



SURFACE SYSTEMS & INSTRUMENTS, INC.

Custom Test Equipment • Mobile Technology Solutions • Inertial Profilers • ADA Compliance • FF/FL Testing

California

1845 Industrial Drive
Auburn, California 95603
Telephone: (530) 885-1482
Facsimile: (530) 885-0593

Kansas

307 Plymate Lane
Manhattan, Kansas 66502
Telephone: (785) 539-6305
Facsimile: (415) 358-4340

smoothroad.com

Profiler V3 Operation Manual

CS-8800

Version 3.3.0.2.



Hardware Design & Fabrication

1845 Industrial Drive
Auburn, CA 95603
Tel: (530) 885-1482
Fax: (530) 885-0593

Email: info@smoothroad.com

Sales & Administration

P.O. Box 790
Larkspur, CA 94977
Tel: (415) 383-0570
Fax: (415) 358-4340

Email: info@smoothroad.com

Electronics & Software

307 Plymate Lane
Manhattan, Kansas 66502
Tel: (785) 539-6305
Fax: (785) 539-6210

Email: info@smoothroad.com

Contents

SAFETY.....	1
AVOID EXCESSIVE SPEED	1
CHARGE BATTERIES.....	1
SET UP	1
LASER FRONT ARM	1
BRAKE	1
COMPUTER.....	1
CHARGING THE BATTERY	2
CABLES	2
LIGHTS	2
RUN AS ADMINISTRATOR (WINDOWS 7)	2
RUN AS ADMINISTRATOR (WINDOWS 10)	2
TEXTURE TABLE SETTINGS (SYSTEMS WITH A LASER)	5
UDP SETTINGS SYSTEMS WITH A LASER	6
COLLECT.....	8
OPENING PROFILER SOFTWARE.....	8
HARDWARE DETECTED AND DISCOVERED	8
SYSTEM SETTINGS	8
<i>Inclinometer Sensitivity</i>	8
<i>Front Arm Setting (If Applicable)</i>	9
<i>GPS Settings</i>	9
<i>UDP Settings</i>	10
<i>UDP Advanced Settings</i>	10
<i>Texture Settings</i>	11
CAMERA SETTINGS	11
<i>How to Begin Using the Camera</i>	11
<i>Enabling Camera Settings</i>	12
CALIBRATION.....	12
DISTANCE CALIBRATION	13
HEIGHT CALIBRATION	15
PROFILE SLOPE CALIBRATION (CLOSED LOOP CALIBRATION) - OPTIONAL.....	19
.....	22
GPS REPORTING NOTES	22
CREATE A NEW JOB FOLDER ON THE HARD DRIVE FOR ORGANIZATION	23
COLLECTING DATA.....	23
CLOSED LOOP REQUIREMENTS.....	28
SLOPE COMPENSATION	28
ADD NOTE.....	29
PAUSES.....	29
SAVING THE NEW COLLECTION	30
TEXTURE MEASUREMENT (FOR SYSTEMS WITH LASER ARM)	31
TRANSVERSE PROFILE COLLECTION.....	32
VIEWING TRANSVERSE PROFILES	38
REPORTING.....	38
FILE TAB	38
NEW	38
OPEN	38
OPEN RECENT	39

CLEAR RECENT.....	40
SAVE.....	40
SAVE AS.....	40
EXPORTING.....	41
EXPORT LOCATION.....	41
EXPORTING TO ERD FORMAT	42
<i>Station Extraction.....</i>	42
<i>Filter Settings—High & Low Pass length.....</i>	43
<i>Include Run Up – Run Up Data.....</i>	43
<i>Export Raw Data.....</i>	43
<i>Match Tracks and Choosing Tracks</i>	43
<i>Match Tracks</i>	43
<i>Choosing Tracks</i>	43
<i>Ignore Pauses.....</i>	44
<i>Include Run Up/ Run out.....</i>	44
<i>Export for ProVal.....</i>	44
EXPORTING TO PPF FORMAT.....	44
<i>Station Extraction.....</i>	44
<i>Filter Settings—High & Low Pass Length.....</i>	44
<i>Available Filters:.....</i>	45
<i>Include Run Up and/or Run out Data</i>	45
<i>Match Tracks</i>	45
<i>Ignore Pauses.....</i>	45
<i>Export for ProVal.....</i>	45
EXPORTING TO PRO FORMAT.....	46
<i>General Settings.....</i>	46
<i>Station Extraction.....</i>	46
<i>Filter Settings-High Pass Length.....</i>	46
<i>Export Raw Data.....</i>	46
<i>Match Tracks</i>	46
<i>Handle Pauses By:.....</i>	47
<i>Details</i>	47
EXPORTING TO SURVEY FORMAT	47
<i>Station Extraction.....</i>	47
<i>Filter Settings.....</i>	48
<i>Output Sampling Interval</i>	48
EXPORTING TO EXCEL FORMAT.....	48
<i>Export to Template.....</i>	49
<i>Defects Template.....</i>	49
<i>IRI Template.....</i>	49
<i>PRI Template.....</i>	49
<i>Summary Unmatched.....</i>	49
EXPORTING TO GOOGLE EARTH.....	49
EXPORTING TO GPX FORMAT	50
EXPORTING TO SIDEWALK FORMAT	51
EXPORTING TO LOCALIZED ROUGHNESS.....	51
<i>Specify Station Numbers.....</i>	52
<i>GPS Reporting.....</i>	52
<i>Lane Settings.....</i>	52
<i>Customization</i>	52
<i>Merging.....</i>	53
<i>Export Defect Locations.....</i>	53
PROFAA.....	53
RMS EXPORT.....	53
GIS EXPORT.....	54

EXPORTING RAW DATA	54
EXITING PROGRAM	54
GENERAL SETTINGS	55
CONFIGURATION	55
FILE SETTINGS	55
<i>Default File Type (RSD, RHD).....</i>	55
<i>Default File Location.....</i>	55
<i>Default File Name</i>	55
<i>Creating a New Template</i>	56
<i>User Defined Parameter.....</i>	56
.....	56
<i>Changing the Template Name</i>	56
<i>Adding Parameters to the Template.....</i>	56
ON STARTUP	56
<i>Load Previous File on Startup.....</i>	56
<i>Load Previous File's Settings</i>	56
<i>Use Last File's Parameters</i>	56
<i>Choose from a Previous File (Browse)</i>	56
<i>Set File Parameters after Collection</i>	57
<i>Automatically Refresh Reports.....</i>	57
DATA COLLECTION HARDWARE	57
<i>Search for Hardware on Startup</i>	57
<i>Disconnect Hardware When Changing Tabs.....</i>	57
REPORT GENERATION	57
<i>Generate Reports in Color.....</i>	57
<i>Include the Footer</i>	57
<i>Enable Animations</i>	57
FORMATTING	57
<i>Font Settings.....</i>	57
<i>Image Scaling.....</i>	57
<i>Profiler Software Update.....</i>	57
PROGRAM LANGUAGE	57
ANALYSIS PARAMETERS (RIDE VALUES).....	57
PROFILING UNITS	58
<i>English.....</i>	58
<i>Metric Meters</i>	58
<i>Metric Centimeters.....</i>	58
<i>Metric Millimeters.....</i>	58
<i>Exclude Paused Sections</i>	58
<i>Include Paused Sections.....</i>	58
<i>Paused Sections Only.....</i>	58
SHORTCUT BAR.....	59
EDIT DATA	59
EDIT RUN	59
SAMPLING INTERVAL	59
EDIT SEGMENTS	60
<i>Pause List.....</i>	60
EDIT A PAUSE/EVENT	60
ADD A PAUSE/EVENT	61
<i>Pause Definition.....</i>	61
<i>Start Station.....</i>	61
<i>End Station</i>	61

<i>Pause Notes</i>	61
<i>Pause/Event Buffers</i>	61
CROP DATA.....	61
	62
PROJECT PARAMETERS	62
JOB INFORMATION.....	63
PROJECT	63
ROAD	63
PAVING.....	63
ADDITIONAL.....	63
REPORT MEMO	64
USER DEFINED.....	64
	64
RUN NOTES	64
	64
SETTINGS	65
REPORT CONTENT	65
IMAGE SUMMARY REPORT.....	66
	66
TRACE REPORTS.....	66
CALIBRATION REPORTS	66
<i>Simple Calibration Report</i>	66
<i>Extended Calibration Report</i>	66
TABLES	67
<i>Enable/Disable Reports</i>	67
THEMES/FONTS.....	68
	68
VIEW	68
REPORT	69
<i>Refresh</i>	69
PRINT.....	69
<i>A Connected Local Printer</i>	69
<i>To PDF</i>	69
REPORT OPTIONS.....	70
	70
COLLECT	70
TRACE	70
CHOOSING TRACKS FOR PLOTTING	71
REFRESH	71
PLOT OPTIONS.....	71
<i>Plotter Data Type</i>	71
<i>Apply filters</i>	71
<i>Show Point Labels</i>	71
<i>Enable Secondary Plotter</i>	71
<i>Localized Roughness</i>	71
<i>GPS Lock-On</i>	72

<i>Rendering Mode</i>	72
<i>Grind Sections</i>	72
<i>COM Output</i>	72
<i>Tag Information</i>	72
PRINT.....	73
SAVE.....	73
ZOOM	73
<i>Zoom Previous Icon</i>	73
<i>Zoom Fit Icon</i>	73
<i>Pan/Zoom Mode Icon</i>	74
UNITS FOR HEIGHT AND STATION.....	74
GPS EDITING AND TAGGING	74
ADVANCED TOOLS	74
IMAGES WINDOW	74
GOOGLE MAPS.....	75
<i>Display Current Location on Map</i>	78
<i>Lock on Current Location</i>	78
<i>Directions from Current Location</i>	78
ABOUT	80
MANUAL.....	80
CHECK FOR UPDATES	81
SEND FEEDBACK.....	81
THIRD PARTY COMPONENTS	81
EXITING PROGRAM	81
RECOMMENDED TOOLS	81
CREATE A PERSONAL DEFAULT FILE NAME CONVENTION FOR YOUR PROJECT	81
LOAD ANALYSIS PARAMETERS AND SETTINGS FROM PREVIOUS PROJECTS	82
SET A DEFAULT FILE LOCATION	82
USE HOT KEYS DURING COLLECTION.....	82
TROUBLESHOOTING AND SUPPORT	82
WHEN CONTACTING SSI TECHNICAL SUPPORT	82
ATTAINING PROFILER SOFTWARE AND REPLACEMENT PARTS	82
PANASONIC TOUGHBOOK COMPUTER	82
PAPER SUPPLIES OR PRINTER SERVICING.....	82
IS YOUR SOFTWARE UP TO DATE?	82
DO NOT ATTEMPT TO REPAIR ELECTRONIC COMPONENTS	82
IS YOUR POWER LED ILLUMINATED?	83
HARDWARE NOT FOUND.....	83
EXAMPLE DIAGNOSTICS	83
FAILED HEIGHT VERIFICATION.....	83
LASERS NOT FIRING	83
DISTANCE NOT CORRECT	83
ELECTRIC EYE EVENTS/PAUSE/START/STOP COLLECTION DID NOT WORK	84
GPS NAVIGATION TIMED OUT (MAP POINT, GOOGLE MAPS, TRACE VIEW)	84
THE CAMERA IS NOT TAKING COLOR PICTURES	84

Table of Figures

Figure 1. Pole plug for charging the walking profiler	2
Figure 2. Window for running Profiler as an administrator in Win 7.....	2
Figure 3. Searching for Profiler V3 program file.....	3
Figure 4. Searching for Profiler V3 program file.....	3
Figure 5. Check 'Run as Administrator' in the Short Cut tab	4
Figure 6. Click 'OK' and 'Continue' to run Profiler as Administrator	4
Figure 7. Window for disactivating notification of changes	5
Figure 8. General Settings Window.....	5
Figure 9. Separate Table for Each Run box checked in Texture Table.....	6
Figure 10. UDP settings	6
Figure 11. IP Settings for operator computer.....	7
Figure 12. Texture Setting Window for dot lasers systems.....	7
Figure 13. Main collection window with Systems Setting button highlighted.....	8
Figure 14. Collection settings tab with same value for inclinometer sensitivity.....	9
Figure 15. The GPS Settings	9
Figure 16. UDP Settings window.....	10
Figure 17. UDP Advanced Settings window	10
Figure 18. Texture Settings window.....	11
Figure 19. Camera Settings window.....	11
Figure 20. The Calibration menu appears after the "Calibrate" icon is selected	12
Figure 21. The initial window of the distance calibration	13
Figure 22. Follow instructions to push device	13
Figure 23. Calibration window with front wheel at the end of the track	14
Figure 24. Enter length of calibration track	14
Figure 25. Last window of distance calibration	15
Figure 26. The first window of the height calibration	15
Figure 27. First Step to Height Calibration.....	16
Figure 28. Align wheels and axels with marks on the floor.....	16
Figure 29. The software will briefly flash the "Leveling" window before continuing the calibration.....	17
Figure 30. Turn system around for next step Height Calibration	17
Figure 31. WalkPro device rotated 180.....	18
Figure 32. Window instructing to turn the devices around.....	18
Figure 33. The system turned back to its original position.....	19
Figure 34. Last Height calibration window	19
Figure 35. 1st window of the Profile Slope Calibration.....	20
Figure 36. 2nd window of the Profile Slope Calibration.....	20
Figure 37. Window after device has been pushed 25 ft along a straight calibration path	21
Figure 38. Window indicating operator to come back over the same calibration line	21
Figure 39. Window starting the second half of the closed loop calibration	21
Figure 40. Window at the end of the second half of the calibration routine	22
Figure 41. Calibration window calculating results	22
Figure 42. Last close loop calibration window indication a completed routine.....	23
Figure 43. The main collection window for the walking profiler	23
Figure 44. First window after pressing the "Collect" button.....	24
Figure 45. Collection procedure for a closed loop collection.....	25
Figure 46. Start Collection window.....	25
Figure 47. The collection window.....	25
Figure 48. Window at the end of the first part of the closed loop.....	26
Figure 49. Begin Second Loop window	26
Figure 50. Collection window for second part of closed loop run.....	27
Figure 51. End of Second Loop for Closed Loop Collection	27
Figure 52. Second Loop Length for Closed Loop is invalid.....	28

<i>Figure 53. Prompt to Use Slope Compensation on an Open Loop Collection</i>	29
<i>Figure 54. Saving Options after a collection</i>	30
<i>Figure 55. Windows Explorer to save the collection</i>	30
<i>Figure 56. The diagnostics window</i>	31
<i>Figure 57. Texture setting tab under system setting</i>	32
<i>Figure 58. First Collection window after pressing collect.....</i>	32
<i>Figure 59. Verification window for collecting transverse profiles.....</i>	33
<i>Figure 60. First Collection window for Transverse profiler.....</i>	33
<i>Figure 61. Window indicating input of start station and direction of travel</i>	34
<i>Figure 62. First Collection window after pressing collect.....</i>	34
<i>Figure 63. After pressing "Stop Tranverse". "No" Leads to figure 65, "Yes" to 67</i>	35
<i>Figure 64. Window during collection.....</i>	35
<i>Figure 65. Save run window after pressing "Yes"</i>	36
<i>Figure 66. Collect another profile window after pressing "No" to figure 64</i>	36
<i>Figure 67. Window after selecting "Yes" for collecting another profile</i>	37
<i>Figure 68. Collecting another transverse profile.</i>	37
<i>Figure 69. Transverse profile viewing window.....</i>	38
<i>Figure 70. Opening a data file in the Profiler V3 program</i>	39
<i>Figure 71. The Open Recent feature</i>	39
<i>Figure 72. The clear recent feature</i>	40
<i>Figure 73. Saving a file through Save As in RSD format.....</i>	40
<i>Figure 74. Window for exporting the data into Excel format.....</i>	41
<i>Figure 75. Select location to save the exported file</i>	41
<i>Figure 76. The export type drop down menu</i>	42
<i>Figure 77. The export folder location selection</i>	42
<i>Figure 78. The ERD format export window with match tracks selected.....</i>	42
<i>Figure 79. The ERD export window settings.....</i>	44
<i>Figure 80. The PPF export window</i>	44
<i>Figure 81. Optional settings when exporting in PPF format</i>	45
<i>Figure 82. The PRO format window.....</i>	46
<i>Figure 83. The Details tab contains information about the project</i>	47
<i>Figure 84. The window for exporting in Survey format.....</i>	47
<i>Figure 85. Stationing units dropdown menu and options</i>	48
<i>Figure 86. Exporting the data into Microsoft Excel format</i>	48
<i>Figure 87. The types of excel formats are listed</i>	49
<i>Figure 88. Google Earth export settings</i>	49
<i>Figure 89. Google Earth view on laptop.....</i>	50
<i>Figure 90. The export window for GPX format.....</i>	50
<i>Figure 91. Export to Sidewalk window.....</i>	51
<i>Figure 92. The Localized Roughness export options window</i>	52
<i>Figure 93. The Customize Window</i>	52
<i>Figure 94. ProFAA window</i>	53
<i>Figure 95. RMS export settings</i>	53
<i>Figure 96. GIS export settings</i>	54
<i>Figure 97. Exporting Raw Data Settings</i>	54
<i>Figure 98. Exiting the program- Saving</i>	54
<i>Figure 99. Configuration window under General Settings</i>	55
<i>Figure 100. Custom file naming convention.....</i>	56
<i>Figure 101. Units and rounding section of the General Settings</i>	58
<i>Figure 102. Shortcut bar with all the frequently used windows</i>	59
<i>Figure 103. Edit run information tab</i>	59
<i>Figure 104. Adding or removing pauses from the collection</i>	60
<i>Figure 105. Edit pause and events window.....</i>	60
<i>Figure 106. Add Pause/Event window</i>	61
<i>Figure 107. Crop Data Tool</i>	62
<i>Figure 108. Project Parameters on the Job Information tab</i>	62

<i>Figure 109: Report Memo window.....</i>	64
<i>Figure 110. The user defined window.....</i>	64
<i>Figure 111. The Run Notes window.....</i>	64
<i>Figure 112: Report options window.....</i>	65
<i>Figure 113. Report Content window.....</i>	65
<i>Figure 114: Image Summary Report options under Report Content.....</i>	66
<i>Figure 115. Calibration Report options.....</i>	66
<i>Figure 116. The Table options in Report Settings.</i>	67
<i>Figure 117. Enable/Disable Reports window</i>	67
<i>Figure 118. Themes and Fonts option under Appearance settings.....</i>	68
<i>Figure 119. Summary header for single trace report.....</i>	68
<i>Figure 120. Printing Options Window.....</i>	69
<i>Figure 121. Drop-down menu for the report options</i>	70
<i>Figure 122: An example of the profile trace.....</i>	70
<i>Figure 123. The plotter options window.</i>	71
<i>Figure 124: Static Tagging Feature.....</i>	72
<i>Figure 125. Print window after the print icon is selected.....</i>	73
<i>Figure 126. Advanced Tools Images window with an image loaded.....</i>	74
<i>Figure 127. Google Maps Initial Screen</i>	75
<i>Figure 128. Google Maps Jump to Overlay</i>	76
<i>Figure 129. Google Maps after Jump to Overlay.....</i>	76
<i>Figure 130. Google Maps Overlay zoomed in with pin clicked for information.....</i>	77
<i>Figure 131. Google Maps Settings: Path Display Type.....</i>	77
<i>Figure 132. Google Maps Settings: Edit Pins.....</i>	78
<i>Figure 133. Google Maps Navigation.....</i>	79
<i>Figure 134. KML export in ArcGIS Earth.....</i>	79
<i>Figure 135: About Window.....</i>	80
<i>Figure 136. Exiting Program window, chose 'Yes' to save changes, 'No' or 'Cancel'.....</i>	81

Safety

Turn on headlights when profiling to alert other drivers and co-workers of your presence. Road profilers are precision instruments, handle with care. Improper maintenance and use will reduce system life and collection accuracy.

Avoid Excessive Speed

The optimal WalkPro collection speeds are below one foot per second. Exceeding this threshold will create varying elevations when compared against the true profile. The operator can choose the operational speed by adjusting the warning speed on the speedometer. When the warning speed is exceeded the computer will beep.

It is recommended that the WalkPro not collect data over 4 feet per second (1.2 meters/second).

Charge Batteries

Fully charge the walking profiler battery before each use. The walking profiler battery will last for a much longer duration if the walking profiler is not also charging the Toughbook. To extend the profiling period, have an extra fully charged Toughbook battery to be exchanged with the operating computer's battery when the original Toughbook battery becomes low on power.

Avoid over-discharge of the lithium-ion battery and premature degradation of the battery. Charge the WalkPro battery periodically to prevent over-discharge. During long storage periods the temperature should remain within the thresholds of $20 \pm 5^{\circ}\text{C}$, Humidity 45-85%. Keep battery 40-60% charged during the periods of storage.

Set Up

Laser Front Arm

The laser front arm should be installed at the recommended measurement height of 12 inches for the Gocator 2342. This height is measured from the bottom of the laser to the measurement surface. When the laser is within its measurement range the "Range" LED will be illuminated.

If using the laser front arm assure that the front arm type is correct under Collect>System Settings.

Brake

The brake is located at the rear of the WalkPro and acts on the left rear wheel. This is the wheel that is attached to the distance encoder. Be cautious to never push the WalkPro while the brake is engaged. The rubber of the rear wheel can be damaged in this way. If the damage is severe, it can affect the quality of the profiling data.

Computer

Always charge the operating computer so that the profiling time is not limited by battery power. If possible keep an extra charged battery to exchange with the original one to extend battery life. The operating computer may be charged by the WalkPro; however, the battery charge of the WalkPro will be depleted in a shorter amount of time.

Charging the Battery

To charge the WalkPro insert the leads into their corresponding ports on the rear of the WalkPro (The power unit/cable comes with the CS8800). An LED light bar on the rear top of the system will indicate the amount of charge. When the battery is fully charged, all the LED bars will be full.



Figure 1. Pole plug for charging the walking profiler

Cables

The walking profiler has cables for the 9-pin data cable (which can also be a USB cable on some models), power cable for the Toughbook and an ethernet cable for front arm laser models. The Toughbook power cable does not need to be connected to collect. If the Toughbook power cable is connected, the battery life of the walking profiler will be reduced.

Lights

The lights on the WalkPro are turned on by flipping the switch on the housing of the WalkPro. The lights can only turn on when the power switch is in the on position.

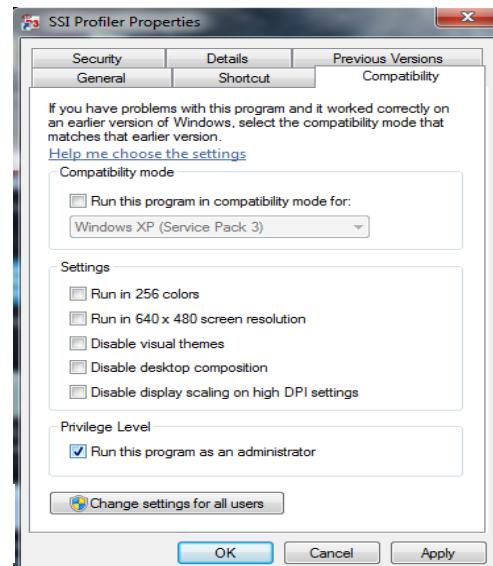


Figure 2. Window for running Profiler as an administrator in Win 7

Run as Administrator (Windows 10)

Front arm laser models with ethernet connection require Profiler to be run as Administrator. Right click on the Profiler V3 icon 'P3', go to More>Open File Location.

Right click on SSI Profiler shortcut, go to properties

In Shortcut tab go to Advanced... Check 'Run as Administrator' and then 'ok'.

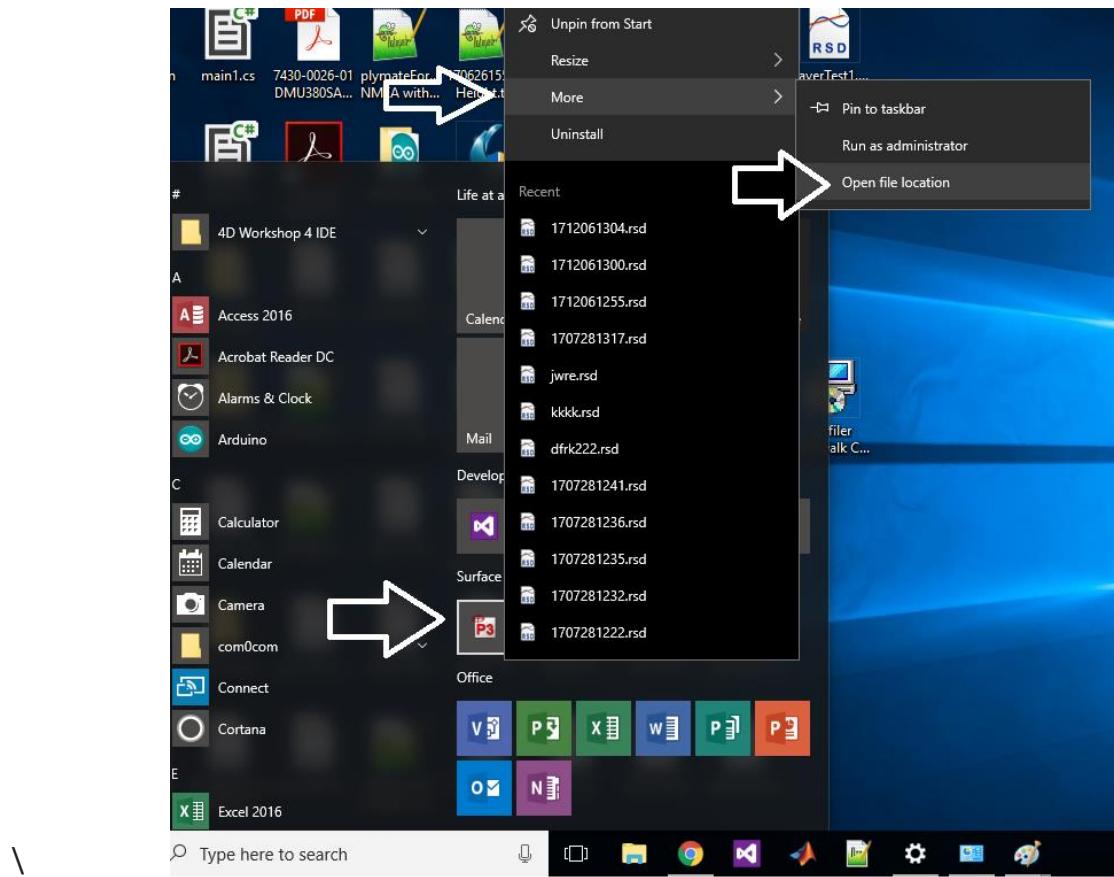


Figure 3. Searching for Profiler V3 program file

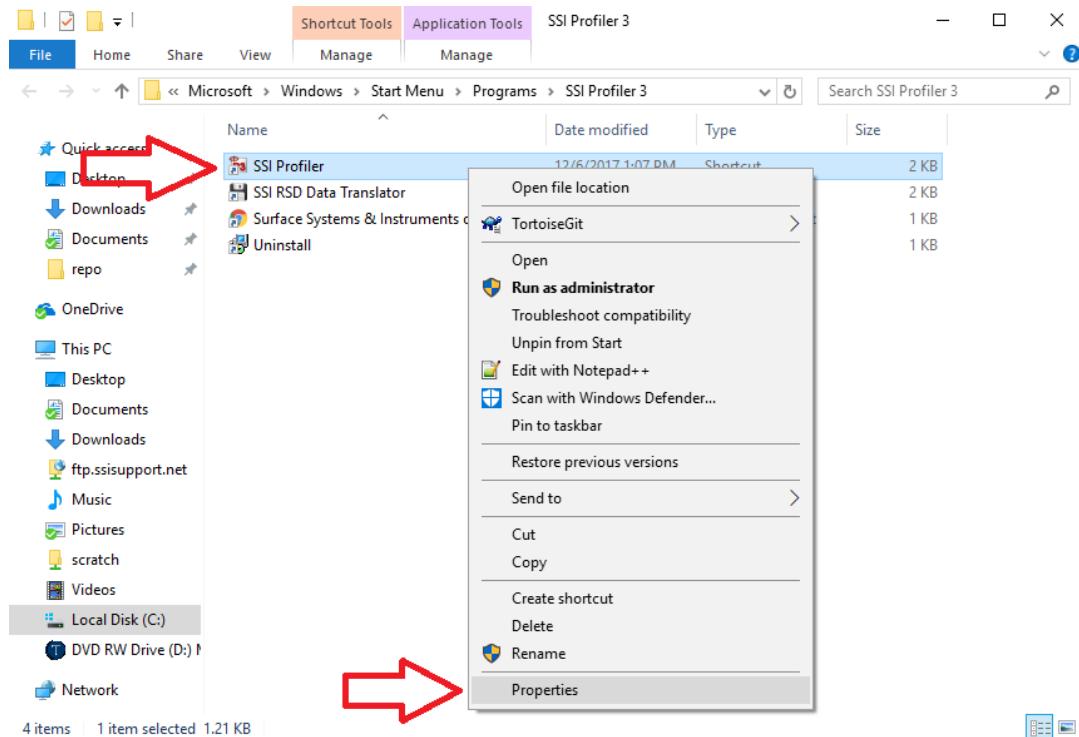


Figure 4. Searching for Profiler V3 program file

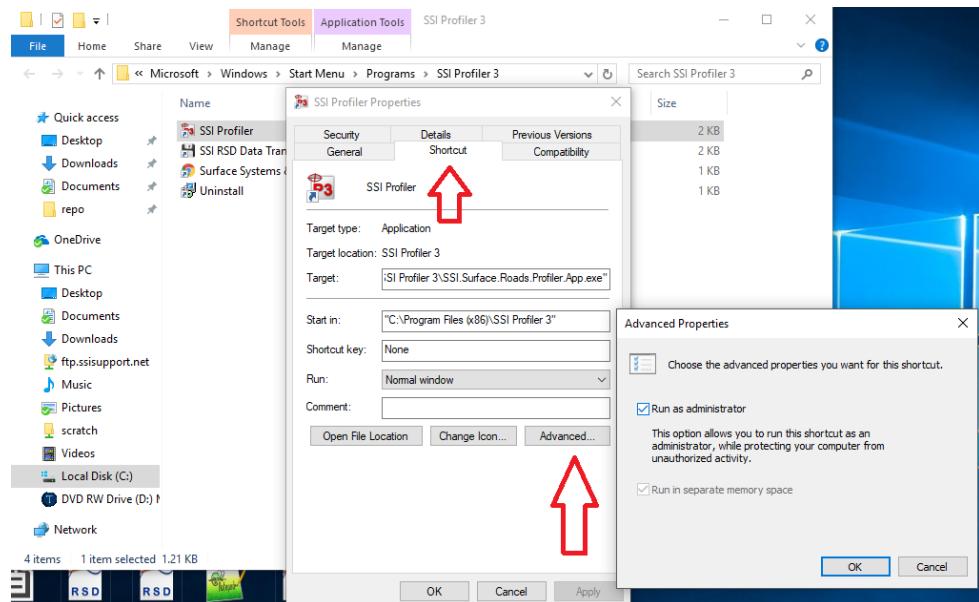


Figure 5. Check ‘Run as Administrator’ in the Short Cut tab

Click ‘Continue’, in Access Denied window for Profiler to run as Administrator every time opened.

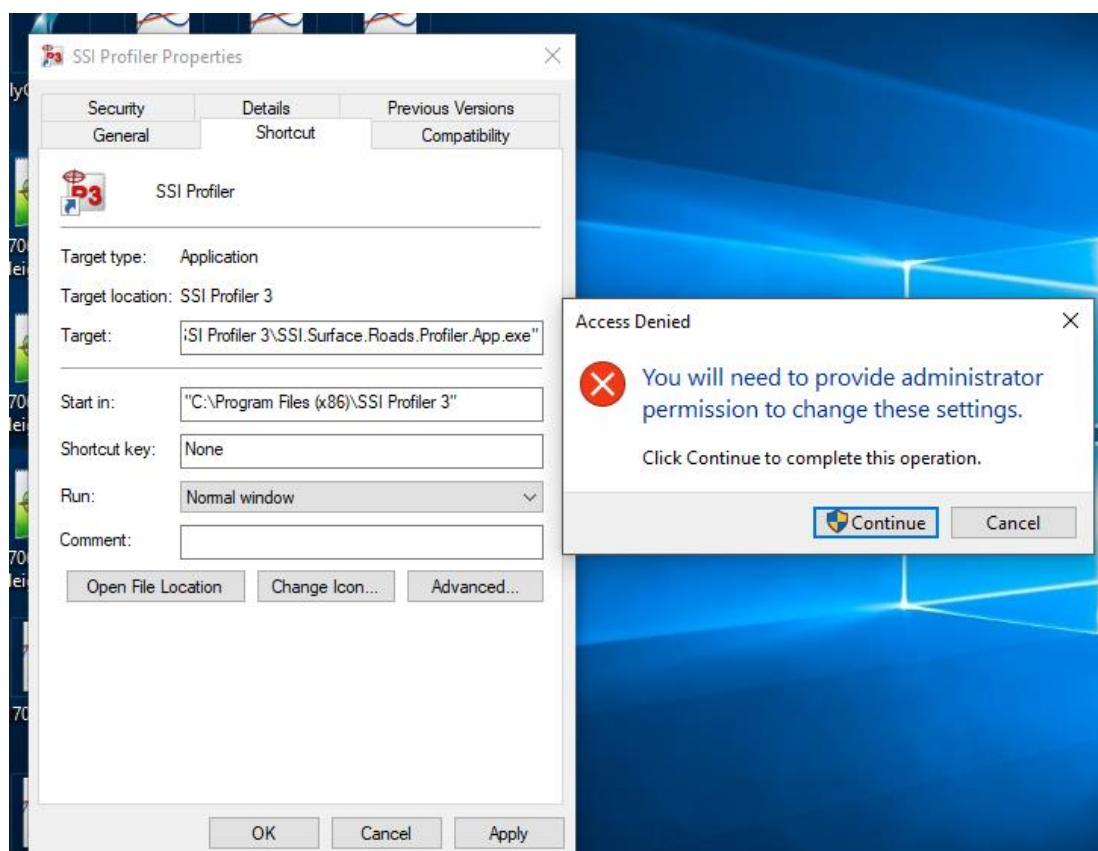


Figure 6. Click ‘OK’ and ‘Continue’ to run Profiler as Administrator

After setting Profiler V3 to run as Administrator, a popup will appear every time you open the program. To get rid of the popup search "user account control" and set to "never notify" (this is Optional)

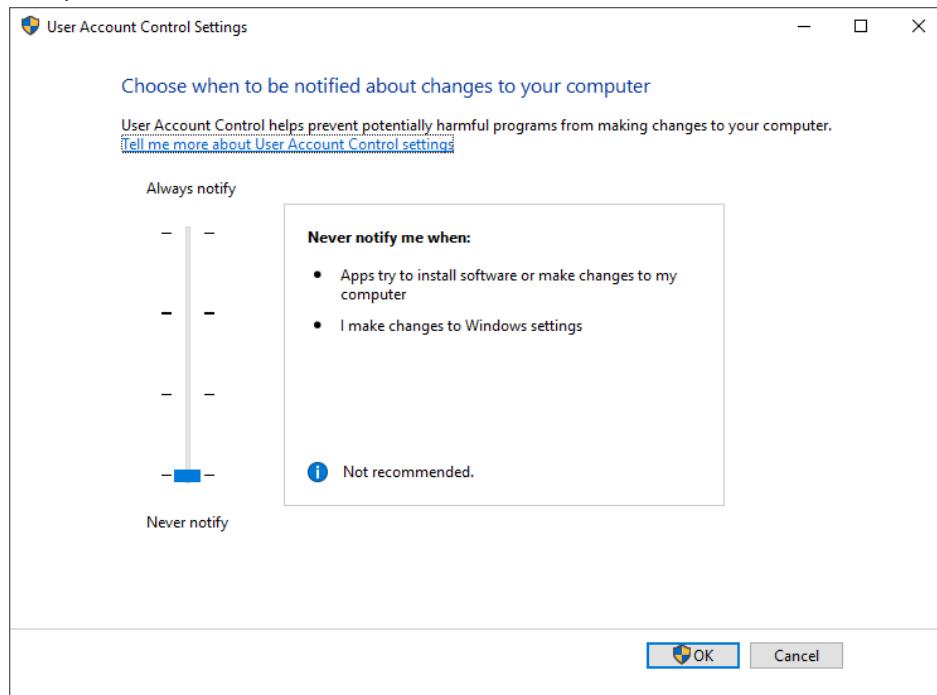


Figure 7. Window for disactivating notification of changes

Note: The settings.xml file goes in C:\Users\SSI PROFILER\AppData\Roaming\SSI\SSI.Surface.Roads.UDP.LaserRec

Texture Table Settings (Systems with a Laser)

It's recommended when using the texture table to change the decimal places to around 6. Go to Report Engin>Settings>General and change it to 6.

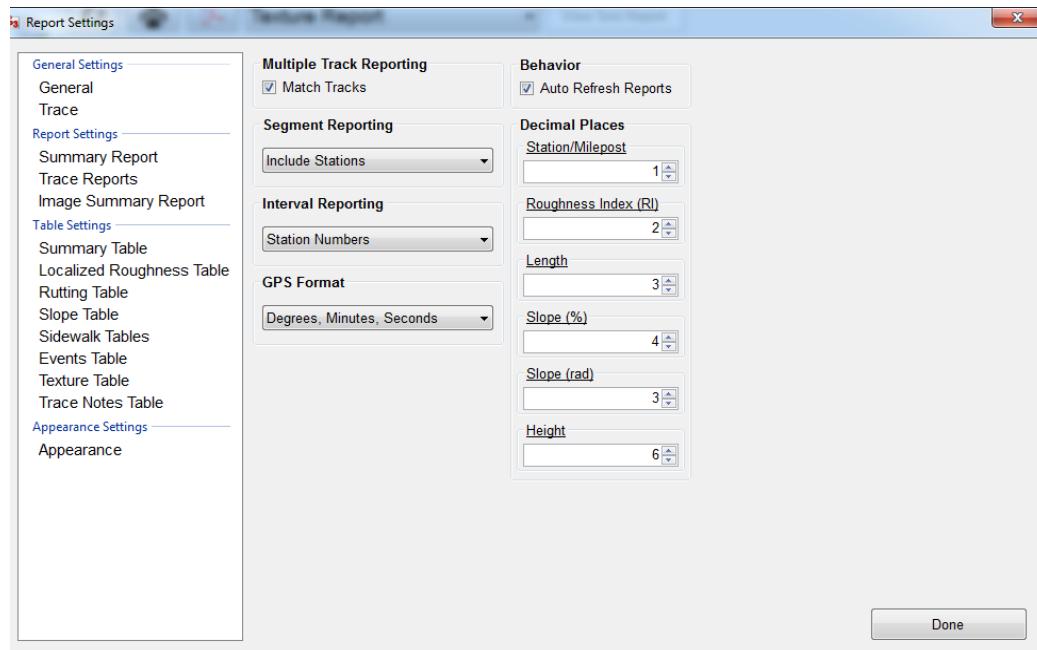


Figure 8. General Settings Window

After changing the decimal places, click on “Texture Table” and check the “Separate Table for Each Run” check box.

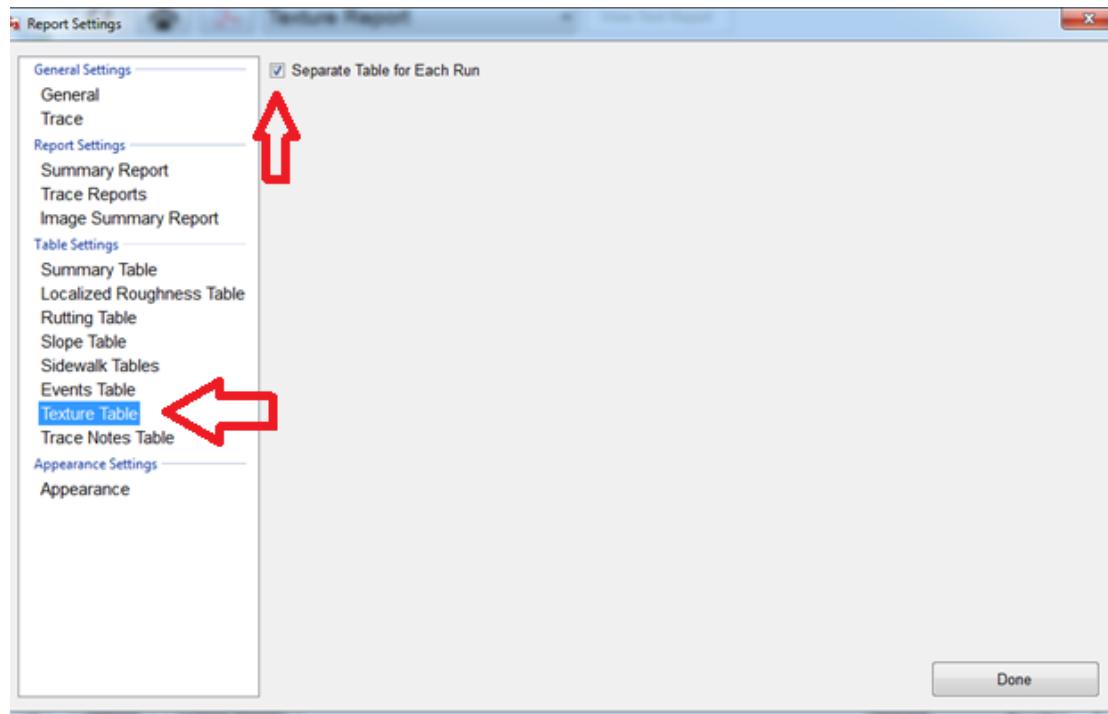


Figure 9. Separate Table for Each Run box checked in Texture Table

UDP Settings Systems with a Laser

For WalkPro systems with a laser, make sure that it has the IP address 192.168.1.10. This change can be made under System Settings>UDP Settings>Advanced Settings. Make sure all the settings are the same as in figure 10.

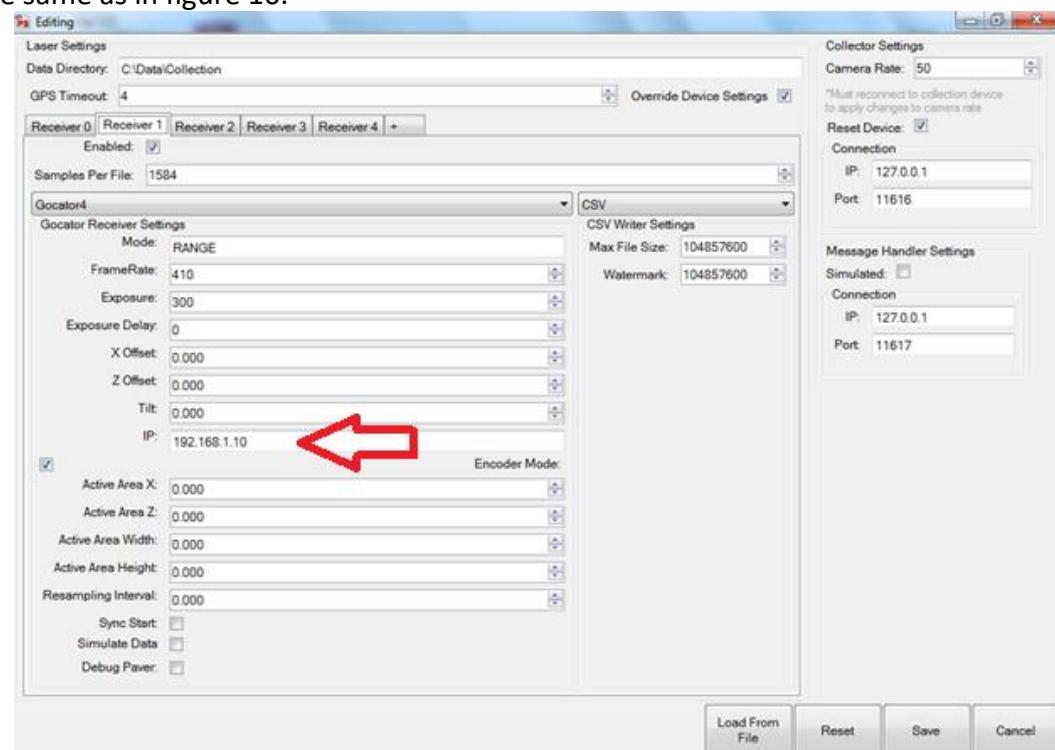


Figure 10. UDP settings

Toughbook operator computers should already be set up with the correct IP address. In any case this can be done ‘Local Area Connection Properties’.

