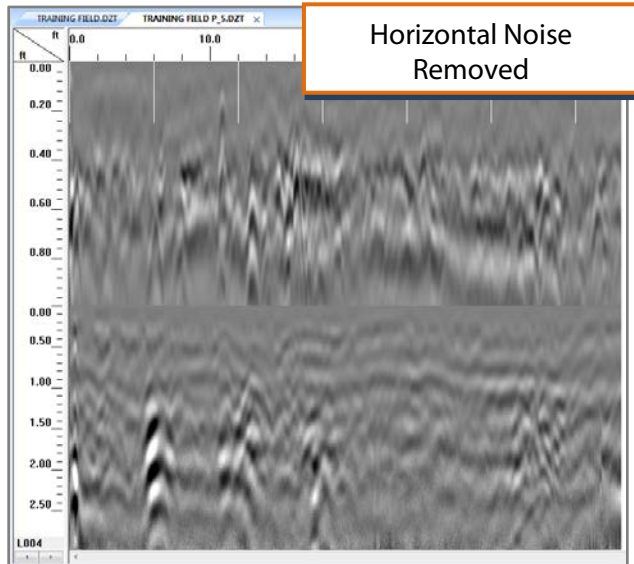
5 Save the data if prompted to do so.

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.

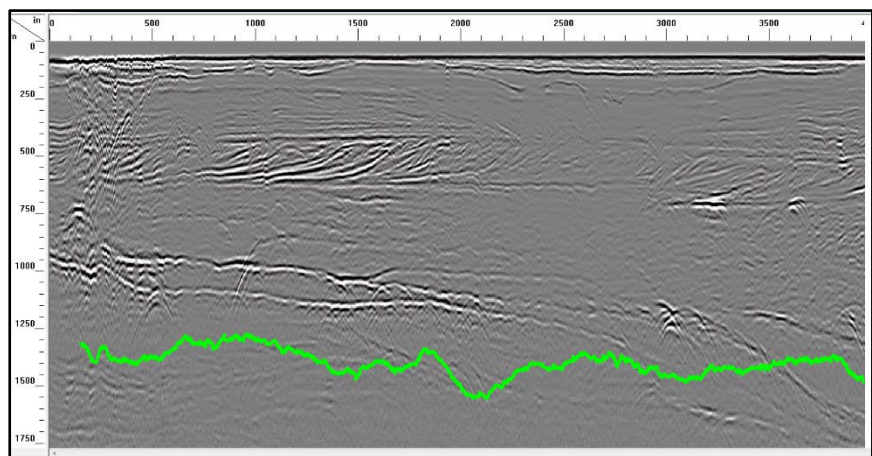
- 1** Click on the Background Removal icon from the Processing Options Window.
- 2** The process will immediately begin.
- 3** If prompted save the file.



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 between which channels 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.

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

Toggle On or Off different data property 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.

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

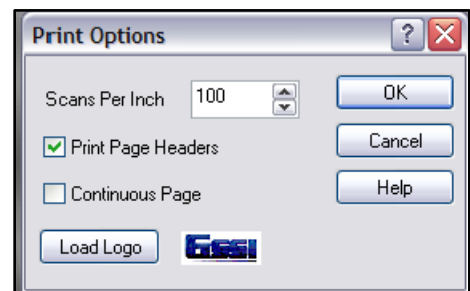
Copy: Click this to copy the current window display to the clipboard. This image then can be pasted to any other 3rd party software (PowerPoint, Word, etc.).

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 DF 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.

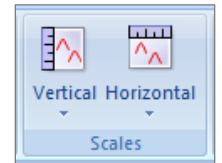
View Ribbon

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

Scales Group

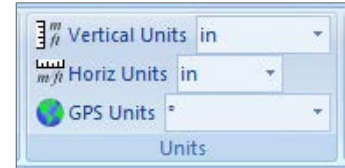
Vertical Scale: Select between Time (ns), Depth, or Samples.

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.



