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Profiler V3 Operation Manual CS-8500 Profilograph System Version 3.3.13.



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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.

Care and Maintenance of the Profilograph

Respect the Profiling Machines

Profilers are precision instruments, handle with care. Improper maintenance and procedures will reduce system life and collection accuracy.

Literature

ASTM E1274 and CalTrans 526 Test Method are some of the state regulated Profilograph specifications.

Do Not Expose Electronics to Excessive Moisture

The encoders, cables, and suitcase housing should not be exposed to moisture while in storage or profiling. Excessive moisture will cause component malfunctions and the inability to collect accurate profiles.

Grease Bogey Wheel Pivot Points

Keep the pivot points on the bogey wheels well lubricated. The grease fittings are attached to the outer face of the bogey wheel assembly.

Keep Computer Updated

In order to keep the computer running efficiently, install updates periodically. Always install windows updates prior to installing new SSI profiler versions. To install updates, navigate to the start menu and select Control Panel from the right or type 'Control Panel' into windows explorer. Select the System and Security option, then select "Windows Update" from the list. Select "Check for Updates" and install the recommended software. Whenever an update is performed through Microsoft or the SSI support site, recalibrate the Profilograph before use.

Keep this Manual on Hand

Read and review this manual prior to operating the Profilograph. Always have a copy of this manual for repair schematics and troubleshooting, found at the end of the manual.

Proper Tire Pressure

Maintain proper tire pressure throughout the profiling process. The proper tire pressure for the measurement wheel is between 20 and 30 psi. Tire pressure will change throughout the day. If the temperature gradient is high for the duration of profiling, multiple distance calibrations may be necessary to collect accurate data. Always check tire pressure prior to performing the distance calibration.

Measurement Wheel Maintenance

If the measurement wheel is damaged or worn, contact SSI for a replacement. Do NOT install a replacement from a local store. SSI custom builds their measurement wheels for smoothness testing. Using a measurement wheel that is not rounded will introduce artificial roughness into the profile data.

Avoid Self Repair of Key Components

Do not attempt to repair or replace the center section encoders of measurement wheel. These components should only be serviced or replaced by SSI. If the factory installation of the encoders or measurement wheel is disturbed, the operating capabilities of the Profilograph may be adversely affected.

Position of Measurement Wheel

The measurement wheel should only touch the ground during collection. Lock the measurement wheel in the upright position when turning or moving the Profilograph into position between collections. Failure to lock the wheel in the upright position can cause the wheel to drag transversely on the pavement and lose its rounded shape. Accurate, smooth profiles depend on a smooth measurement wheel.

Avoid Excessive Speed

Optimal Profilograph collection speeds are at walking speeds of 2-3 m.p.h. Exceeding this threshold will introduce roughness into the profile data. The faster the speed the more likely for the measurement wheel to bounce, which adds roughness to the collected data.

Set Up

Preparing for Operation

Before proceeding further, verify that the system has been assembled correctly, no component parts are left unattached, and all cables are plugged in. Check that the generator has fuel and oil and has the 110AC cable plugged in. Following the generator manufacturer's instructions, start the generator and allow at least one minute for the generator to warm up and stabilize. Following the instruction in the computer manual, turn Toughbook computer on; enter the password (if applicable) when prompted. Double click Profiler icon to bring up Profilograph software (known as "SSI Profiler"). This will bring up the main menu of the Profilograph software.

Pinch Points

Avoid pinch points while assembling and disassembling the Profilograph system. Wear gloves to avoid finger injury.

Profilograph Frame

The California Profilograph frame is 25 feet long. Make sure that the frame clamps are tight by adjusting the nut and bolt within the clamp head. If the clamp is too tight against opposing frame, vibrations from operation can disengage the clamp. The Profilograph sections are oriented so that the guide pins on each corner of the Profilograph frame attach to their corresponding mate. The

center section has female connection pins on one side and males on the other. Profilograph frame sections can only be assembled incorrectly if the pins do not match.

Bogey Wheels

The bogey wheels are assembled easiest when not connected to the Profilograph frame. Connect the two pairs of arms that consist of the wheel chassis and secure the clamps. After the Profilograph frame is assembled, carefully lift one end of the frame and guide it over the bogey wheel positioning pins. Repeat for the other side and set the brake on the Profilograph frame if necessary.