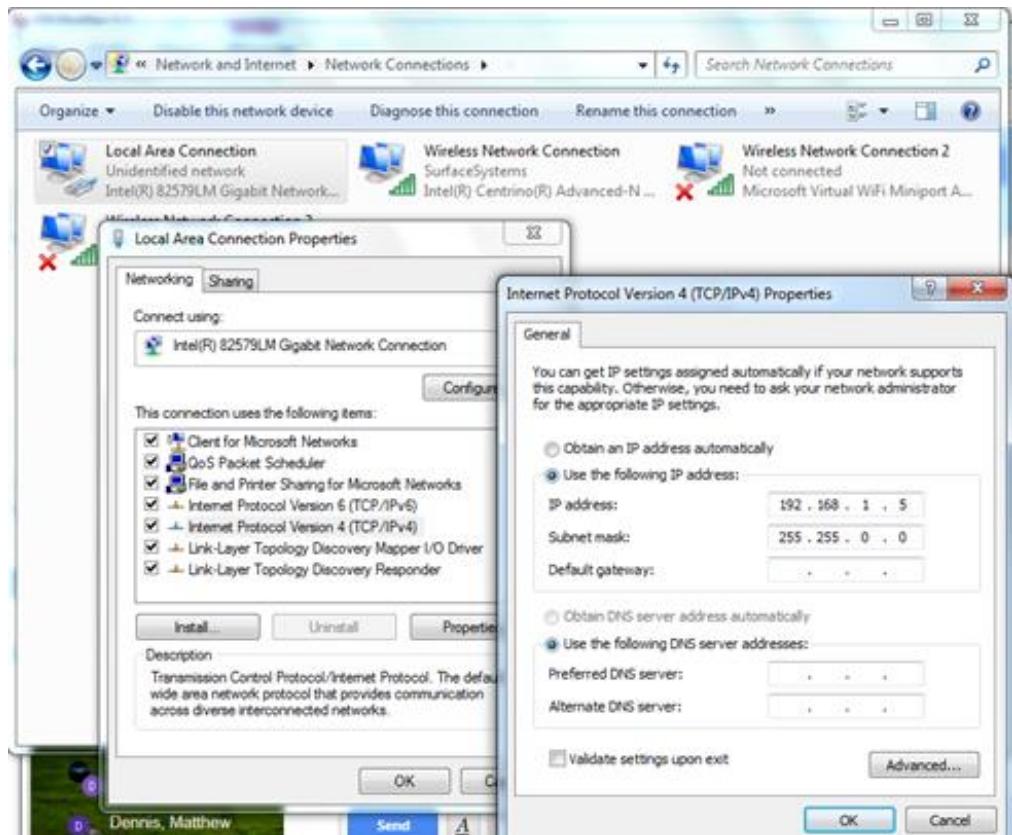
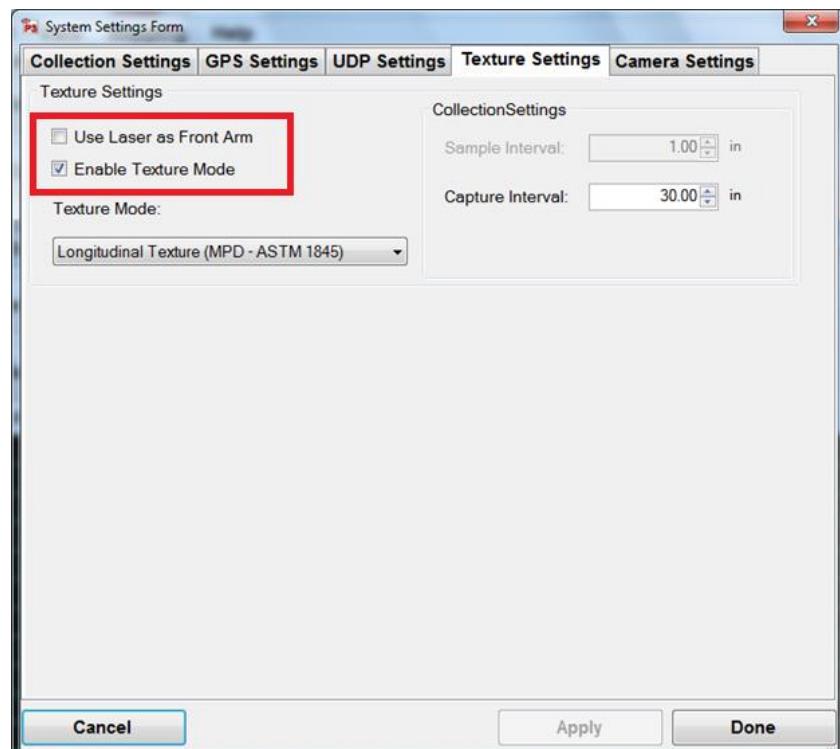


Figure 11. IP Settings for operator computer

Dot lasers only work with Longitudinal Texture mode. Go to System Settings>Texture settings and check the “Enable Texture Mode” box. Do not enable the “Use Laser as Front Arm” box.

Figure 12. Texture Setting Window for dot lasers systems



Collect

Opening Profiler Software

Open the Profiler software by selecting the Profiler icon on the desktop, or through the folder destination of MyComputer>C:\ProgramFiles\SSIProfiler3 and selecting the ‘SSI.Surface.Roads.Profiler.App.exe’ file. The software will only detect the hardware if the electronics are powered on and the computer is connected to the device through the DB-9 serial port or the proper USB cable.

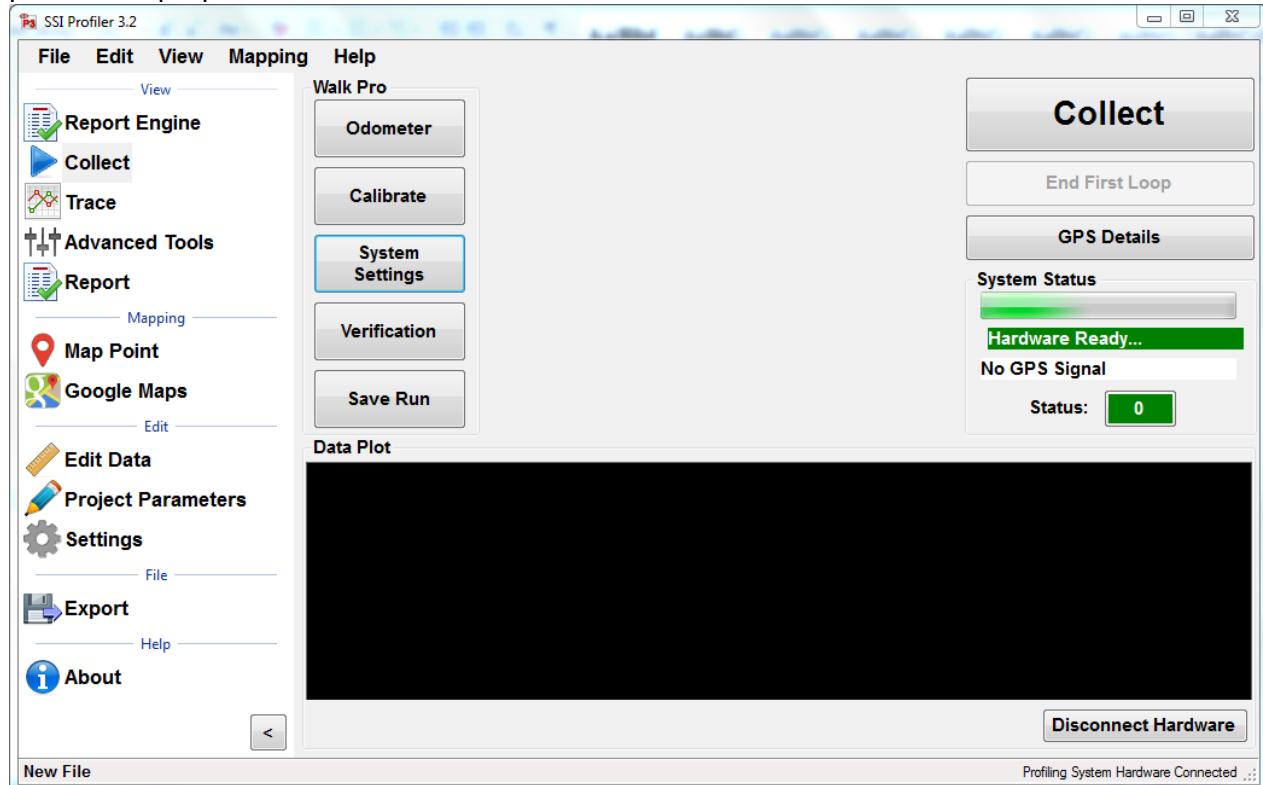


Figure 13. Main collection window with Systems Setting button highlighted

Hardware Detected and Discovered

Once hardware is properly connected and set up, the Profiler program will recognize the hardware once the Collect window is opened. When the hardware is found, “Profiling System Hardware Connected” will be displayed at the bottom right corner of the window.

System Settings

Inclinometer Sensitivity

Under System setting there are text boxes to enter the inclinometer sensitivity. Before performing the height calibration make sure the inclinometer sensitivity is set up correctly. Enter the same number in Channel 0 and Channel 1 for the CS8800. For the CS8850 Sidewalk Profiler there are different numbers for each channel. You can find your inclinometer sensitivity from the documentation provided by your SSI Representative. The inclinometer sensitivity is based on the scaling factor of the inclinometer.

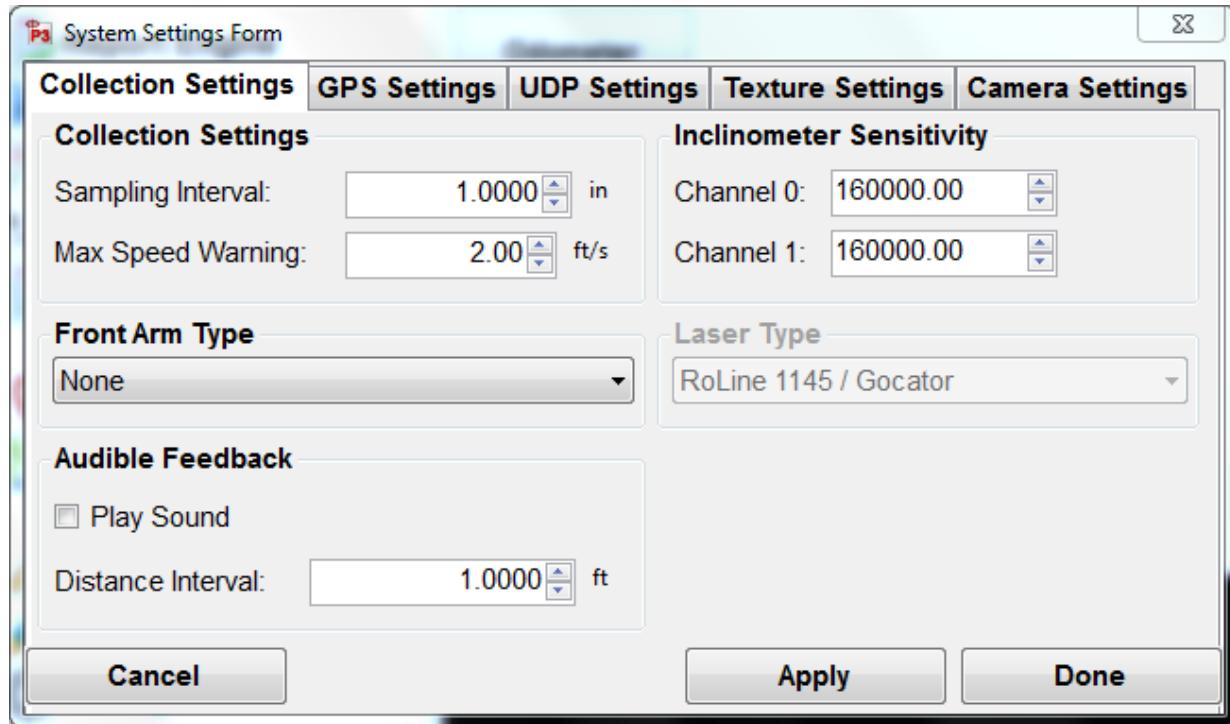


Figure 14. Collection settings tab with same value for inclinometer sensitivity

The sampling interval should be set at one inch unless directed by a SSI Representative. The one-inch sampling interval allows the CS8800 to be a Class I profiler for use in comparison with high speed inertial systems.

The maximum speed warning can be adjusted based on the type of work being collected. As the collection speed increases the accuracy of the system decreases. For optimal results, collect data at one to 1.2 foot per second. Do not exceed two feet per second.

Front Arm Setting (If Applicable)

Depending on the type of front arm the operator should set the type of front arm being used. The parameters will be entered in the Collect window under System Settings and Collection Settings. There are no calibrations for the laser front arm.

GPS Settings

The CS8800 operator can select the type of GPS string to display in the Collect Window, and enter the parameters of the GPS antenna location for more accurate GPS positioning. The minimum GPS sampling can be set to the default value of 0.00 for the maximum amount of samples.

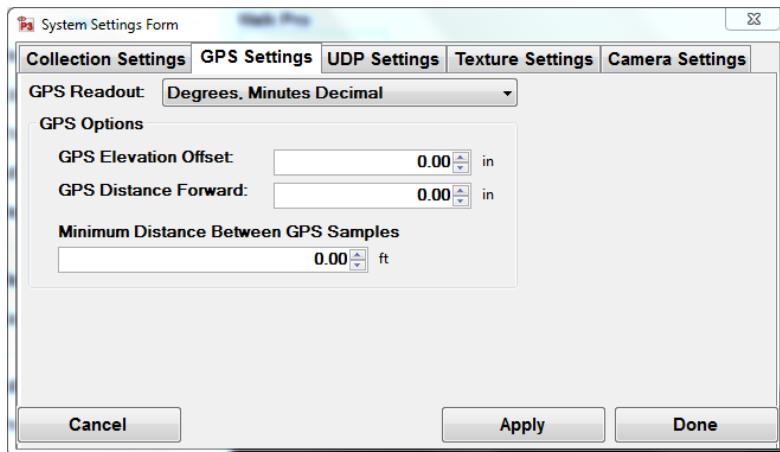


Figure 15. The GPS Settings

UDP Settings

Choose the appropriate UDP setting according to the configuration of your system. For devices with a front arm laser, use “The Advanced setting” to configure the particular laser.

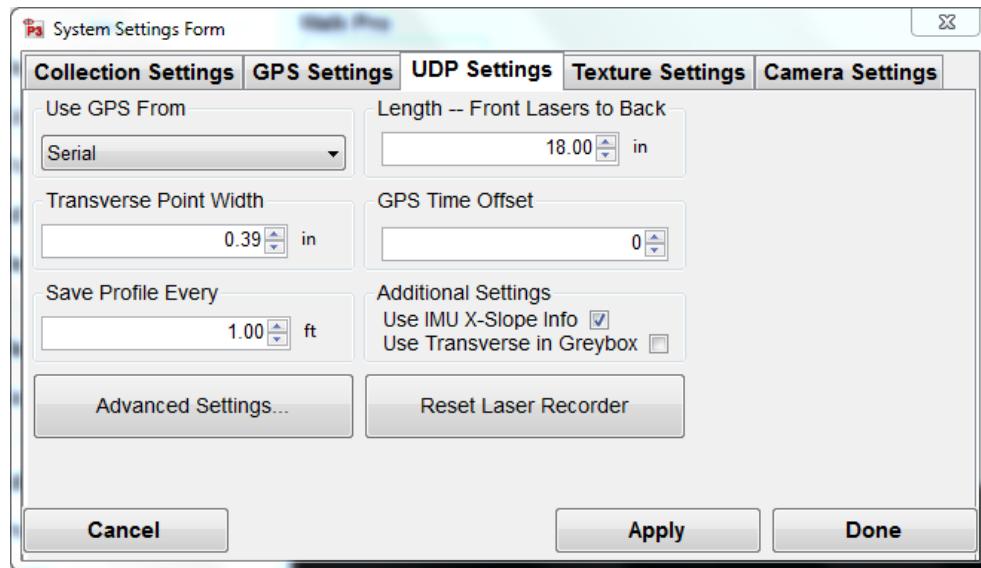


Figure 16. UDP Settings window

UDP Advanced Settings

Under Advanced Setting, make sure to follow the below image. The tab for “Receiver 0” should be active and enabled. Make sure to select “Gocator 4” above the Gocator Receiver Settings and take particular care in copying the correct inputs for Mode, FrameRate, Exposure, and the IP address.

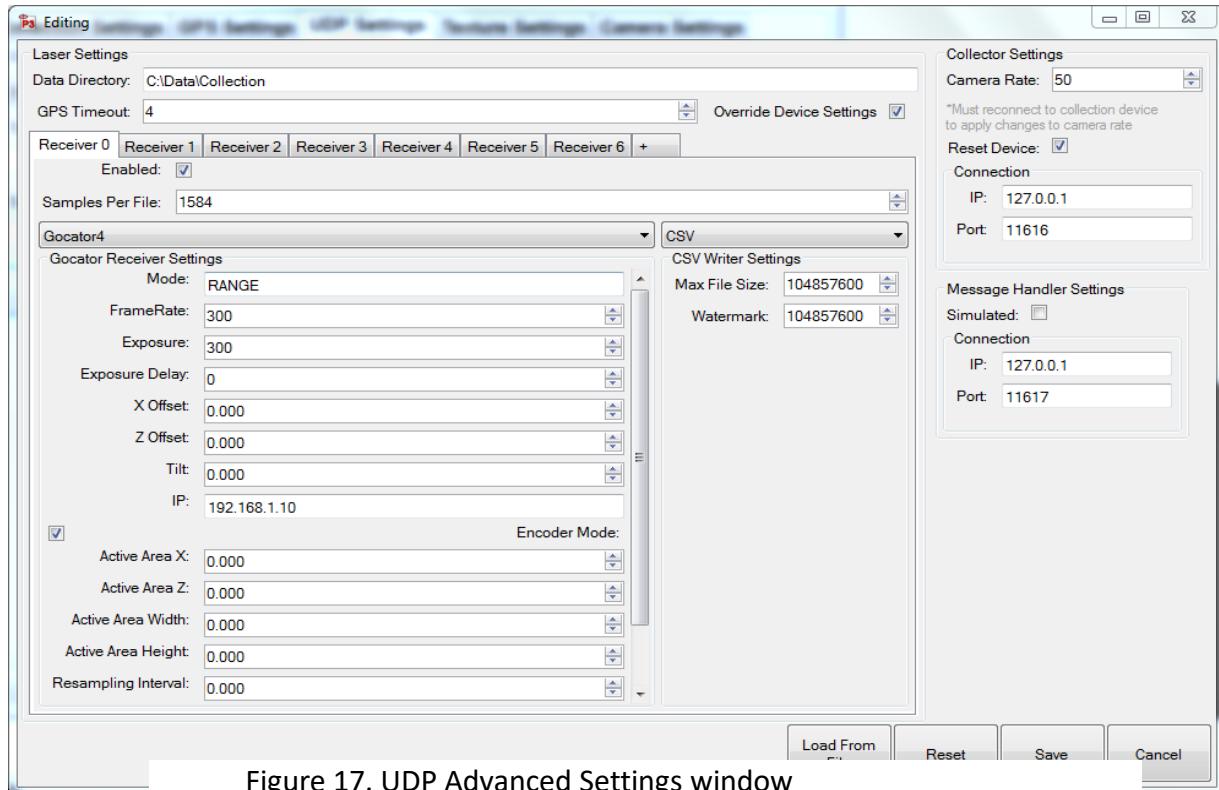


Figure 17. UDP Advanced Settings window

Texture Settings

Under the Texture Setting window, make sure to select the “Enable Texture Mode” checkbox. SSI recommends the Texture Mode set to “3d Mode” for most applications.

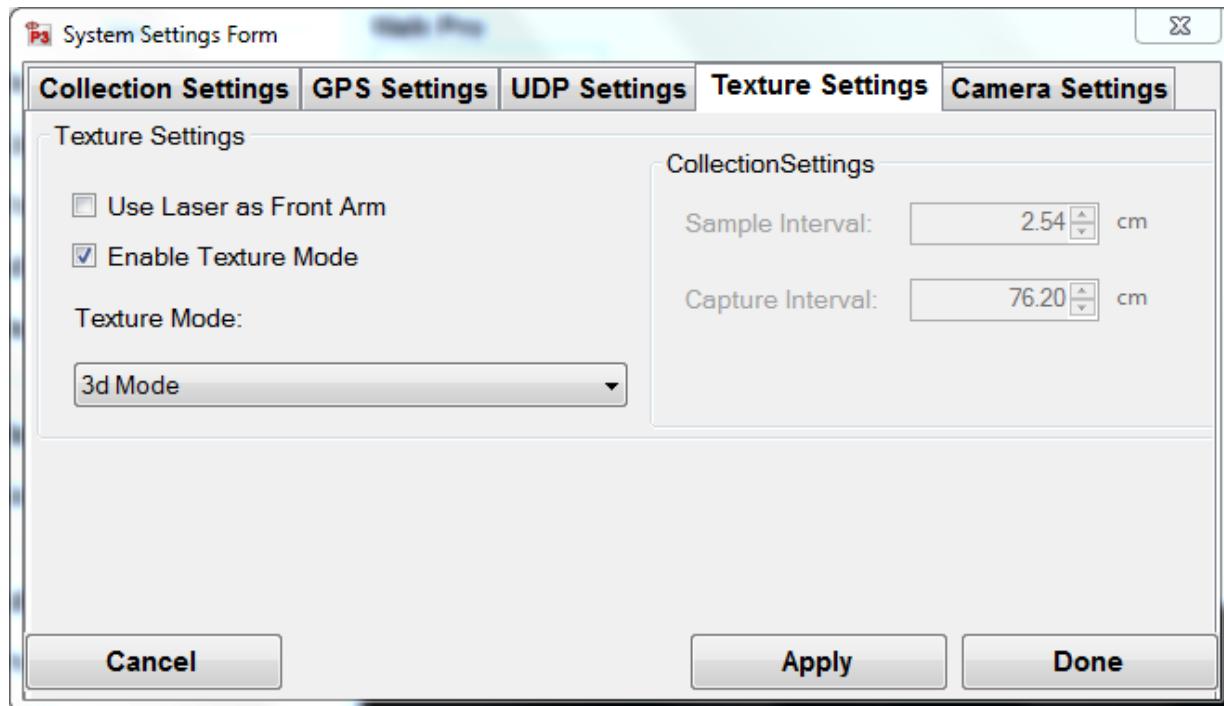


Figure 18. Texture Settings window

Camera Settings

How to Begin Using the Camera

Install the Flycap2Viewer driver located on the disk supplied by SSI (or already installed on the computer). The correct driver depends on if the computer is 32 or 64 bit. To check this, open the start menu and right click on My Computer (or My PC) and choose ‘Properties’. On this window find the System Type and view if the

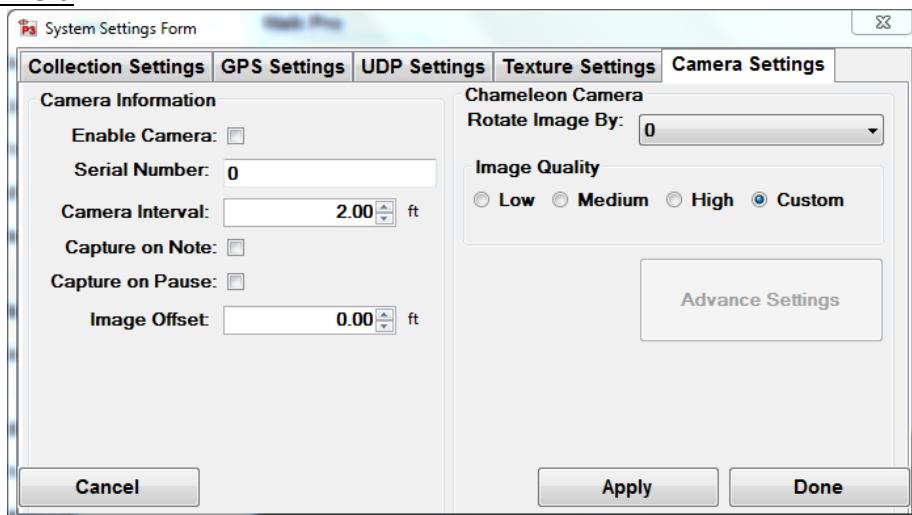


Figure 19. Camera Settings window

system is 32 or 64 bit. If the computer is 32-bit, install the x86 flycap2viewer. If the system is 64-bit, install the x64 flycap2viewer. Once the driver is installed, plug in the Chameleon Camera to the computer’s USB port and the camera’s back cover. The computer will sound two pings and install the driver software for the camera. Once finished, a notification window will appear in the bottom right of the screen to say that a Chameleon camera is connected. Now the camera can be enabled in the Profiler V3 program.

Enabling Camera Settings

Once the profiling system is connected and the Collect tab is open, the operator can enable the camera. At this time make sure the flycap2viewer driver is installed and the camera is connected. Open the collect window and once the hardware is found, select System Settings. Under the system settings window, select the Camera Settings tab. To enable the camera feature, select the check box under the Camera Settings Tab. The camera interval is the distance between each picture. This can be set to any interval, however, the more pictures taken results in more data saved to the file and more time that post-processing will take. If the camera is not mounted upright, enter the correct rotation angle in degrees, selecting one of the four options. The camera is focused on the physical lens. Enter the serial number of the camera which is on the sticker on the back panel of the camera. Once apply is selected the camera will be found in under one minute for the first use. Once the settings are saved, the serial number will fade out.

If the camera image preview is not in color: Under Collect Window > System Settings > Advanced Camera Settings > Standard Video Mode, select the button for the resolution and pixel type to be Y8 and 1280 x 960. The frame rate should be at 15 Hz. This will make the camera take color pictures (as seen in the preview window also). Also make sure that the pixel type is Raw 8 and the mode is '0' under the custom video modes tab.

The image preview should appear in the Collect window in color and at the correct orientation. If not, change the settings to the appropriate orientation or open the Advanced Settings.

To reduce the size of the image, change the resolution of the camera medium or low. This will decrease the processing time and RSD file size. The Advanced Options can be changed by the user under Custom Mode.

Calibration

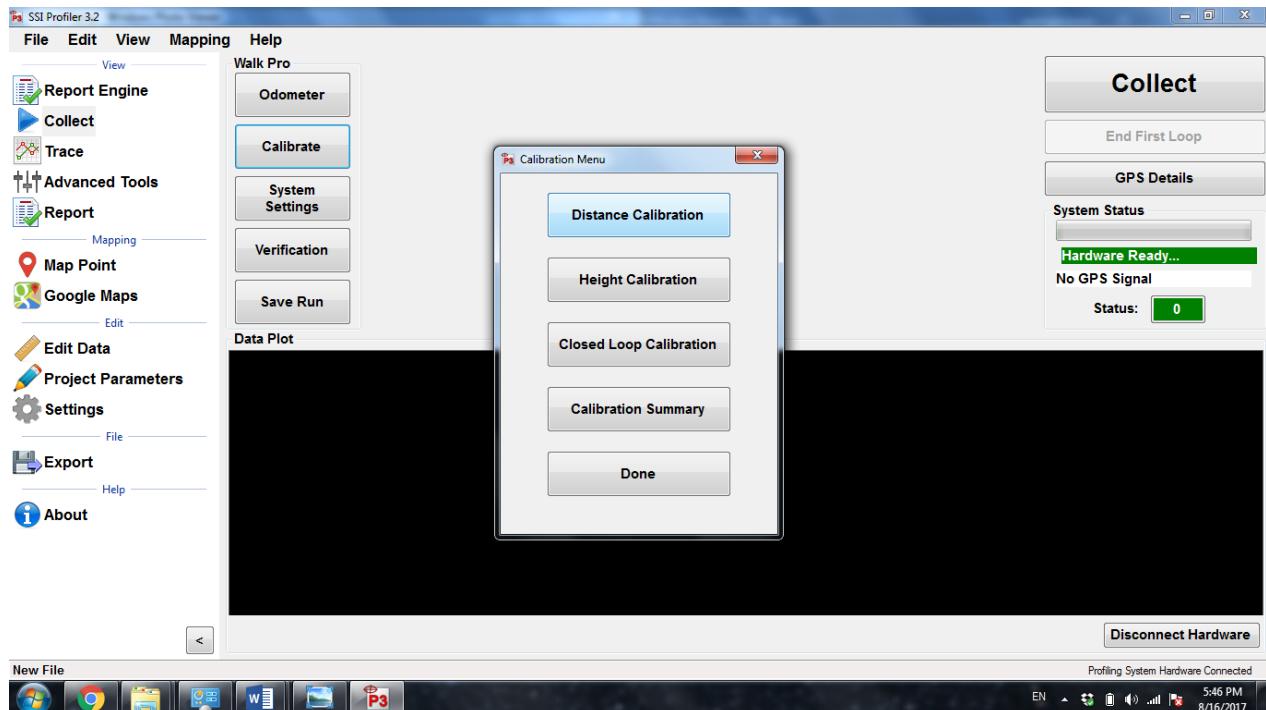


Figure 20. The Calibration menu appears after the “Calibrate” icon is selected

Distance Calibration

Prepare a test track by measuring out 528 ft (160 meters) with a rolling wheel measuring device in a marked and straight path. Once the test track is prepared, start the calibration procedures through the Calibrate icon in the Collect window. Select Distance Calibration and follow the steps precisely to complete a successful calibration.

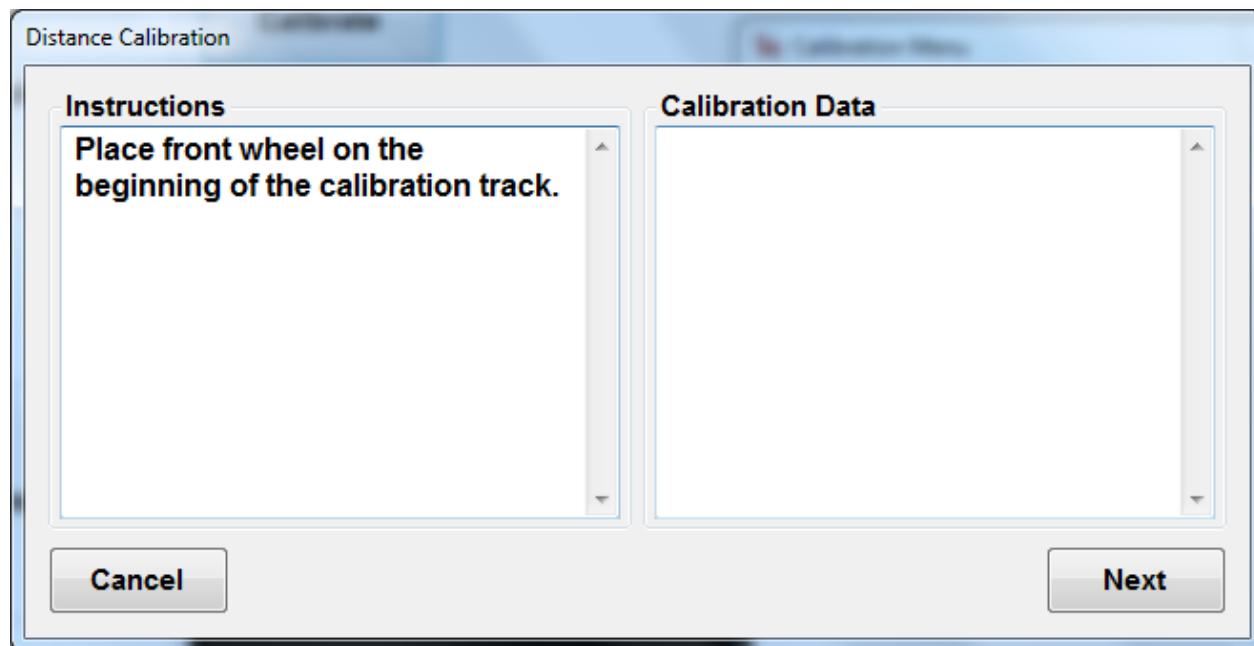


Figure 21. The initial window of the distance calibration

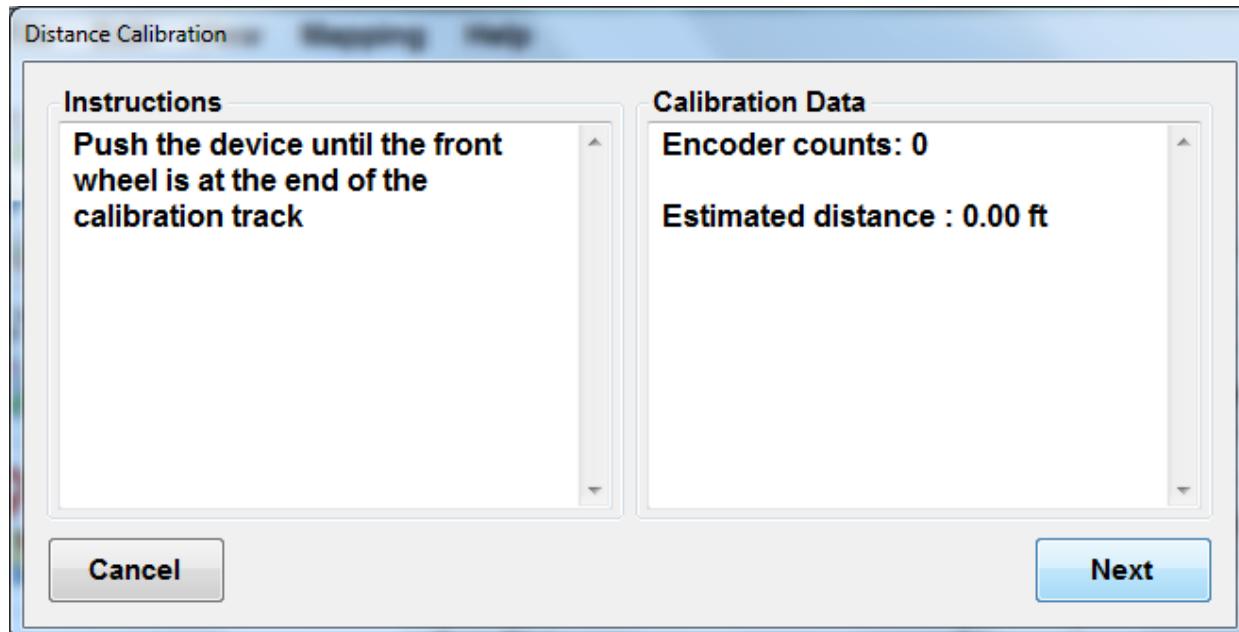


Figure 22. Follow instructions to push device

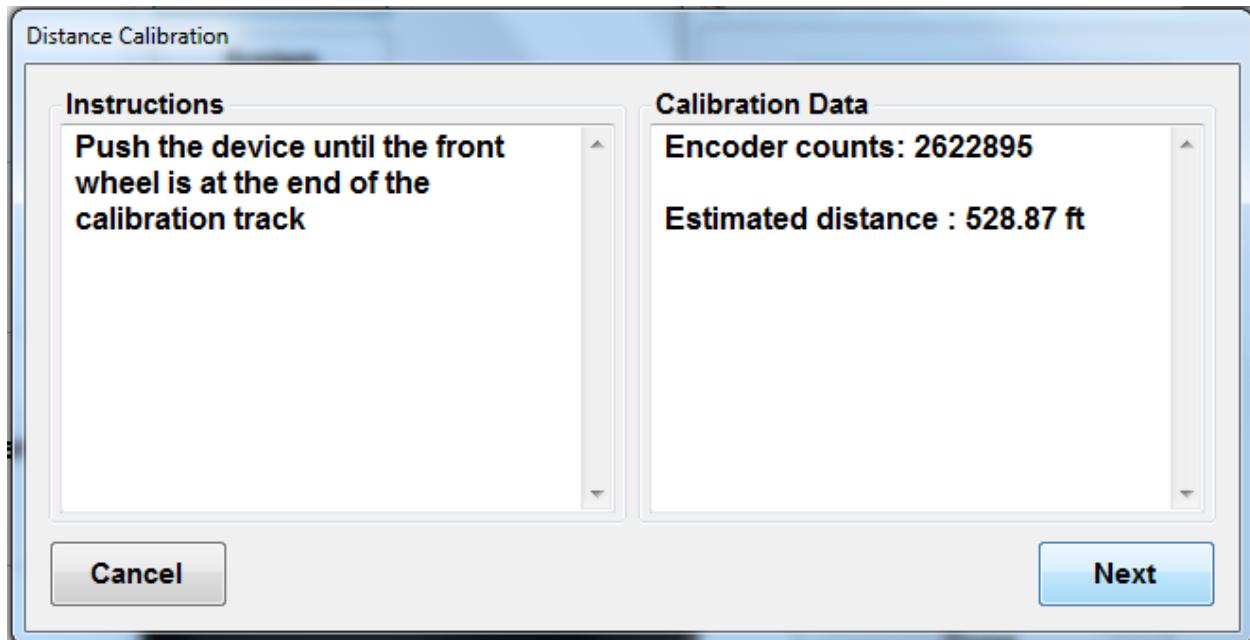


Figure 23. Calibration window with front wheel at the end of the track

The estimated distance can be ignored. It will be overwritten at the end of the procedure.

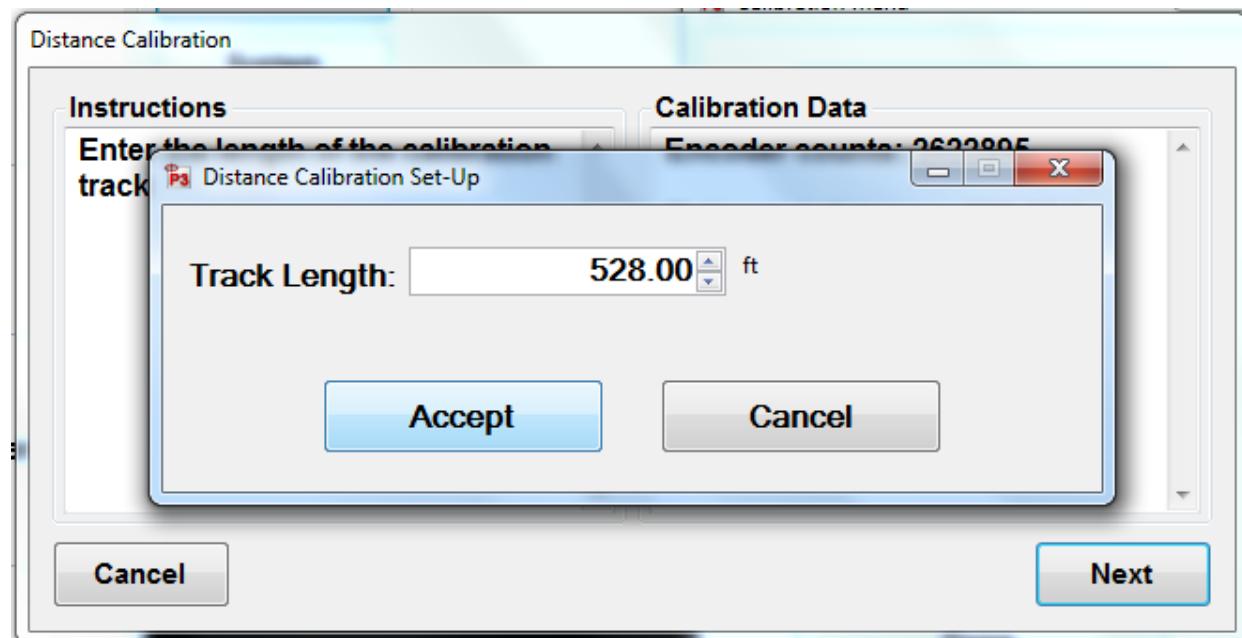


Figure 24. Enter length of calibration track

The units can be changed by clicking on the feet (ft) and choosing the appropriate units. After the length of the track has been entered, select Next.

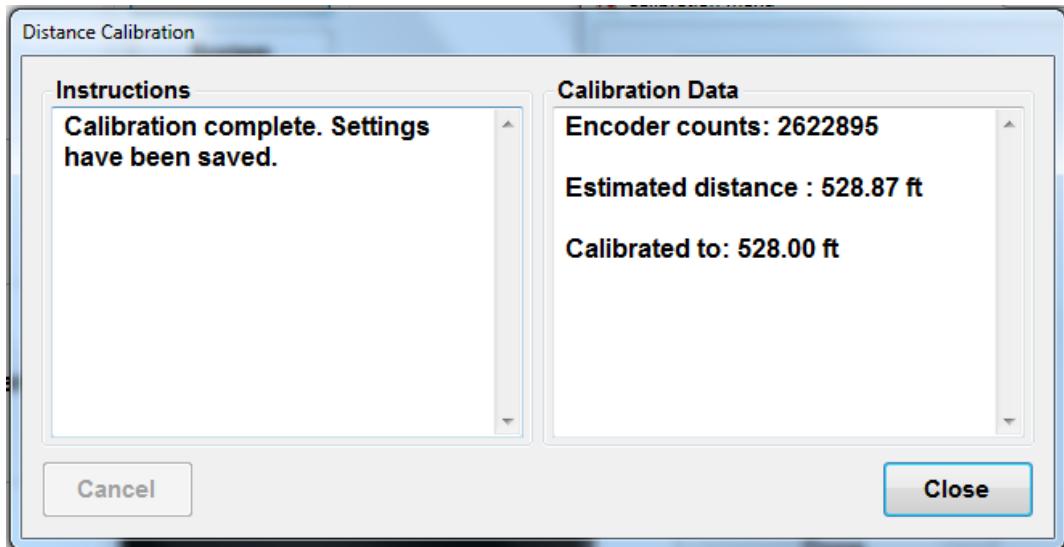


Figure 25. Last window of distance calibration

Height Calibration

Before performing the height calibration make sure the inclinometer sensitivity is set up correctly under System Settings. Enter the same number in Channel 0 and Channel 1. You can find your inclinometer sensitivity from documentation from your SSI Representative. The inclinometer sensitivity is based on the scaling factor of the inclinometer.

To perform a height calibration, the walking profiler needs to be placed on a level surface. Mark the locations of the main wheels on the ground and begin the calibration process. These wheels do not move along the body of the walking profiler, so they are a good reference point. While the inclinometer is calibrating, do not touch or move the walking profiler.

Once the first step is complete, rotate the walking profiler 180 degrees so that the wheels switch positions and resume the calibrations. Last, return the device to its initial position on the marks. These steps are listed in the procedures while performing the height calibration. Follow the images and instructions below.

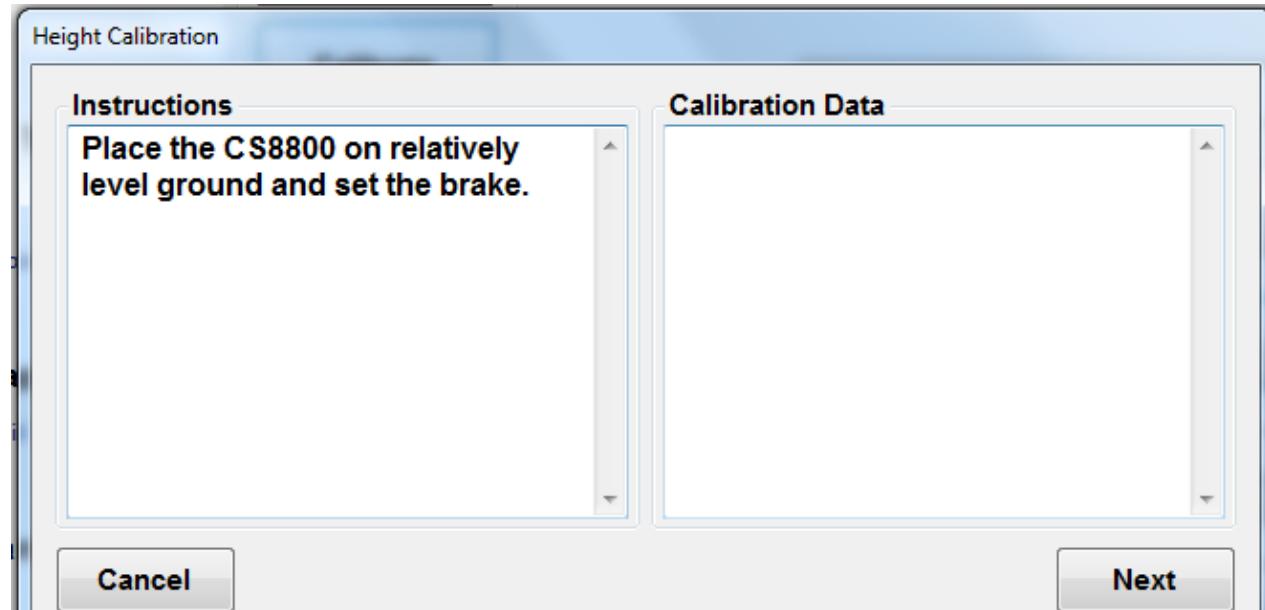


Figure 26. The first window of the height calibration

The position of the wheels must be marked in a manner similar to the image. To begin the calibration, the surface must be close to level.

Figure 27. First Step to Height Calibration



Make sure the wheel's axels align with the markings on the floor by looking from above down at the axel. Look that the axels align with both marking, and that the wheels are exactly above the intersecting points of the markings.