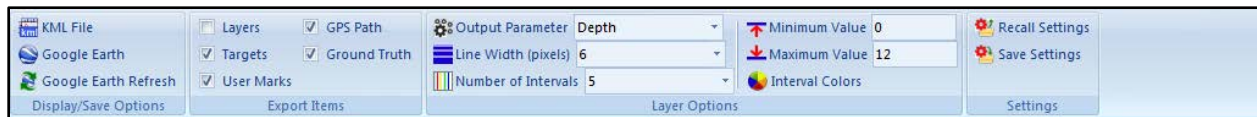
Coordinates Group

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**

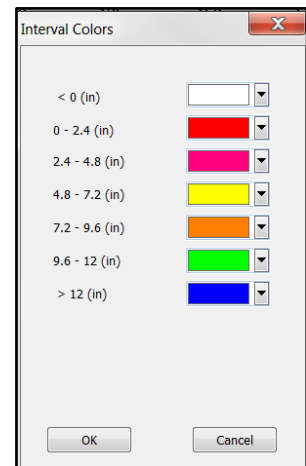
Line Width: Display width of the line in Google Earth.

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

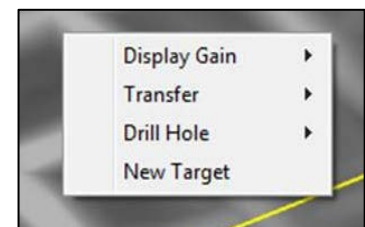
Recall Settings: Press this button to recall the current export settings (Export Items and Layer Options) that have most recently been saved by pressing the Save Settings icon.

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

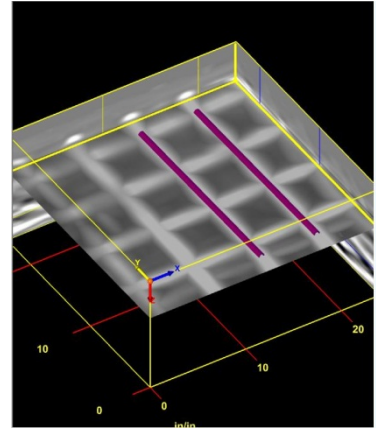
Mouse Functions

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.



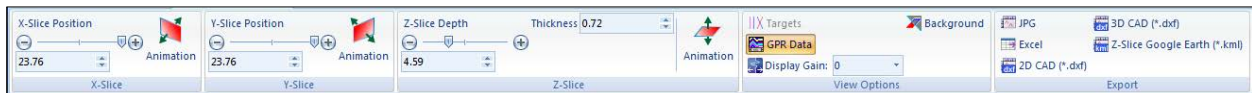
2 Right-click on a Target to:

- **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.

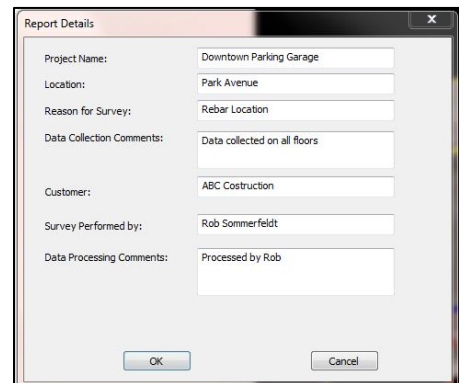
View Options

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.

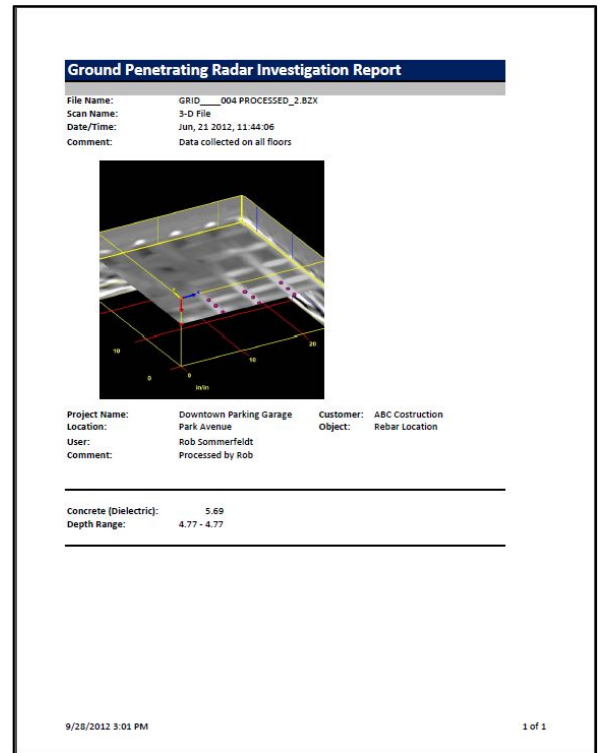
Excel: Create a report in MSExcel with user entered information, data information and a picture of the 3D Grid.