Steering Wheel Install

To assemble the steering column, place the rectangular aluminum rod partially into the frame rings on the Profilograph frame. Then attach the end of the steering shaft to the angle gear at the bottom of the frame near the bogey wheels. Recent model Profilographs have two way steering, so the angle gear used will be the one at the forward-end of the Profilograph. In this position the operator will be able to push the machine with the generator behind him. The steering wheel should be on the same side of the Profilograph so that it is possible to see inside the open Pelican suitcase while steering.

Connect the steering rod from the angle gear to the bogey wheels using the capped bolt. Always remember to loosen the lock on the bogey wheel adjustment knob. Failure to allow the bogey wheels to move freely when steering can cause the pins in the angle gears to shear. If the pins of the angle gear shear, steering will not operate in that direction until the pins are replaced. While profiling, the alignment of the rear bogey wheels may need to be adjusted. Always be able to steer freely with the bogey wheels connected to the steering column, but have the rear bogey wheels locked in place.

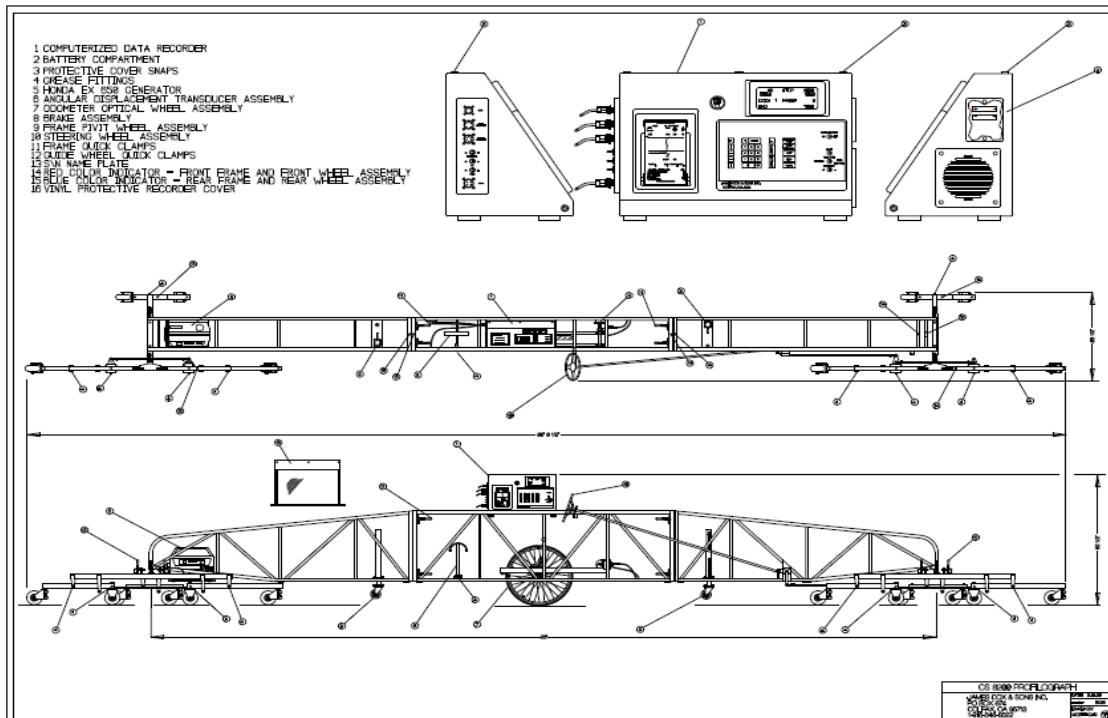


Figure 1: The top and side view schematic for the Profilograph system

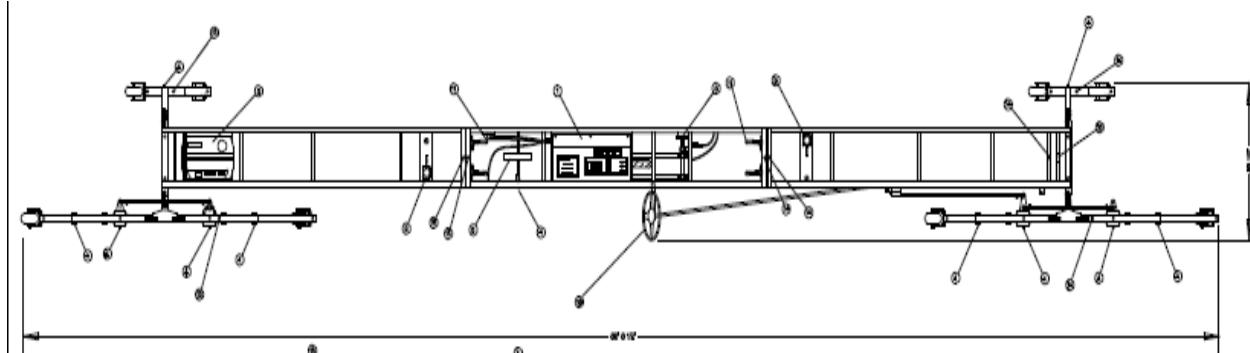


Figure 2: The top view of a correctly assembled Profilograph

Profilograph Alignment

During the distance calibration and other movements of the Profilograph prior to collection, view and adjust the alignment of the bogey wheels so that the Profilograph moves in a straight path within the lane. Adjust the steering alignment on the rear bogey wheels by changing the position of the lock bolt. If at any time the Profilograph is difficult to push on level surfaces, stop and check the cause of the problem. Excessive force while pushing a Profilograph can cause damage to the angle gear, steering wheel, bogey wheels or brake assembly.

Generator

Check the oil and fuel levels of the generator before each use. It is important that the generator is allowed to warm up before connecting it to the Profilograph system. Do not start the generator while it is connected to the suitcase electronics. Reference the generators manual for more information on operation.

Suitcase

Place the suitcase housing on top of the Profilograph frame within the guide rails on the center section. The guiderails will contain the feet of the Pelican suitcase. Use the Jeep hooks to secure the case to the frame. The suitcase should open towards the side of the steering wheel and the measurement wheel lock pin. If the suitcase is placed correctly on the Profilograph frame, the Amphenol connections will easily reach the ports on the side of the suitcase.