Figure 28. Align wheels and axels with marks on the floor

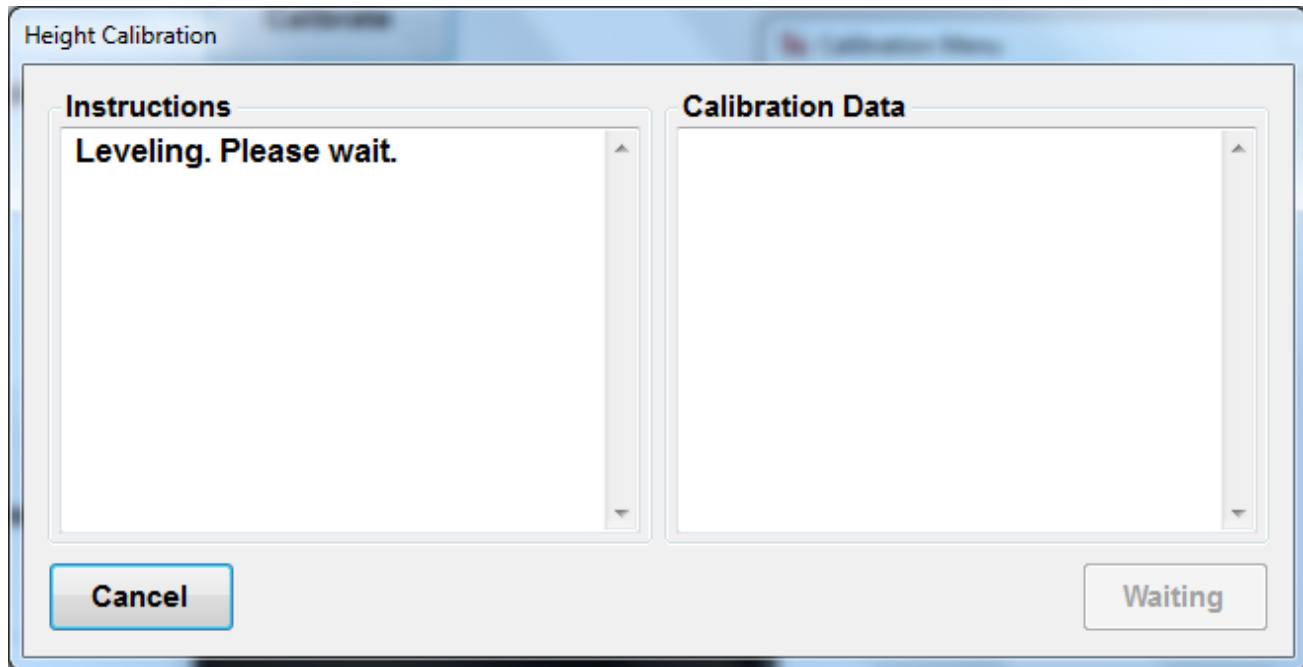


Figure 29. The software will briefly flash the “Leveling” window before continuing the calibration

After the first phase of the height calibration, the walking profiler must be turned around 180 degrees and have its left rear wheel switch positions with the left front wheel. The wheels must interchange contact points.

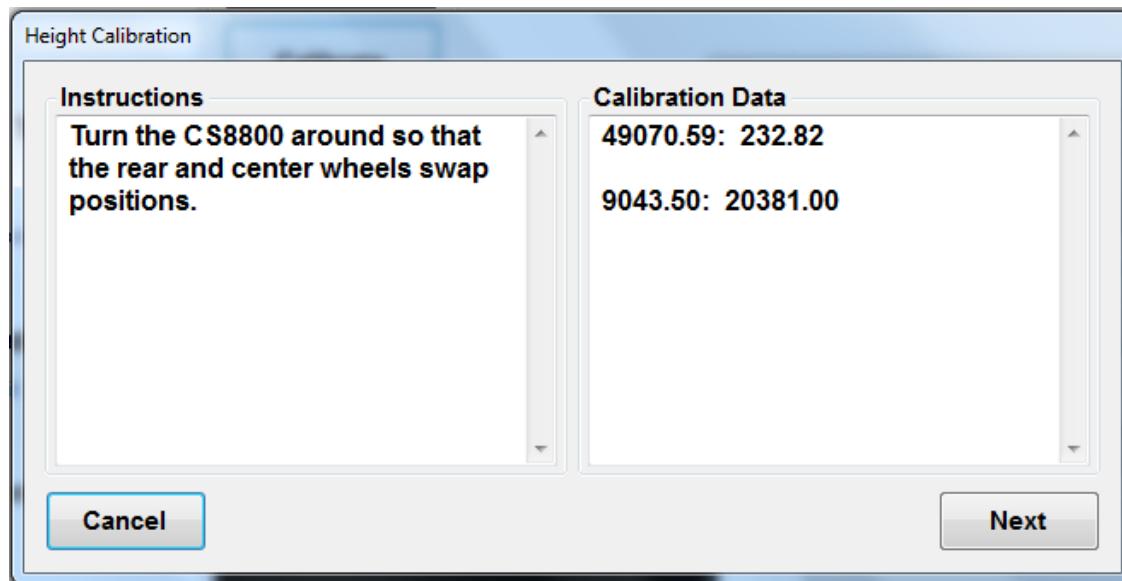


Figure 30. Turn system around for next step Height Calibration

After the first phase of the calibration, rotate the walking profiler 180 degrees so that it is facing the other direction. Line up the wheels on the same marks that were made in phase one; the back wheel has switched positions with the front wheel. Finish the calibration procedures given by the program. The points of contact of between wheels and floor should now be interchanged.



Figure 31. WalkPro device rotated 180

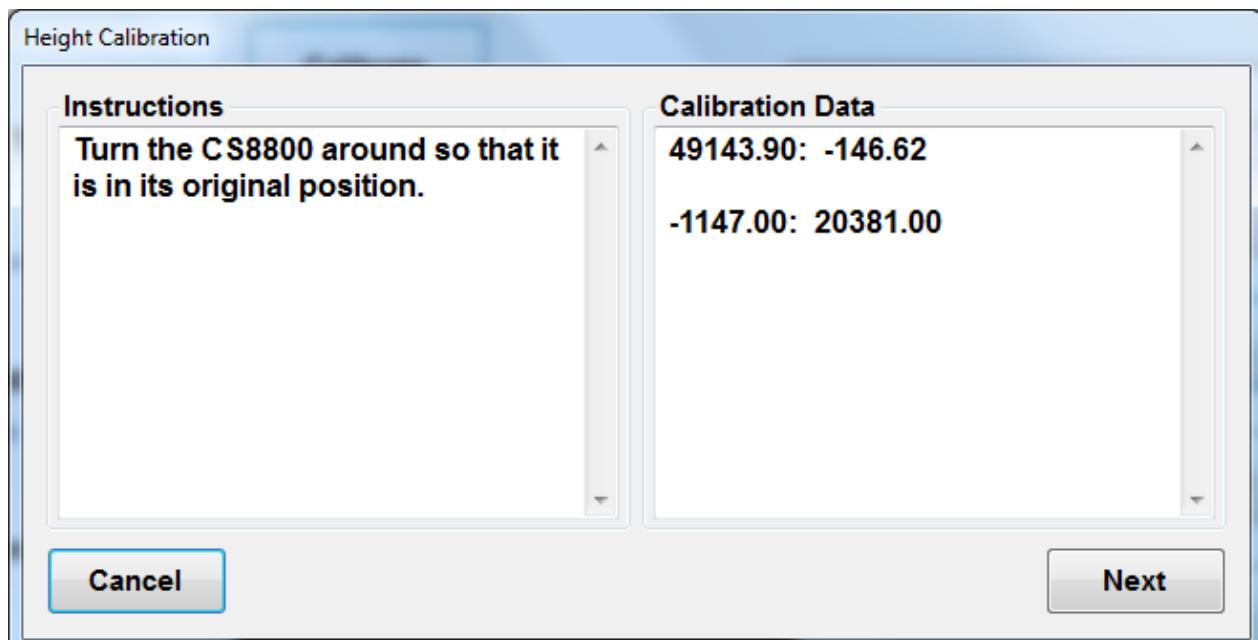


Figure 32. Window instructing to turn the devices around

This last step of the height calibration will only appear if the system hasn't been recently calibrated. If the device has valid height calibration settings, the calibration routine will stop after rotating the system 180 degrees and pressing next.



Figure 33. The system turned back to its original position.

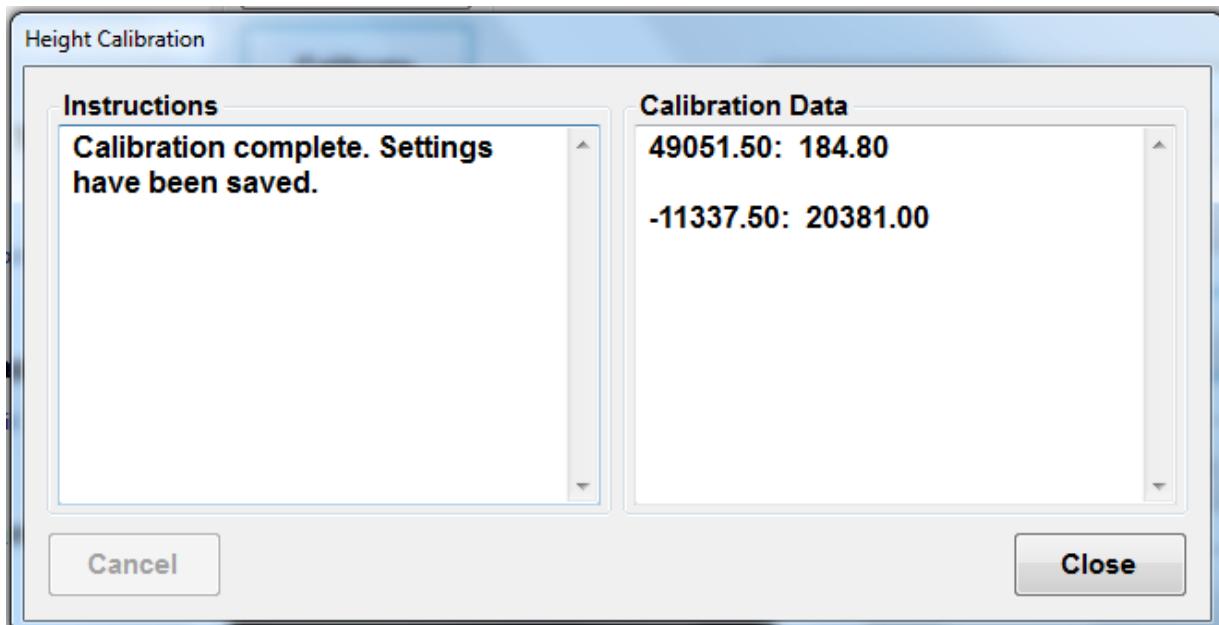


Figure 34. Last Height calibration window

Profile Slope Calibration (Closed Loop Calibration) - Optional

This calibration allows the system to determine the inclinometer drift and compensate for it. The closed loop calibration is not required for operation of the CS8800. By compensating for the drift the elevation profile will be more accurately represented. The calibration is called a closed-loop calibration because the operation is performed down and back along the calibration track. A distance of 20ft-25ft is recommended for the closed loop calibration (20ft is the minimum).

Calibration Instructions:

Place front wheel (or laser for laser systems) at start of track. Finish with rear wheel.

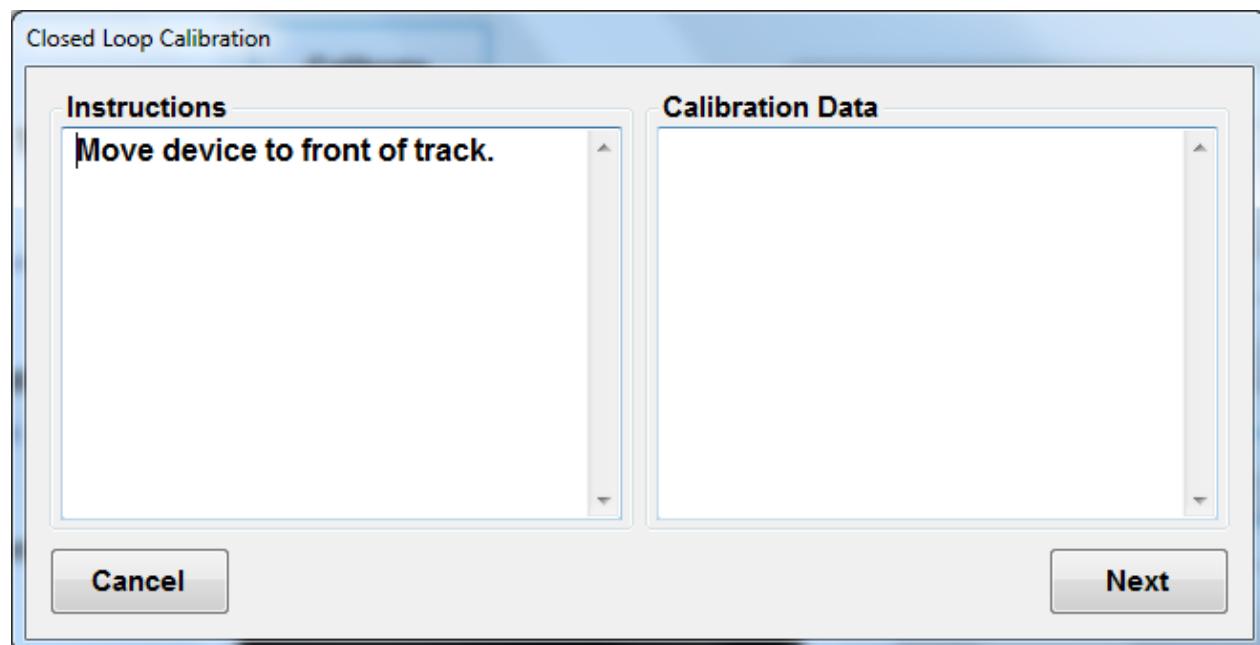


Figure 35. 1st window of the Profile Slope Calibration

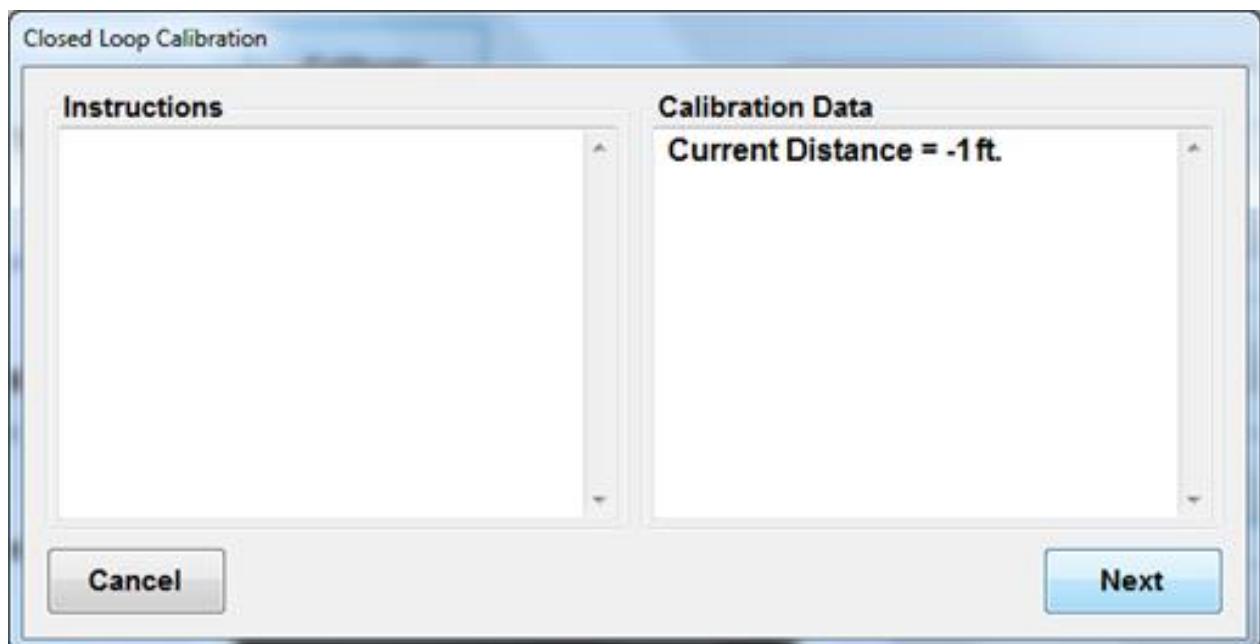


Figure 36. 2nd window of the Profile Slope Calibration

The initial negative distance indicates the length between the front and back wheel.

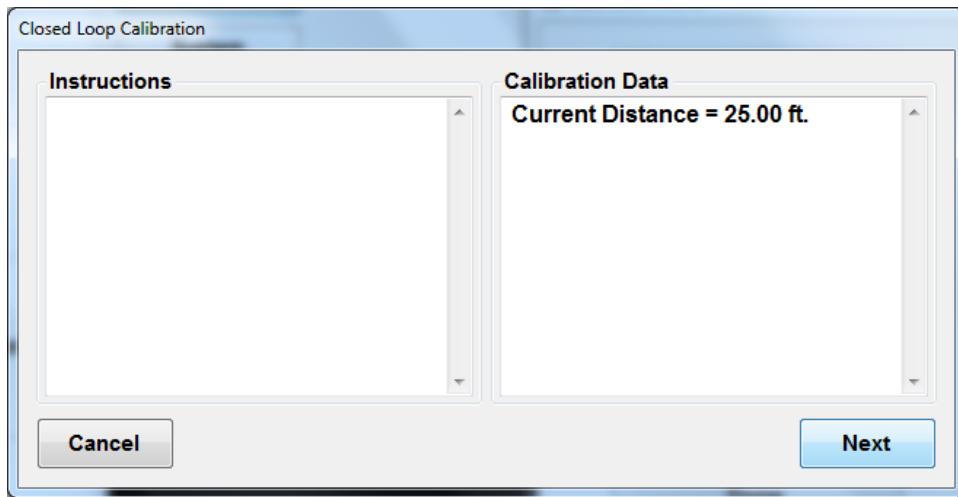


Figure 37. Window after device has been pushed 25 ft along a straight calibration path

Closed loop calibrations can be no shorter than 20ft.

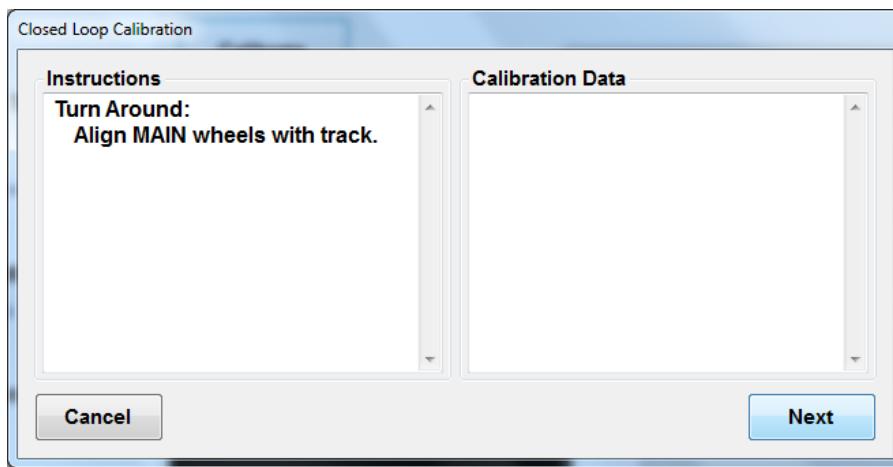


Figure 38. Window indicating operator to come back over the same calibration line

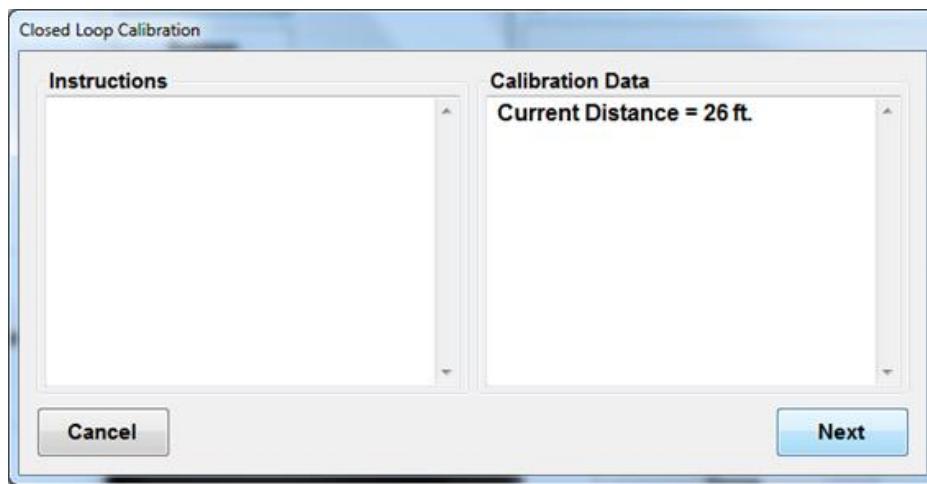


Figure 39. Window starting the second half of the closed loop calibration

With the system facing the opposite direction and laser at the end of the track, push system back to initial starting point. The main wheels should go over the same line. The distance traveled will be reversed. Stop when the onscreen “Current Distance” shows 0.00 feet.

Figure 40 below shows how the window when the device has reached the starting point of the initial track.

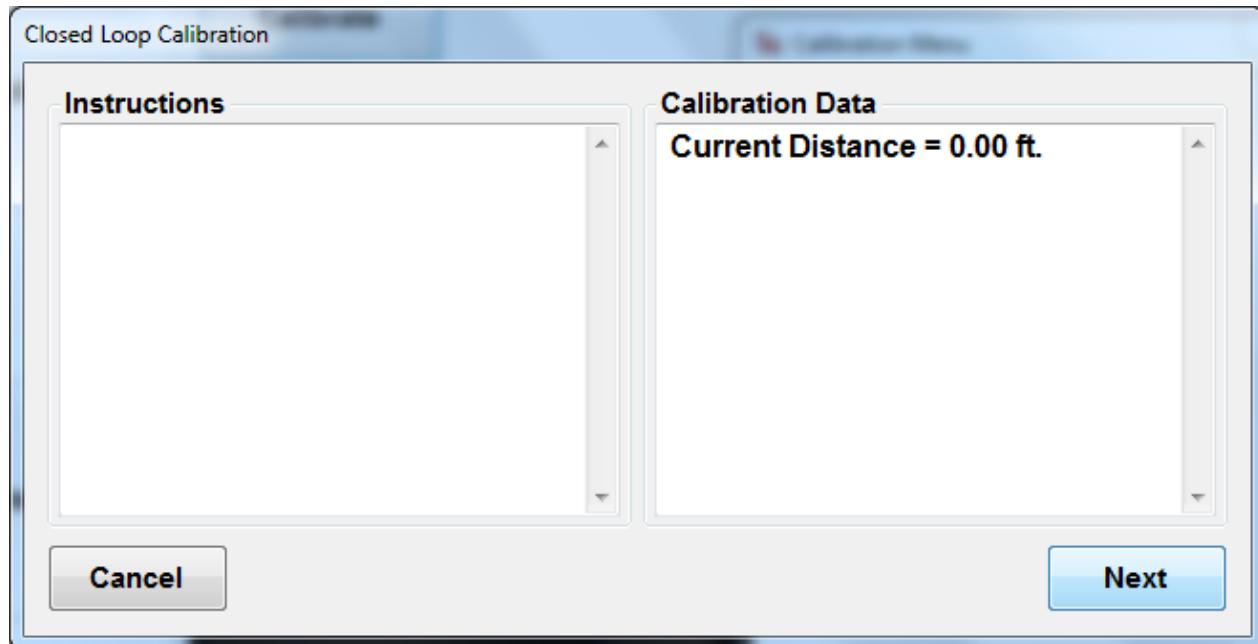


Figure 40. Window at the end of the second half of the calibration routine

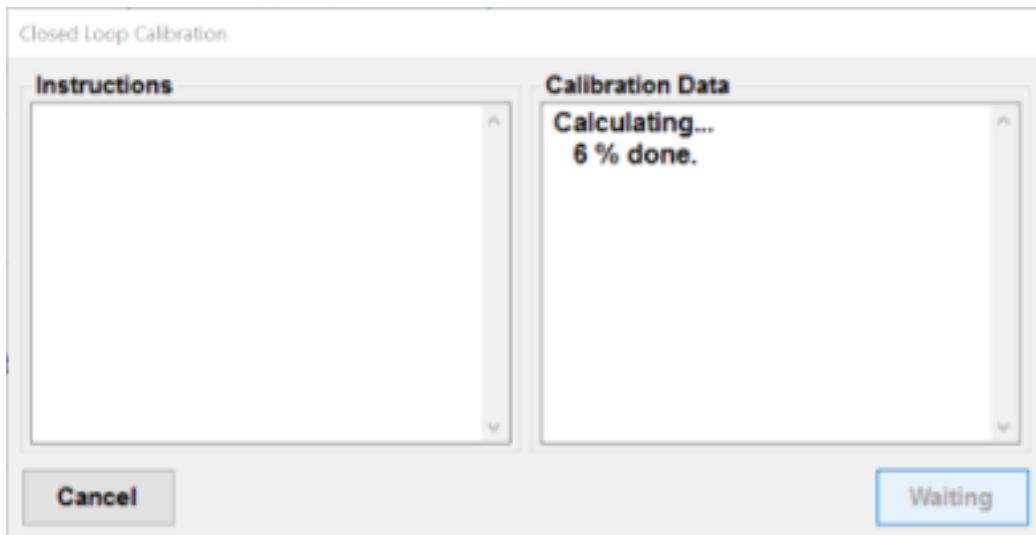


Figure 41. Calibration window calculating results

GPS Reporting Notes

If WalkPro is equipped with 5 Hertz (Hz) GPS, the coordinates of the profile will be included with the data. The GPS system is maintenance free and does not require any set up as long as the antenna is fixed to the WalkPro housing. The reporting interval of the GPS coordinates can be adjusted within Profiler V3. Navigate to the Report Options tab under Settings. Select the icon

labeled “Customize Reporting Intervals” and enter the appropriate distance between GPS coordinates.

Create A New Job Folder on the Hard Drive For Organization

Prior to starting a profile job, it is recommended to organize the files into a folder where all of the files can be easily accessed. Each job should have its own folder. To create a new folder right click within windows explorer and select New>Folder.

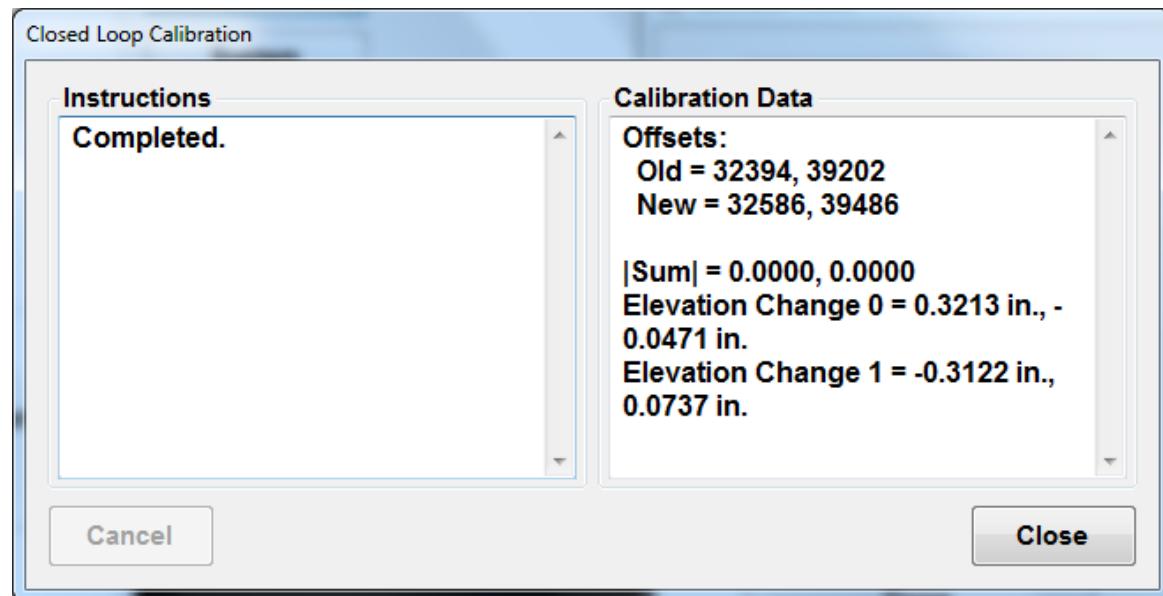


Figure 42. Last close loop calibration window indication a completed routine

Collecting Data

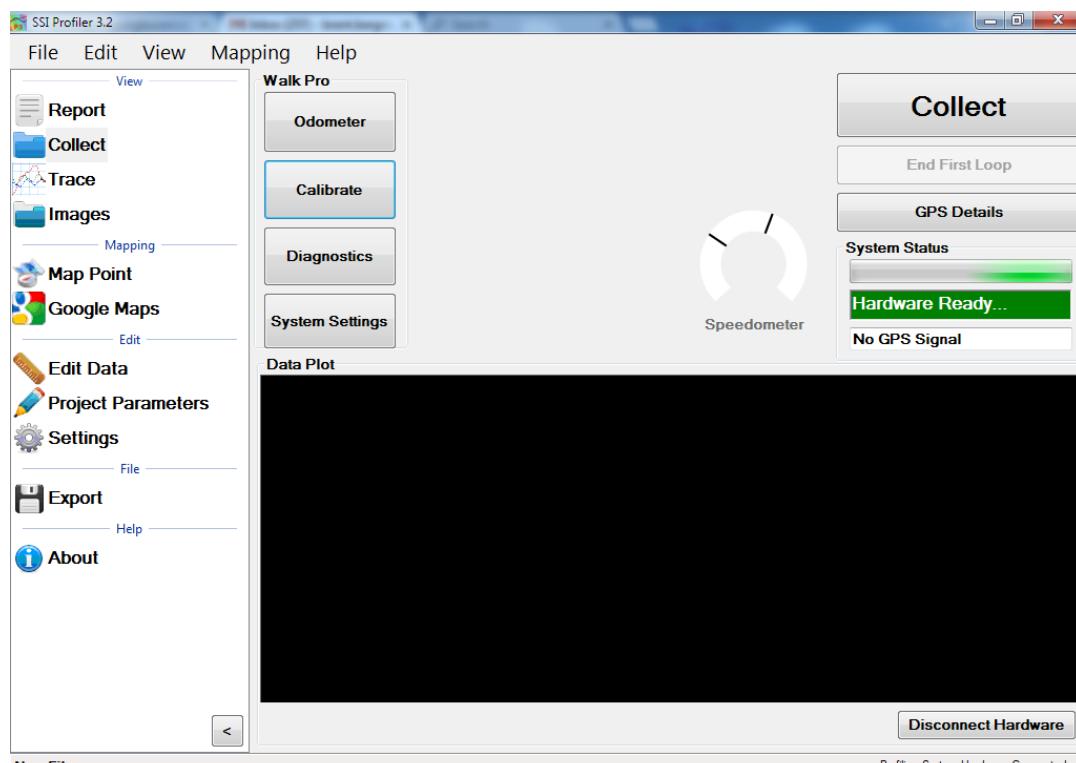


Figure 43. The main collection window for the walking profiler

Closed Loop Collections and Slope Compensation
Closed loop collections are not mandatory to operate the WalkPro. The operator has the right to only run open loop collections (one collection direction).

Closed loop collections eliminate inclinometer drift by subtracting the elevation changes from sequential samples through the profile. A closed loop collection collects one run up and the second run down the collection path. A slope compensation value is determined from the first closed loop collection and is used in the subsequent collections of the WalkPro as long as the device hardware is not disconnected. If the hardware is disconnected the slope compensation value is deleted and the operator must perform another closed loop collection to determine the drift coefficient.

The two main left wheels should follow the same path for both collection directions.

Every time the hardware is disconnected the slope compensation value is lost and another closed loop collection is required to replace the drift coefficient.

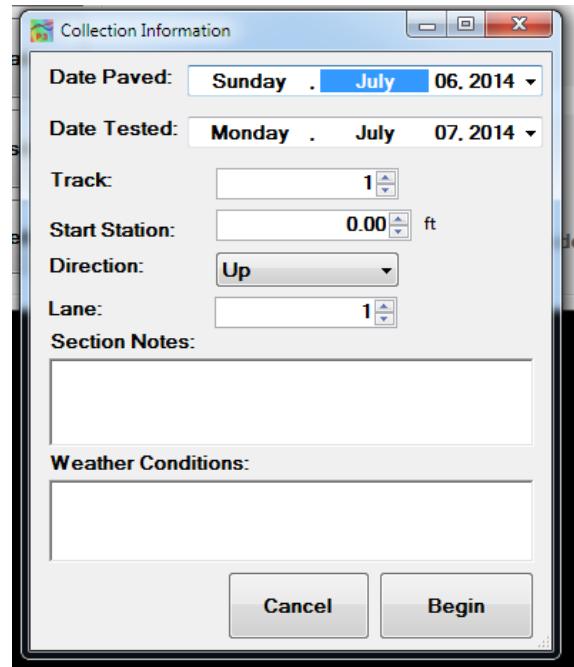


Figure 44. First window after pressing the “Collect” button

To collect a closed loop collection, begin the collection by connecting the WalkPro hardware and selecting Collect icon to input the collection parameters. Start the collection with the front left wheel (lever wheel) on the starting position. Select “OK” to begin collecting. Once the collection device’s rear left wheel is over the end point select “End First Loop” below “Stop Collecting” See figure 47 (End First Loop is a closed loop collection; Stop Collecting is an open loop collection). Once the operator selects “End First Loop” the WalkPro should be turned 180 degrees so the main wheels are on the same path as run one. The operator will select “Start Second Run” when in the start collection position. Push system to the beginning point of run one and end the collection by selecting “Stop.” At this time the program will determine a drift coefficient for the current hardware connection.

If the second loop is not approximately the same length as the first loop (1 foot tolerance) the program will make the collections into open loop runs.

The physical procedure for closed loop collections is shown below. Begin at a point A and end at point B, then turn around to begin at point B to end at point A. The exact path of run 1 is followed until the collection is ended at point A. Do no drastically lift the wheels of the walking profiler while reversing its direction. Execute multiple “Y” turns to rotate the walking profiler 180 degrees. Begin the collection of run one at point A with the axle of the front measurement wheel centered on the starting line. End run 1 at the ending station (point B) with the left rear wheel centered over the end line (the wheel that the brake acts on). This ending position may be marked to find the same point to start run two. Begin run two with the measurement wheel (left front wheel) centered on the marked line showing the end of run one. Run two ends at point A with the left rear wheel over the initial starting point.

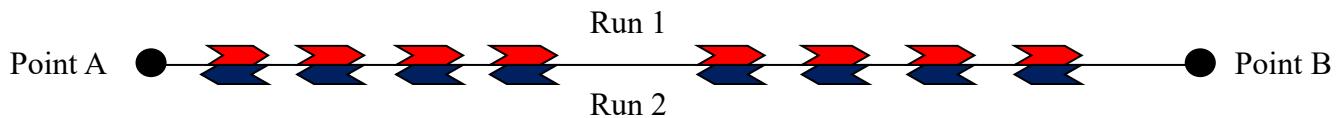


Figure 45. Collection procedure for a closed loop collection

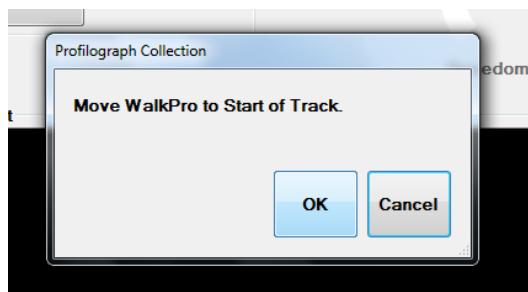


Figure 46. Start Collection window

The collection speed should not exceed one foot per second to have the most accurate profile collections. The speed limit is denoted by the red area of the speedometer. The operator is able to change the warning speed at their discretion. As the collection speed increases the accuracy of the WalkPro decreases. To start the collection, move the walking profiler to the beginning of the track. Once OK is selected, dataction will begin.

It is not recommended to collect WalkPro profiles

faster than 4 feet per second. For the most accurate profiles set the speedometer for a maximum speed of 1 foot per second.

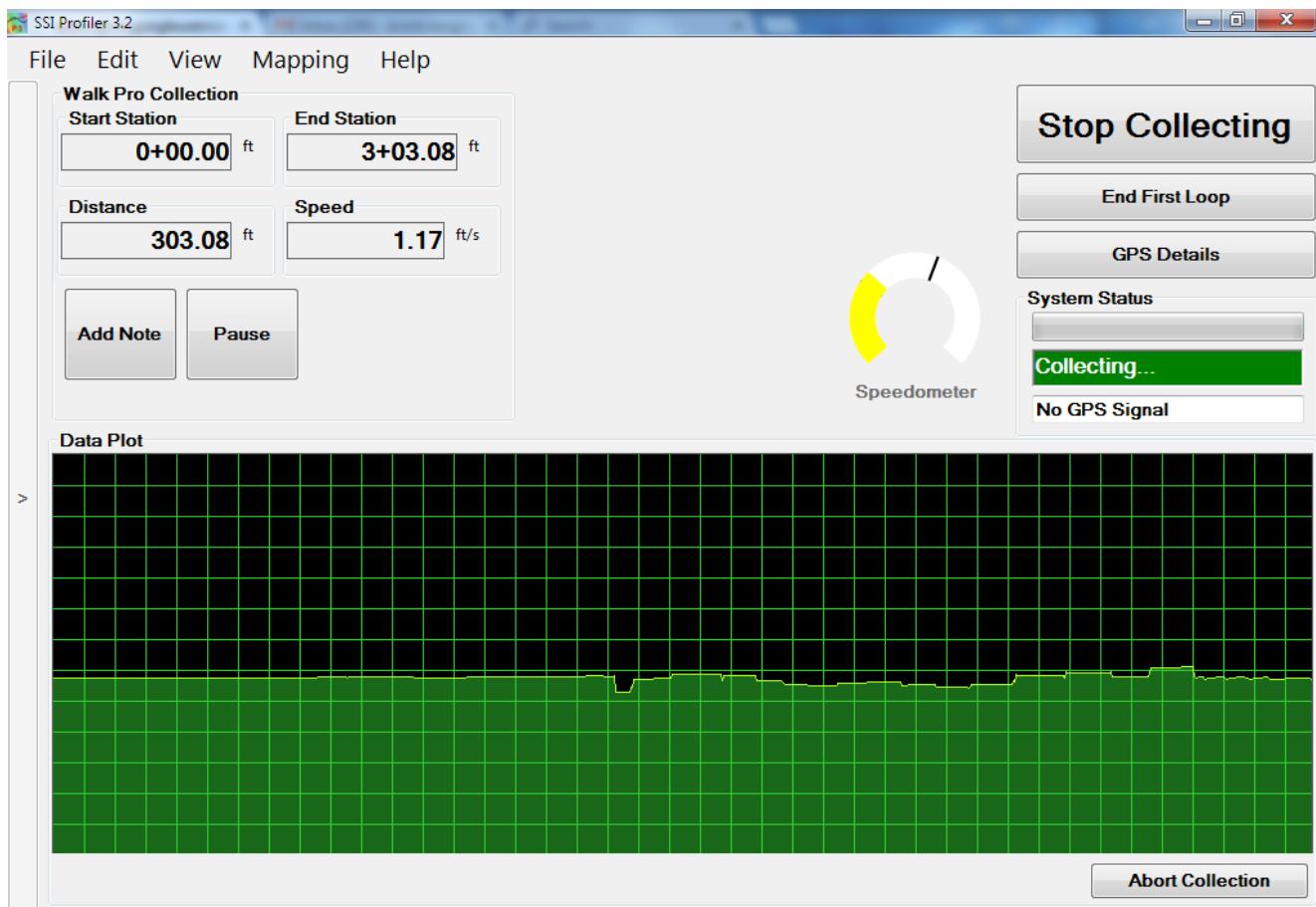


Figure 47. The collection window

The collection window shows the initial options to stop the open loop collection or end the first loop of a closed loop collection.

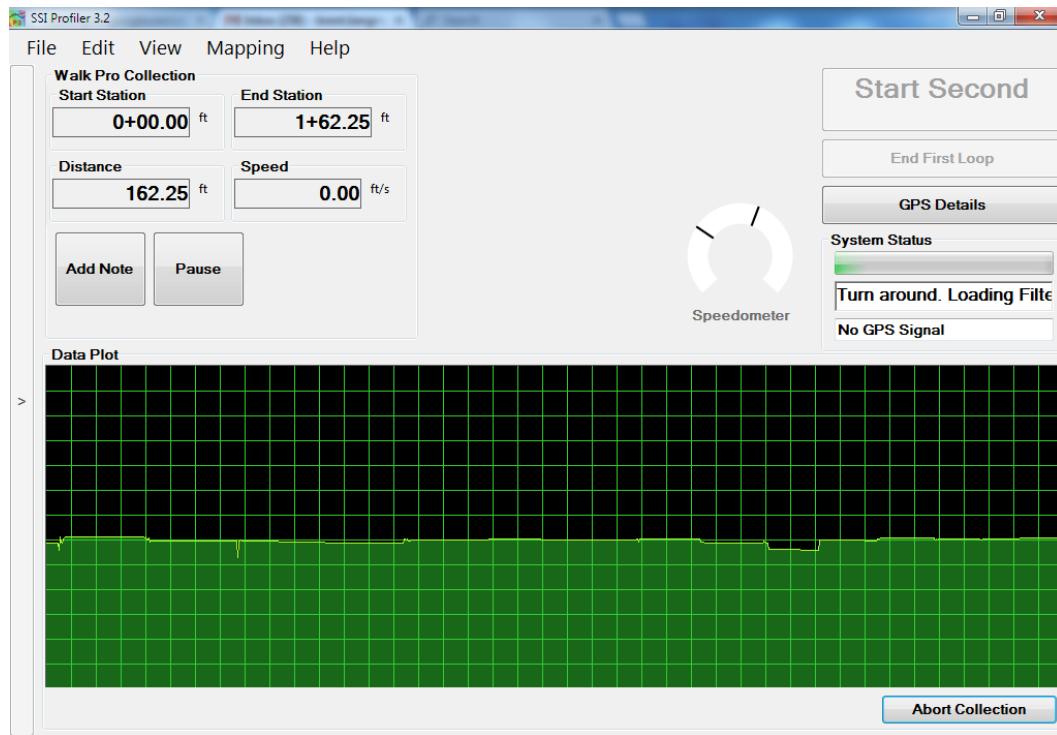


Figure 48. Window at the end of the first part of the closed loop

When the walking profiler is in place to start the second leg of the closed loop, woth the front left wheel on the starting mark the operator may select "Start Second".

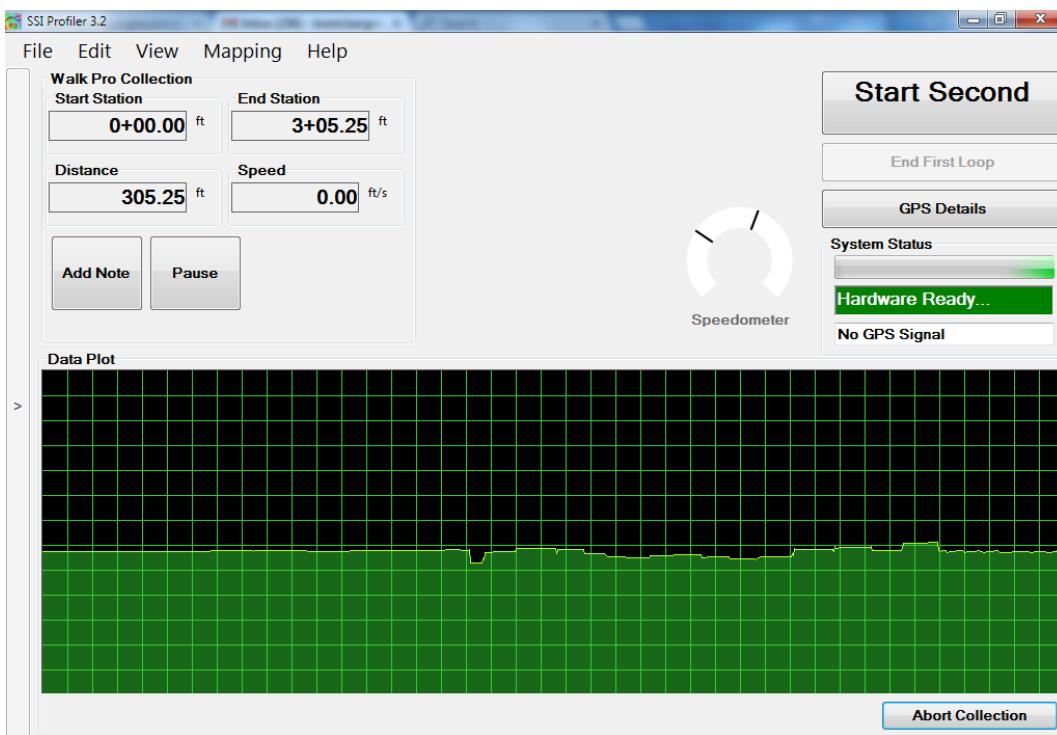


Figure 49. Begin Second Loop window

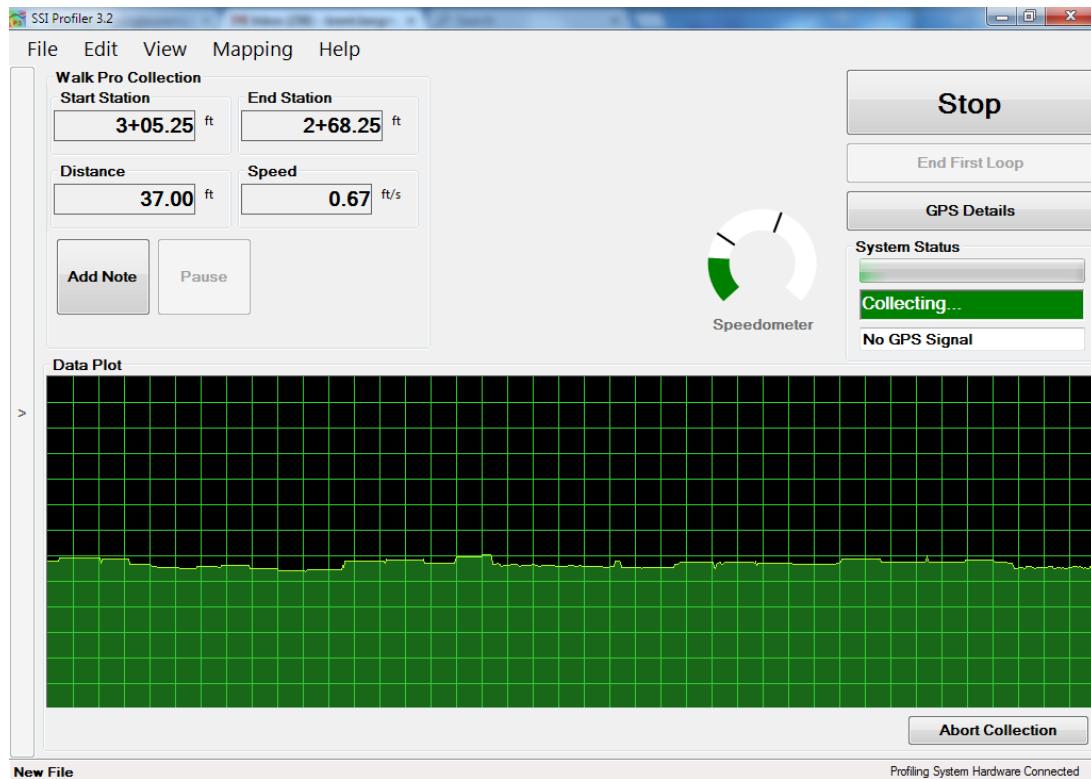


Figure 50. Collection window for second part of closed loop run

Once the second run is started the option to stop collecting appears. During the second leg of collection, the end station will decrease toward zero; the starting station for the first loop.