- 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.

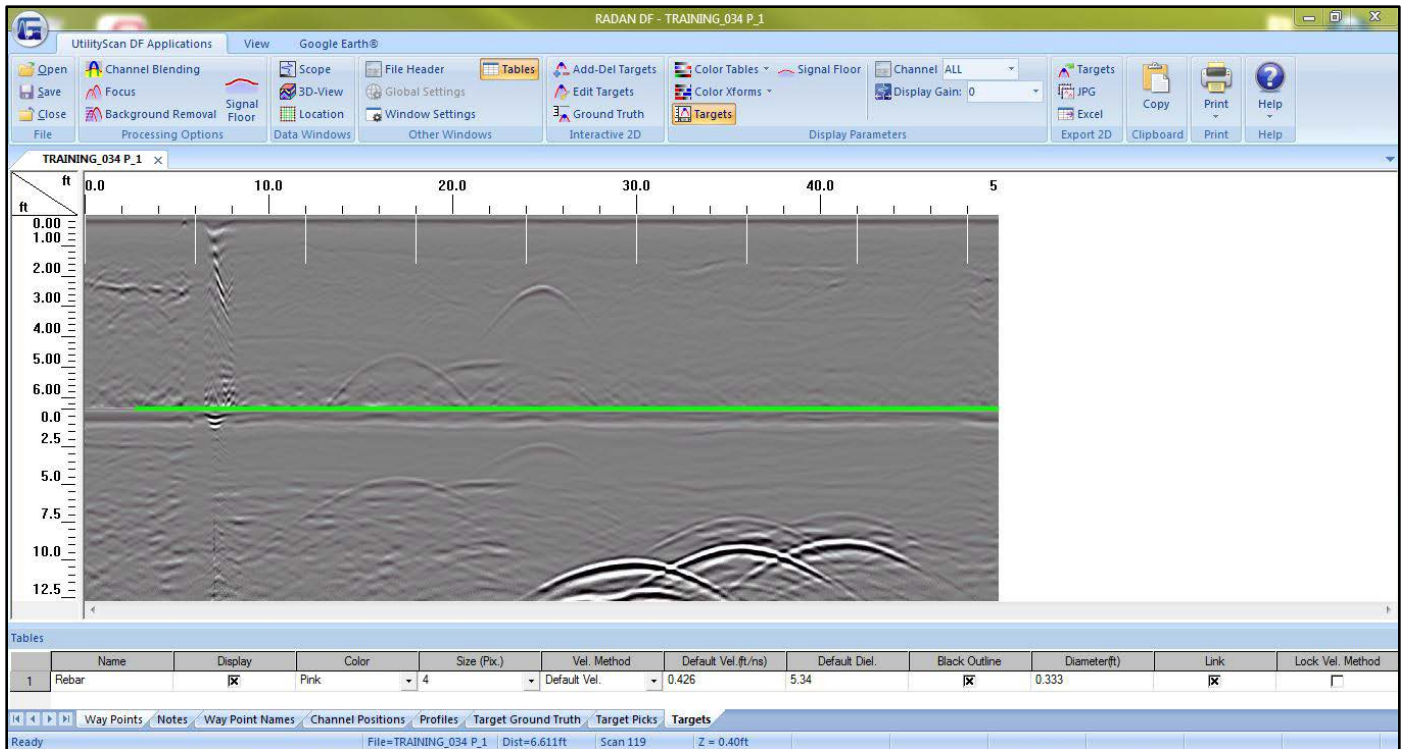


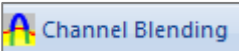
UtilityScan DF Processing Tutorial

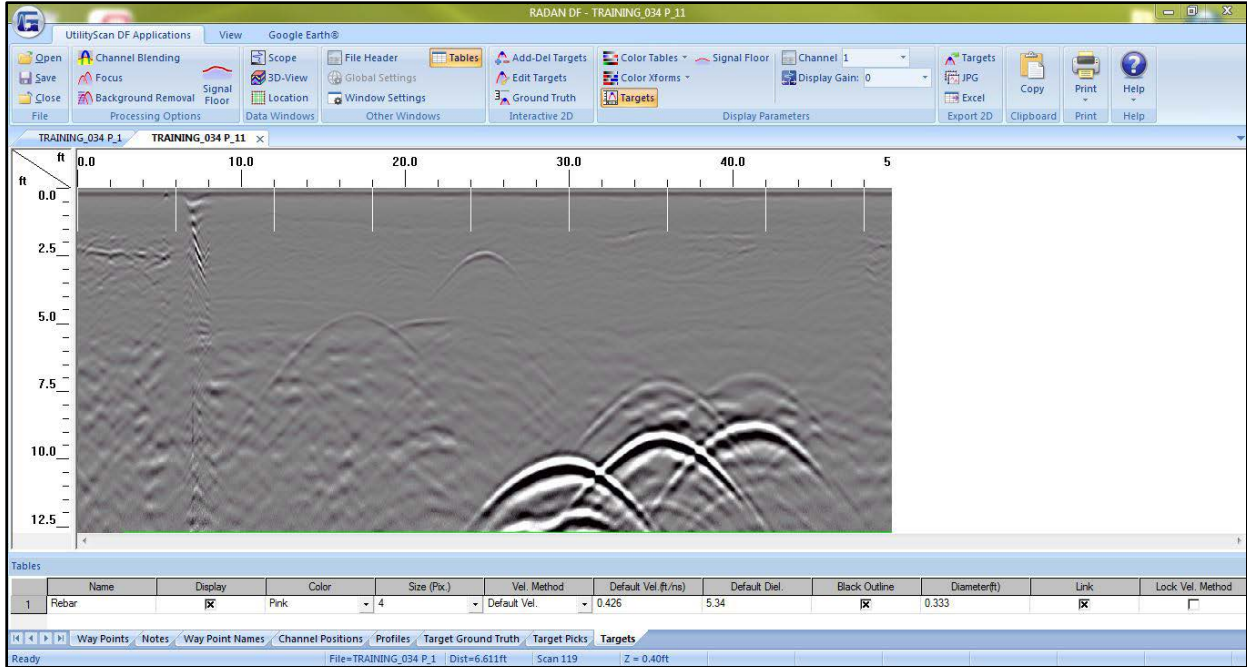
Here are a few tips in the processing of 2D and 3D UtilityScan DF files. The 3D files must be created during data collection using 3D Mode or in RADAN Standard Processing with the 3D module.