Amphenol Connections

The Amphenol connections are the military grade connectors used to transfer the signal of the encoders to the computer housing electronics. Do not twist the cable to attach or remove the cables from the housing. If the cable is twisted, the soldered lead wires will break and the Profilograph will not be able to collect data. If this has occurred, reference the wiring schematic in the appendix of this manual.

Toughbook Computer

If you encounter problems with the Profiler software, always try completely exiting the Profiler program and restarting it. If the problem persists, or if you encounter problems with the windows operating system on the Profilograph computer, try turning the computer OFF and then ON again. If the computer freezes during operation, press the CTRL-ALT-DEL keys several times to reboot the computer, or once to open the task manager. If this does not allow the computer to restart, slide

the ON-OFF switch continuously for 10 seconds (until the computer beeps) and the computer will shut itself off. Consult the computer manual or Windows operating system manuals for further assistance for problems that do not relate to the Profiler software. Contact SSI if problems persist with the profiler software program. If identical reoccurring messages appear (e.g. access violations, invalid floating point operations, etc) ALWAYS close down and restart the Profiler software, and reboot the computer if necessary. Contact SSI for technical support if the issue persists.

Printrex Printer

Connect the Printrex printer to the operating computer through the USB port on the side of the Toughbook. If problems occur with printing, review the printer settings found in Control Panel, Devices and Printers. Right click upon the Printrex 422 icon and select preferences. The majority of problems come from the USB port not being set up correctly. If the printer is connected but the print queue is not being processed, open the properties of the Printrex printer and change the port that the printer is connected through. For more information contact SSI technical support.

GPS

The GPS system of the Profilograph will acquire the satellites and its position automatically as soon as the system receives power. If the GPS does not acquire its position, open the GPS Details window and check the status of the GPGGA coordinates and the number of satellites. The software requires detection of numerous satellites so if the profilograph is under bridge, inside a shop, surrounded by large trees or if the weather is extremely cloudy, the sufficient satellites might not be detected and the system will not be able to produce a proper GPS string. If problems persist, contact SSI technical support.