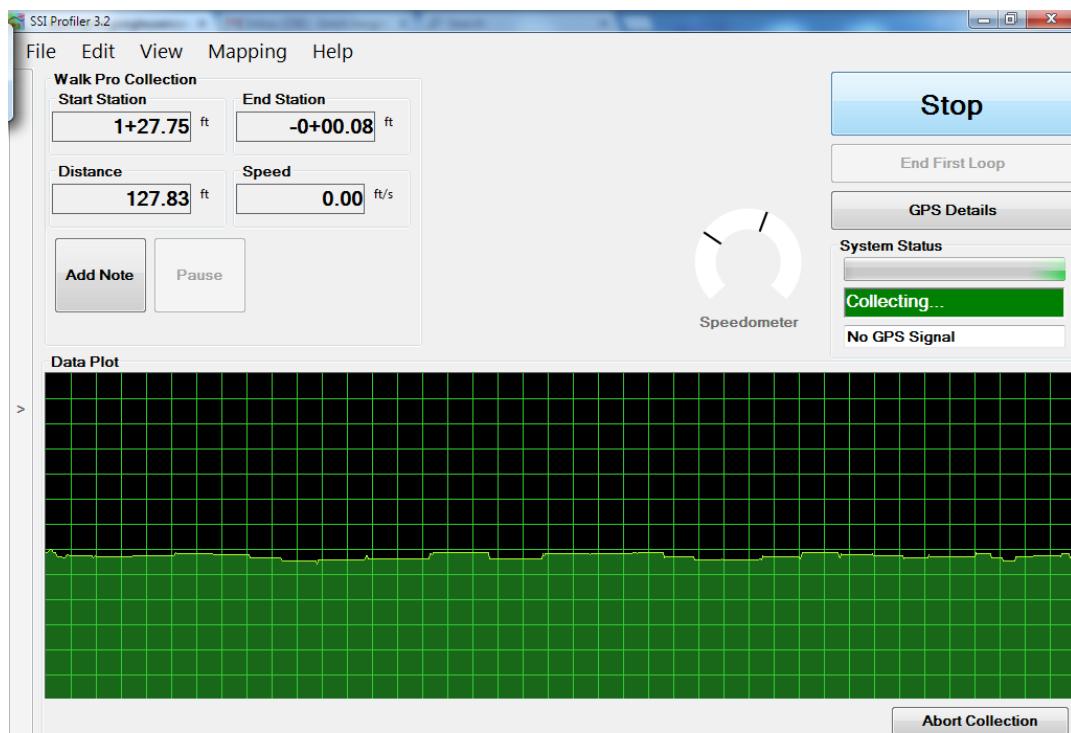


Figure 51. End of Second Loop for Closed Loop Collection

Closed Loop Requirements

If the second leg of the closed loop collection is not as long as the first leg the Profiler program will give the operator an error. The tolerance for this error is one foot. The ending station of the second loop must accurately match the beginning station of loop one for the slope compensation feature to function.

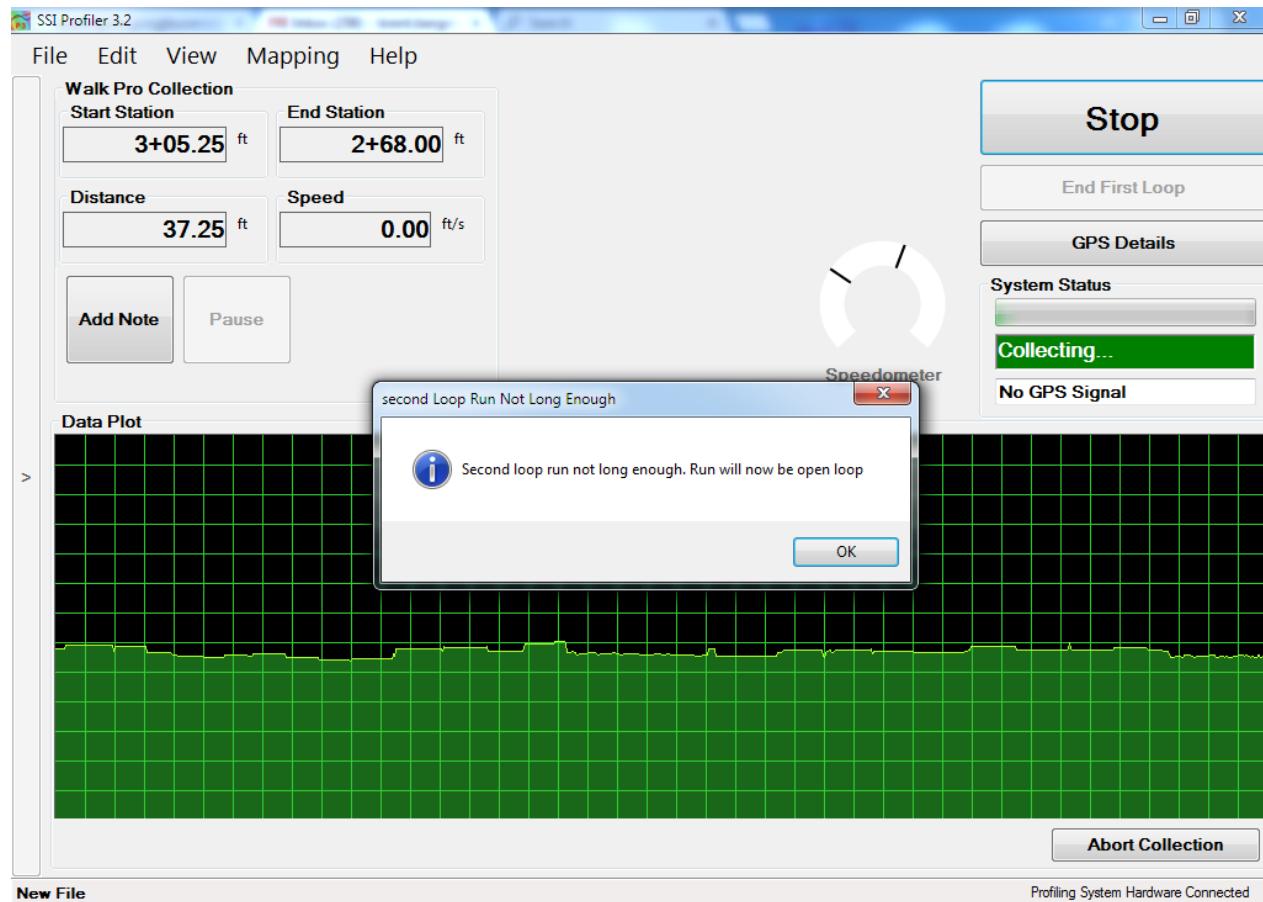


Figure 52. Second Loop Length for Closed Loop is invalid

Slope Compensation

After the operator has collected a valid closed loop run the WalkPro software will save the slope compensation value until the hardware is disconnected. To use the slope compensation feature with open run collections, select “Yes” after an open loop collection. The slope compensation allows one direction open loop collections to be closed loop collections. Either method, closed loop or slope compensation, will produce accurate profiles without inclinometer drift. The slope compensation is much faster and more efficient and will reduce the number of runs collected by the operator.

For instructions on performing a closed loop collection, see the closed loop section above.

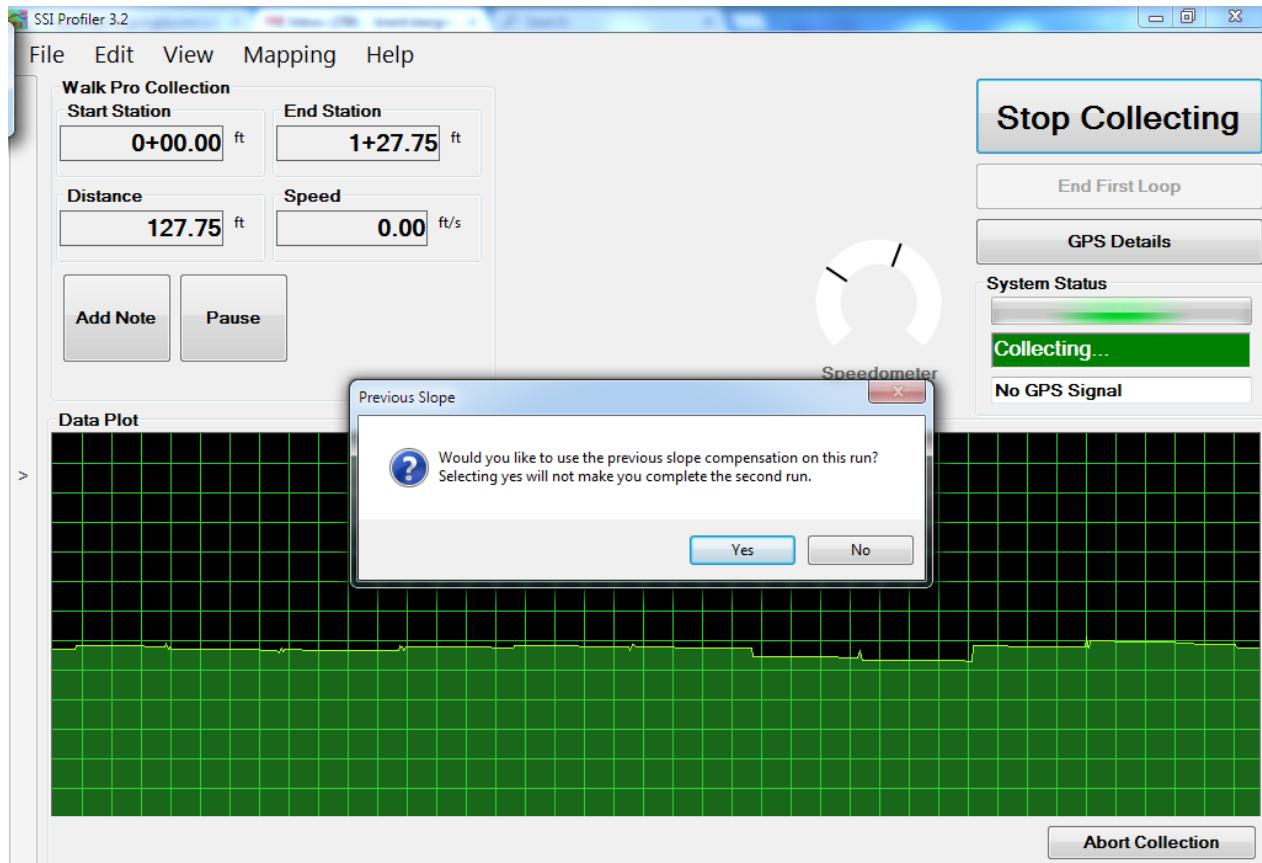


Figure 53. Prompt to Use Slope Compensation on an Open Loop Collection

Add Note

Adding notes is a valuable tool when pausing or explaining information that is not included in the profile data. This can be information on manholes, drainage structure, bridge decks or any other obstruction. Adding notes assures the operator that the data will be able to be deciphered at a later date, and any questions can be answered. Notes, also known as events, can be changed or edited in post processing under the Edit Data>Edit Events tab in Profiler V3.

Pauses

Pausing is allowed for certain obstructions in the profiling path. These are for instance, drainage structures, bridge decks and manholes. Review the overseeing agency's specifications for paused and excluded data. Pausing the data run still collects the distance traveled, but the height data is omitted. The trace will still show the trace of the paused section. If the operator decides to review the paused sections, these sections can be analyzed alone, with the rest of the data, or excluded. When the paused sections are excluded, the data within the paused section will not affect the localized roughness or ride value calculations. This option can be found in General Settings within the drop-down menu under the label Pause Section Analysis.

New pauses, adjustments to the run up/out data, and stationing changes can be made after the data has been collected. To adjust these settings, navigate to the Edit Data section under the Edit tab.

Saving the New Collection

After collection of the data the Profiler program will ask the operator to Save as New Project, Save Run, or Do Not Save. The options of Save as New Project and Save Run will open windows explorer to choose a folder destination for the new file. If do not save is chosen, the program will keep the last collection, but it will not be saved. To save the collection after selecting do not save, open the file>Save As in the menu bar.

When there is unsaved data or changes in Profiler

V3, the file name in the lower left corner will have an asterisk (*) after the file name.

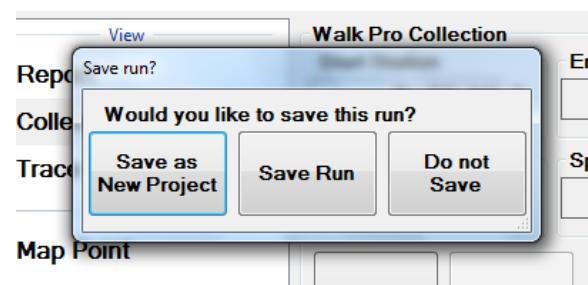


Figure 54. Saving Options after a collection

The save as new feature can be used if a new file was not created before collection. If the data was collected under an old file name and the operator does not want the recent data to be saved under this old file, choose Save As New. If the operator created a new file prior to collection Save As New and Save Run will perform the same function.

Save the file by selecting File>Save or File> Save As. This will allow the operator to save the collection data.

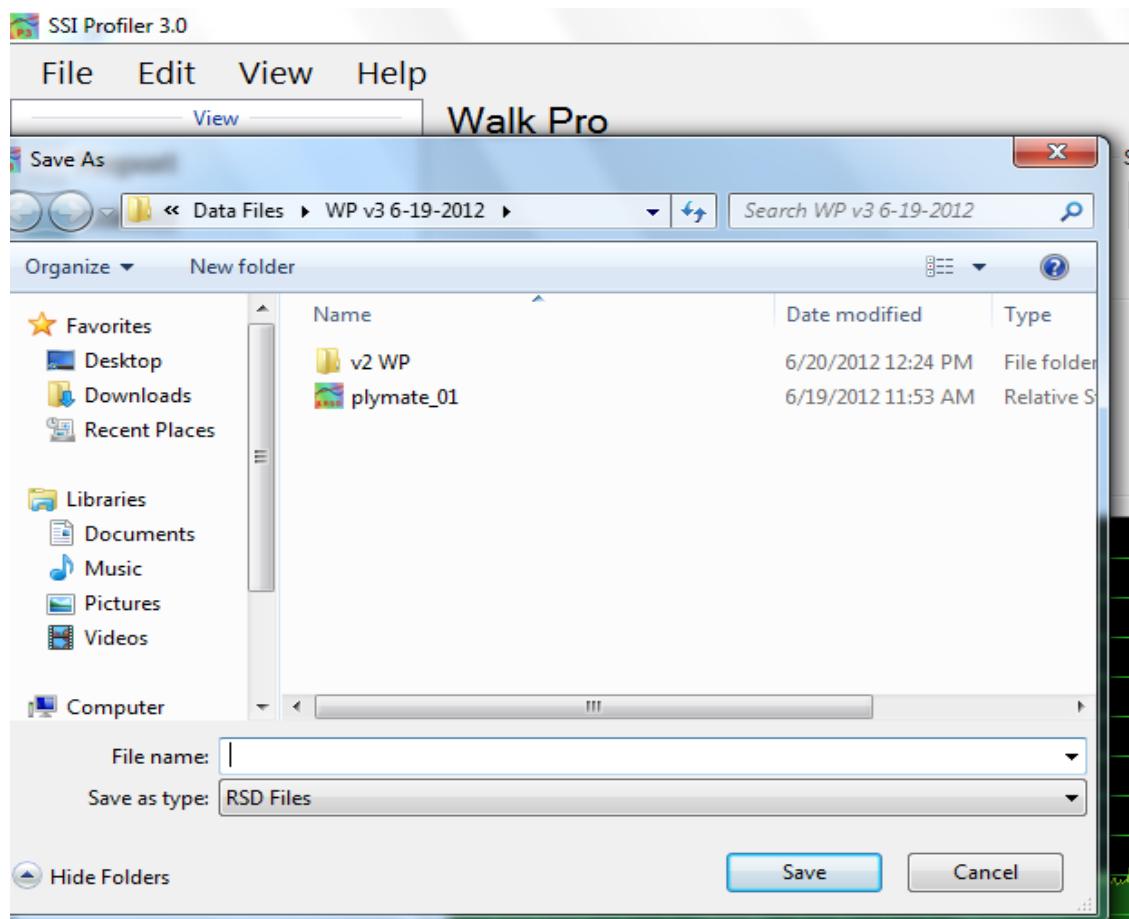


Figure 55. Windows Explorer to save the collection

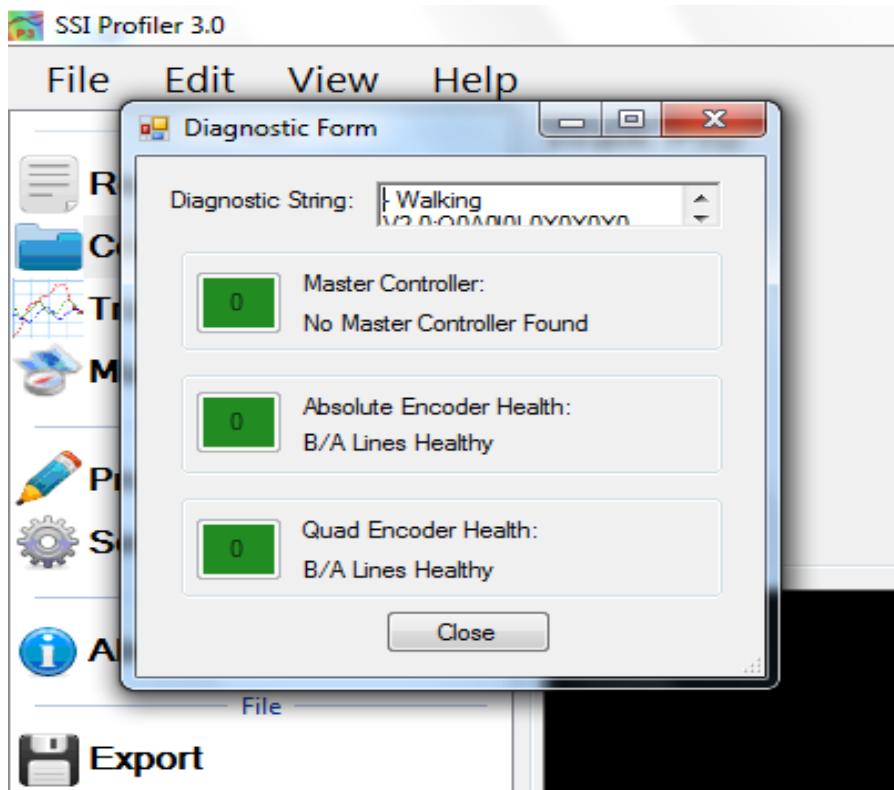


Figure 56. The diagnostics window

Texture Measurement (For Systems with Laser Arm)

Using the laser front arm the WalkPro can collect high frequency elevation samples to be used to calculate texture or Mean Profile Depth (MPD). The collection procedure is the same as the regular WalkPro collections, however there are new parameters that need to be entered prior to collection such as texture sampling interval and laser front arm type. The collection program uses SSI's Laser Recorder program that has the ability to collect a high amount of laser samples in different modes. Under Collect>System Settings>Texture Settings the operator can choose one of three texture modes: Longitudinal, Transverse and 3D Modes. The sampling interval is the length of the texture sample while the capture interval is the length between texture patches.

- Longitudinal Texture Mode
 - Collects longitudinal texture along a thin line, only using the center elevation readings of the laser. A four-inch (10.16 cm) strip is used to calculate the texture value.
- Transverse Texture Mode
 - Collects transverse texture at the specified sampling interval.
- 3D Texture Mode
 - Full and continuous texture profile at 1mm x 1mm resolution.

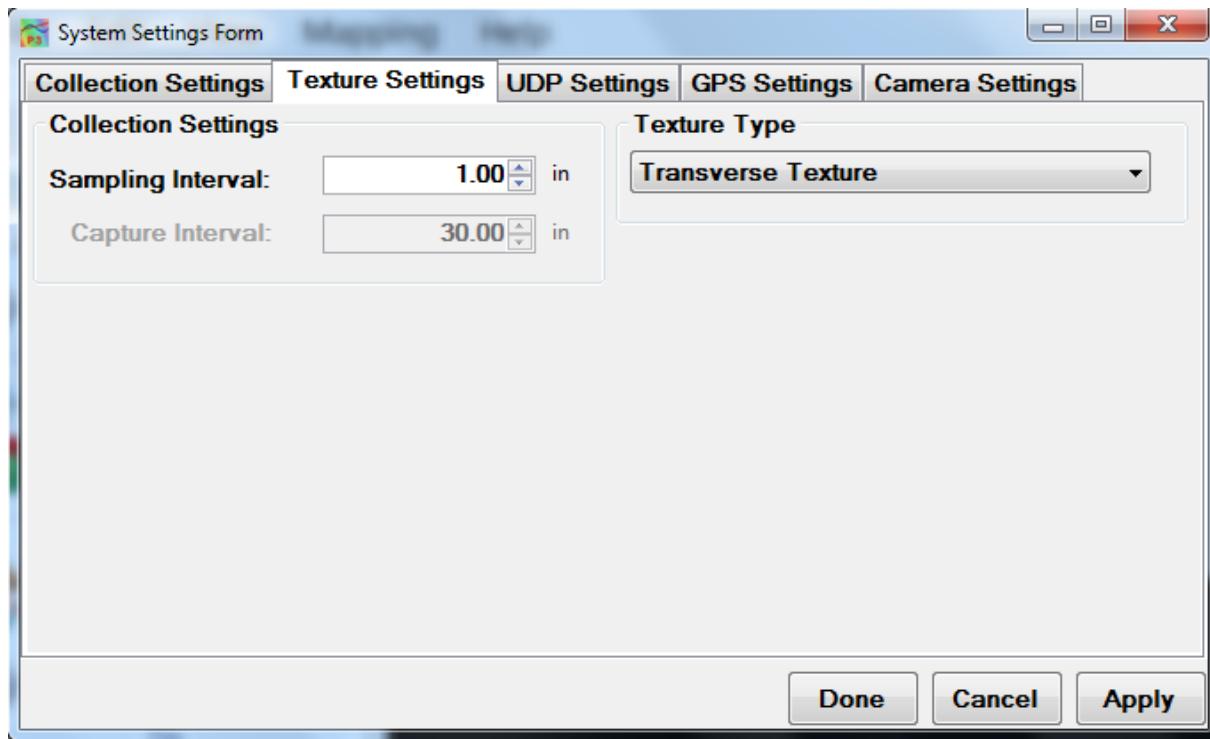
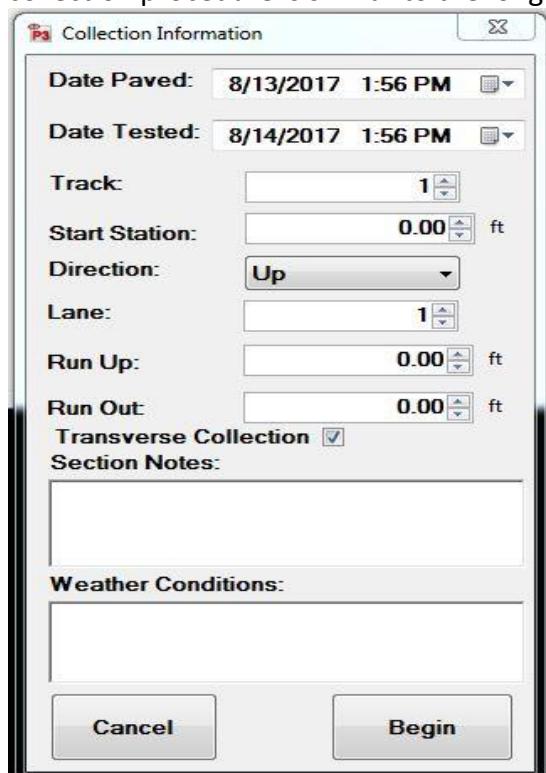


Figure 57. Texture setting tab under system setting

Transverse Profile Collection

The WalkPro CS8800 is able to collect transverse profiles with no change in hardware. In order to complete this operation, the user must select the check box under the run out input of the Collection Parameters window (appearing after clicking on the Collect icon). The transverse collection procedure is similar to the longitudinal collection and the calibrations are the same.



After selecting the 'Collect' icon at the top right corner of the Collect window the user is presented with the Collection Parameters window. To collect transverse runs select the checkbox below the run out input. After selecting begin the operator will be asked if the collection type is desired to be transverse (see figure 59 below). Before proceeding the CS8800 should be near the starting point of the collection. The collection will begin after the SSI Profiler program confirms the CS8800 is at the edge of the collection track, or path, and the user enters the starting station and station direction.

Figure 58. First Collection window after pressing collect

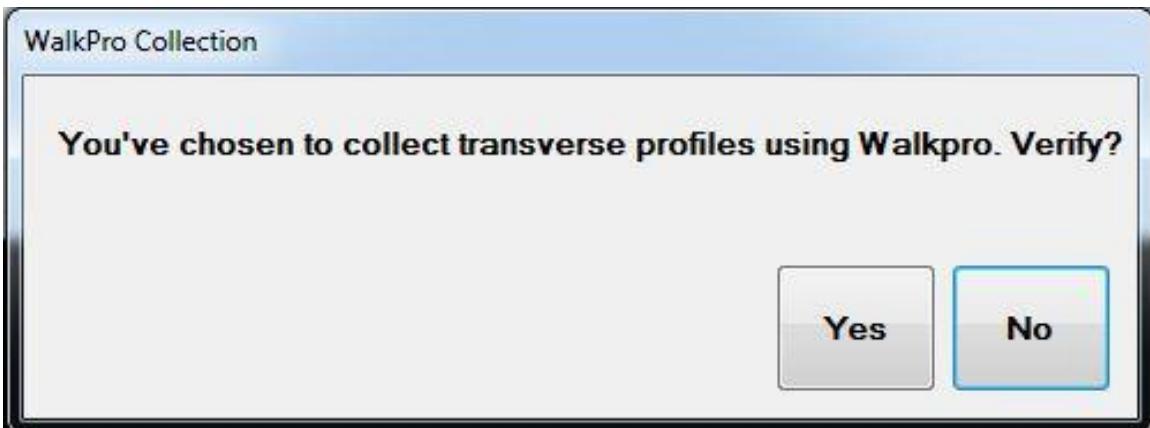


Figure 59. Verification window for collecting transverse profiles

The transverse data will be displayed within the collection screen along with the distance traveled, speed and station position. To end the collection, select the icon at the top right of the window, 'Stop Transverse'.

At the end of the collection the SSI Profiler program will ask if more transverse profiles will be collected. If no other collections will be made the previous collection will be saved.

Data Saving Option A:

If additional transverse data will be collected the program will ask how to save the additional runs. The user may save the additional runs to the currently open RSD file. The SSI program will automatically categorize the collections as sequential Run 1, Run 2, etc.

If another transverse collection will be saved to the current RSD file, the user shall move the CS8800 to the edge of the collection track when prompted by the software. The collection will start once the user selects OK under the, 'Move WalkPro to Edge of Track' window. Additional transverse collections will be terminated the same way as previous runs. Additional collections may be saved under one RSD file. SSI recommends a maximum of twelve collections under one RSD file.

Data Saving Option B:

The user may save each transverse collection as an independent RSD file. This is the preferred collection method when post-processing will be performed. After each collection the operator shall decline to collect additional transverse collections and will save each file as a new RSD file.

Once the user is ready for another collection, it is recommended to create a new file. A new RSD file can be created through File>New or CTRL+N.



Figure 60. First Collection window for Transverse profiler



Figure 61. Window indicating input of start station and direction of travel

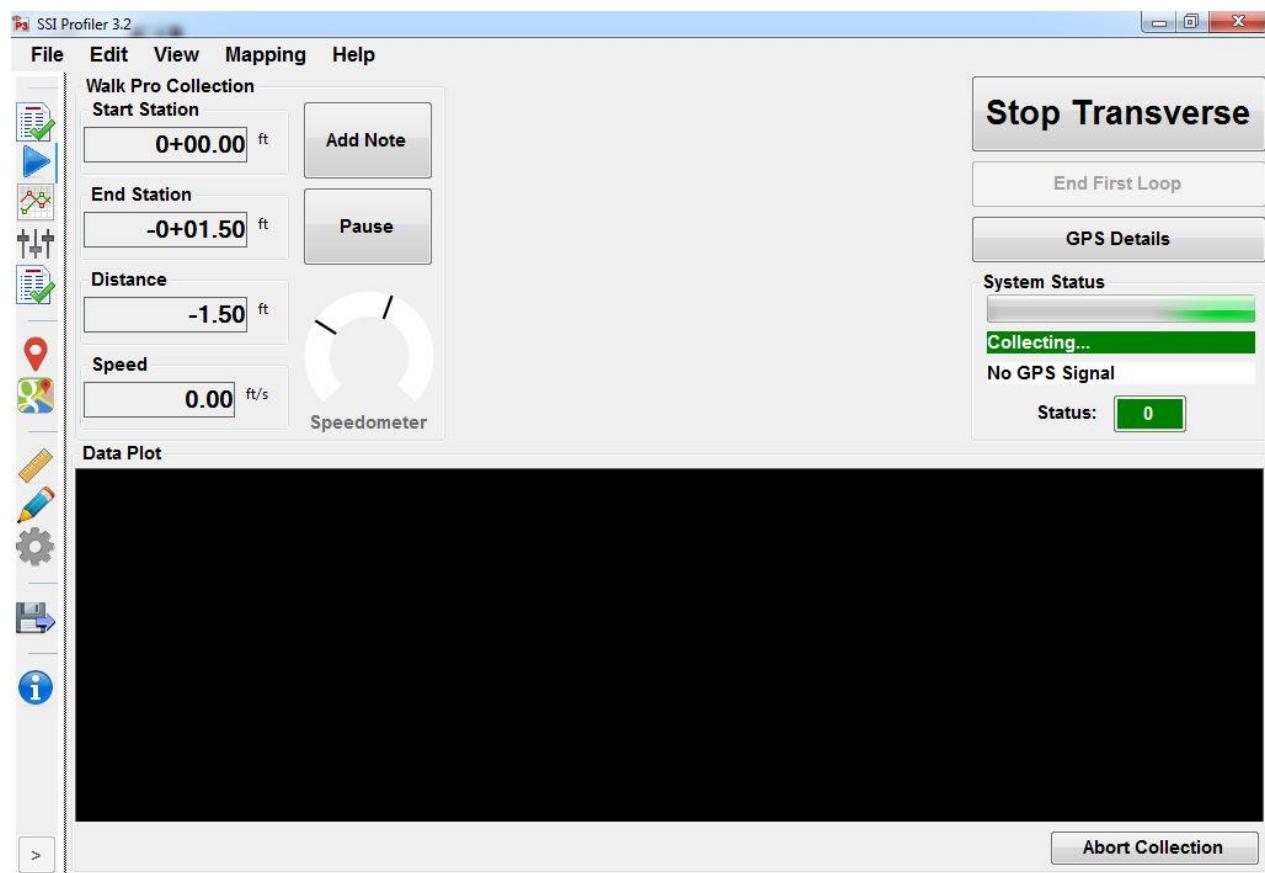


Figure 62. First Collection window after pressing collect.

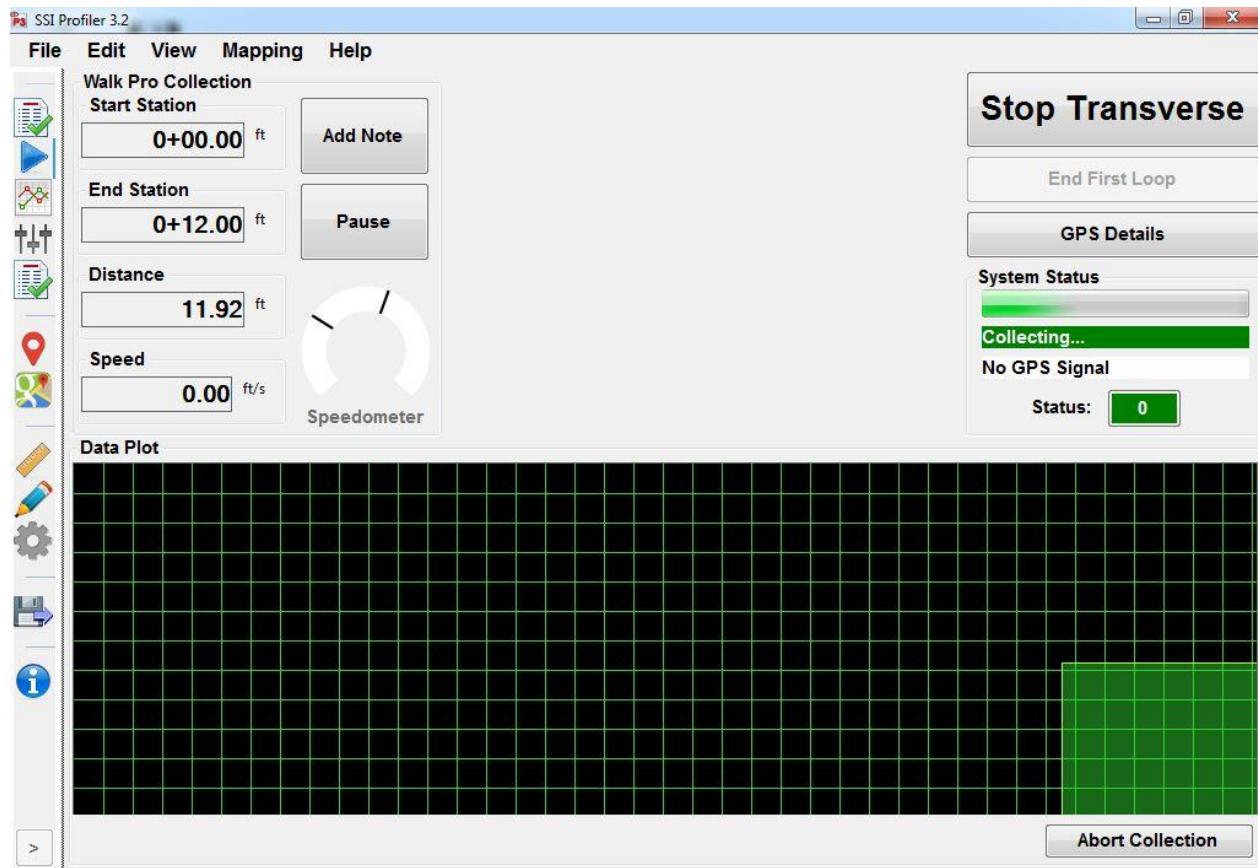


Figure 64. Window during collection

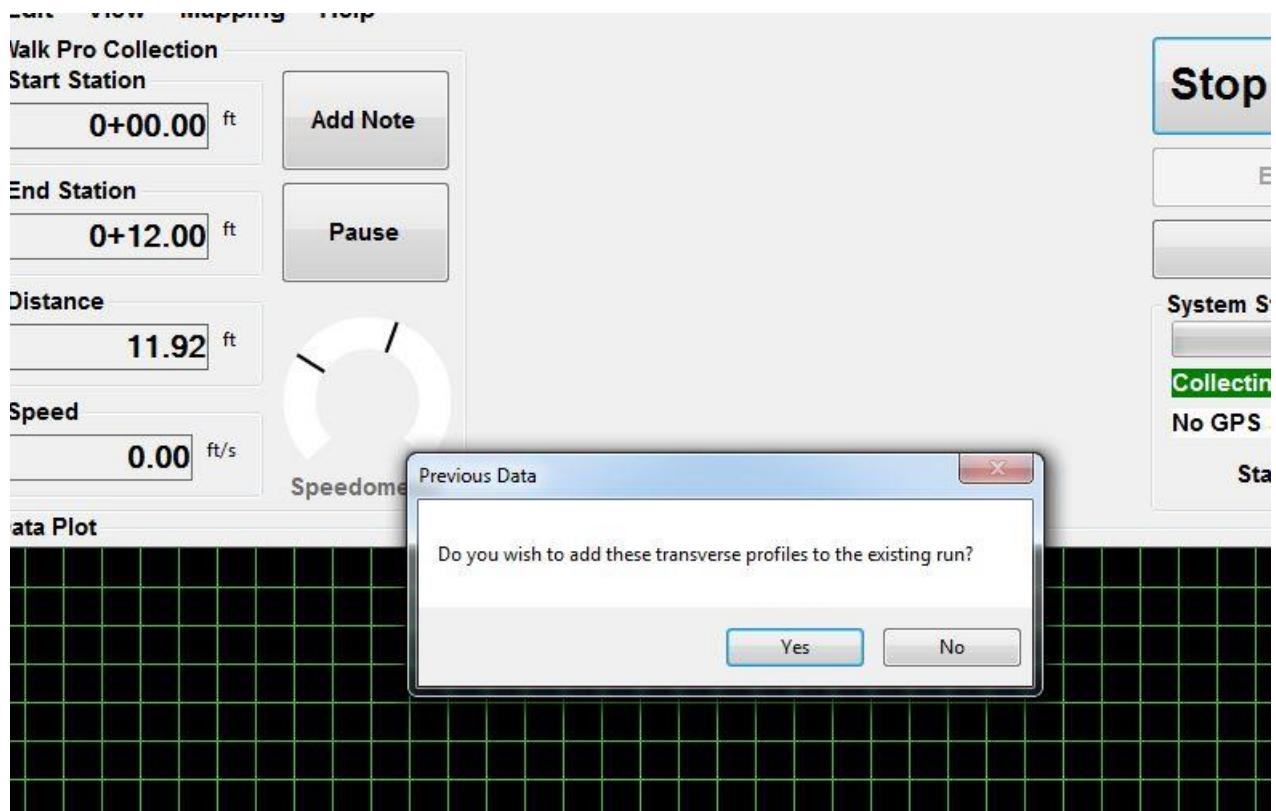


Figure 63. After pressing "Stop Tranverse". "No" Leads to figure 65, "Yes" to 67

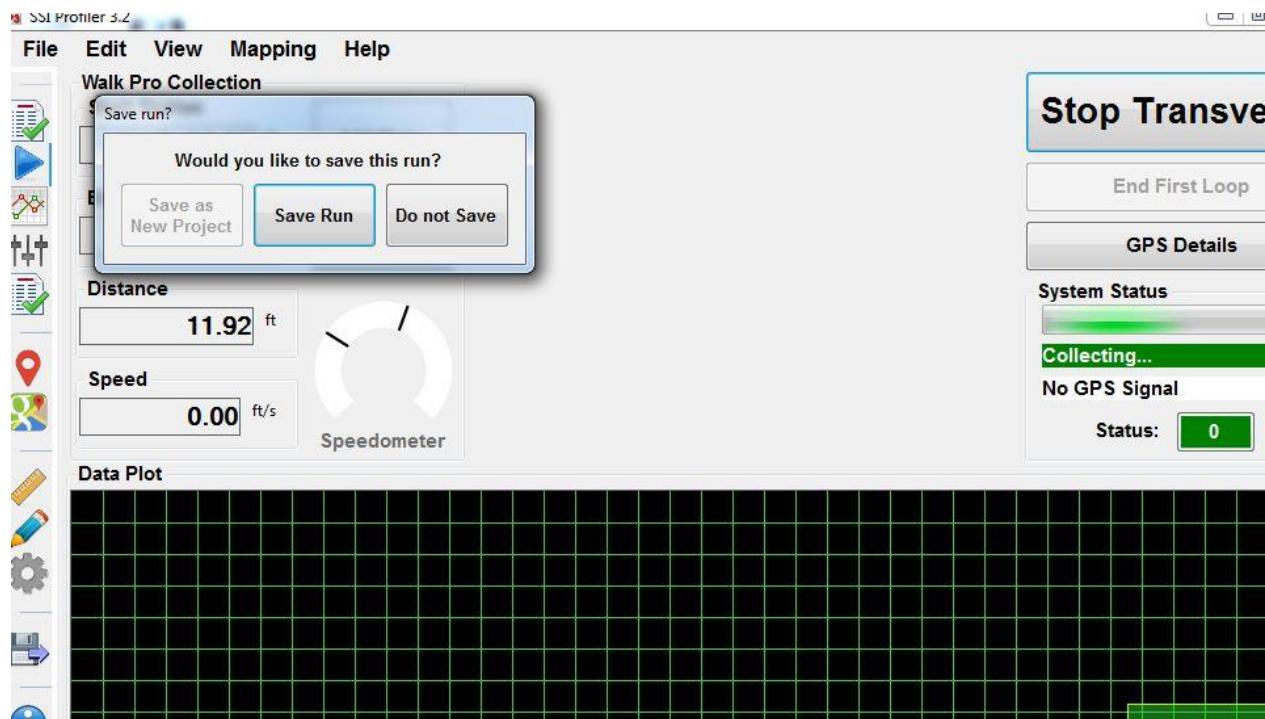


Figure 65. Save run window after pressing “Yes”

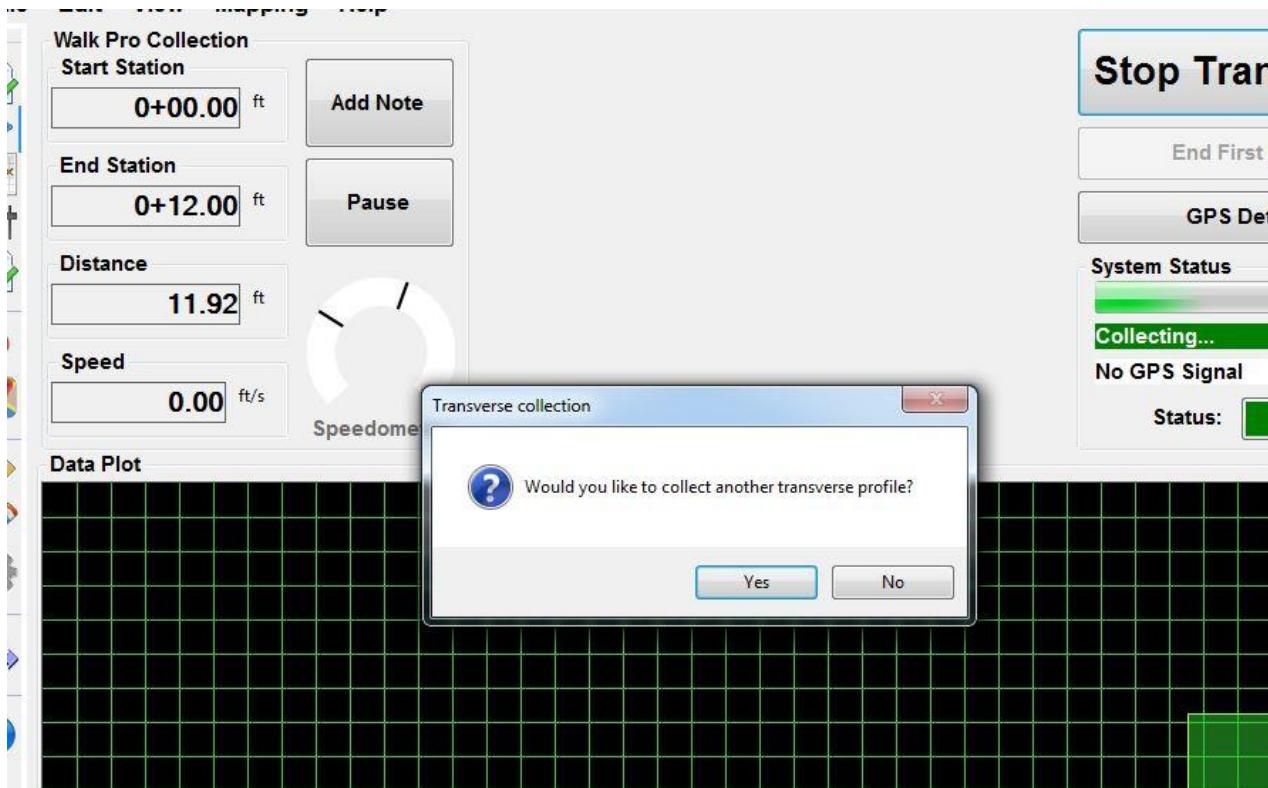


Figure 66. Collect another profile window after pressing "No" to figure 64

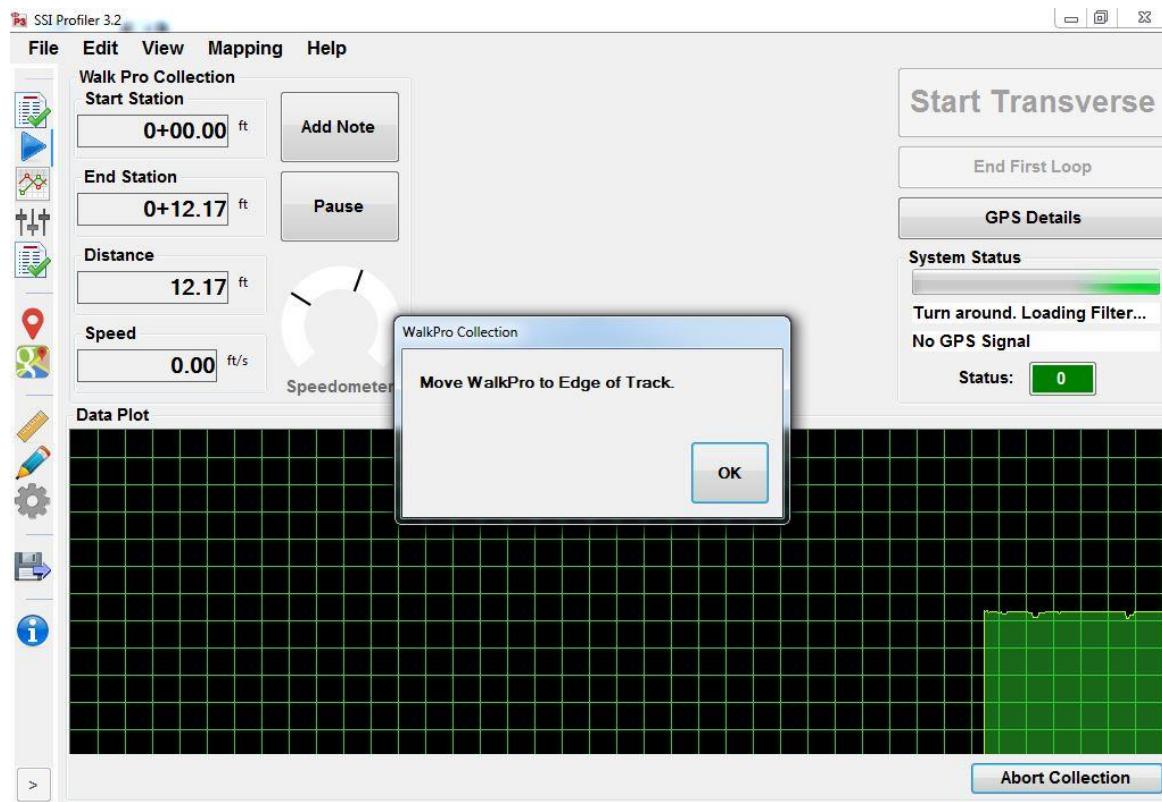


Figure 67. Window after selecting “Yes” for collecting another profile

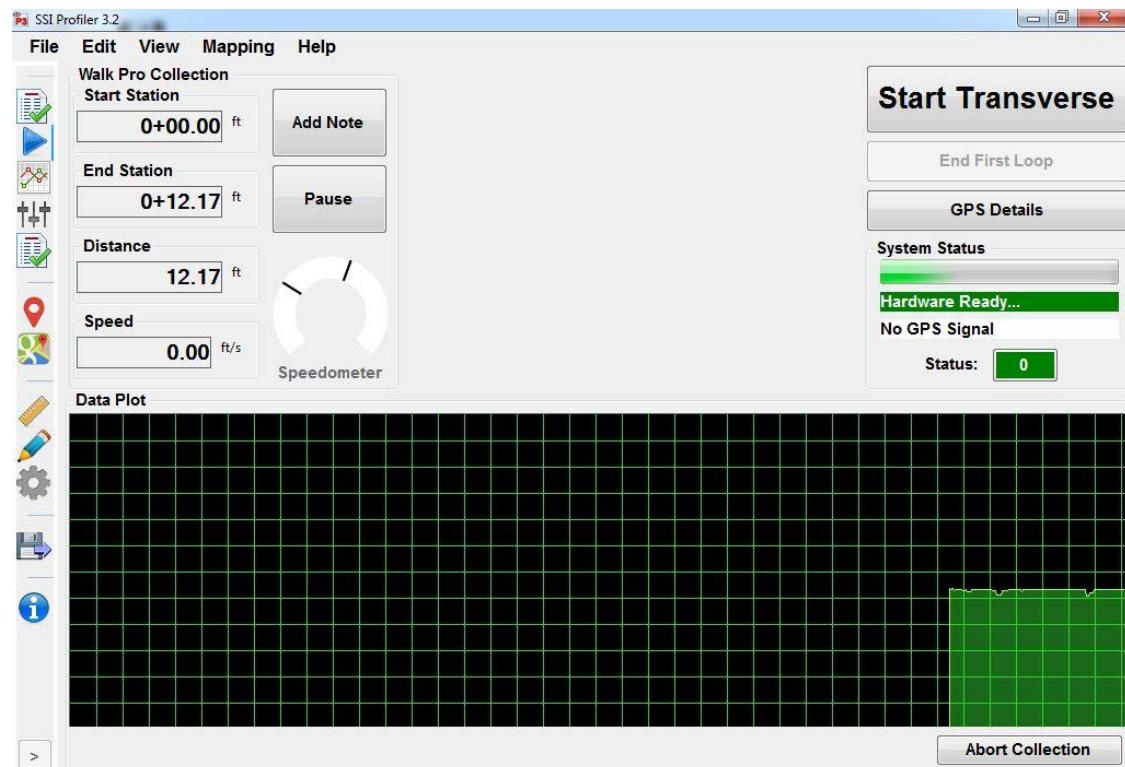


Figure 68. Collecting another transverse profile.