Once either the individual 2D profiles or the pre-assembled 3D grid are opened in RADAN for UtilityScan DF, you can follow the processing sequence below.

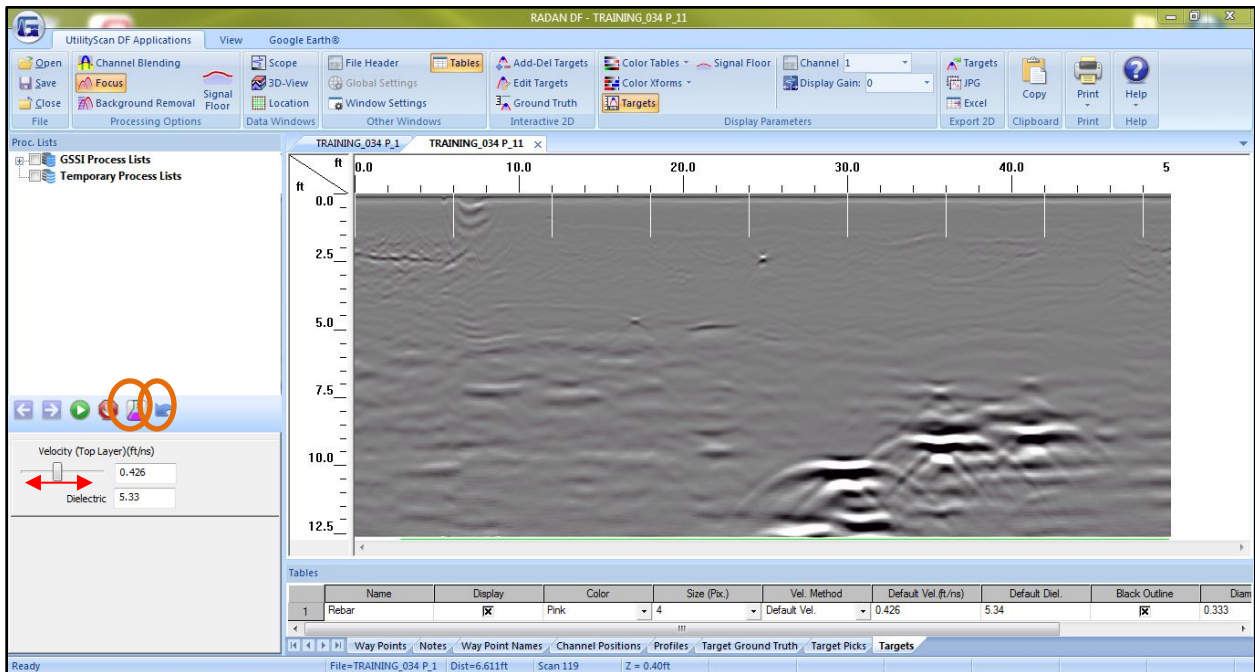
- 1 Open the unprocessed 2D or 3D file. It'll automatically process using the filters specified during data collection on the UtilityScan DF unit. The raw file will be closed and the processed file will appear.