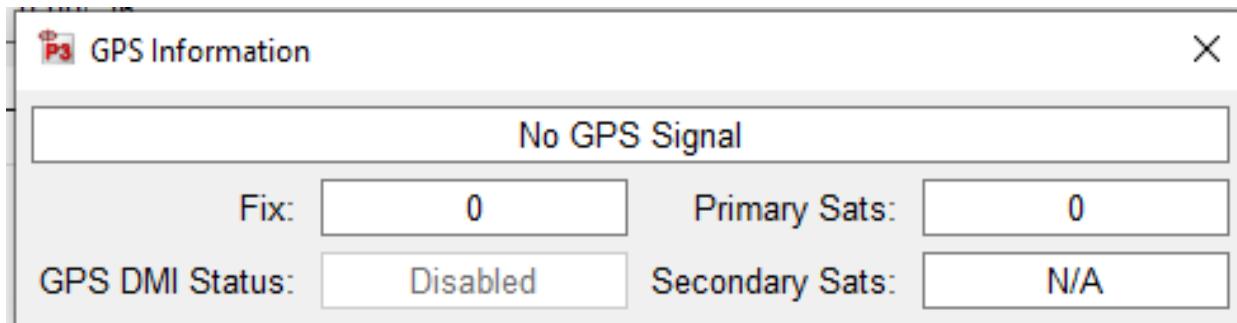


Figure 3. The GPS Details window showing No GPS signal

Data Collection

Collect

Under the collect window shown below, the operator can collect data or perform height and distance calibrations.

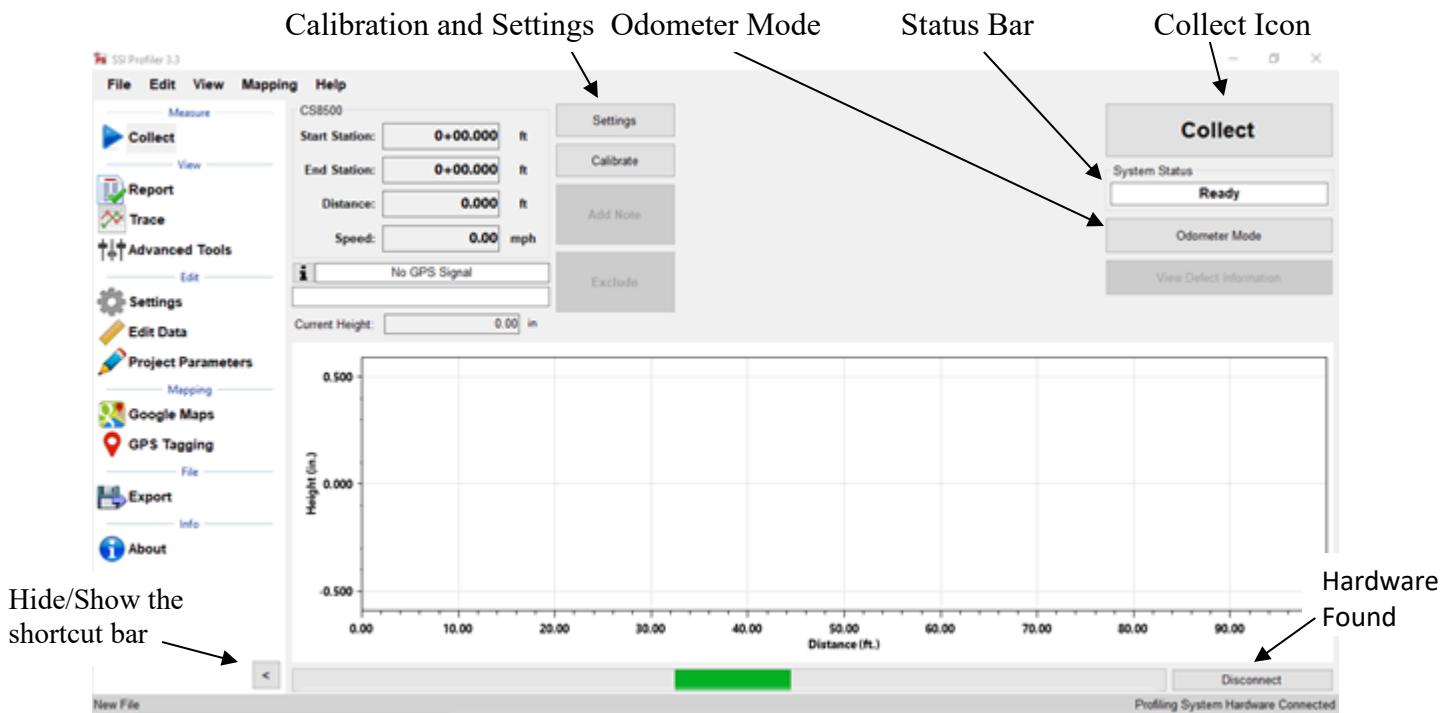


Figure 4: The Main Collection Window

Hardware Found

Once hardware is properly connected and set up, the Profiler program will recognize the hardware and ‘Hardware Found’ will appear at the bottom right corner of the screen. If the hardware is not found, “Searching for Hardware...” will be displayed instead. If this is the case, check all of the connections and power sources. If the problem persists, contact SSI Support.