Viewing Transverse Profiles

The transverse collections will be available for viewing under the Advanced Tools section of SSI Profiler. The tab will be labeled, ‘Transverse Profile’. Within this window the user may review the elevation trace, longitudinal station, and rut depth. Each transverse profile can be edited under this window by cropping either side of the collection.

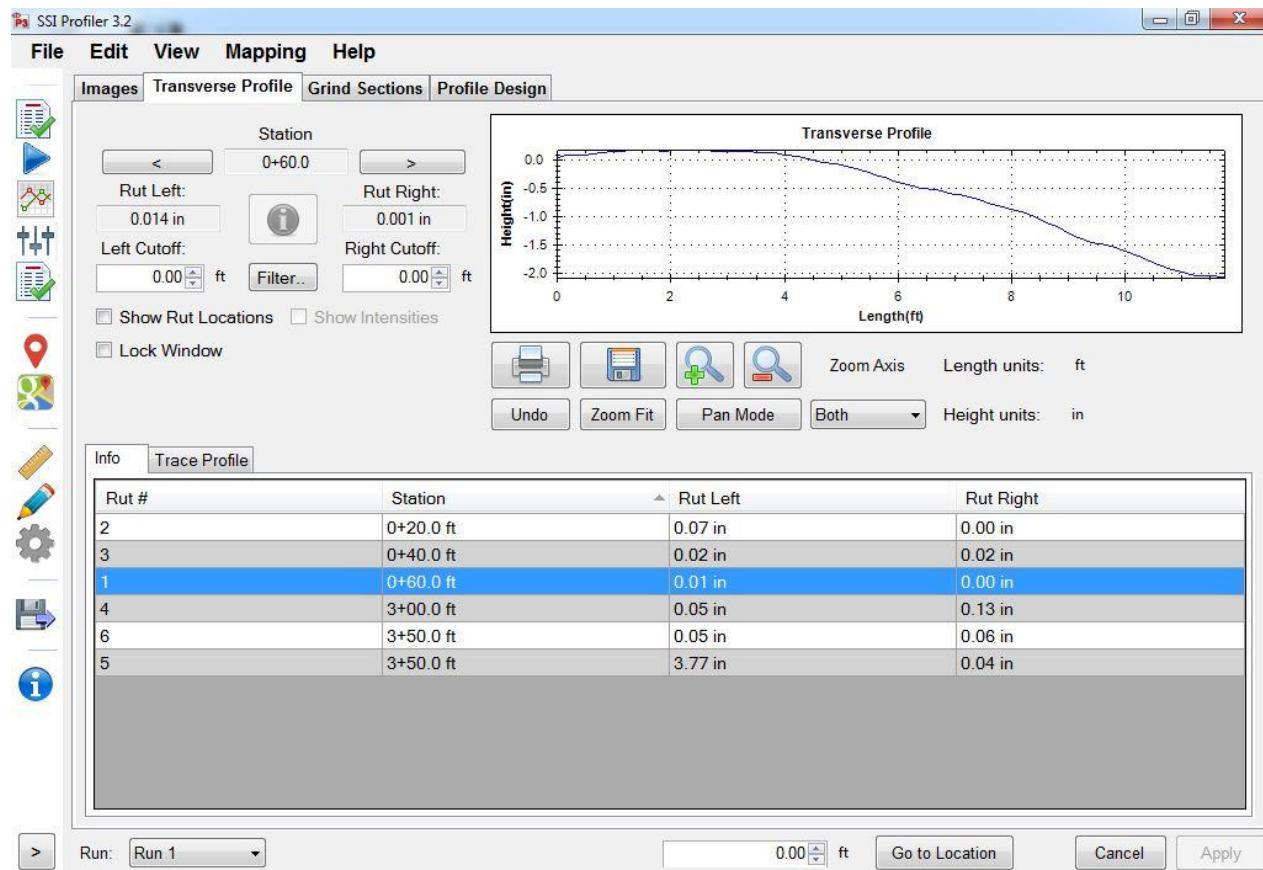


Figure 69. Transverse profile viewing window

Reporting

File Tab

New

Selecting New creates a new project file to be saved on the operator's computer or external device. The file will open automatically and the bottom left corner of the program will display “New File.” If data has been collected with this file, the name will be displayed with an asterisk as “New File*.”

Open

Opens a project file previously saved on the operating computer or connected external device. Profiler V3 creates RSD type files. The RHD file type from the previous version of Profiler can also be opened in Profiler V3. If your file is in another format, use the appropriate translators found on the support website (<http://www.smoothroad.com/support/download.asp>) or contact S.S.I.

Customer Support. The only two file formats used in the Profiler V3 program are RHD and RSD. Profiler V3 only collects data in the **RSD** format.

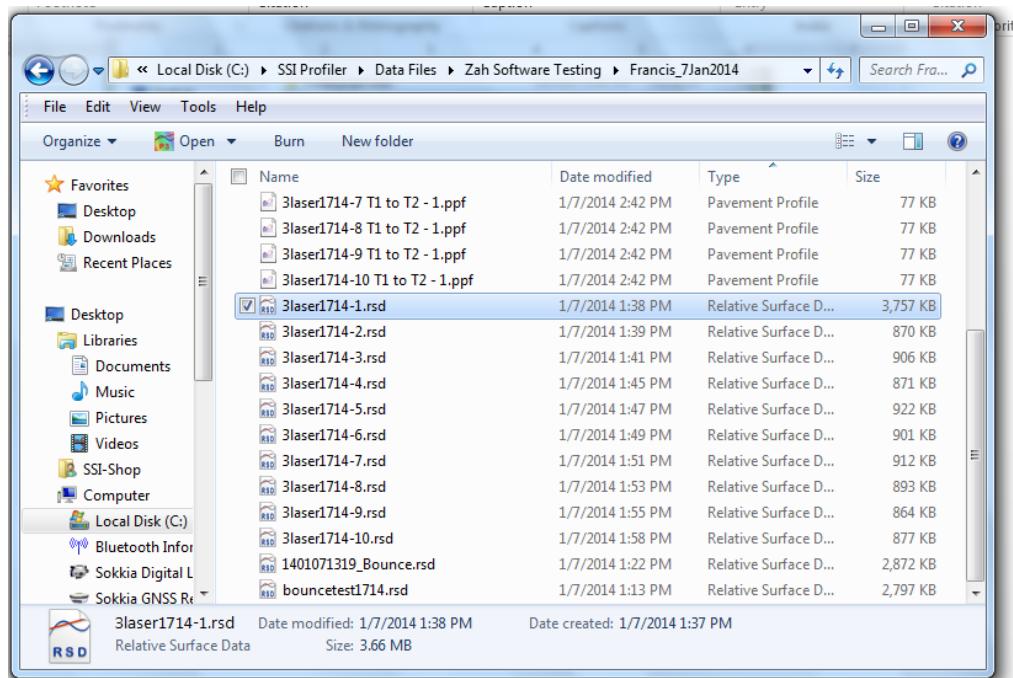


Figure 70. Opening a data file in the Profiler V3 program

Open Recent

Opens recently viewed or created project files. Files will only be available if they are saved on the operating computer or connected external device. The Open Recent feature is a shortcut to find current profiling data. It is also possible to use the File>Open tool to open saved data. The only two file formats used in the Profiler V3 program are RHD and RSD. Files can only be saved in RSD. The default file to be searched for in Window's Explorer can be changed under General Settings and the "Default File Type."

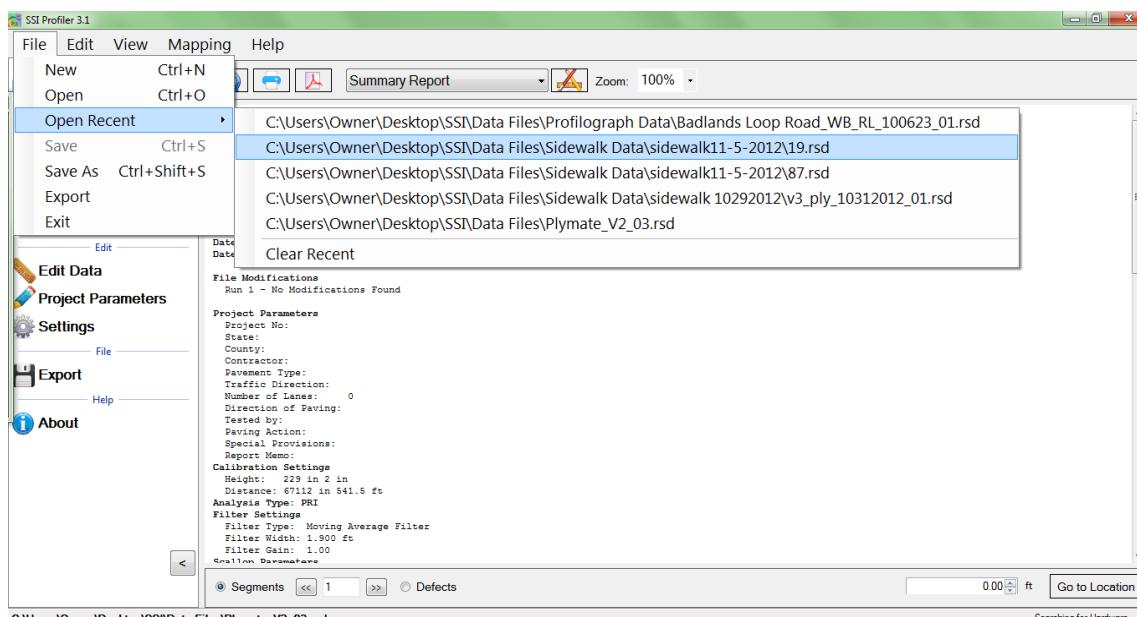


Figure 71. The Open Recent feature

Clear Recent

Clear Recent deletes the history of previously viewed RHD and RSD files. Once the history is cleared it cannot be reversed. The operator must navigate to File>Open to view saved files.

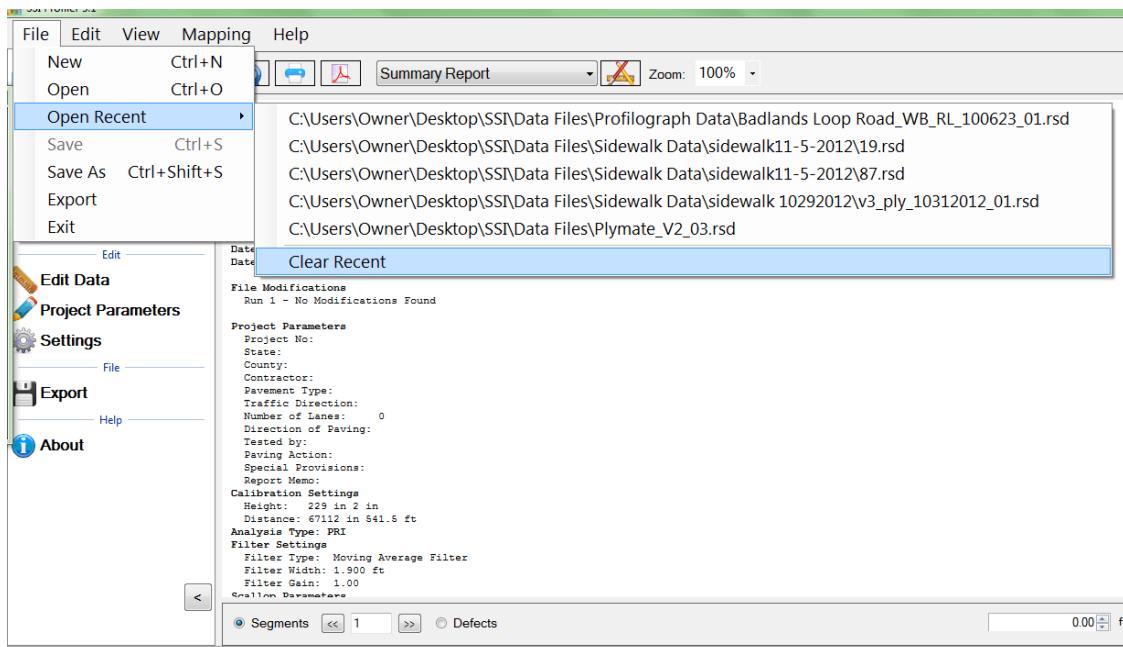


Figure 72. The clear recent feature

Save

Save allows the operator to save the current file in RSD format on the operating computer or connected external device. If 'Save' is selected while an unsaved file is open, the operator will be prompted to choose a file name and folder destination to save the current file. The file will be saved in SSI's patented RSD format. If another format is required, visit the SSI support website (<http://www.smoothroad.com/support/download.asp>) to download the latest translators or contact SSI Customer Support.

Save As

When Save As is selected, the operator will be prompted to choose a file name and folder destination in which to save the current file. The file will be saved in SSI's patented RSD format. If another format is required, visit the SSI support website (<http://www.smoothroad.com/support/download.asp>) to download the latest translators or contact SSI Customer Support.

Note: Save and Save As are only available after data has been collected or if changes are made to preexisting file.

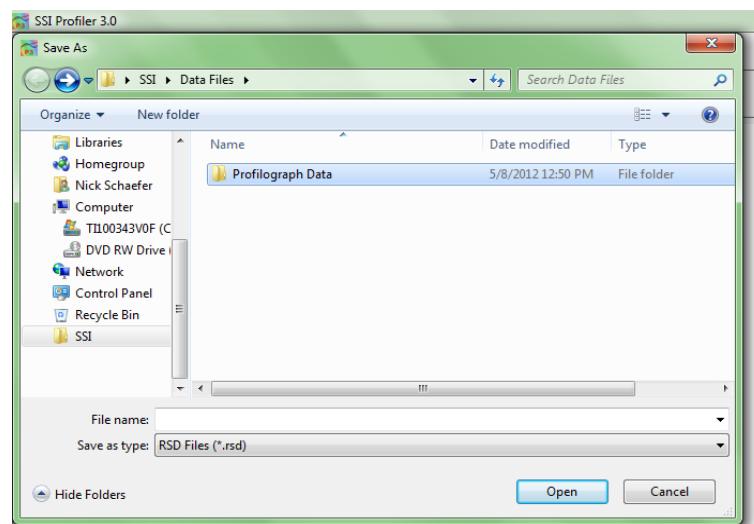


Figure 73. Saving a file through Save As in RSD

Exporting

Exporting allows the operator to create files in **ERD, PPF, PRO, Survey, GPS Matching, and Excel** formats. The settings for each export feature are described below. For each of the exporting formats, a folder destination is required. The Export feature can be found in the shortcut bar on the left hand side of the Profiler V3 window and in File>Export.

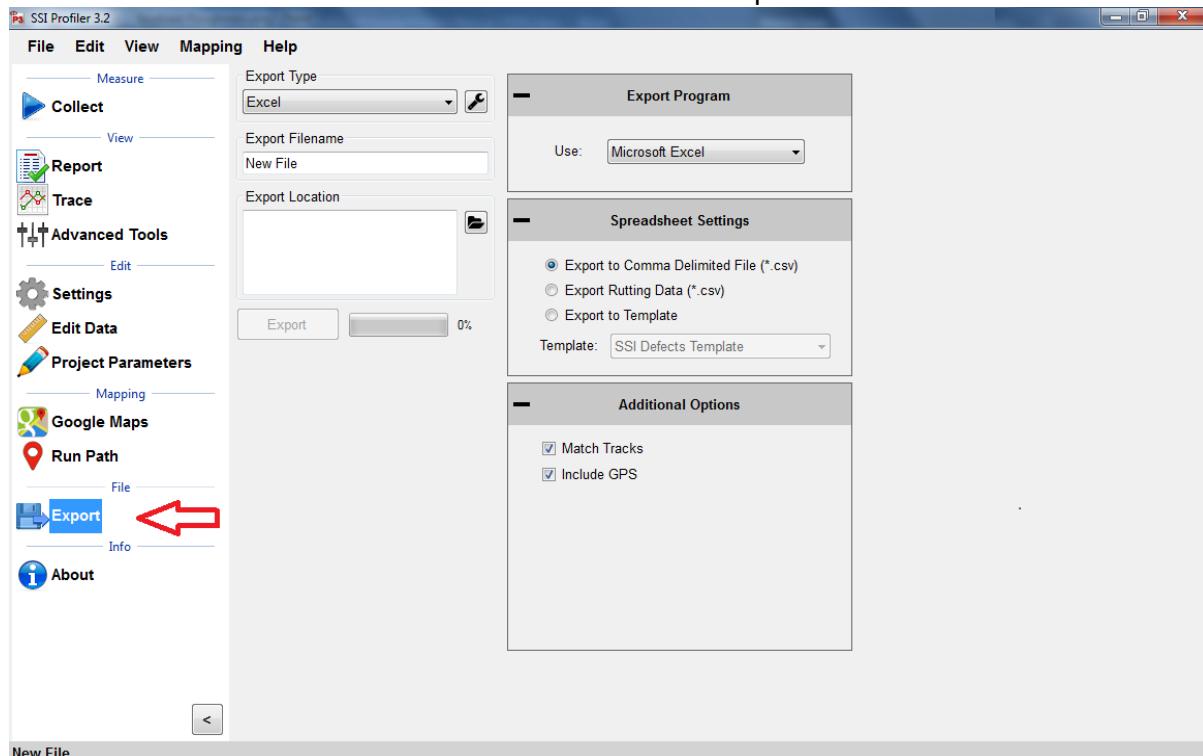


Figure 74. Window for exporting the data into Excel format

Export Location

To select the folder destination, select 'Browse' and navigate through Windows Explorer to the desired folder. Once the folder destination is reached and selected, left click on 'OK' at the bottom of the window to save the folder location.

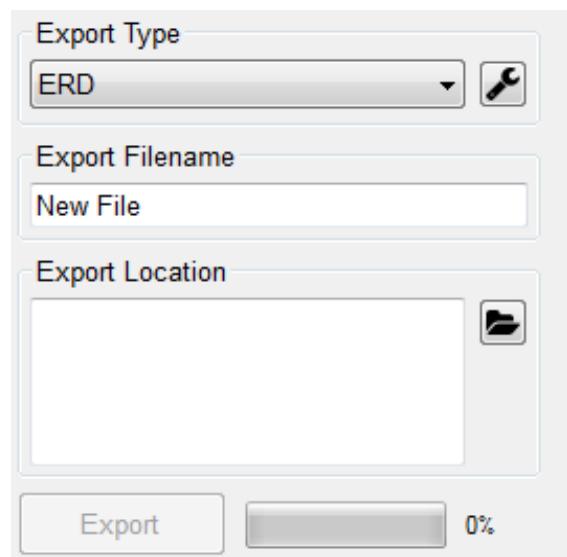


Figure 75. Select location to save the exported file

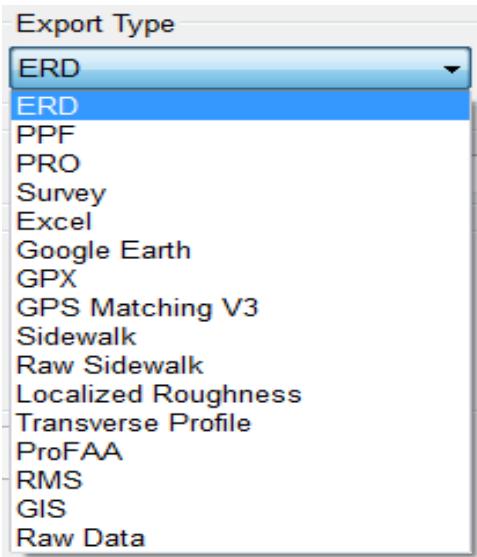


Figure 76. The export type drop down menu

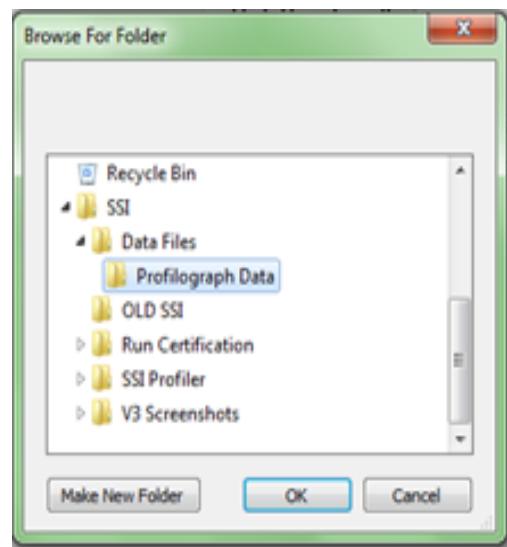


Figure 77. The export folder location selection

Exporting to ERD Format

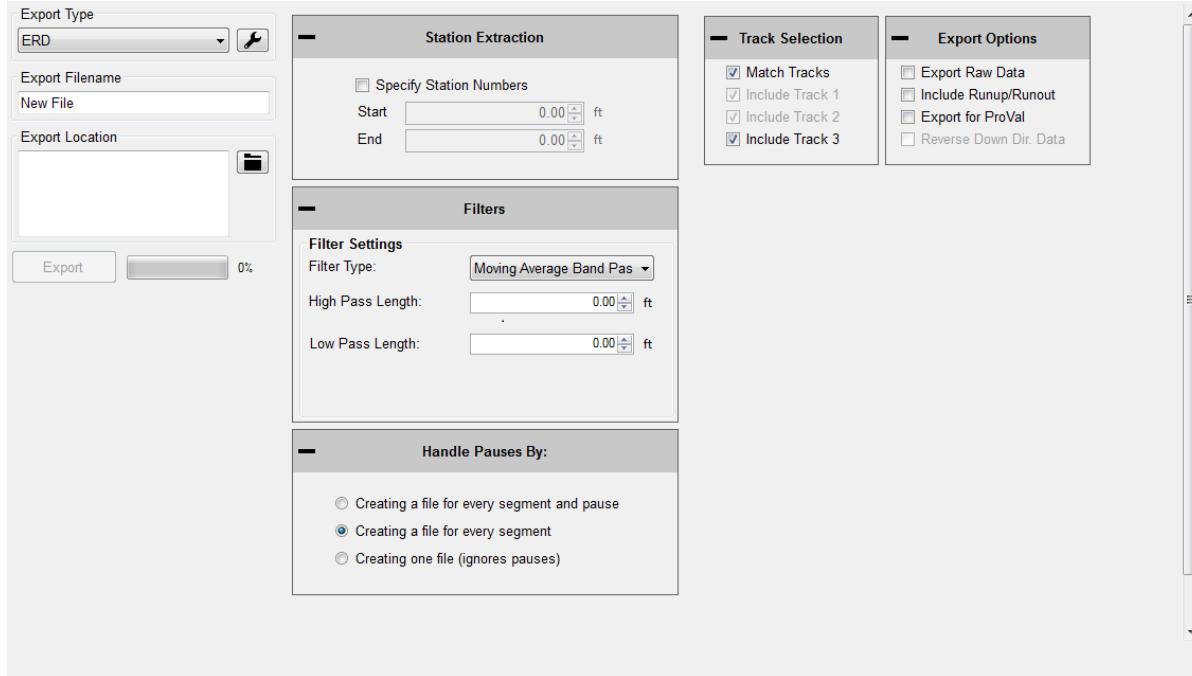


Figure 78. The ERD format export window with match tracks selected.

Station Extraction

The operator has the option export only certain sections of the data, based on the stationing set within the profiling data. To use this feature, select the check box near "Specify Station Numbers." When the box is selected, the operator will be able to adjust the stationing numbers. The 'Start' stationing is the initial stationing where the exported file will begin, while the 'End' stationing is the point where the exported file will finish. These values can be adjusted by typing values into the box or by using the arrow keys to the right of the box.

Filter Settings—High & Low Pass length

The exported data file can have additional filters applied while being processed into the chosen format. To not filter the data, leave the filter lengths at the default value of 0.00 feet.

Moving Average High Pass Filter

A high pass filter will remove any trend that is shorter than the selected length. Typical range of length for this filter is one hundred feet (100 ft.) through two hundred feet (200 ft.).

Moving Average Band Pass Filter

This filter only allows the desired frequency of data to be shown. Adding this filter will adapt the profile trace to remove the high frequency motions. Moving average filters are typically used for short data runs less than two hundred feet (200 ft.).

Butterworth High Pass Filter

High pass filters allow the high frequency characteristics of the data plot to pass through while blocking the lower frequency attributes of the data run. Butterworth filters do not introduce a phase shift into the plot like moving average filters. Butterworth filters are traditionally used for longer data runs over two hundred feet.

Butterworth Band Pass Filter

This filter will perform both a high pass and low pass Butterworth filter operation on the data. The result is a run that has frequencies within the lower and upper bounds. Butterworth filters do not introduce a phase shift into the plot like moving average filters. Butterworth filters are traditionally used for longer data runs over two hundred feet.

Include Run Up – Run Up Data

Some High-Speed Profiling data files have Run Up and/or Run out data associated with them, depending on the practice used to collect the data. If this data exists in the data file, it will be included in the exported file if this box is selected. Run Up and Run out is used to allow the electronics to settle on the accurate profile.

Run Up data exists in HSP data files if the operator selected a Run Up and/or Run out distance in the initial stages of setting up a collection. In the HSP collection software, the Run Up and Run out settings are found on the last window before performing a collection. Use run up and run out to stabilize the electronics before the starting location is reached.

Export Raw Data

Selecting the Export Raw Data check box assures the operator that only unfiltered data collected from the profile will be exported into the chosen file.

Match Tracks and Choosing Tracks

Match Tracks

Selecting ‘Match Tracks’ exports all of the tracks associated with the lane file. For the three laser systems, this includes Track 1, 2 and the center trace. For Profilograph files, the tracks are matched based on the settings entered prior to profiling. The label of the track number and stationing cannot be changed after collection.

Choosing Tracks

The tracks that are exported are checked under “Track Selection.” If Match Tracks is selected the user cannot deselect track 1 or 2.

Ignore Pauses

Pauses are useful when an obstruction comes into the profiling path or when a section of pavement is not to be profiled. When Pause is activated, the stationing remains constant and under the same file. Pauses can either be omitted or included in reports and exported files of Profiler V3 software. To omit pauses from the exported file, select the check box, "Ignore Pauses."

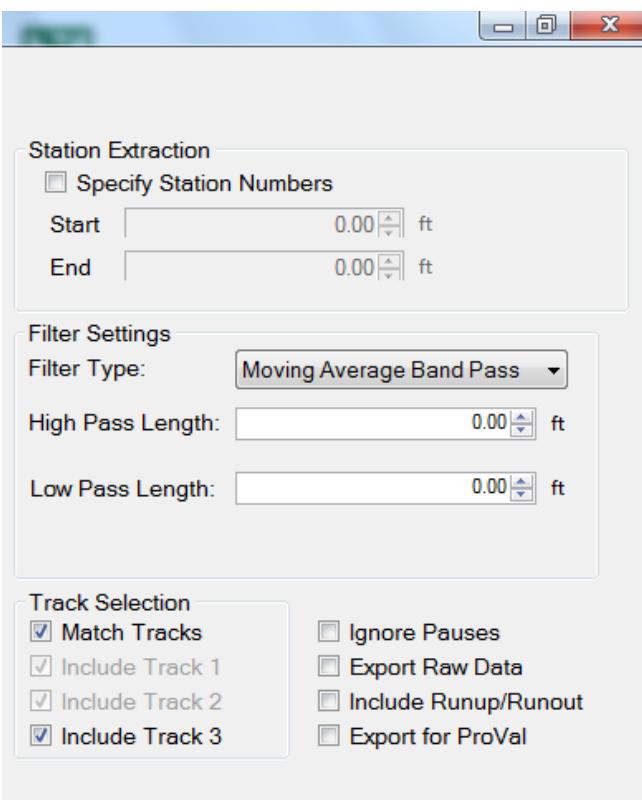
Include Run Up/ Run out

When this option is selected, the Run Up and Run out data collected during the collection will be included in the export data.

Export for ProVal

When the user exports an ERD file for use in ProVal, it changes the file's default filters and settings to more accurately match the values in ProVal.

Figure 79. The ERD export window settings



Exporting to PPF Format

Station Extraction

The operator has the option to export only certain sections of the data, based on the stationing set within the profiling data. To use this feature, select the check box near "Specify Station Numbers." When the box is selected, the operator will be able to adjust the stationing numbers. The 'Start' stationing is the initial stationing where the exported file will begin, while the

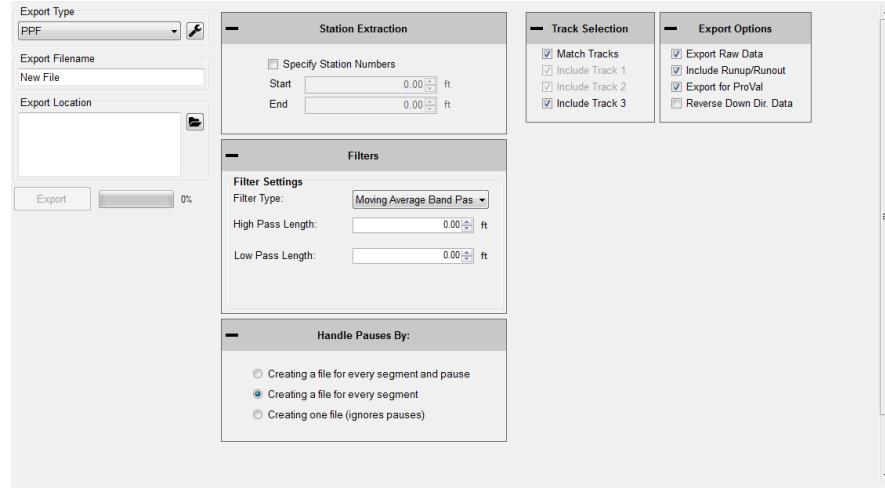


Figure 80. The PPF export window

'End' stationing is the point where the exported file will finish. The start and end stationing can be adjusted by typing values into the box or by using the arrow keys to the right of the box.

Filter Settings—High & Low Pass Length

The exported data file can have an additional filter applied while being processed into the chosen format. To not filter the data, leave the filter lengths at the default value of 0.00 feet.

Available Filters:

- Moving Average High Pass Filter**
- Moving Average Band Pass Filter**
- Butterworth High Pass Filter**
- Butterworth Band Pass Filter**

Include Run Up and/or Run out Data

Some High-Speed Profiling data files have Run Up and/or Run out data associated with them, depending on the practice used to collect the data. If this data exists in the data file, it will be included in the exported file if this box is selected.

Run Up data only exists in HSP (High Speed Profiler) data files if the operator selected a Run Up and/or Run out distance in the initial stages of setting up a collection. In the HSP collection software, the Run Up and Run out settings are found on the last window before performing a collection.

Match Tracks

Selecting ‘Match Tracks’ exports all of the tracks associated with the lane file. For the three laser systems, this includes Track 1, 2 and the center trace (track 3). For the Profilograph files, the tracks are matched based on settings entered prior to profiling. The stationing and number label assigned to the track are settings that cannot be changed after collection.

Ignore Pauses

Pauses are used when an obstruction comes into the profiling path or when a section of pavement is not to be included in the calculation of ride values and localized roughness. While Pause is activated, the program will continue to collect stationing data, but will not collect height data. Pauses can either be omitted or included in reports and exported files. To omit pauses from the exported file, select the check box, “Ignore Pauses.”

For importing into ProVal, the best method is to include pauses. The pauses of the rsd file will turn into a leave-out section within ProVal. If pauses are not included during export, it will result in two PPF files for the same track. There will be one more PPF file than the number of pauses.

Export for ProVal

When the user exports a file for use in ProVal, it adds a negative sign in front of all stationing. This is done because ProVal does not use stationing, it only uses forward distance. If you collect data down station, you must check the Export for ProVal box to keep accurate stationing through the collection. ***Always choose “Export for ProVal” when importing into ProVal.***

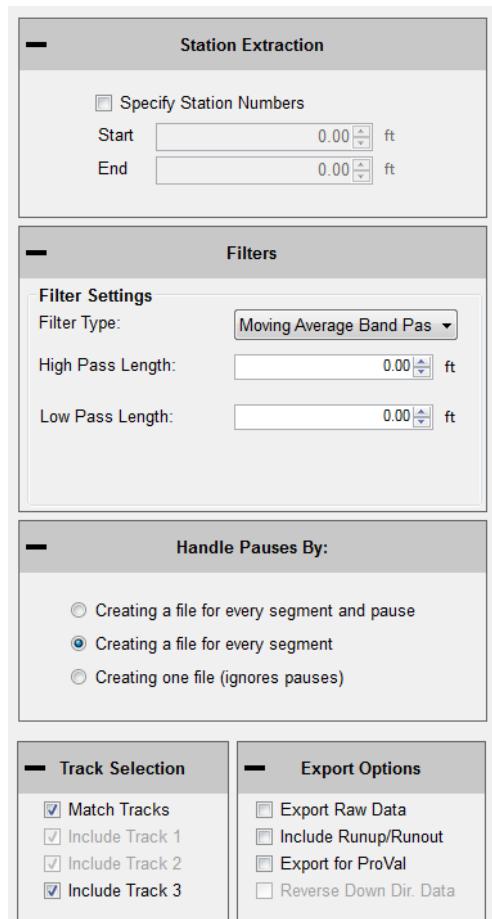


Figure 81. Optional settings when exporting in PPF

Exporting to PRO Format

The screenshot shows the 'PRO' export type selected in the top left. The 'Station Extraction' section contains fields for 'Specify Station Numbers' (checkbox), 'Start' (0.00 ft), and 'End' (0.00 ft). The 'High Pass Filter' section includes a checkbox for 'Use Custom Filter Length' (set to 61 m). The 'Export Settings' section has checkboxes for 'Include Run Up/Out For Filtering', 'Export Raw Data' (unchecked), and 'Match Tracks' (checked). The 'Handle Pauses By:' section offers three options: 'Creating a file for every segment and pause' (radio button), 'Creating a file for every segment' (selected radio button), and 'Creating one file (ignores pauses)' (radio button). The right side of the window is the 'Details' section, which includes fields for District Number (01), Reference Marker (0000), County Number (001), Reference Offset (00.000), Highway Descriptor (HH000H), Lane Descriptor (L0), Certification Number, Certification Date (Sunday, March 18, 2018), Comment, Certification Level, Serial Number, Operator Name, and Profiler Model (SSI_CS9100).

Figure 82. The PRO format window

General Settings

Station Extraction

The operator has the option to export only certain sections of the data, based on the stationing set within the profiling file. To use this feature, select the check box near "Specify Station Numbers." When the box is selected, the operator will be able to adjust the stationing numbers. The 'Start' stationing is the initial stationing where the exported file will begin, while the 'End' stationing is the point where the exported file will finish. These values can be adjusted by typing values into the box or by using the arrow keys to the right of the box.

Filter Settings-High Pass Length

The High pass filter length can be changed when exporting files to PRO format. A High Pass Filter removes all of the data trends below the filter length. The default length of the High Pass Filter is 200 feet. In order to export the data without filtering, the 'Export Raw Data' check box must be selected. See 'Export Raw Data' below.

Export Raw Data

Selecting the Export Raw Data check box assures the operator that only unfiltered data collected from the profile will be exported into the chosen file.

Match Tracks

Selecting 'Match Tracks' exports all of the tracks associated with the lane file. For the three laser systems, this includes Track 1, 2 and the center trace (Track 3). For the Profilograph files, the tracks are matched based on settings entered prior to profiling. The label of the track cannot be changed after collection.

Handle Pauses By:

The paused sections within the collected data can be exported in two ways. Separate files can be created for each segment or the profile data can be exported with the paused sections included in one file. The difference in these two options is that creating separate files for each segment exports multiple files into the folder location, while the “Using pause events” option exports one file including all of the data. If the pauses were used to omit data because of pavement anomalies, use the option of ignoring the pauses.

Details

The details section of PRO exporting is the job specific information saved with the file, such as **District Number**, **County Number**, **Reference Marker**, **Reference Offset**, **Highway Descriptor**, **Lane Descriptor**, **Certification Number**, **Certification Date**, and **Comments**. This information is then saved with the PRO file to be displayed when the file is opened or printed using another program.

Exporting to Survey Format

Station Extraction

The operator has the option to export only certain sections of the trace, based on the stationing set within the profiling data. To use this feature, select the check box near “Specify Station Numbers.” When the box is selected, the operator will be able to adjust the stationing numbers. The ‘Start’ stationing is the initial stationing where the exported file will begin, while the ‘End’ stationing is the point where the exported file will finish.

These values can be adjusted by typing values into the box or by using the arrow keys to the right of the box.

The screenshot shows the 'Station Extraction' window with the following settings:

- Export Type:** Survey
- Export Filename:** New File
- Export Location:** A dropdown menu.
- Buttons:** Export (disabled), Progress bar (0%), and a large gray button.
- Station Extraction Tab:**
 - Specify Station Numbers
 - Start: 0.00 ft
 - End: 0.00 ft
- Additional Settings Tab:**
 - Stationing Units: Feet
 - Output Sampling Interval: 0.30 m
 - Use Filters from Settings
 - Include Center Track
 - Merge Runs: Left to Right

Figure 84. The window for exporting in Survey format

Filter Settings

High and Low Pass filters are optional when exporting to survey format. The exported data file can have an additional filter applied while being processed into the chosen format. To not filter the data, leave the filter lengths at the default value of 0.00 feet.

Available Filters:

- Moving Average High Pass Filter***
- Moving Average Band Pass Filter***
- Butterworth High Pass Filter***
- Butterworth Band Pass Filter***

Output Sampling Interval

The sampling interval is the distance between readings of the SSI survey system. The default length of this interval is 1 foot. This feature allows other intervals to be implemented, depending on the accuracy specifications required in the surveying program.

The raw GPS will be exported in a separate text file in a NMEA (GPGGA) GPS string format. To match tracks 1 and 2 within the same file select the match tracks option.

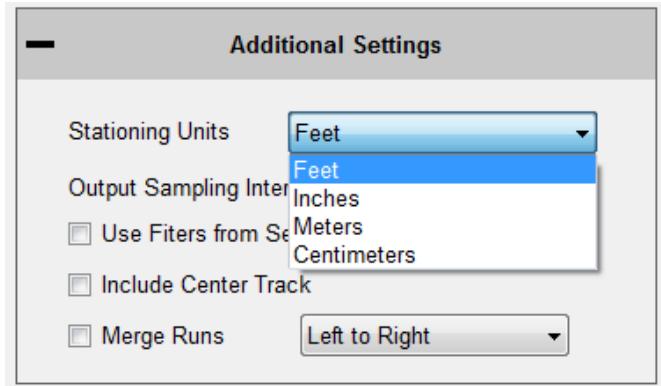


Figure 85. Stationing units dropdown menu and options

Exporting to Excel Format

Exporting the profile data to excel gives the operator versatility and efficiency when an adjustable numerical printout is needed.