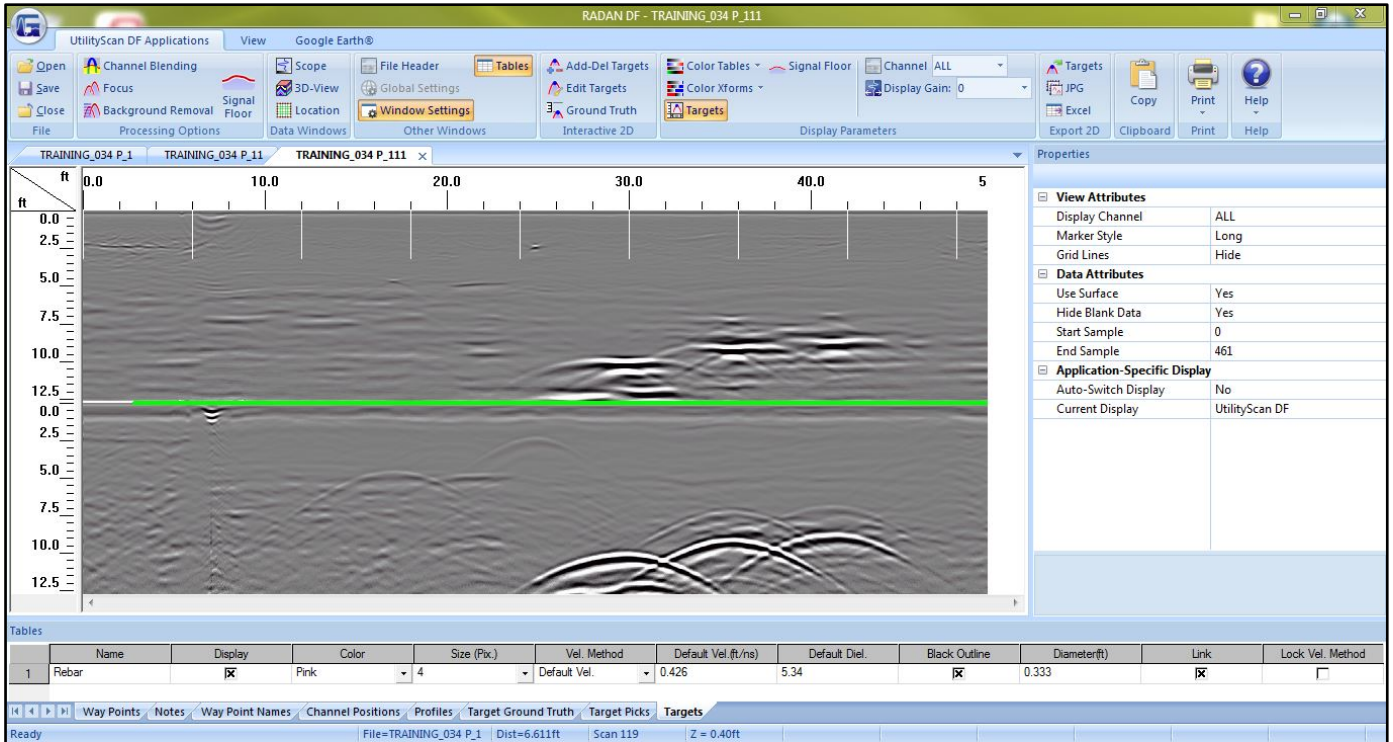
- 2 Press the channel blending button . Channel blending is automatically performed (using 80% of the top channel as the blending point). The blending result is then written to both output channels. The output is a two channel file with identical data in both channels. The output file display will default 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.



- 3** 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.



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



- 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 DF

When a 3D UtilityScan DF 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)
ALL	<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?).