Calibration

The Calibration Window can be viewed only when profiling hardware is connected to the operating computer. Once hardware is found, navigate to the collect window by selecting View>Calibration from the menu bar or by selecting Calibration from the shortcut bar.

Select the Calibration icon to open the Calibration Menu Window and choose the type of calibration to be performed. The options will be a height calibration, distance calibration or done to exit the menu.

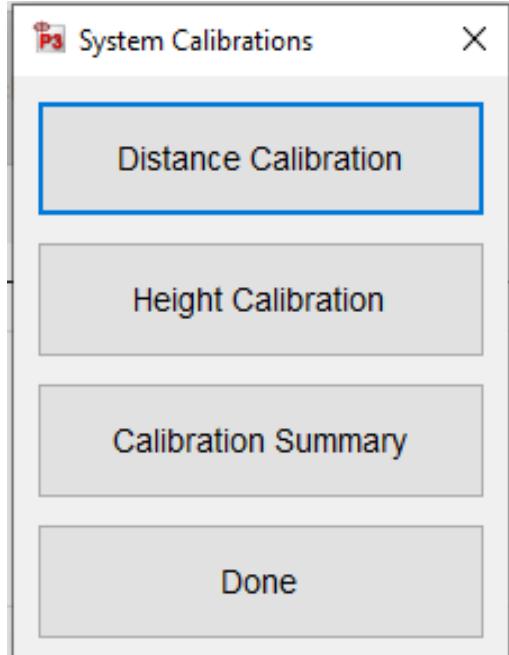


Figure 5. The Calibration menu

Distance Calibration

A distance calibration should be completed at least once per day. The length of the calibration track should be the same length as the segments to be reported (528ft, 100m, or 200m are typical). Measure out the distance over a clean, straight and flat surface. **You must calibrate the profilograph in the same units of measurement as the project you are about to profile.** For example, if the specification calls for metric testing, you must calibrate the profilograph in metric. Select the calibration icon and chose Distance Calibration. The first window will instruct the operator to place the center measuring wheel at the beginning of the calibration track. Align the axle of the center measuring wheel over the beginning of the track.

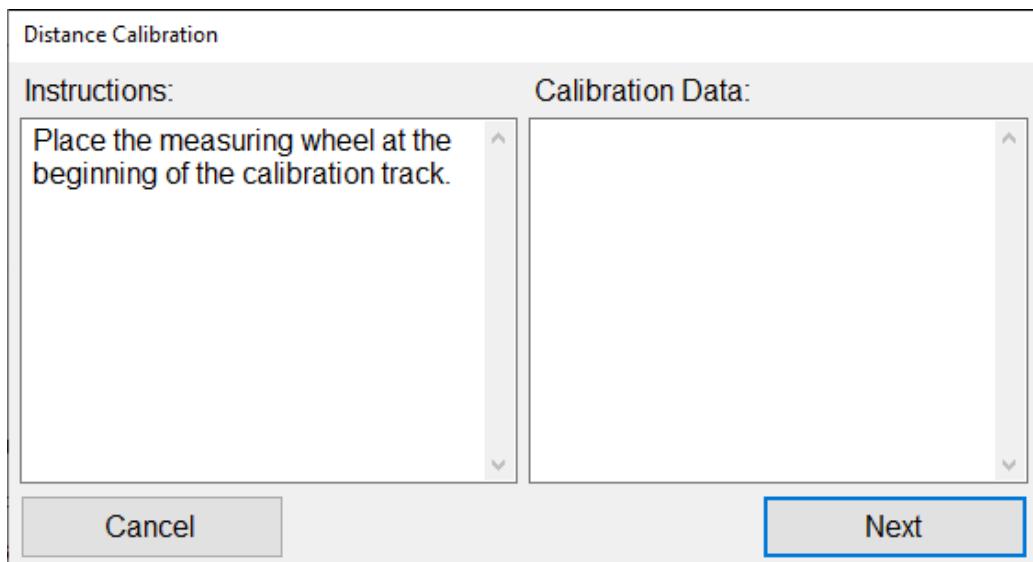


Figure 6. First window of distance calibration

After pressing next, push the profilograph in a straight line to the end of the calibration track.