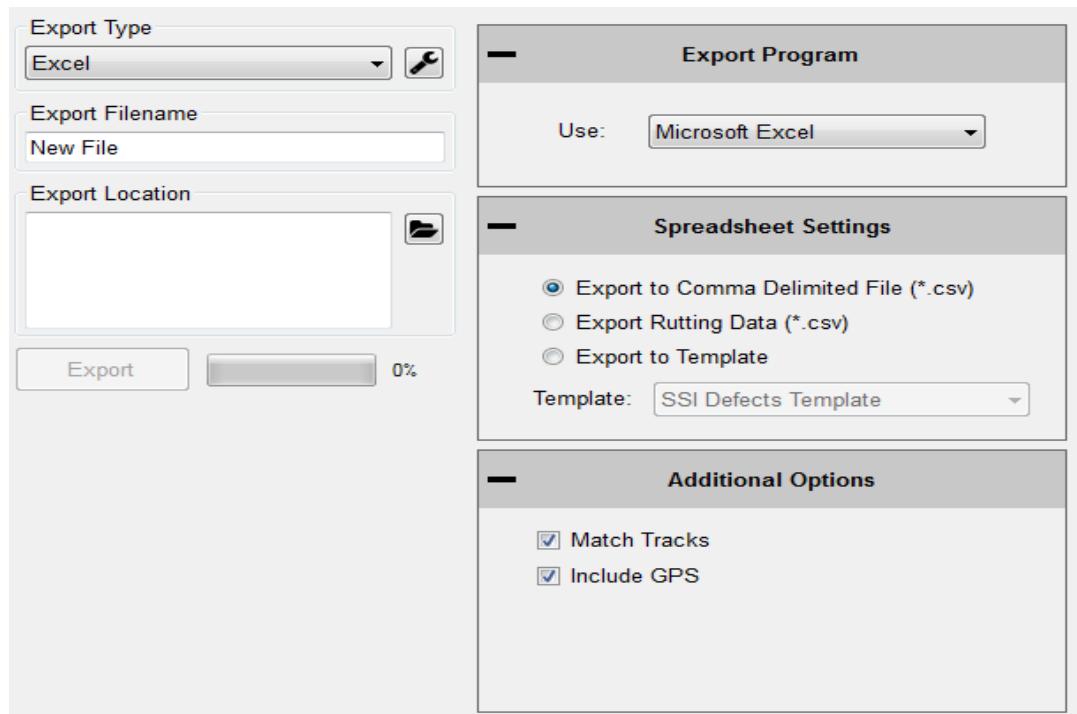


Figure 86. Exporting the data into Microsoft Excel format

Export to Template

To choose a SSI Excel Template, select “Export to Template.”

Defects Template

The Defects Template shows the locations and heights of the defects and information about the file in spreadsheet form.

IRI Template

The IRI Template shows IRI statistics along with the defect locations and heights.

PRI Template

The PRI Template lists the PRI for each track along with the bump heights, locations and settings.

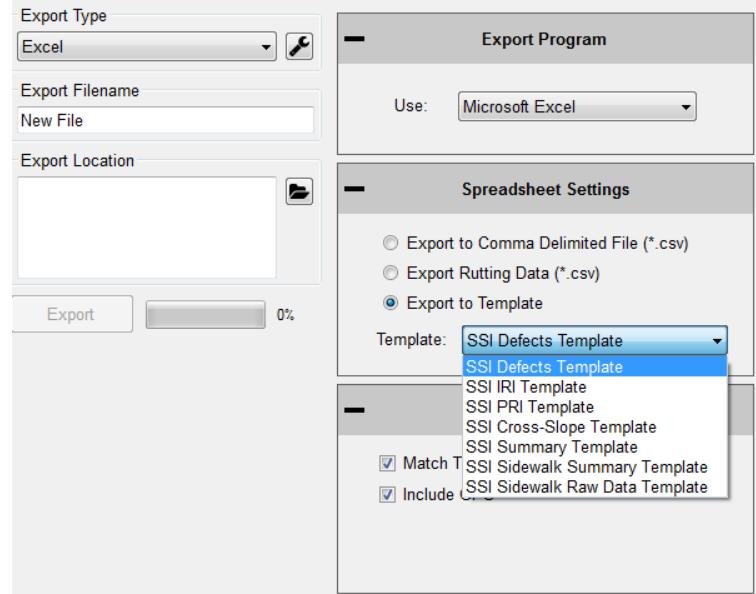


Figure 87. The types of excel formats are listed

Summary Unmatched

The Summary Template shows a version of the summary report the calculated PRI for each track along with the bump heights, locations and settings in spreadsheet form.

Note: Sidewalk templates are reserved for Sidewalk Profiler. For more info visit www.smoothroad.com

Exporting to Google Earth

The export to Google Earth feature allows operators with Google Earth installed on their computers to view the test data in the real environment. The view of the Google Earth feature shows the project area with the traces superimposed onto the window. The user may view the traces and project from any view or angle. For this feature to be used, the operating computer must have Google Earth installed.

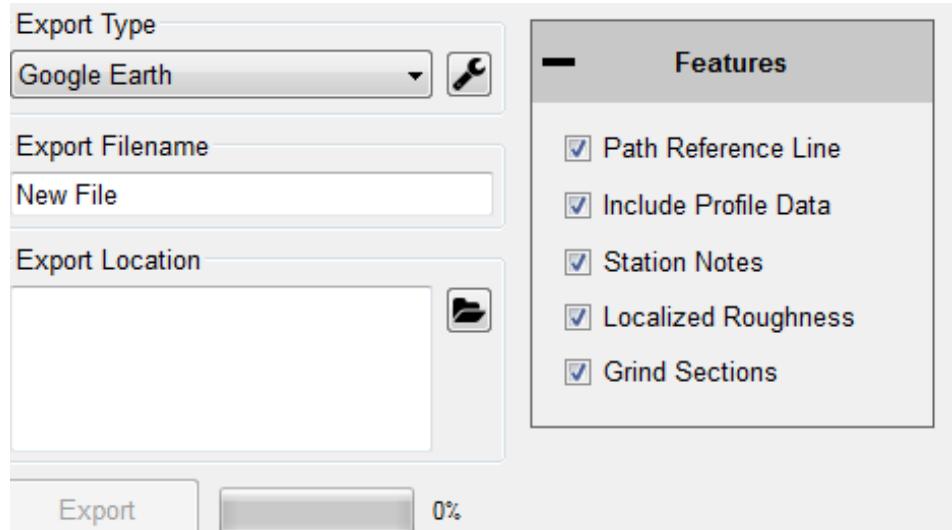


Figure 88. Google Earth export settings

The user may then use Google Earth to view the profile trace in their computer, tablet or smart phone as long as the device has Google Earth installed. The .kmz file can be emailed to the device or sent via Bluetooth if your Toughbook is equipped.

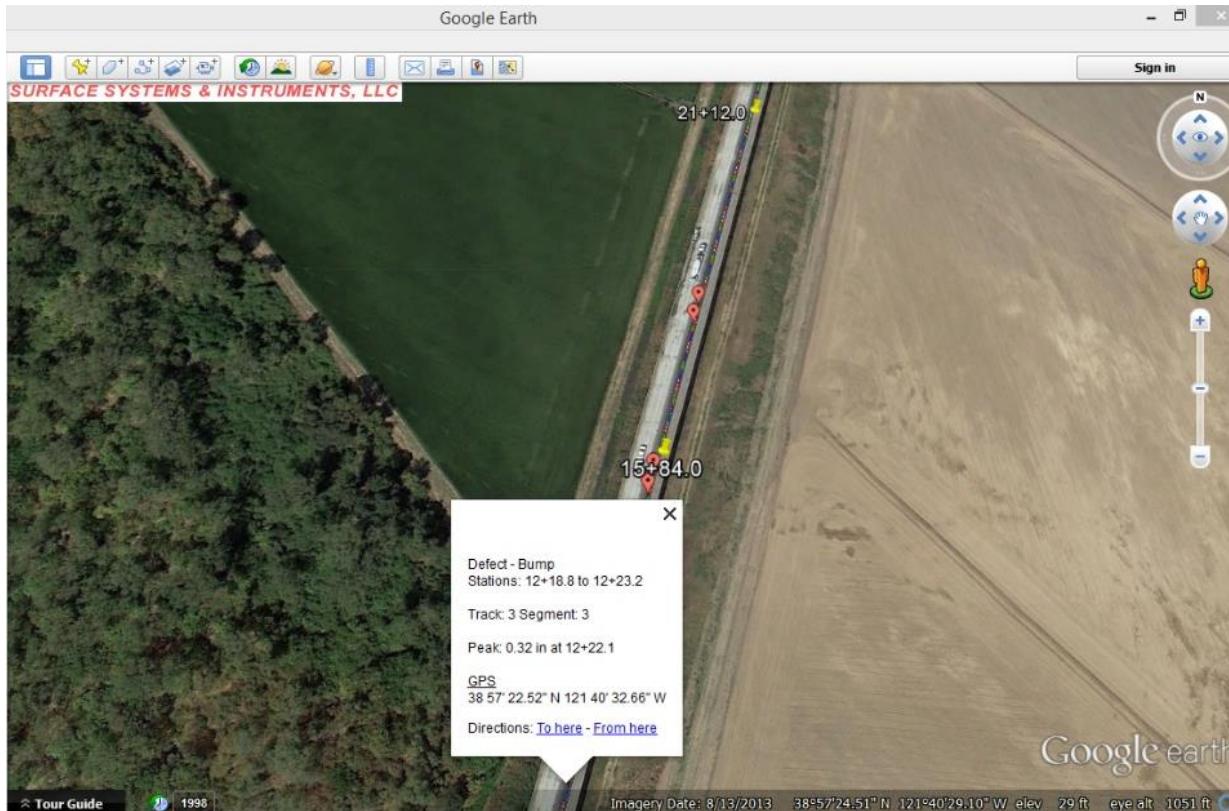


Figure 89. Google Earth view on

Exporting to GPX Format

The GPS coordinates can be exported into a format for submittals. The GPS coordinates of the defect can be viewed through the defect start station, defect end station or the defect peak station. Specific runs can be chosen to retrieve the GPS coordinates by adjusting the drop-down menu under the title, "Select Run to Export."

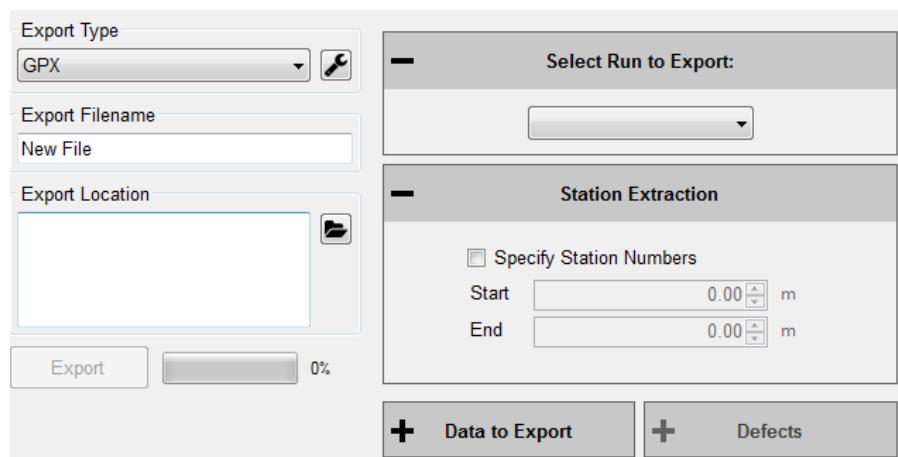


Figure 90. The export window for GPX format

Under the title "Data to Export" there are multiple check boxes. In order to export the defect's GPS coordinates, the "All Raw GPS Locations" check box must be unchecked. Once the "All Raw GPS Locations" box is deselected, the options to export the defect stationing GPS coordinates become available.

Exporting to Sidewalk Format

This option is only to be used with files collected with the SSI Sidewalk Profiler (CS-8850). The sidewalk format has all of the information of the collection exported into GIS compatible file types. The files types and the corresponding information (See Glossary for explanation) are:

Ngd: Contains synchronized distance, time, and gyroscopic data for a specified collection interval.

pxyzd: The three dimensional profile derived from the travel grade and gyroscope.

pxyzdg and pxyzdinc: Same as pxyzd, except without column headers for the data.

rmpslp: Rmpslp is the ramp and running slope exceptions. The column headers are travel distance, marker distance, time, ramp type, and casename.

rmpslpg: Rmpslpg contains the same data as the file rmpslp, except rmpslpg does not have column headers. This format contains travel distance, marker distance, time, ramp type, and casename.

rmpslpg_ls: Rmpslpg_ls is a line segment version of rmpslpg without column headers.

uba: This file contains the bump height and bevel slope data. The column headers are; travel distance, bump type, bump height [inches], bevel slope, and the casename.

ubag: Ubag contains the same data as uba, but ubag does not have column headers for the data. This format contains travel distance, bump type, bump height [inches], bevel slope, and the casename.

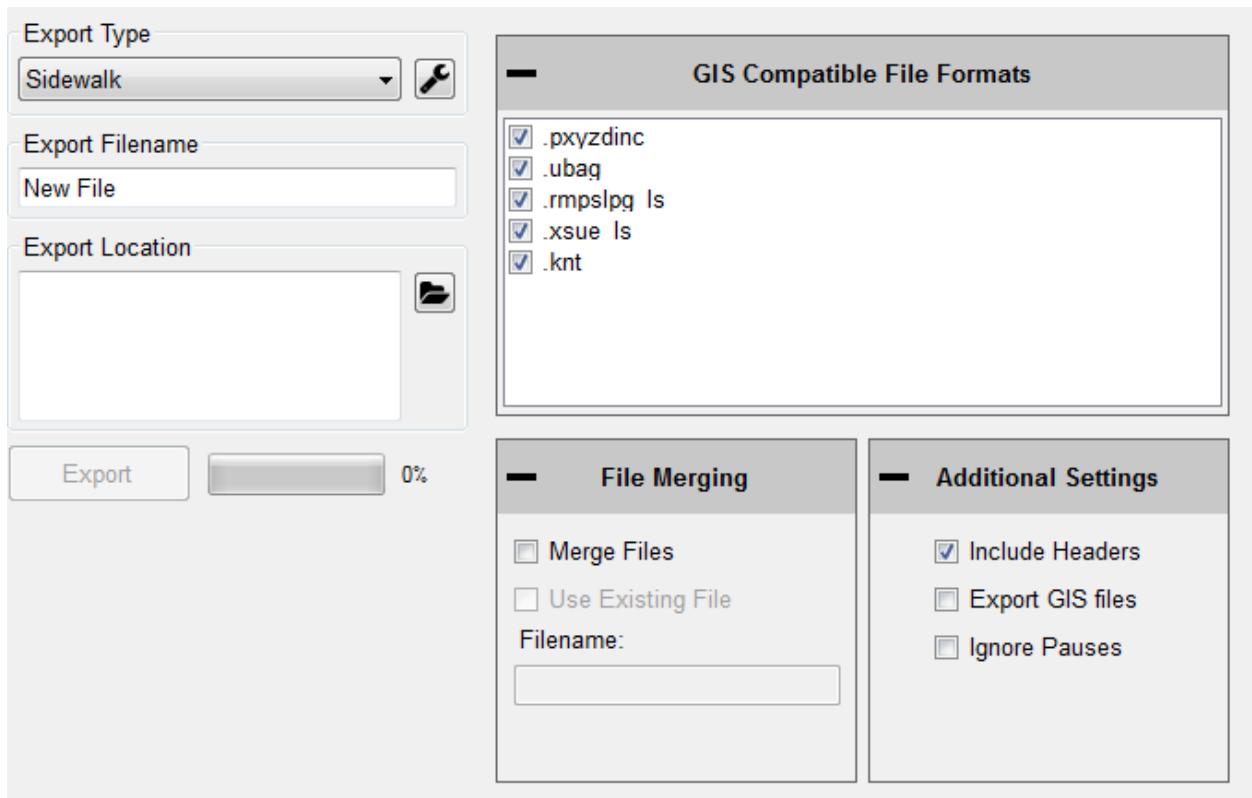


Figure 91. Export to Sidewalk window

Exporting to Localized Roughness

The localized roughness export feature allows the user to create an excel spreadsheet of the localized roughness, or defects, for the collected data.

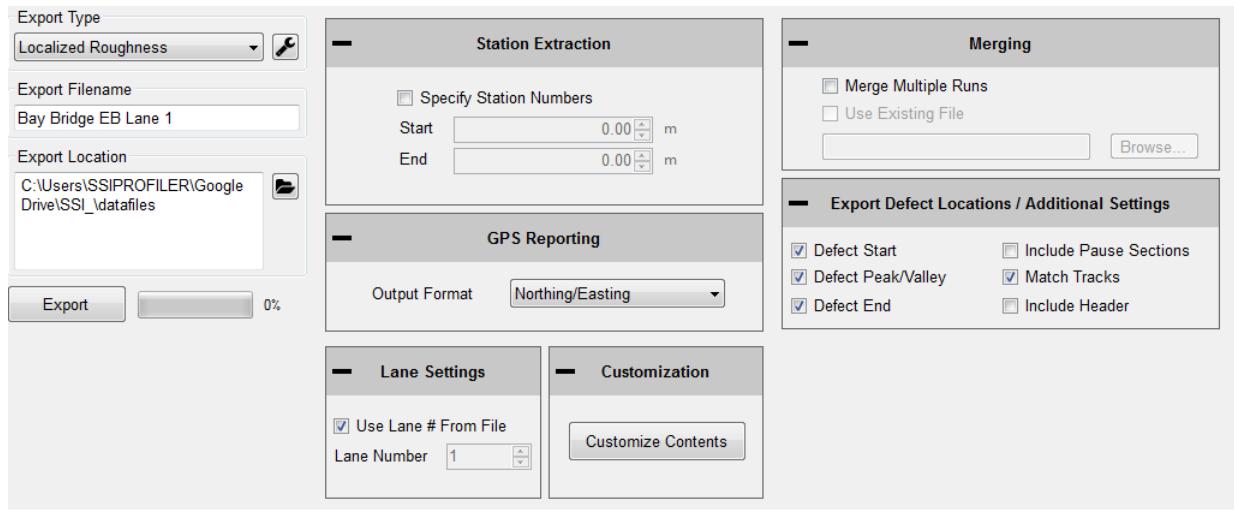


Figure 92. The Localized Roughness export options window

Specify Station Numbers

If the user desires to only export a section of the collection, select this check box and enter the start and end stationing of the soon to be exported section. If the specify station numbers is not selected, the entire collection will be exported.

GPS Reporting

To choose the type of GPS format used in the export, select Northing/Easting, Decimal Degrees, or NMEA Format from the drop down list.

Lane Settings

The user may change the lane number that is currently in the collection file by selecting this check box and entering the correct lane number. To change the lane number, deselect the check box and change the lane number in the input location.

Customization

The user may add, move and remove columns from the Excel spreadsheet format. To do this, open the “Customize Contents” window and use the arrow keys. Move up and move down to change the order of the included columns. The columns types are at the top of the “Columns in File” side the left-most columns in the exported Excel file.

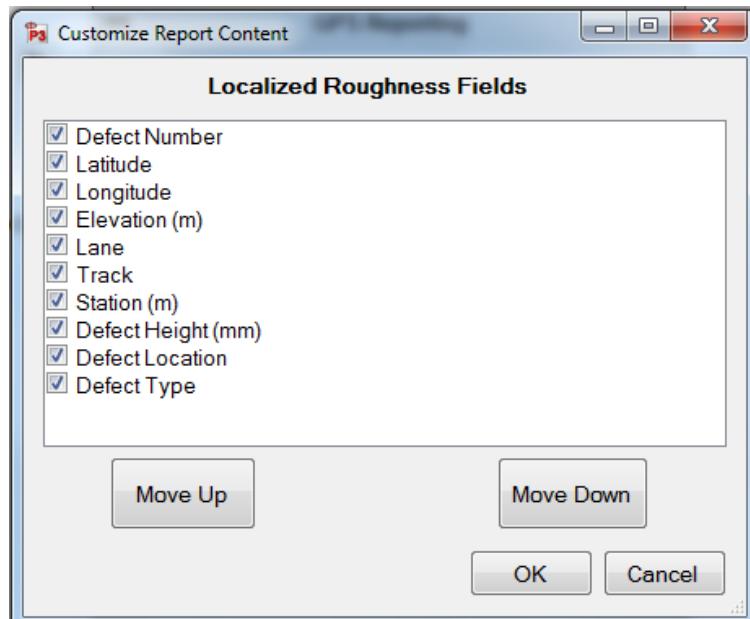


Figure 93. The Customize Window

Merging

The ‘Merge Multiple Runs’ check box allows the user to include multiple collection runs in the spreadsheet. Runs that are saved in a separate file can be opened and exported alongside the current file by selecting “Use Existing File” and browsing to enter the location of the file.

Export Defect Locations

Use the check boxes to select whether the program will export the start, peak and end of the defect in the spreadsheet. The user will have the option to match tracks 1 and 2, include the paused sections, and include the header information. When paused sections are included the defects within the paused sections will be listed.

ProFAA

ProFAA is the format used for the Federal Aviation Administration (FAA) profiling program. This is the program that uses the Boeing Bump test method. The user can enable high and low pass filters, change the start and end stationing, including the pauses and exclude specific tracks from the exported data.

Exporting raw data will force the data through a linear regression filter and have the data begin and end at zero elevation. The Run Up and Run out data can be included by selecting the check box.

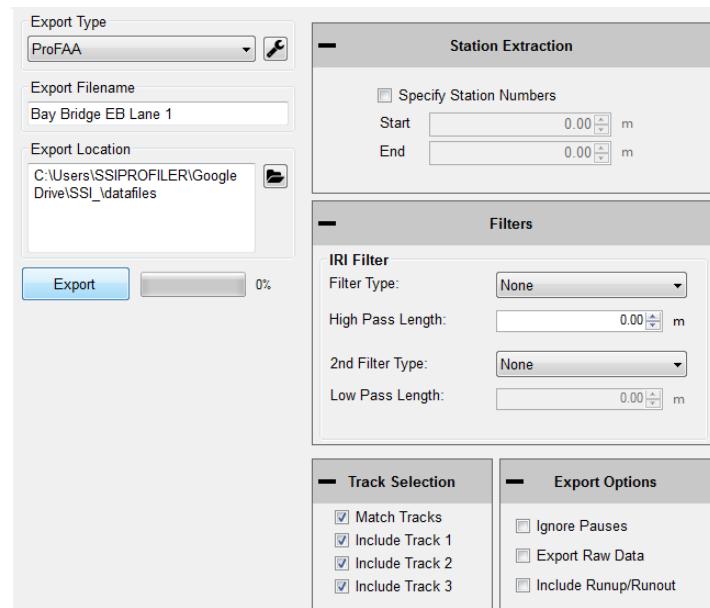


Figure 94. ProFAA window

RMS Export

The RMS export is a normalization of the profile data. RMS removes the influences of long wavelengths and grades while focusing on the amplitudes of the wavelengths in the profile. The RMS output does not show the frequency of these amplitudes in the profile, only that they exist.

Set the RMS base length for continuous RMS and the sampling/segment interval.

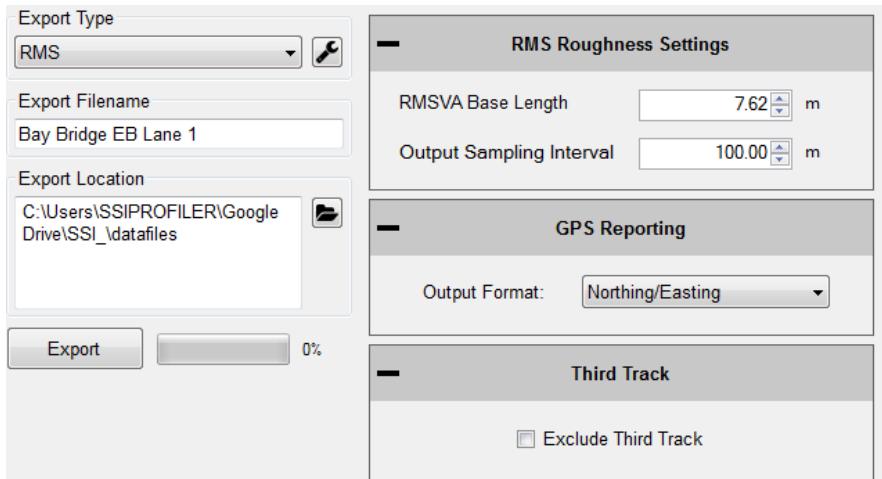


Figure 95. RMS export settings

GIS Export

The GIS export will create shape files for the segments, localized roughness, events, and track path for the profile. These files will be organized into their own folder entitled GIS Files under the destination folder.

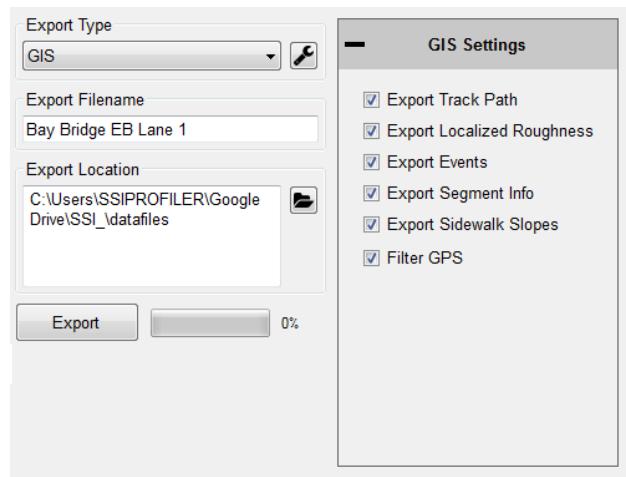


Figure 96. GIS export settings

Exporting Raw Data

The user can export raw elevation data, GPS data and GPS height data. The settings can be changed to export certain GPS string formats. It is recommended to use the Linear Regression Removal Filter to set the raw elevations along the null line. Otherwise there can be drift in the trace and give inaccurate elevation data.

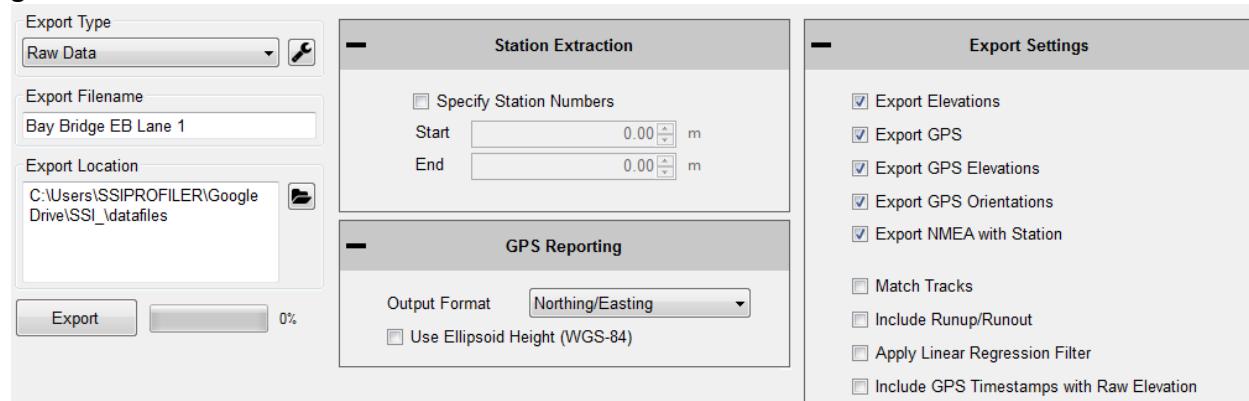


Figure 97. Exporting Raw Data Settings

Exiting Program

To exit the Profiler V3 program, save current project and click the red “X” at the top right corner or navigate to the File tab and select Exit. If the current project is not saved when the program is terminated, Profiler V3 will ask if the operator would like to save the current project. To save and exit the program, select “Yes.” If you do not wish to exit to program, select cancel and the program will remain open.

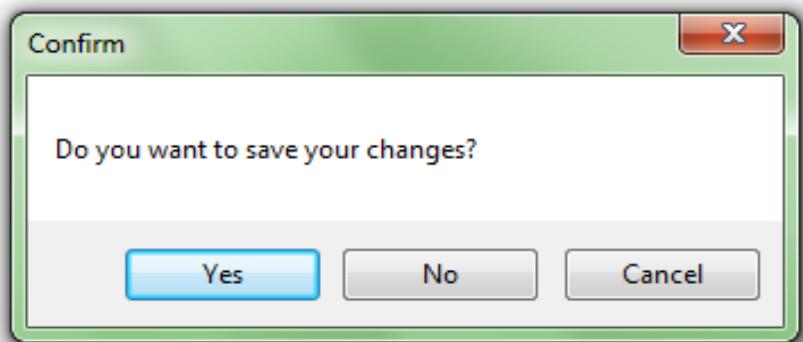


Figure 98. Exiting the program- Saving

General Settings

Configuration

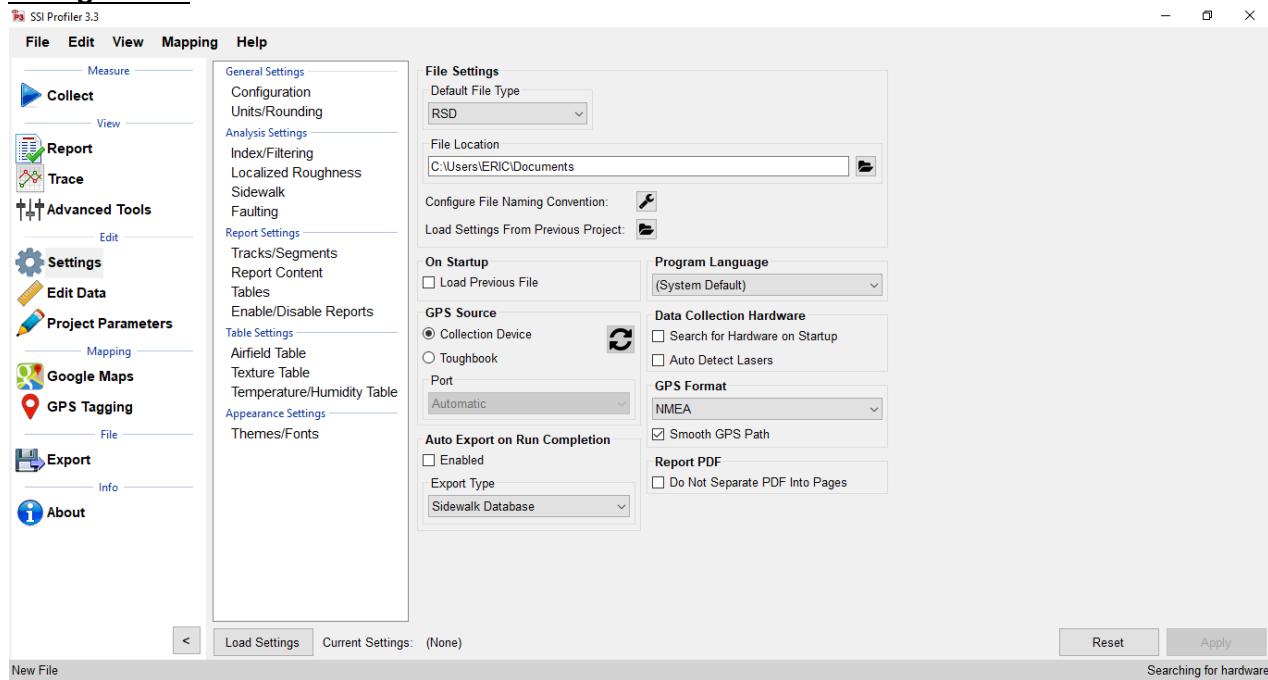


Figure 99. Configuration window under General Settings

File Settings

Default File Type (RSD, RHD)

The drop-down menu can be used to select the type of file opened in Profiler V3. Both RHD and RSD files can be imported into the program at any time. The default file type is the file format that will be used automatically when files are opened. **Profiler V3 only saves in the RSD format.**

Default File Location

The default file location is the folder on the computer or external device that Profiler will search for the default file type. This folder can be changed through the Browse icon. If a location is used to open a file, the program will use this location to open files for future attempts. This feature saves time opening files since the program opens directly to the file location. Select **Apply** after a folder is chosen.

Default File Name

The file name can be chosen to have a name based on parameters of the program or by using a pre-loaded template. The parameters can be chosen from the list of (multiple can be chosen): Contractor, Country, Tester, etc. When a template is selected there will be a preview at the bottom of the window. Select OK and Apply to set this configuration as the default file name.

Creating a New Template

Create a New Template by selecting the “New Template” icon on the right side of the window. Select the template’s name to rename it and append parameters to it. ***The template will be used as long as it is selected when OK is selected at the bottom right corner when exiting the Default File Name tool.***

User Defined Parameter

To create parameters that are specific to the job, type a new parameter name into the User Defined Parameter text box and select “Add User Defined Parameter.” The bracketed variable will appear in the filename preview. To add information to the user defined parameter, open Project Parameters and the User Defined Tab. The name of the parameter will be under the Key column. Under the Value column, enter the information that is needed in the filename.

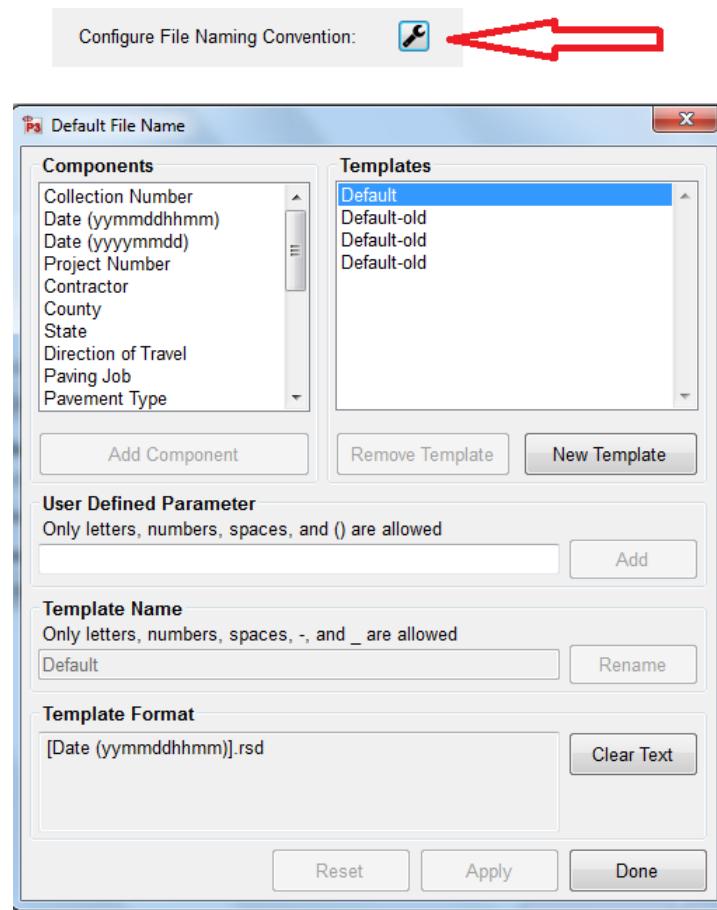


Figure 100. Custom file naming convention

Changing the Template Name

The template’s name can be changed by changing the characters under Template Name. Once a change is made, the Rename icon will be available. Select OK or Apply to save the changes.

Adding Parameters to the Template

When adding parameters to the template they will only be added to the right end of the template, as seen in the naming preview. **Select Apply after changes are made to the template.**

On Startup

Load Previous File on Startup

If this box is selected in figure 85, the file that was open when profiler closed last will be reopened when the program is started. A report of this file will be generated when the program is opened.

Load Previous File’s Settings

The user may choose a previous file to save time if entering the same analysis parameters or project parameters under “Settings.” To load a previous file’s setting’s, choose the file under General Settings **or** start a new file and choose one of the three options.

Use Last File’s Parameters

This option will use the last file’s settings under the localized roughness and project parameters.

Choose from a Previous File (Browse)

When this option is chosen a window explorer window will appear and the user may select a file that is saved on the computer to import the saved file’s parameters under analysis and project parameters.

Set File Parameters after Collection

By choosing this option the user will not import a previously collected file but will instead manually set the parameters after the collection has finished.

Automatically Refresh Reports

The reports will automatically refresh when the operator navigates to the report window from another tab. When the user makes a change of report type within the report window, the refresh button will have to be selected manually.

Data Collection Hardware

Search for Hardware on Startup

If this option is selected the program will search for hardware and, if available, will connect to it upon opening the program.

Disconnect Hardware When Changing Tabs

If this feature is checked the program will disconnect from the hardware when the operator leaves the collect tab.

Report Generation

Generate Reports in Color

If the reports are generated in color, the defect types will be more visible. On the trace reports dips will appear be highlighted blue and bumps will be highlighted red.

Include the Footer

If the footer is included, the file name and the page number will be printed at the bottom of each page for the report. Select the check box to apply this feature.

Do not include the footer while printing with a Printrex 422.

Enable Animations

When enable animations is selected, the windows within Profiler V3 will slide across the screen whenever the operator moves from one section to another (Reports to Collect). This feature does not affect the functionality of the program, but adds an aesthetic behavior when changing windows.

Formatting

Font Settings

The report font can be changed by selecting the Font Settings icon under formatting. This allows the user to make the size of the font smaller or larger. The image scaling allows the user to print off less pages by increasing the scaling factor. The window that appears can also change the font to a strike-through or an underline.

Image Scaling

The default for the image scaling is 100%. When image scaling is set to a percentage greater than 100%, it acts the same way as the zoom function. The size of the traces within the reports will increase.

Profiler Software Update

Profiler V3 will check the internet connection by attempting to connect to the website listed under this location. If the internet connection is found, the updates will be available for download from the SSI server.

Program Language

Choose between English, Spanish (North/Central America) and, Spanish (South America)

Analysis Parameters (Ride Values)

Profiling Units

English

Selecting English units sets the segment length to 528 feet. English units use inches for the height of the defects, counts for roughness settings, and feet for scallop width and filter lengths. After every change of units, select apply in the lower right corner to save.

Metric Meters

In Metric Meters units, the blanking band, scallop height and scallop resolution are all in cms. The rest of the measurements for scallop width and filter lengths are in meters. The Metric Meters and Metric Centimeters settings have the same units of centimeters for height, and meters for length for all sections of defects and roughness. After every adjustment of units, select apply.

Metric Centimeters

Selecting Metric Centimeters units, the blanking band, scallop height and scallop resolution are all in centimeters. The rest of the measurements for scallop width and filter lengths are in meters. The Metric Meters and Metric Centimeters settings have the same units of centimeters for height, and meters for length, for all sections of defects and roughness. After every adjustment of units, select apply in the lower right corner to save changes.

Metric Millimeters

Selecting Metric Millimeters units, the blanking band, scallop height and scallop resolution are all in millimeters. The rest of the measurements for scallop width and filter lengths are in meters. After every adjustment of units, select apply in the lower right corner to save changes.

Exclude Paused Sections

When selected, the paused sections created during collection or through the Segment Adjustment window will not be included in the report.

Include Paused Sections

When Include Paused Sections is selected, the paused sections are included with the actual collection. The report will show the paused sections in the segment summary and the trace view.

Paused Sections Only

When 'Include Paused Sections Only' is selected from the drop-down menu, only the paused sections created during collection or through the Segment Adjustment Window will be displayed in reports.

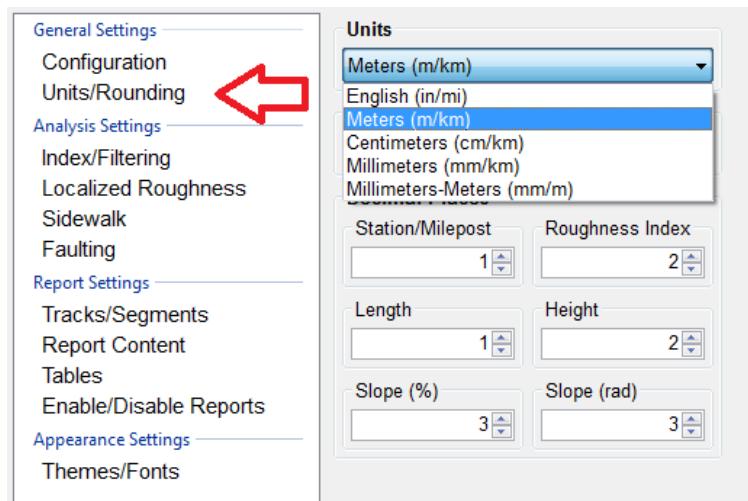
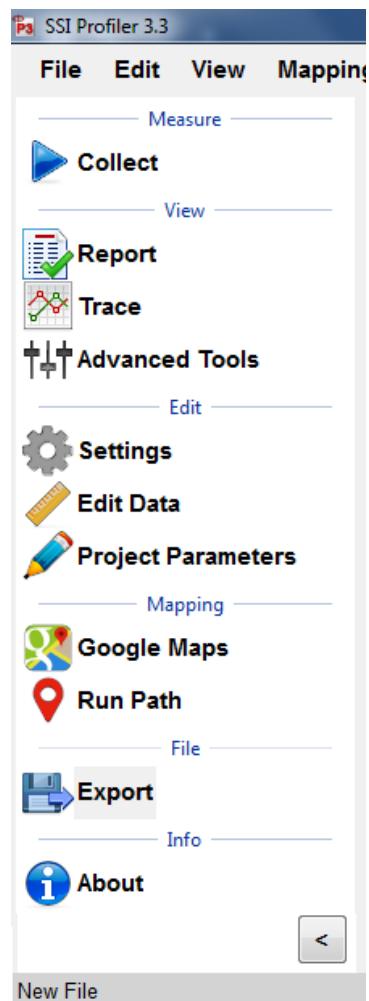


Figure 101. Units and rounding section of the General Settings

Shortcut Bar



completed.

The Shortcut Bar is located at the left side of the main window. The shortcut bar is used to navigate around the profiler program without using the menu bar.

The shortcut bar can be hidden by selecting the arrow at the bottom of the window. The direction that the arrow is pointing is the direction that the shortcut bar will move. It will either become hidden or reappear.

Figure 102. Shortcut bar with all the frequently used

Edit Data

Note: Any edit to the data will be described in the report header under File Modifications.

The edit data feature allows the user to adjust the starting station, insert pauses, or add events. All of this can be done in post processing, after a collection has been

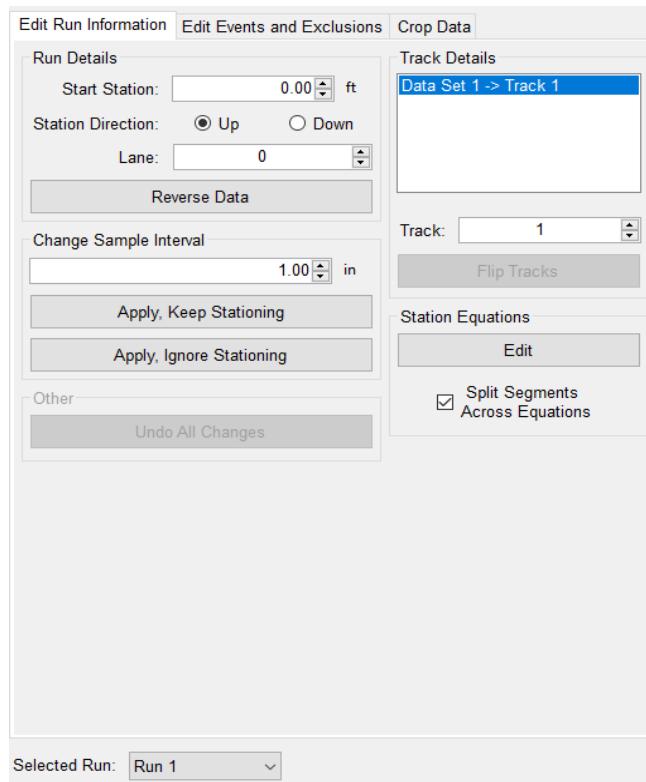


Figure 103. Edit run information tab

Edit Run

Open the Edit Data feature in the shortcut bar (Look for the ruler icon). Under Edit Run Information Tab, the user can adjust starting station, Lane, Track, and Station Equations. If the data was collected in the wrong station direction, the operator can change to Station Direction to Up or Down or use the 'Reverse Data' button.

Sampling Interval

The sampling interval is the distance between readings of the electronics of the profiling system (DMI, lasers, etc.). This is usually set to 1 inch, but can be changed under the 'Change Sample Interval'. Do not change the sample interval unless strictly necessary.

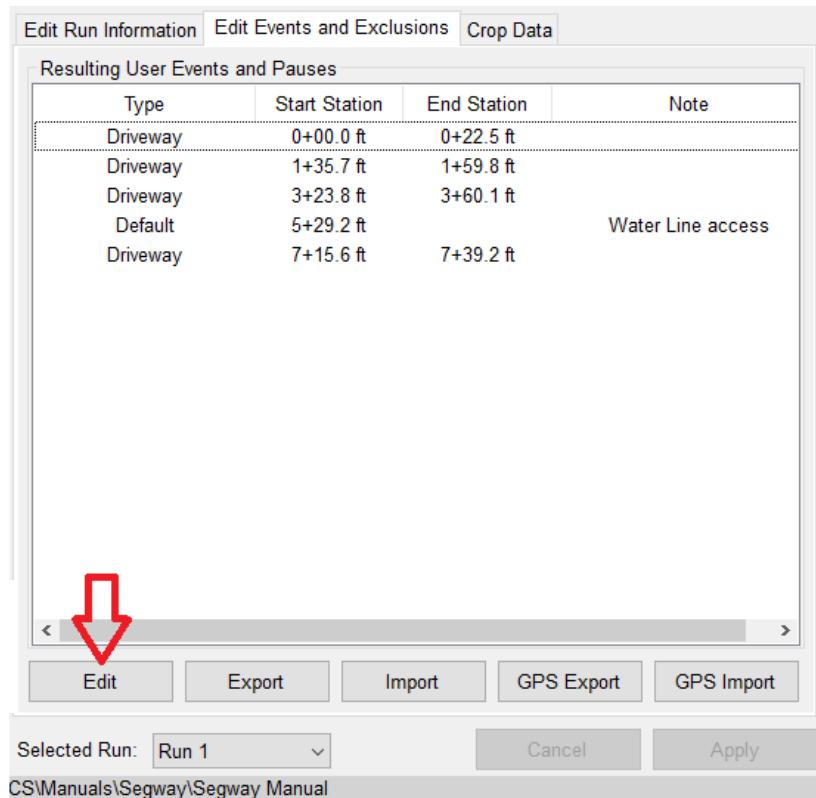
Edit Segments

The Edit Segment feature allows the user to add pauses to the collection or to ignore a certain distance of collected data at the beginning or end of the run.

Pause List

The Pause List shows all of the paused sections of the selected runs. The runs are selected from the drop-down menu of "Add Pause to Run."

Figure 104. Adding or removing pauses from the collection



Edit a Pause/Event

1. Select the pause or event to be edited in the left column list. It is selected when the blue bar is highlighted the Pause/Event title. See figure 86.
2. On the right side of the window, Select the run number to add the pause to from the drop-down menu.
3. Change the Type of Pause/Event
4. Change the Start and End Station.
5. Add a Note to the Pause/Event
6. Change Buffer settings.
7. Select the Apply button

Note: If the pause is going to be deleted, select the Delete icon to remove it from the list.

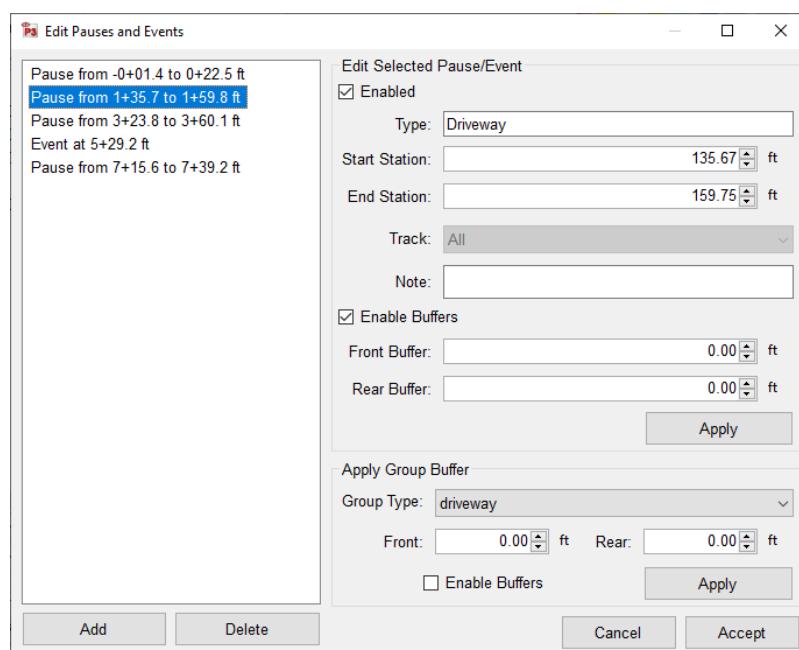


Figure 105. Edit pause and events window

Add a Pause/Event

1. Select the 'Add' button under the Pause/Default list in figure 86 above.
2. Select Pause or Event
3. Enable Pause/Event information
4. Choose Type, Start Station and End Station
5. Add notes and/or buffers
6. Select the 'Add' button

Pause Definition

When the collection system is paused, height data is omitted but distance is still collected. When the paused sections are excluded, the height values are not used in the calculation of localized roughness or ride values.

Start Station

The Start Station is the stationing where the pause is to begin.

End Station

The End Station is the stationing where the pause will stop, and collection will resume.

Pause Notes

To explain the reason for the pause/event or the location, enter the information in the pause notes. This information will appear in the track notes of the trace reports. See figure 87.

Pause/Event Buffers

Choose the Pause/Event Front and Rear Buffers. The units can be changed by simply clicking on the unit icon to the right of the buffer and a dropdown list will appear. Select Add when finished.

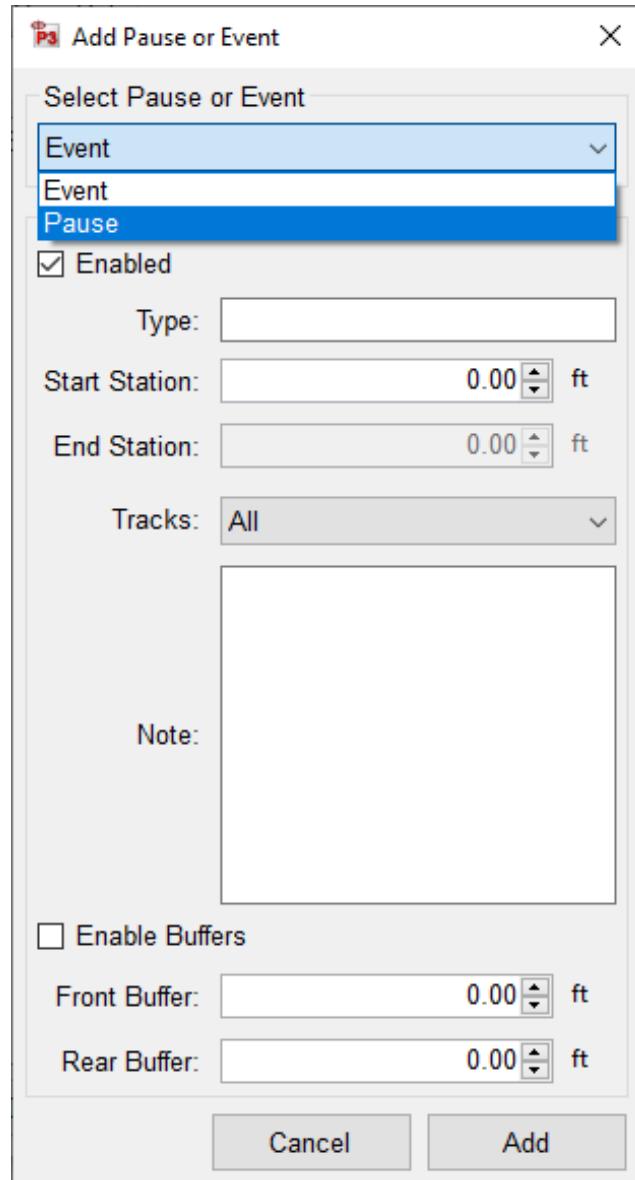


Figure 106. Add Pause/Event window

Crop Data

The Crop Data tool (See figure 88 below) allows the user to trim the collections before analysis and reporting. If any changes are made to the file, the information that was changed will be described in the report header under File Modifications. To crop the collection, change the distances for the run up and/or run out distances. When the lengths are at the desired distances, select **Apply**.

Change the distance units and height units of the graph by clicking on the units icon and selecting from the drop down menu. The graph can also be seen in the Pan or Zoom mode with an option to apply on either the x axis, y axis or both.

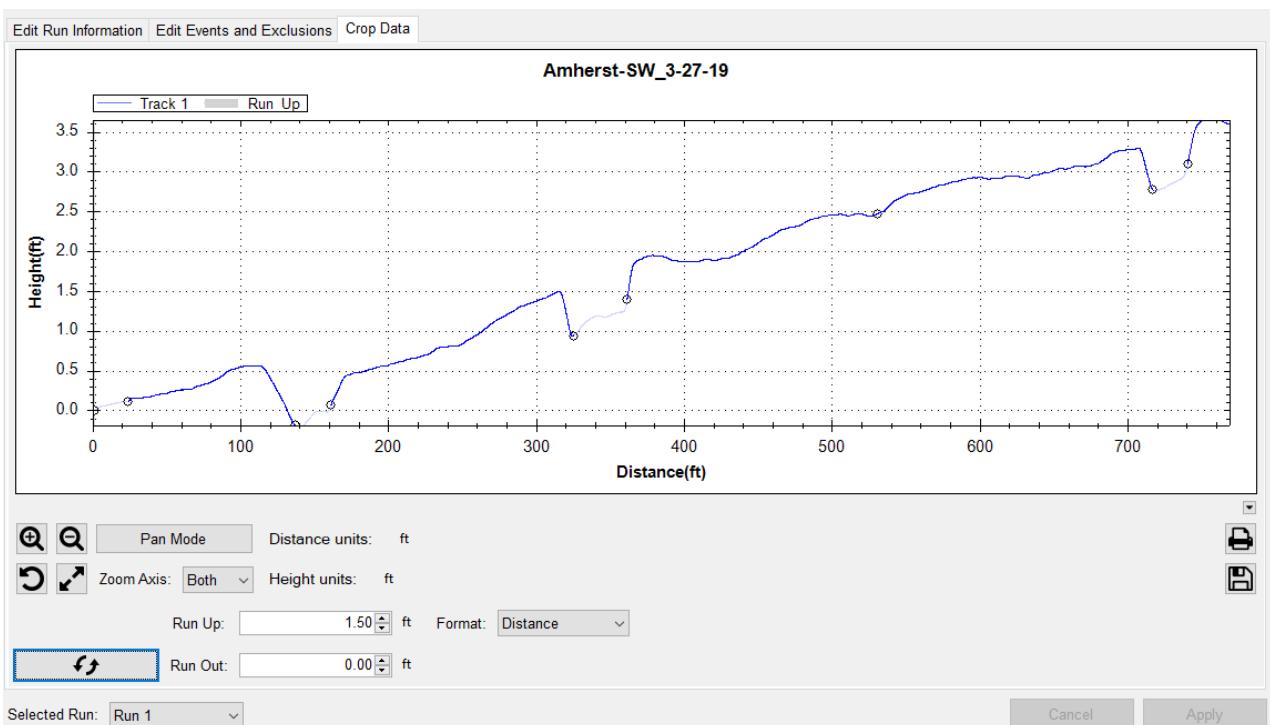


Figure 107. Crop Data Tool

Project Parameters

The Project Parameters section is the location where the job information is entered. This information appears on the header of the reports and the exported excel templates. Before leaving the Project Parameters window, always select 'Apply' if changes were made.

The screenshot shows the 'SSI Profiler 3.3' application window. The left sidebar has icons for Collect, Report (selected), Trace, Advanced Tools, Settings, Edit Data, Project Parameters (selected), Google Maps, GPS Tagging, Export, and About. The top menu bar includes File, Edit, View, Mapping, and Help. The main area has tabs for Job Information, Report Memo, User Defined, and Run Notes. The Job Information tab displays the following data:

Project	Paving	Additional
Project Number 301404	Pavement Type HMA	Tester SSI - Nicholas Schaefer
County VEN	Paving Direction	Driver
State CA	Paving Job Corrected	Date Tested Run 1 03/27/19 03:30 PM
Contractor Granite	Paving Action	Provisions
Road	Date Paved Run 1 10/23/19 04:09 PM	Report Specification CTM 387
Number of Lanes 1	Traffic Direction WB	Equipment/Vehicle Number
Traffic Direction	Roadway 126	Only parameters with specified info shown in reports.

At the bottom right are 'Apply' and 'Cancel' buttons.

Figure 108. Project Parameters on the Job Information tab

Job Information

The job information tab specific criteria listed below are descriptive information about the project. Review the contract to enter the required information into the sections listed below. These sections can be edited at any time within Profiler V3.

Project

Project Number

The Project Number is unique to each project. This is to be determined by the State, Federal DOT or by the contractor. This information will be listed in the project contract.

County

This location is reserved to list the county where the profiling is taking place.

State

The state in which the profiling is taking place and the job is located.

Contractor

This section is for the name of the paving company or for the company operating the profiler.

Road

Traffic Direction

The traffic direction of the lane to be profiled.

Number of Lanes

The number of lanes of the project. This section can be changed by inputting values directly or by using the arrow keys. Traditionally, the number of lanes is the number of lanes travelling in the same direction for main line freeways. Use a classification system that can be understood during post-collection analysis.

Paving

Pavement Type

Input the type of pavement here. Enter pavement types such as Cold-in-Place Asphalt, HMA, JPCP, CRCP, Open Grade etc.

Paving Direction

Enter the direction of the paver when placing the pavement.

Paving Job

Specify the type of paving job, either corrected or original.

Paving Action

Under paving action list any further information about the paving process.

Additional

Tester

The individual operating the profiling equipment over the pavement surface.

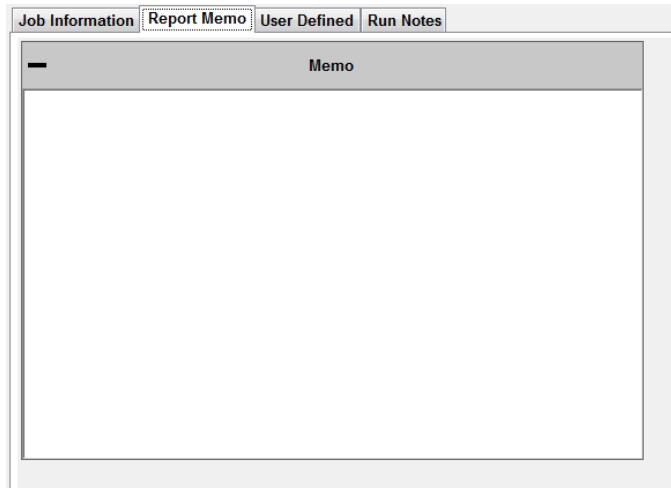
Provisions/Weather

The weather at the time of profiling the pavement. Such as: Cold, Hot, Overcast, Morning, Afternoon, Evening, etc.

Report Memo

Report Memo is a section available for inputting large amounts of text to be saved along with the data file. Anything from reminders to stationing can be inputted into the Report Memo and not influence the data.

Figure 109: Report Memo window



User Defined

Additional parameters can be stored in the data file as desired by the operator. Consult the contract for any additional user defined parameters that may be required for the profile data files. Add new parameters by selecting 'Add' at the bottom of the window. The parameters are entered by double-left clicking on the 'Key' column and typing in the required information.

User Defined	
Key	Value
District	07
EXIST/PAVE/CORR	PAVE

Run Notes

The Run Notes lets the user add specific notes to the run indicating whatever useful knowledge the operator wishes to associate and save with the file and run. This can include road and weather conditions. Press 'Apply' to save the changes.

Figure 110. The user defined window

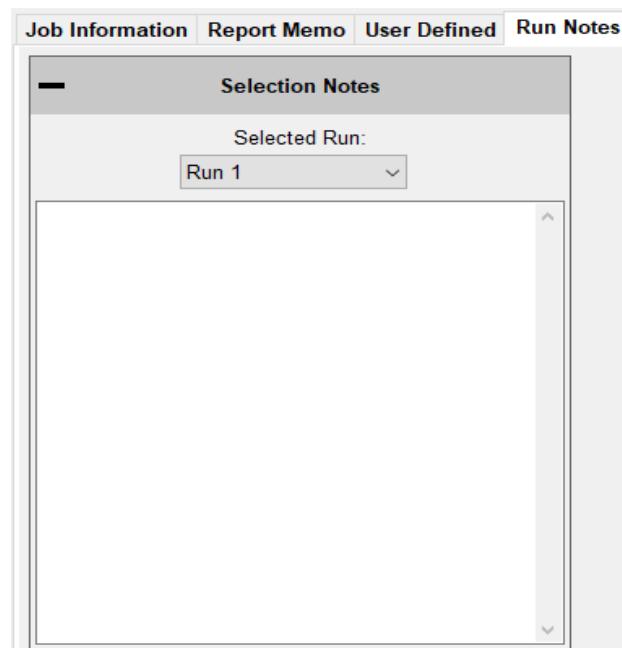


Figure 111. The Run Notes window.

Settings

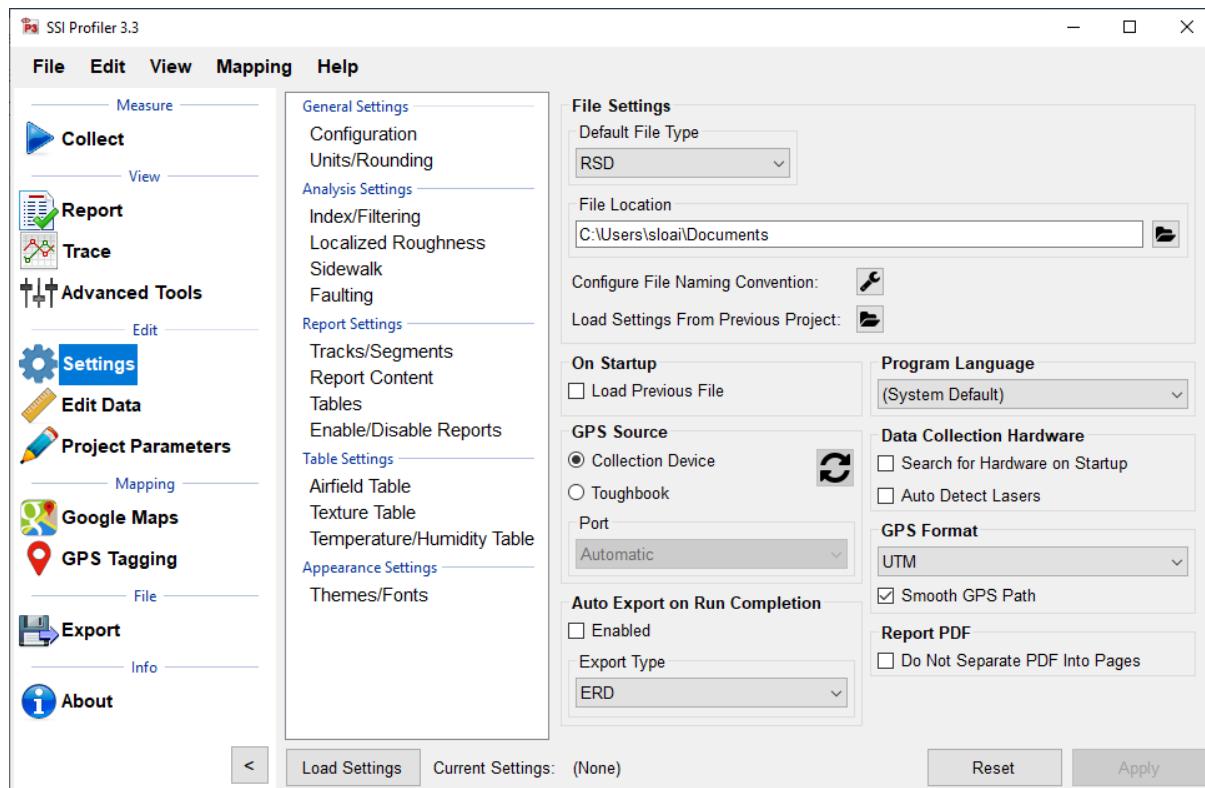


Figure 112: Report options window

Report Content

Chose which parameters to show in the Summary Report by clicking on the checkbox next to the following options: Show Defects Table, Show Rutting Table, Show Event Notes Table, Show Only Failing Segments. Below, the operator can choose whether to show Individual track 1 and track 2 Values or an Average for track 1 and track 2 values.

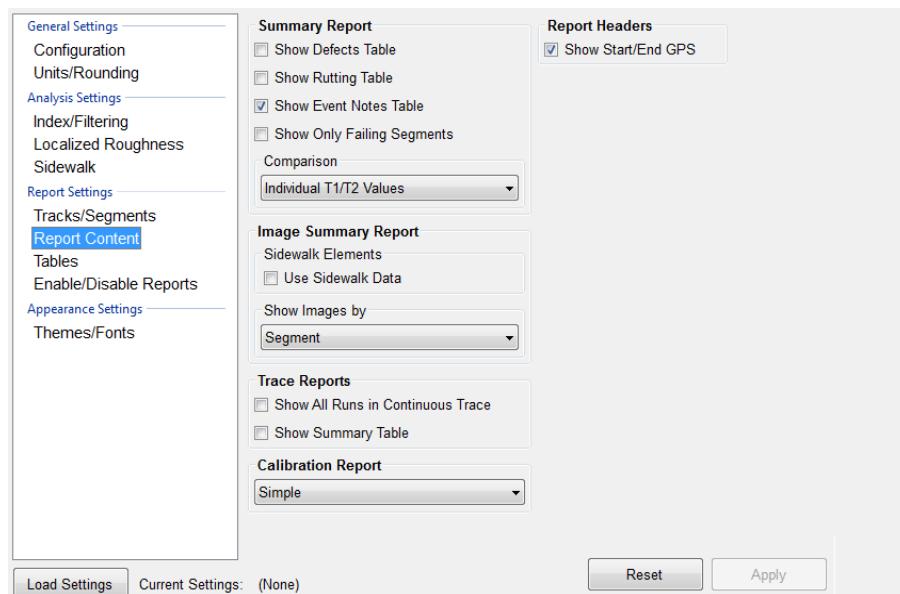
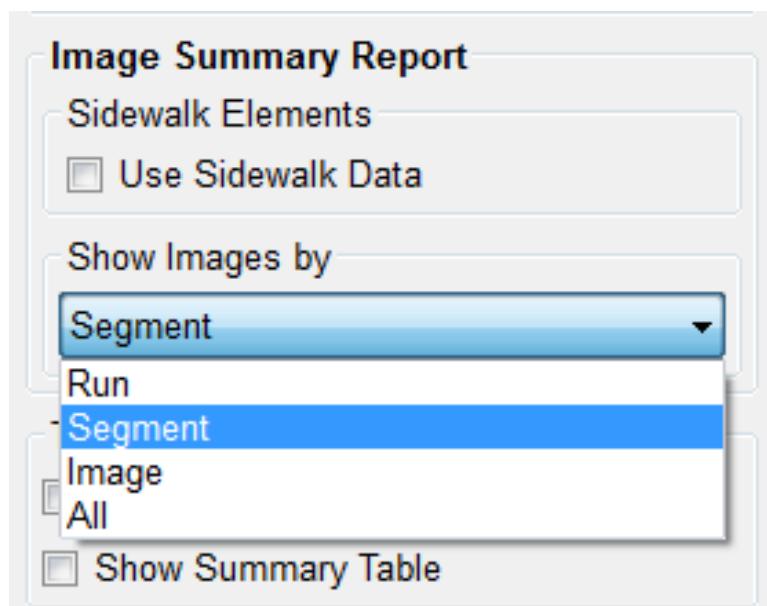


Figure 113. Report Content window

Image Summary Report

This section of the Report Content Tab allows for the operator to choose how to show the images collected (applicable to systems with a camera). The images can be shown by Run, Segment, Image or All. To configure for sidewalk data, check the "Use Sidewalk Data" box.

Figure 114: Image Summary Report options under Report Content.



Trace Reports

Choose to Show All Runs in a Continuous Trace and/or show the summary table by clicking on the checkboxes next to each option.

Calibration Reports

Simple Calibration Report

The simple report contains information about the software version and the calibration summary. The included calibrations are the accelerometer calibration constants, distance calibration counts, and inclinometer calibration settings.

Trace Reports

- Show All Runs in Continuous Trace
- Show Summary Table

Calibration Report

- Simple (selected)
- Simple
- Extended

Figure 115. Calibration Report

Extended Calibration Report

The extended report has the calibration and the verification data from the last verification procedures. The verifications for the inclinometer, height sensor, and the bounce test are all included along with the calibrations for the accelerometer, inclinometer, and distance encoder.

Tables

Select content desired to be reported in the Summary Table, the Rutting Table, The Trace Notes Table, the Slope Table and the Events Table. These will appear as additional columns.

Note: The Rutting table only applies to laser systems with more than three lasers. The Slope table only applies to systems with IMUs including some laser systems and the CS8600 system.

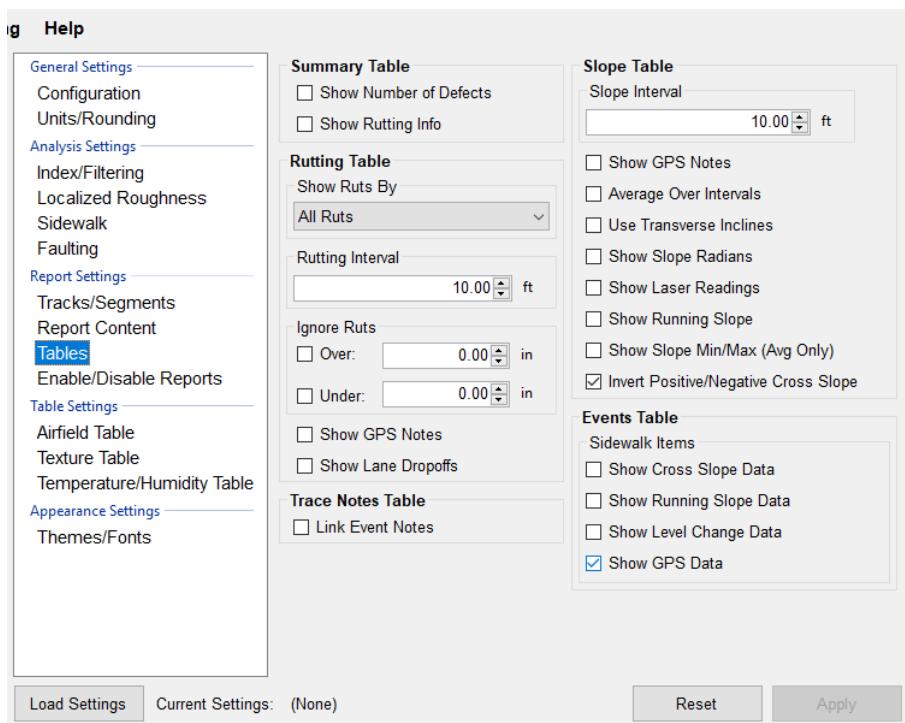


Figure 116. The Table options in Report Settings.

Enable/Disable Reports

This feature allows the user to select the type of reports that appear in the drop-down menu. To have a report not be displayed in the drop-down menu, deselect the check box. These reports will be reflected in the dropdown menu to the right and also in the Reports Section of Profiler V3. See figure 104.

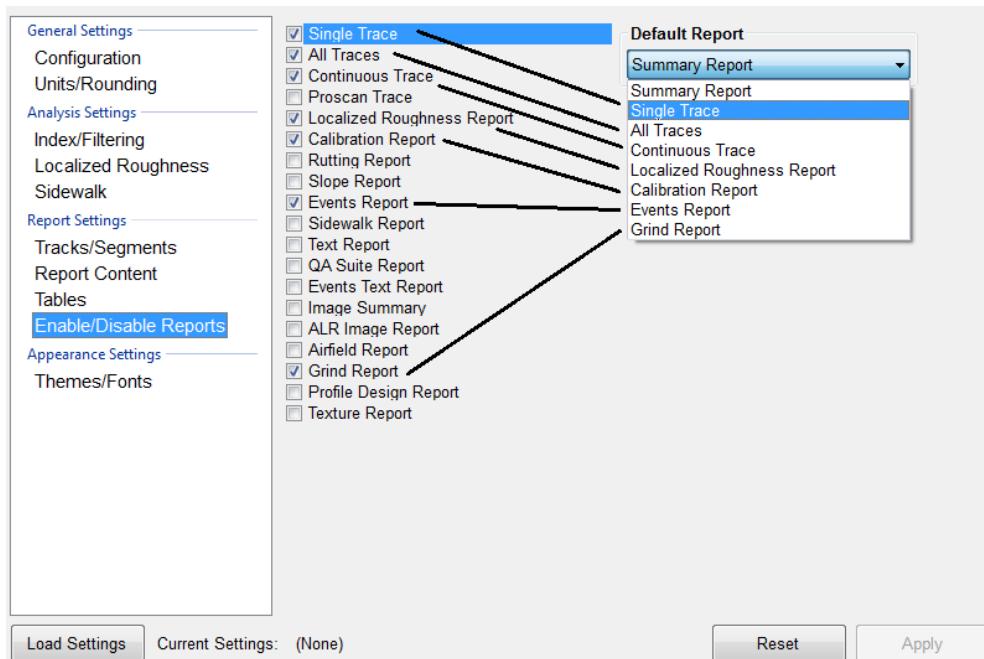
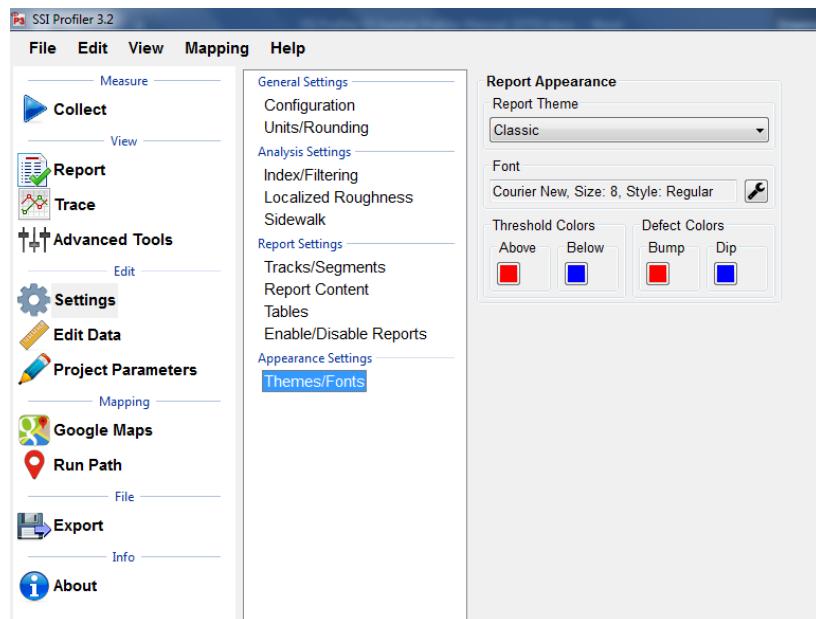


Figure 117. Enable/Disable Reports window

Themes/Fonts

Profiler V3 lets the operator choose between two different Reports Themes: Classic (default) and Light. The Font can also be changed along with the Threshold Colors and the Defect Colors.

Figure 118. Themes and Fonts option under Appearance settings.



View

Refresh Icon Print Icons Page Setup PDF Drop Down Report Menu

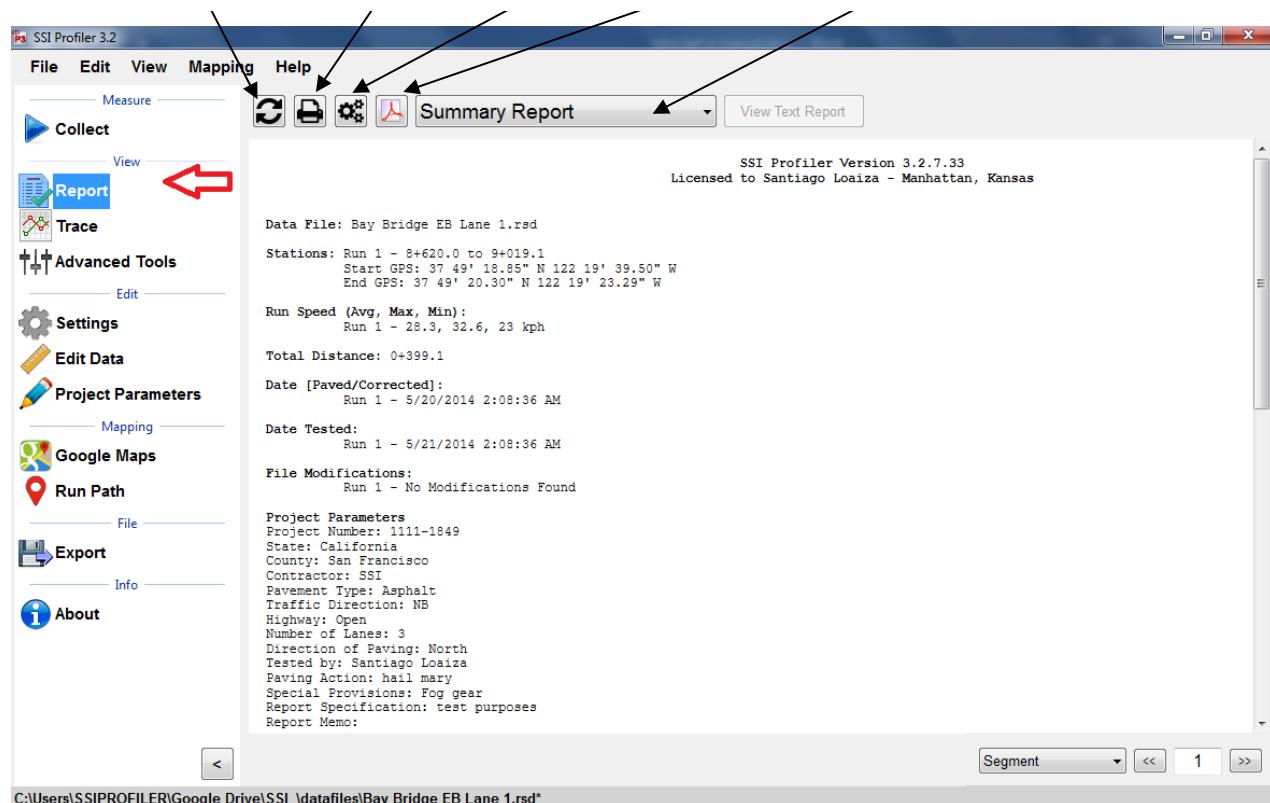


Figure 119. Summary header for single trace report

Report

Refresh

It is required to refresh the Report window whenever a change is made to the Project Parameters, Settings, or Report Options. The refresh icon is located at the top left of the Report window. Select the refresh button and verify that the information is accurate before printing. Automatically Refresh may be selected in Tracks/Segments settings window. With this selected, reports will automatically refresh when changes are made.

Print

Always confirm the correct report is being printed by selecting the refresh icon.

A Connected Local Printer

To print a report select the print icon in the Report window or select CTRL+P on the keyboard. The print window will appear. Within the window, select the printer to be used and verify that the printer settings are correct. When 'Print' is selected, the document will be sent to the printer.

If more printing options are needed, select the 'Preferences' icon.

This icon will open a window that is printer specific that contains information about the orientation, paper size, and image quality.

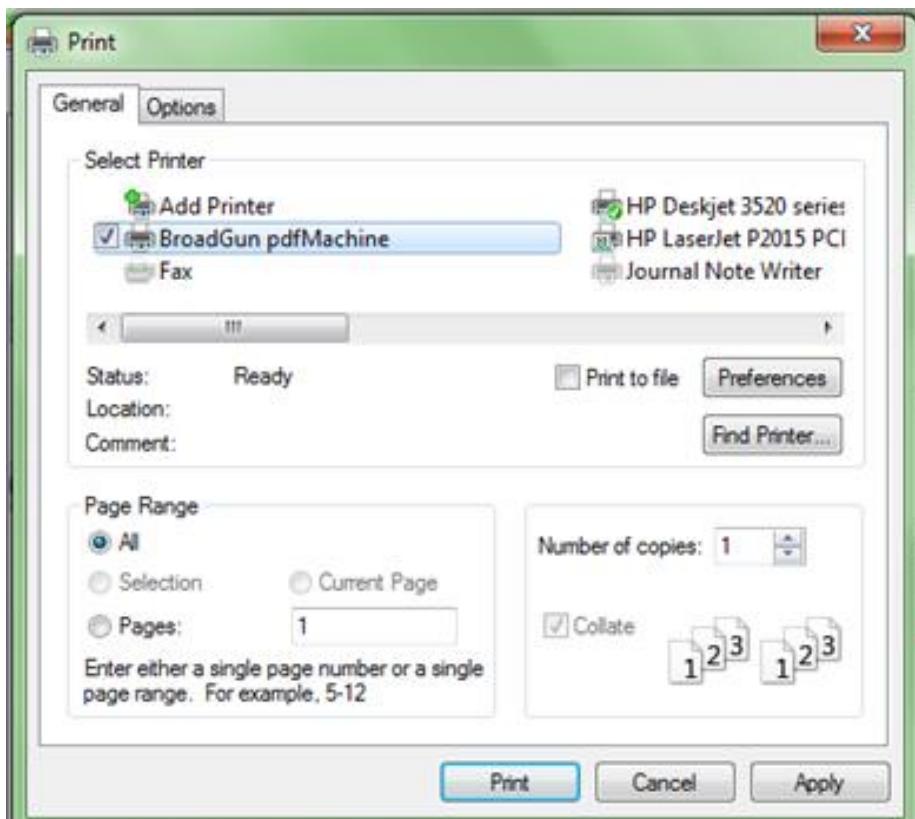


Figure 120. Printing Options Window

To PDF

The Adobe Symbol between the Printer symbol and the report type will print the current report to PDF format if a PDF printer is installed. Contact SSI support if you are having issues with your PDF printer.

Report Options

The Report Options available in Profiler V3 are Summary Report, Single Trace, All Traces, Continuous Trace, Proscan Trace, Localized Roughness Report, Calibration Report, Rutting Report, Slope Report, Events Report, Sidewalk Report, Text Report, QA Suite Report, Events Text Report, Image Summary, ALR Image Report, Airfield Report, Grind Report, Profile Design Report, Texture Report.

Reports containing Sidewalk data are "Sidewalk Report", "Image Summary Report", and "Texture Report".

Figure 121. Drop-down menu for the report options



Collect

To collect data the operator should select the Collect Icon when the hardware is attached. Once the hardware is found, the data collection may begin. See the Collection section of this manual for procedures to perform prior and during a collection.

Trace

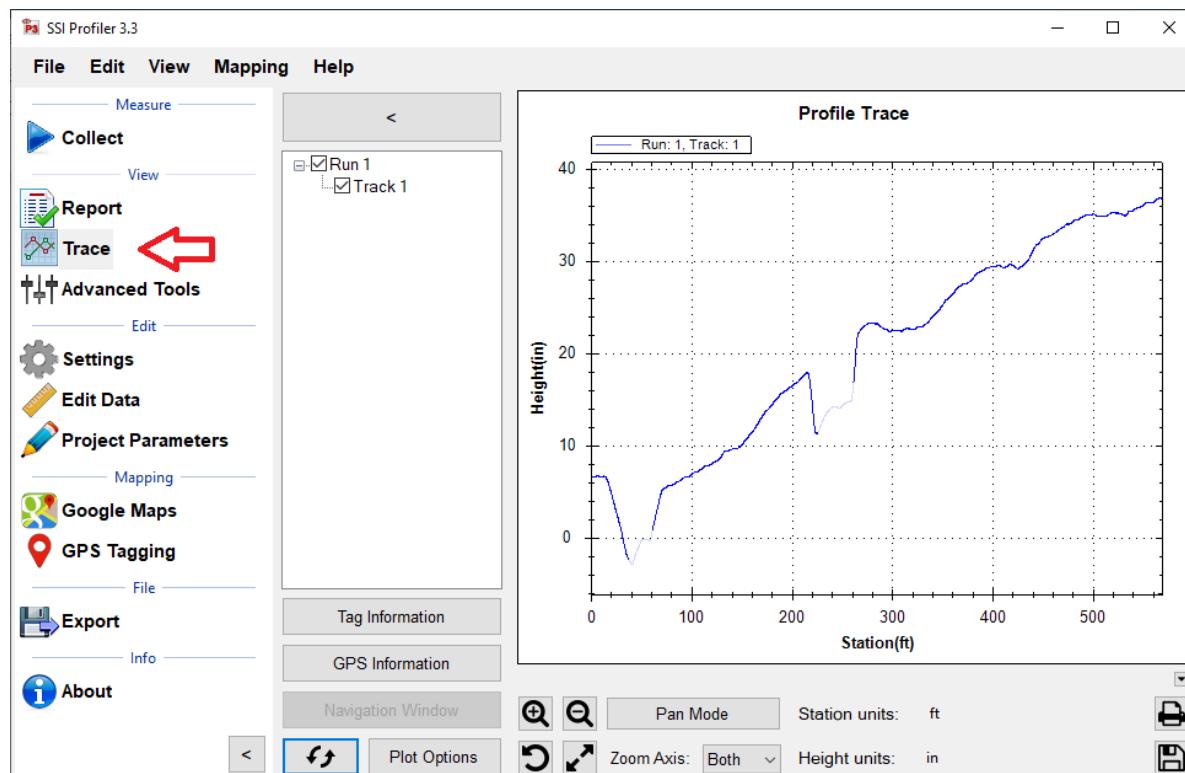


Figure 122: An example of the profile trace

Choosing Tracks for Plotting

To choose tracks for plotting in the trace window, select the check box next to the desired tracks. Once all the necessary tracks are checked, select the refresh icon to view the tracks within the plot.

Whenever a change is made by deselecting a track or checking a new track, select the refresh icon to have it appear in the trace. *If the refresh icon is not selected, the trace will not update and changes will not be shown.* Review the legend to verify that all the selected tracks are shown in the plot.

Refresh

It is required to refresh the Trace window whenever a change is made to the track selections. The refresh icon is located at the bottom left of the Trace window. Select the refresh button and verify that the trace is accurate before a print is made.

Plot Options

Plotter Data Type

Select between Profile, Continuous IRI, MRI and HRI, Median Profile, Segmented Bar IRI, Birds Eye View, Continuous IRI vs Speed, and Rolling Straight Edge.

Apply filters

To apply filters select the check box "Apply Filters."

Show Point Labels

Showing point labels allows the user to move the cursor over the profile to find the stationing and height at a certain point of the plot. When the cursor stays over a point for one second, a dialogue box appears that gives information on station number and height at the cursors current position. The units of the stationing and height are the same as the units of the axes.

Enable Secondary Plotter

Select the 'Enable Secondary Plotter' to add another graph to the window making for easier analysis when comparing profiles.

Localized Roughness

Select the 'Display Defects' checkbox to show Bumps and/or Dips according to the previously chosen Localized Roughness Settings. Select the 'Display Defect Peak Value' to show the max height of the bumps/dips.

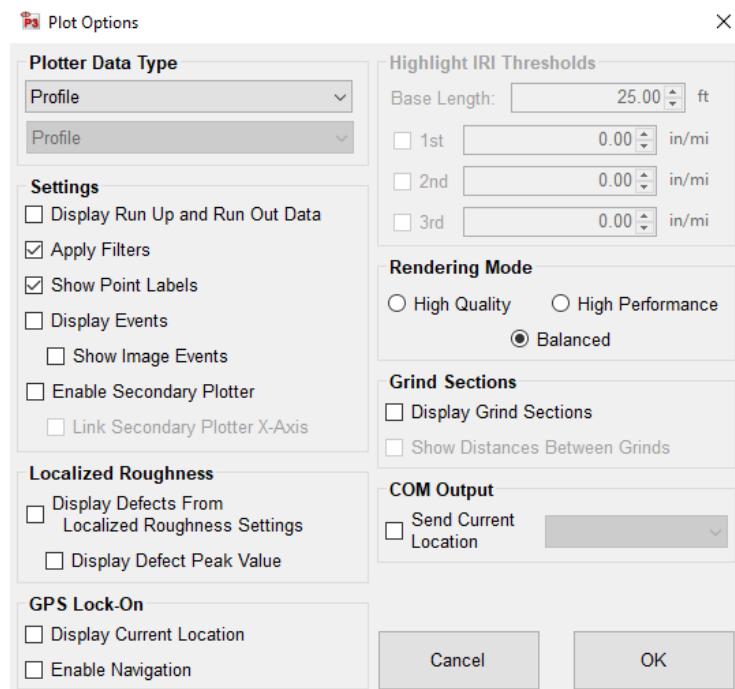


Figure 123. The plotter options window.

GPS Lock-On

Select the 'Display Current Location' checkbox to indicate GPS position. Select the 'Enable Navigation' checkbox. This feature will display a vertical line at the vehicle's current GPS location. This vertical line will move through the trace as the vehicle moves.

Rendering Mode

Under the Rendering Mode section the operator can choose the type of rendering to increase the speed or increase the quality when refreshing the graph. When using the high quality rendering, the time it takes to refresh will be longer, however the resolution of the trace will be optimum.

Grind Sections

Select the 'Display Grind Section' and then select 'Show Distance Between Grinds' for complete grind information.

COM Output

Select the 'Send Current Location' to output GPS location data to another device

Tag Information

The tag feature allows the user to add pauses, events and station markers to previously collected data. The system must be connected to GPS for it to work. With GPS Location displaying position choose 'Set Station Marker', 'Event Location', 'Start Pause Location', 'End Pause Location', 'Start Grind Location', 'End Grind Location'.

Use the 'Undo' and 'Undo All' buttons to eliminate any changes.

The 'Set Static Location' button will popup the Static Location window allowing the input of a GPS location. The window will also allow the user to select the Location Type. Choose between 'Set Station', 'Start Pause', 'Event', and 'End Pause'.

The 'Import Locations' button will allow the user to import and use previously defined GPS Locations.

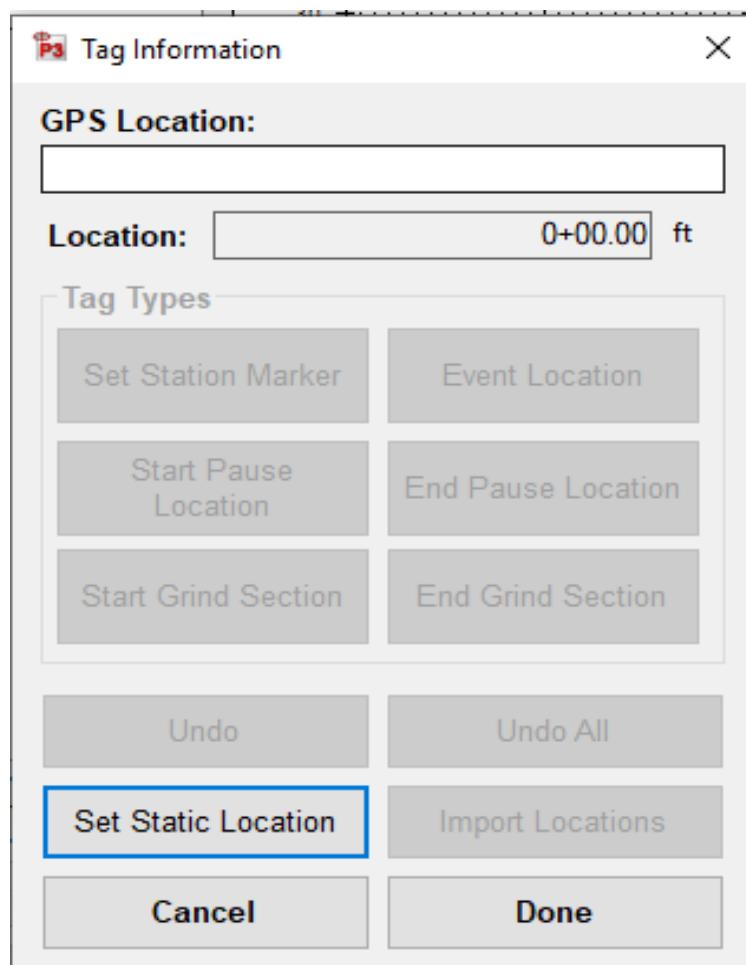


Figure 124: Static Tagging Feature

Print

To print the trace, select the Print Icon in the lower right-hand corner of the window or select CTRL+P on the keyboard. The print window will appear at this time. Within the window, select the printer to be used and verify that the printer settings are correct. When 'Print' is selected, the document will be sent to the printer.

If more printing options are needed, select the 'Preferences' icon. This icon will open a window that is printer specific containing information about the orientation, paper size, and image quality.

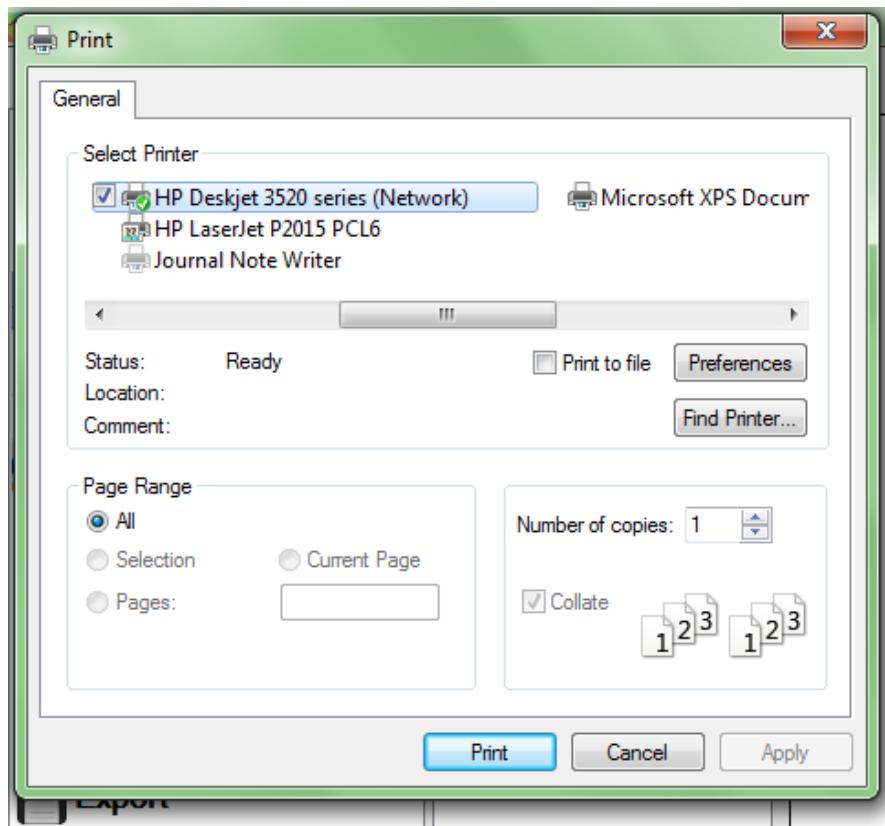


Figure 125. Print window after the print icon is selected

Save

Click on the Save icon in the lower right-hand corner of the trace window. When the Save icon is selected, the user is able to save the trace as an image in png, gif, jpeg, tiff, and bmp format. The image can be saved on the operating computer or on a connected external device.

Zoom

To zoom in the trace window, verify that the Pan/Zoom Mode icon displays 'Pan Mode.' To zoom in on the plot, left click and hold while dragging the cursor over the area to be blown up. While dragging the cursor, a dotted box will appear. This dotted box contains the area of the plot that will be blown up, by being fit to the size of the plot window.

Zoom Previous Icon

When Zoom Previous is selected, the last 'zoom in' action is undone.

Zoom Fit Icon

To return to the original aspect ratio, also known as the home view, select Zoom Fit.

Pan/Zoom Mode Icon

The Pan/Zoom Mode icon has two functions. When Pan Mode is displayed, the cursor may be used to zoom in on the plot. To zoom in on the plot, hold down the left mouse button and move the cursor over the plot area to be blown up. The dashed box contains the area that will be enlarged.

When Zoom Mode is displayed, the operator may use the cursor to pan across the plot area. The pan mode allows the user to navigate through the plot area without changing the aspect ratio, or zooming out.

Units for Height and Station

The units for height (y-axis) and stationing (x-axis) can be changed by left clicking upon the current units and selecting the necessary units from the dialogue box that appears. The units available are mils, inches, feet, yard, miles, millimeters, centimeters, meters, and kilometers. The units scale the plot area.

GPS Editing and Tagging

The operator can use the GPS signal to edit the start and stop locations of the collections and add events to the collection.

Advanced Tools

Images Window

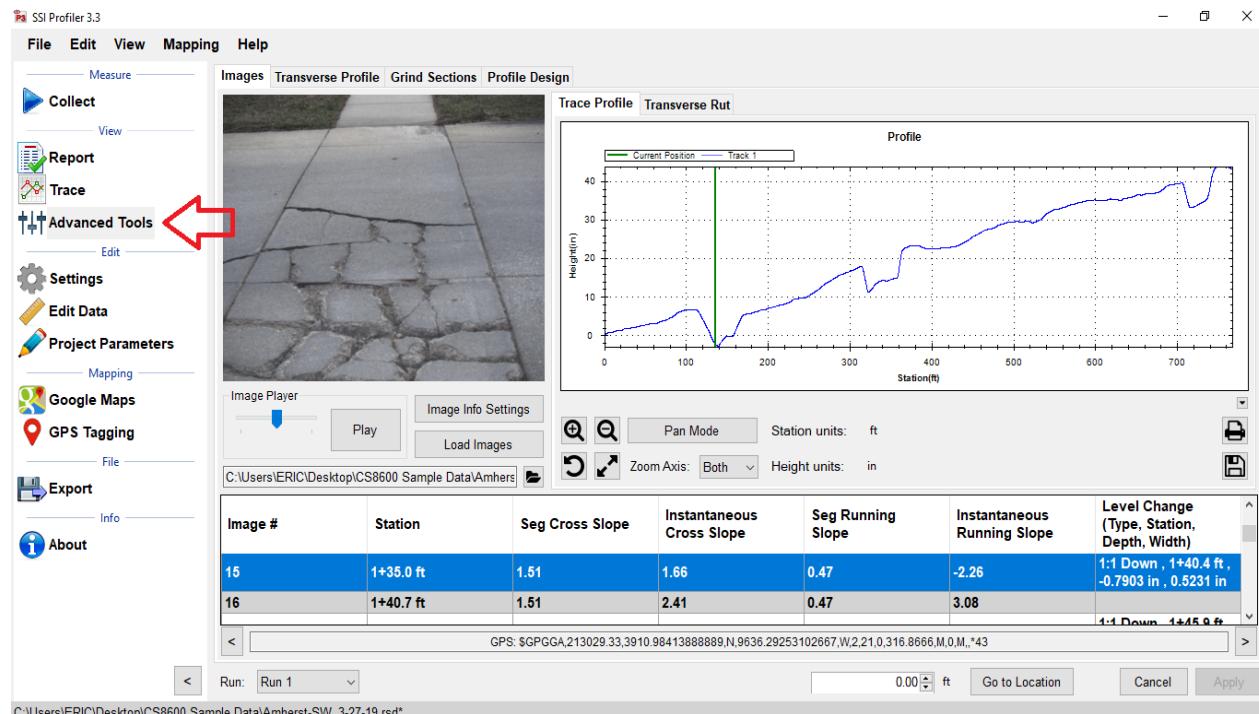


Figure 126. Advanced Tools Images window with an image loaded

Once the 'Load Images' button is selected, the software will load the images found in the directory listed below the button. The default address is where they are initially saved after collection. If the

directory where they were initially saved to is changed and software closed, the next time Profiler 3 is opened the address box will say 'Image directory not found'. **Displayed content can be modified by right clicking on the header row.**

For CS8600 systems Image #, Station, Seg Cross Slope, Instantaneous Cross Slope, Seg Running Slope, Instantaneous Running Slope, and Level Change can be viewed. Seg Cross/Running Slope computes the average slope over the "Segment Length" which can be configured in Settings>Index/Filtering. Instantaneous Cross/Running Slope displays the slope reading at the station the image was taken plus/minus image offset.

The arrow keys on the computer's keyboard can be used to advance the images. There will be a lag using the computer's keyboard until the images are populated from the files. After the images are loaded the operator will be able to constantly hold the up/down arrow keys to view a slide show of the collection.

Mapping

Google Maps

Google Maps allows visualization of data within SSI Profiler 3 software. The data depicted in Google Maps will be the same as exported Sidewalk GIS files.

***An internet connection is required for use of Google Maps**

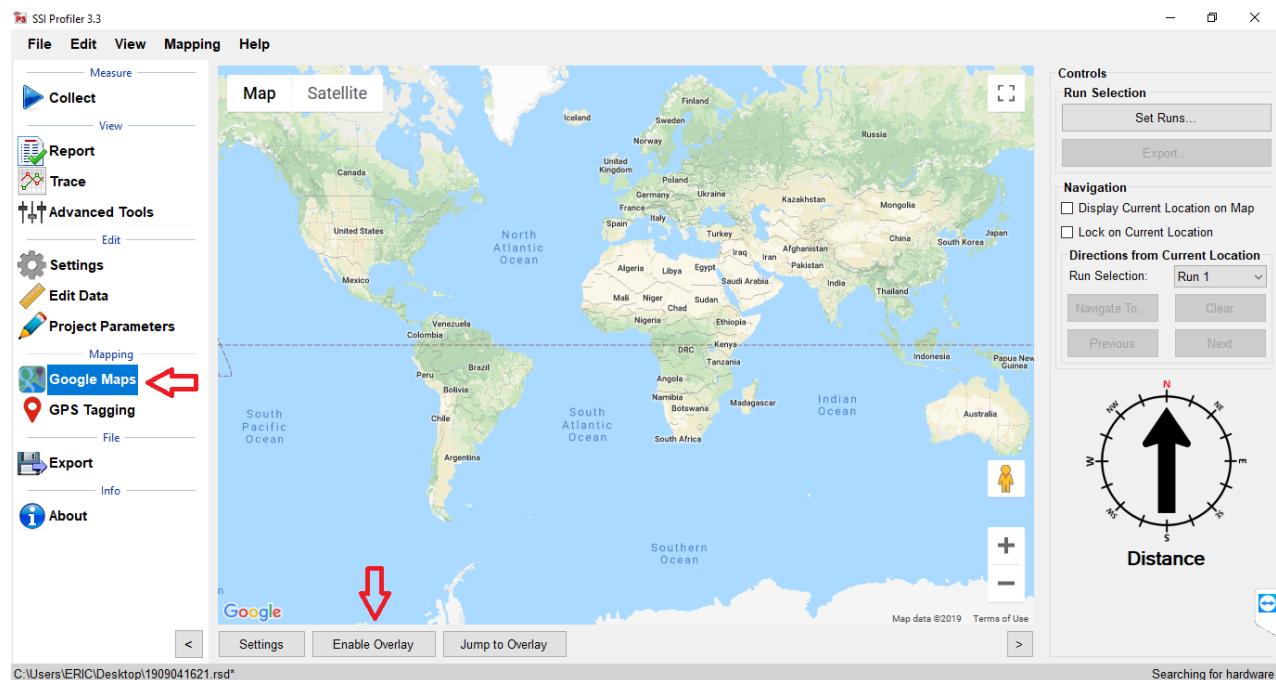


Figure 127. Google Maps Initial Screen

With a file loaded, press "Enable Overlay" to superimpose data on the map. "Jump to Overlay" zooms in on the loaded dataset.

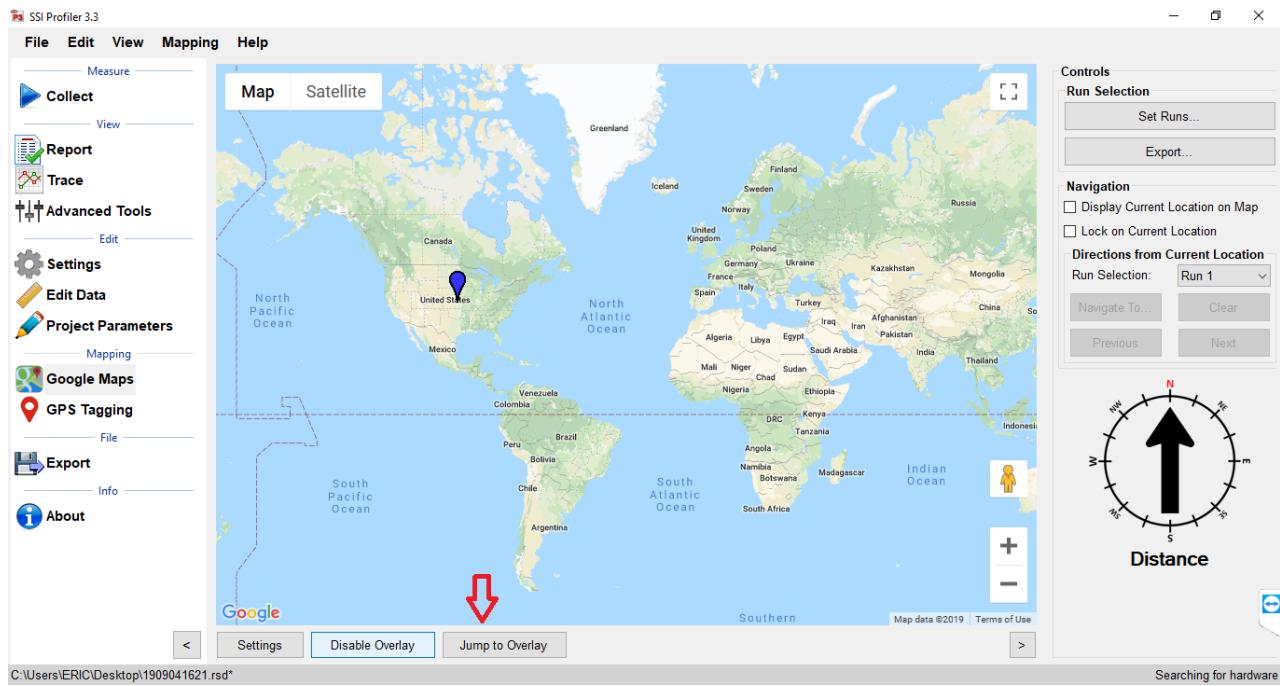


Figure 128. Google Maps Jump to Overlay

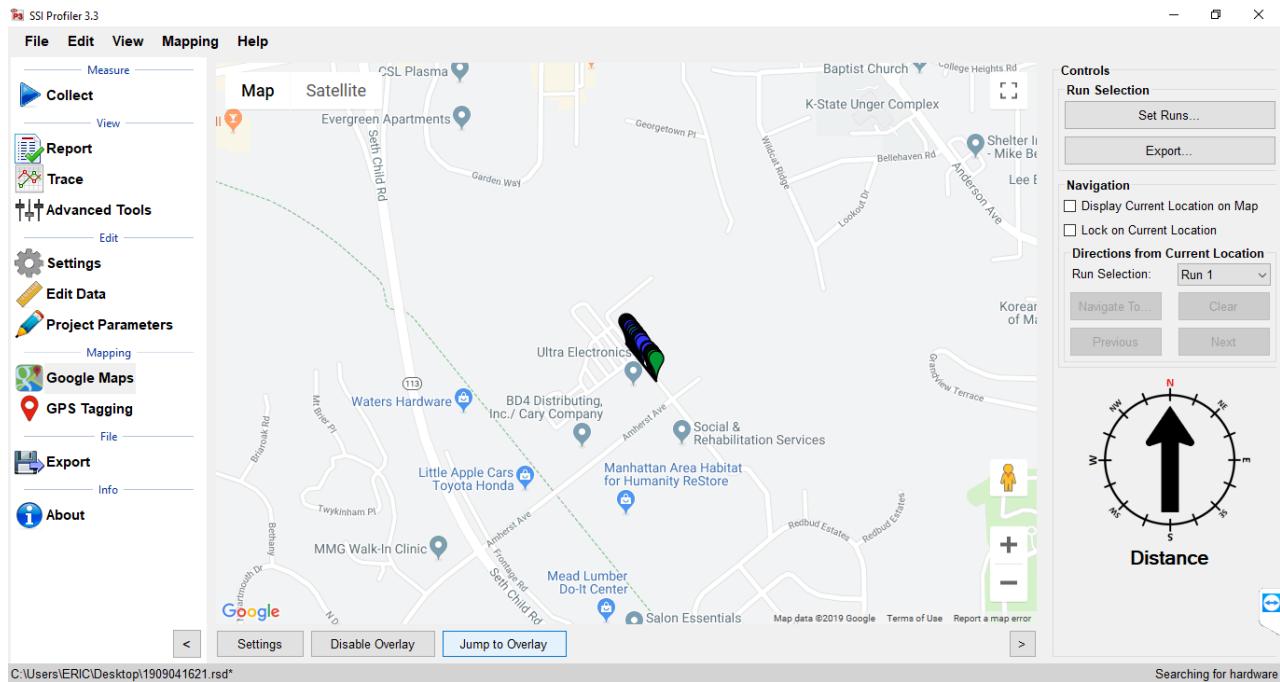


Figure 129. Google Maps after Jump to Overlay

The pins displayed in Google Maps represent sidewalk features. When selected, each pin displays its relevant data.

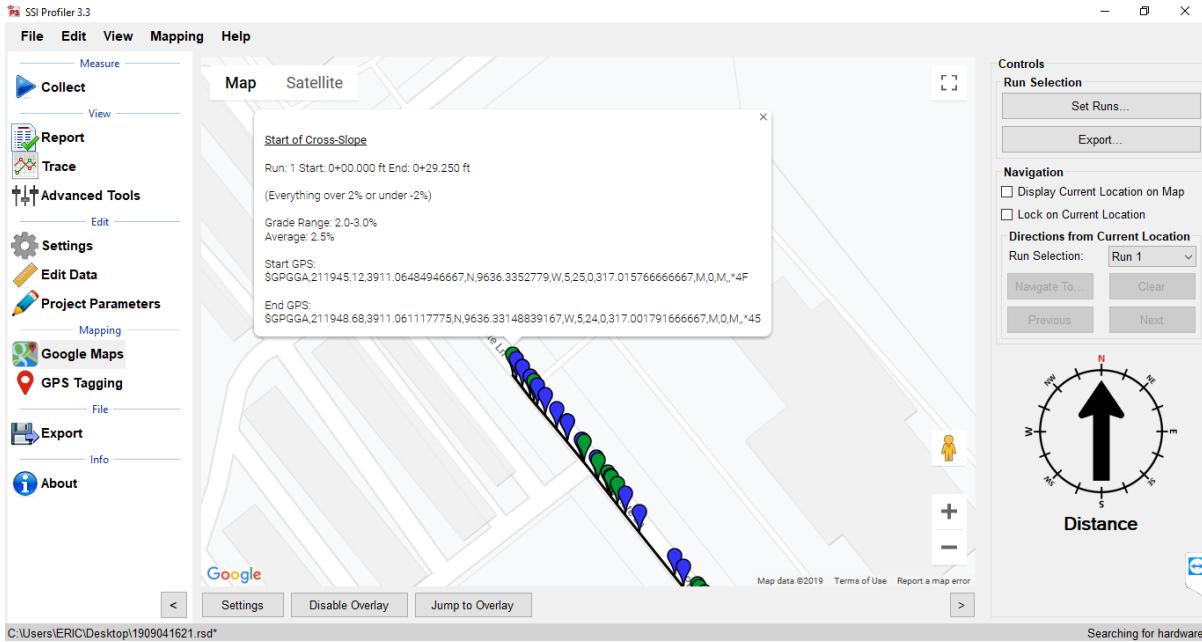


Figure 130. Google Maps Overlay zoomed in with pin clicked for information

“Settings” allows configuration of which features are displayed in Google Maps under Display Options. Path Display Type changes how the traveled path is depicted. Pin colors can be edited as desired through Map Pins>Edit Pins.

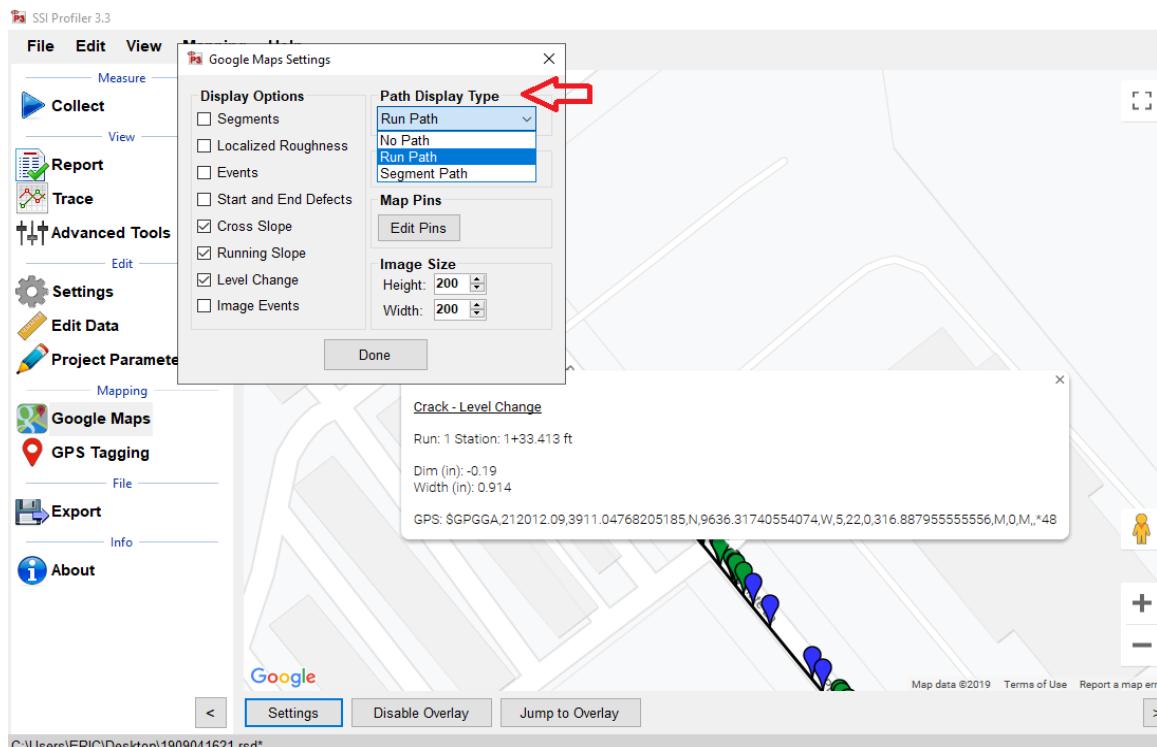


Figure 131. Google Maps Settings: Path Display Type

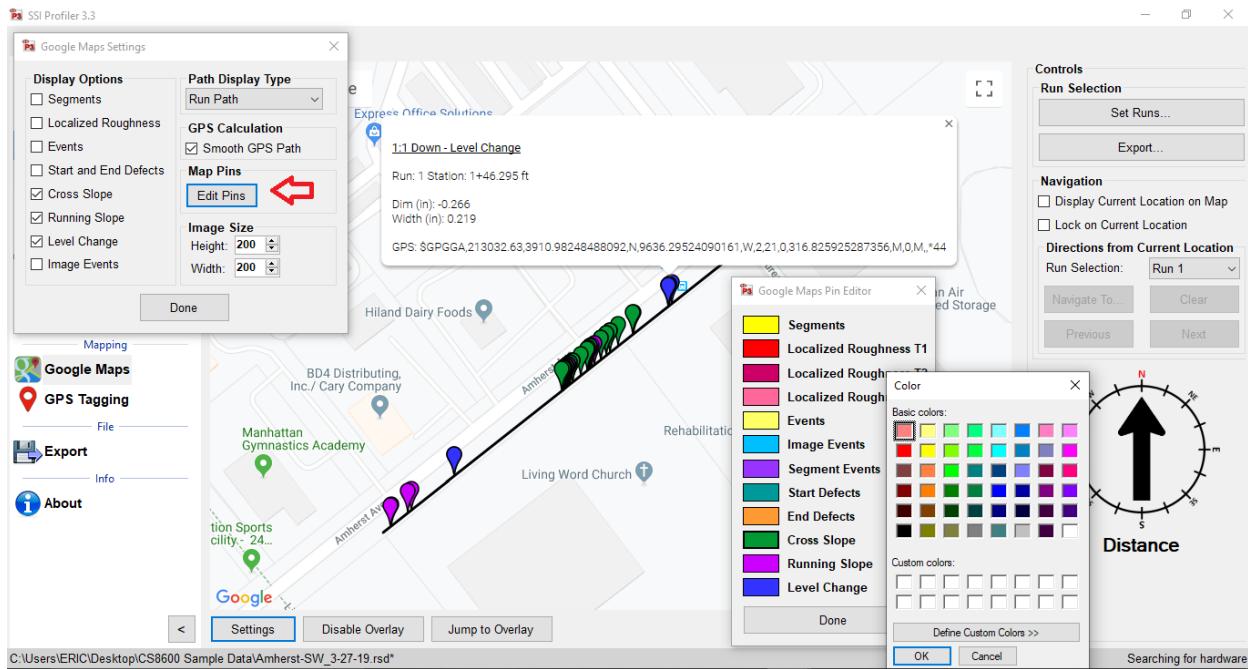


Figure 132. Google Maps Settings: Edit Pins

Data can be exported to .kml format through the Google Maps window by clicking “Export” under Run Selection. KML files can be viewed in most GIS software, for example, ESRI ArcGIS Earth and Google Earth.

Display Current Location on Map

If this check box is selected, the current location of the profiler is marked by a large green arrow in the map window. Must be connected to system with GPS to use this feature.

Lock on Current Location

If the check box for “Lock on Current Location” is selected, the location of the profiling system will remain in the center of the map window. The map will move with the GPS system in real time. Must be connected to system with GPS to use this feature.

Directions from Current Location

The V3 program will navigate to the start or end of the run and other information found during collection. Select the destination from the drop-down menu and select the calculate icon. The route will appear as a blue line from your current location to the “B” landmark.

To navigate to an Event, Pause, Segment, Image, GPS Coordinate, or Station, select the correct run number and then the “Navigate To” icon. If GPS is connected the program will ask the user where to be navigated to. Once the location is selected Profiler will direct the device to the location.

Note: GPS must be connected to use the Google Maps Navigation feature.

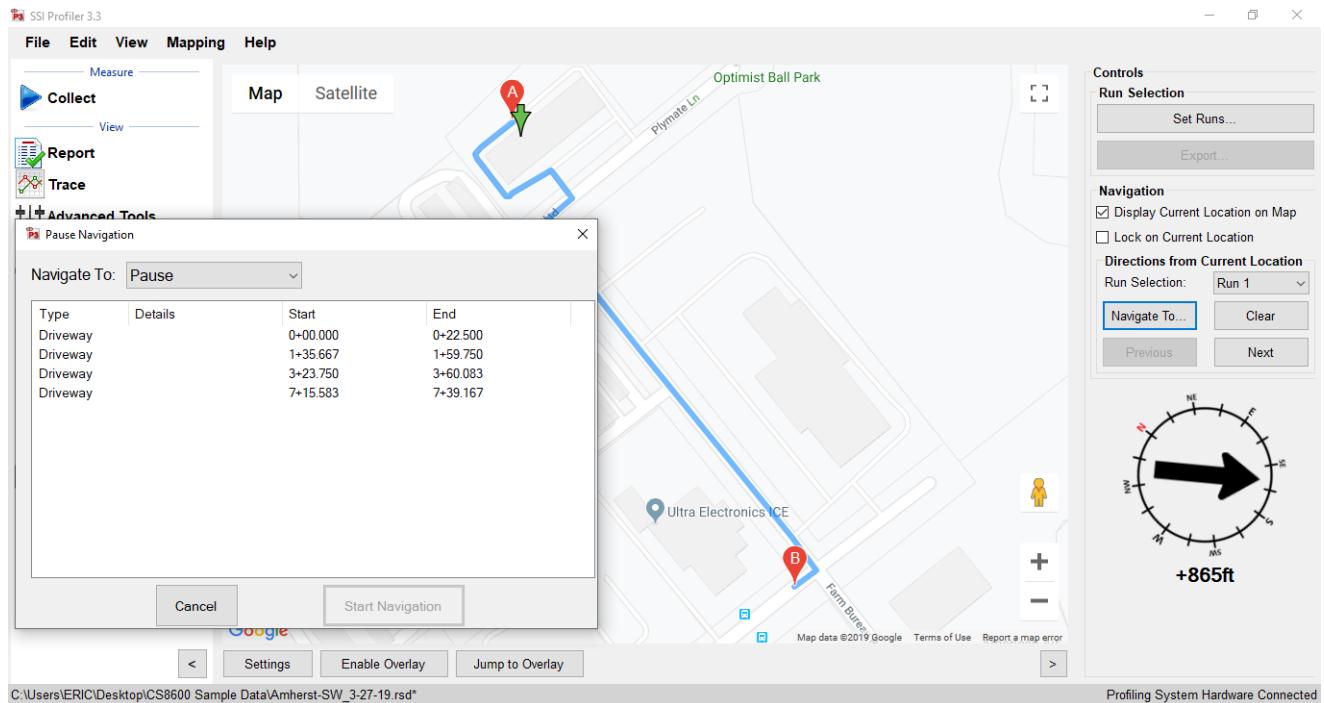


Figure 133. Google Maps Navigation

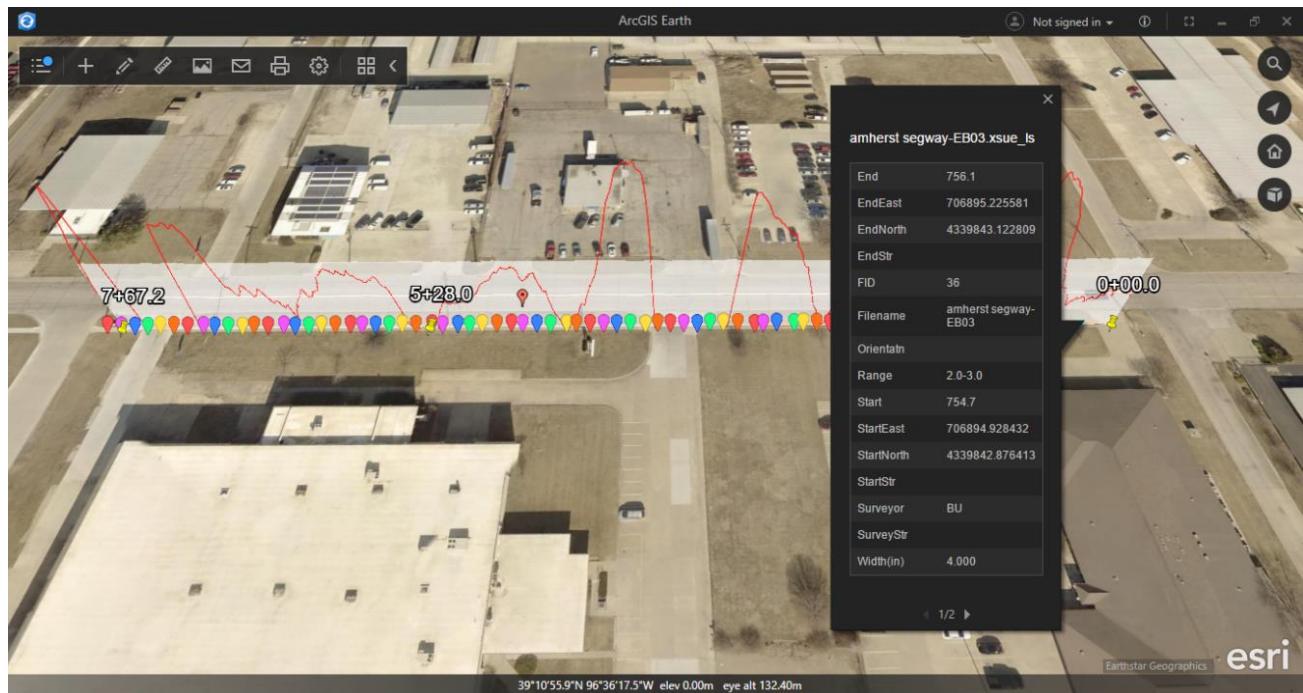


Figure 134. KML export in ArcGIS Earth

About

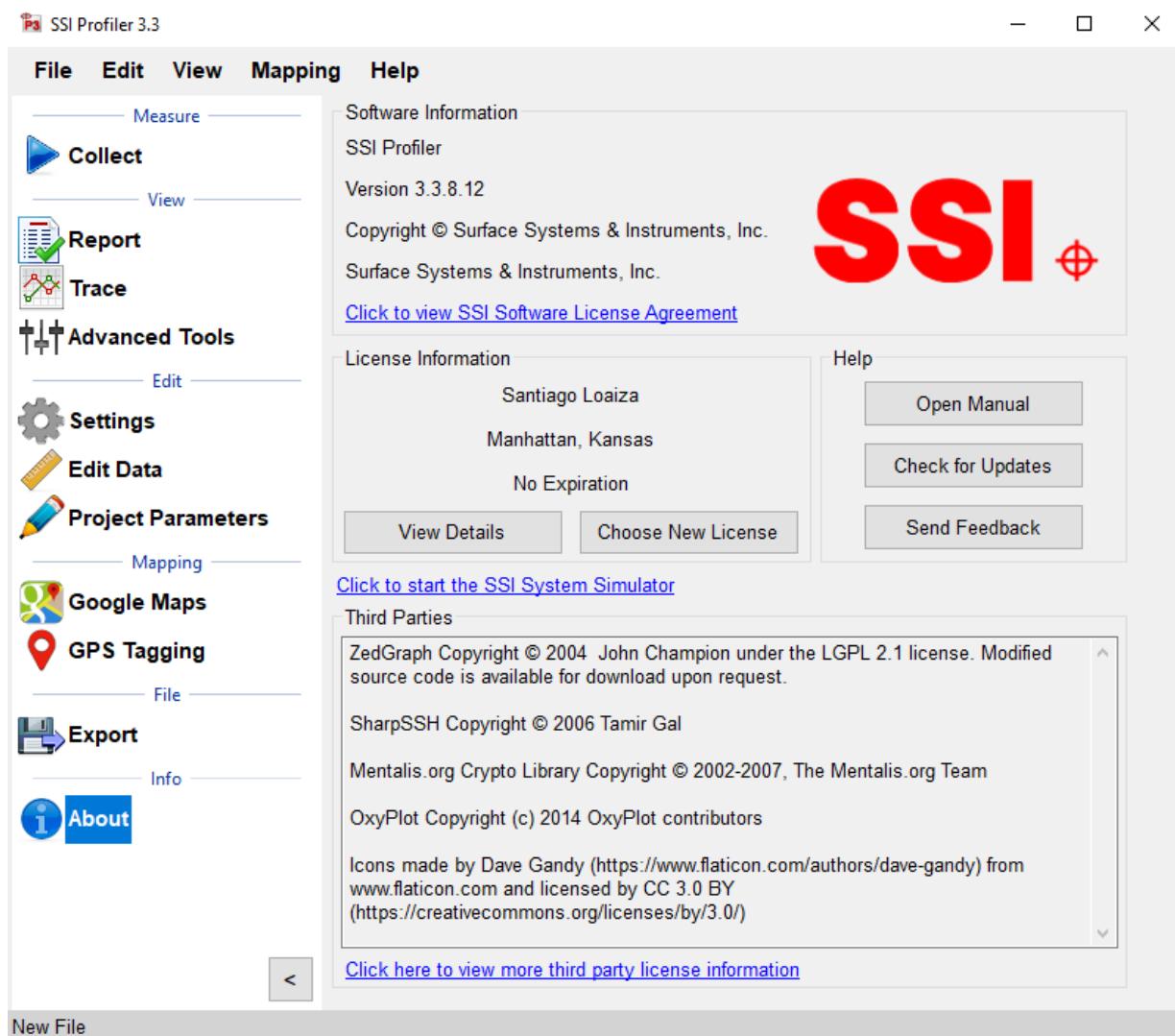


Figure 135: About Window

The About section has information concerning Profiler V3 software and its licenses. The software version, copyright and license can all be found in the 'About' window. Additionally, third party software licenses are listed in the About window.

The About window is where the user can view the terms and features enabled with their license. Select View details to see the applicable collection devices and software features that are enabled. The update icon allows the user to update to the latest version of software.

Manual

The manual can be found under the Help Tab or on the About Section window.

Check for Updates

The operator can manually check for updates through Help>Check For Updates. By default, the program will check for updates every time it is opened. To not check for updates at each opening, deselect the check box in this window.

Send Feedback

If SSI should be informed of issues or advancements of the software, please send us feedback so we can improve our services.

Third Party Components

The Third Party Components of Profiler V3 are:

ZedGraph Copyright © 2004 John Champion under the LGPL 2.1 license.

Modified source code is available for download at:

<http://www.smoothroad.com/support/download.asp>.

SharpSSH Copyright © 2006 Tamir Gal

Mentalis.org Crypto Library Copyright © 2002-2007. The Mentalis.org Team

Full copies of all third party licenses can be found in the Licenses folder located inside the Profiler V3 installation directory.

Exiting Program

To exit the Profiler V3 program, save current project and click the red “X” at the top right corner or navigate to the File tab and select Exit. If the current project is not saved when the program is terminated, Profiler V3 will ask if the operator would like to save the current project. To save and exit the program, select “Yes.” If you do not wish to exit to program, select cancel and the program will remain open.

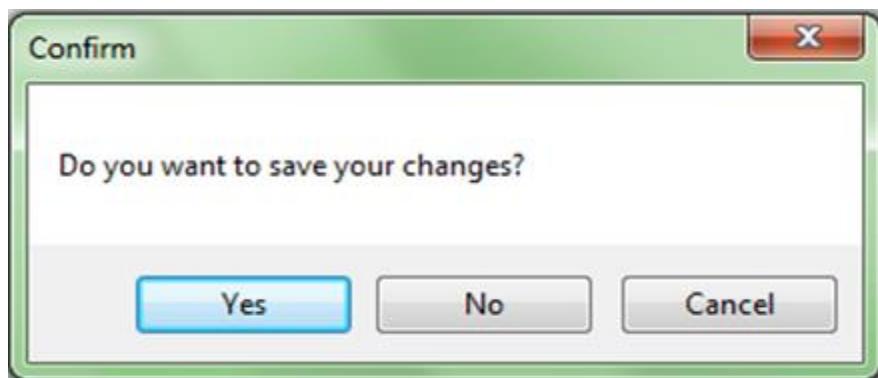


Figure 136. Exiting Program window, chose 'Yes' to save changes, 'No' or 'Cancel'

Recommended Tools

Create a personal default file name convention for your project

Under General Settings the operator may select “Configure File Naming” to create a new file name convention.

Load analysis parameters and settings from previous projects

When a previous file has the correct project information and settings saved within it, the operator may load the previous file's settings into the current file. By selecting "Load" under General Settings the user may select the previous RSD file and load its settings into the current project.

Set a default file location

The user may select a default folder to save all files and reports under General Settings. It is recommended paste the folder destination into the address input.

Use hot keys during collection

During collection the operator can assign a command to any keyboard key except for the space bar and the enter key. The keys can start or end a collection, arm and electric eye or create an event for various types of scenarios such as pavement distresses or debris.

Troubleshooting and Support

When Contacting SSI Technical Support

If possible, have the profiler system type, profiler software version, operating system, computer model number, and company of ownership ready. If an internet connection is available, SSI staff may request your data files for comparison and troubleshooting.

Attaining Profiler Software and Replacement Parts

For technical support with the CS8600 software contact SSI. Software issues should also be reported to SSI by email at support@smoothroad.com, with a copy of any data files to be reviewed by SSI technical support staff. SSI support staff can also be contacted by telephone at (530) 885-1482 (Auburn, CA); or (785) 539-6305 (Manhattan, KS).

Parts can be ordered online from SSI at <http://www.smoothroad.com>. For support issues involving the profiler hardware (DMI, Pelican cases, hardware, cables, etc.), contact the SSI office in Auburn, California at (530) 885-1482 or by email at support@smoothroad.com.

Panasonic Toughbook Computer

For technical support for Panasonic Toughbook computers, contact Panasonic Technical Support at 1-800-Laptop5 (800- 527-8675) or go to the Panasonic support website at:

<http://www.panasonic.com/business/toughbook/support.asp>.

Paper Supplies or Printer Servicing.

For printer paper supplies or printer servicing, contact SSI at support@smoothroad.com or (530) 885-1482.

Is your Software Up to Date?

Contact SSI to upgrade your software if your problems reoccur after support assistance.

Do Not Attempt To Repair Electronic Components

All of the electronics within the SSI Profiler systems are built custom for Surface Systems and Instruments. Do not attempt to fix issues without contacting SSI.

Is your Power LED Illuminated?

No power to the system would cause the hardware to disconnect from the software.

Hardware Not Found

Check the cables of your system for any wire breaks. If the Amphenol connections are twisted, it can break the soldered wires. If problem persists, contact SSI Support Staff.

Example Diagnostics

By selecting the button on the upper right of the Collect screen with a single digit number on it. The single digit number will be the same as the number of lasers on your system. The button is colored green for systems without an issue, yellow for systems with a device disconnected and red for connectivity issues.

SSI Profiler 2.1: Q0g0r0r0x0x0x0

‘0’ means that the device is connected.

Q is the encoder symbol

g is Trimble GPS

r is for a Roline laser. The order is Track 1 laser, Track 2 laser, Track 3 laser (if equipped).

x is an open port

Failed Height Verification

- 1) Check block Orientation. Do not block receiving laser sensor.
- 2) Check Laser Type in System Settings
- 3) Check the integrity of the cables and pins. Make sure the pins are not bent inside the connectors and that the cables are not damaged.
- 4) Check the height of the lasers from the measurement surface. For Gocator and low stand-off spot lasers the minimum height is 200 mm (7.8 inches). For high stand-off spot lasers the minimum height is 12.8 inches (325mm).
- 5) Is there a glare on the verification blocks?

Lasers Not Firing

Main Cause: No/ insufficient power reaching the lasers

- Is the blue light flashing on the laser?
- Is the blue LED on the white housing emitting light?
- Are the red lights on the grey box serial ports emitting solid red light?
- Check the condition of the pins in the cables.
- Is the vehicle off or running?
- Does the same problem happen with the engine running?

Distance Not Correct

When was the last calibration performed?

Was the actual distance traveled during calibration entered correctly?

Is the DMI damaged or loose?

Is the DMI Amphenol cable attached correctly?

How long is your calibration track?

Is there a large temperature gradient?

Is the calibration track a straight line?

Electric Eye Events/Pause/Start/Stop Collection Did Not Work

Is the correct EE turned on?

There will be an amber or green light on the back of the EE. Flip the switch on the white housing if it is not on.

Is DOT-C2 reflective tape being used?

Is the angle of the reflector matching with the EE orientation?

GPS Navigation Timed Out (Map Point, Google Maps, Trace View)

- 1) Check if the system lost GPS signal (Open the Collect window then GPS Options to check the satellite reception).
- 2) Disconnect hardware and reconnect hardware.
- 3) Check that all cables are securely connected.
- 4) Check power source for consistency.
- 5) If using a Topcon system, review the MC-R3 rover settings for accurateness.

The Camera is not taking color pictures

- 1) Choose another pre-formatted option (Low, Medium and High Resolution).

Advanced User Options (Custom Resolution)

- 1) The camera settings can be found under the Collect window in System Settings.
- 2) Go to the Camera Settings tab
- 3) Open Advanced Camera Settings
- 4) Review Custom Video Mode to affirm that Raw 8 is the pixel type.
- 5) Select Standard Video Mode
- 6) Select the button for resolution and pixel type to be Y8 (Raw 8) and 1280x960.
 - a. Once this change is made the preview will also be in color

Profiler Hardware Not Found

Check the serial port connection from the profiler to the computer. Check that the profiler has power and is charged. If software disconnects from hardware, close SSI Profiler and reopen the program with the profiler powered on. If problem persists, close the program and shut the power off to the profiler. Wait five seconds then turn the power to the profiler on. Then open the SSI Profiler program. If the issue is not solved, contact SSI customer support.

Do Not Replace the Device Components with Store Bought Items

Surface Systems and Instruments designs and manufactures their custom-built profilers in house. Replacing damaged parts that are inadequate will adversely affect the ability to collect accurate profiles. Please contact SSI for replacement parts.

Updating the Software

If your SSI Profiler license has expired, you will not be able to update. Contact SSI to renew your license and receive new software updates.