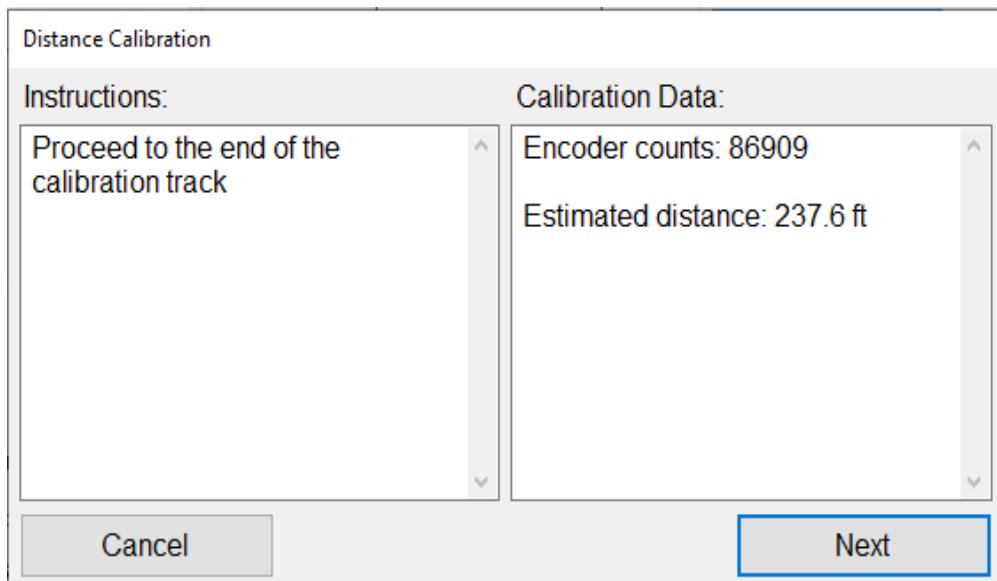


Figure 7. Distance calibration window mid calibration.

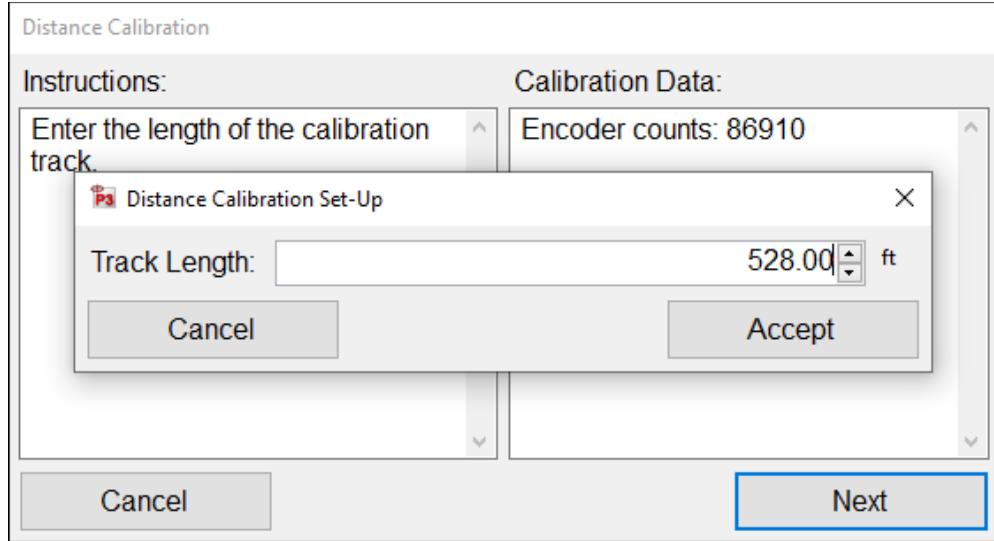


Figure 8. Enter the length of the calibration track in the last window

At the end of the calibration track, align the axle of the center measuring wheel over the end point of the calibration track and press "Next". The Track Length window will appear. Enter the length of the calibration track. **The estimated distance read out does not have to match the distance actually traveled during the calibration.** The estimated distance rarely matches the actual distance during a calibration if the Profilograph has been relocated, in storage or the software has been updated. After finishing a successful distance calibration, select "Next" to save the data. Recalibration may be necessary if the temperature changes by twenty degrees F (about 10 degrees C). The changing pressure in the tire will alter the circumference and the distance readout.

Height Calibration

Select "Height Calibration" from the Calibration Menu. Follow the directions within the instructions text box for placing the blocks. Only use the machined step block and base plate supplied by SSI. If replacement calibration blocks are needed, contact SSI technical support.

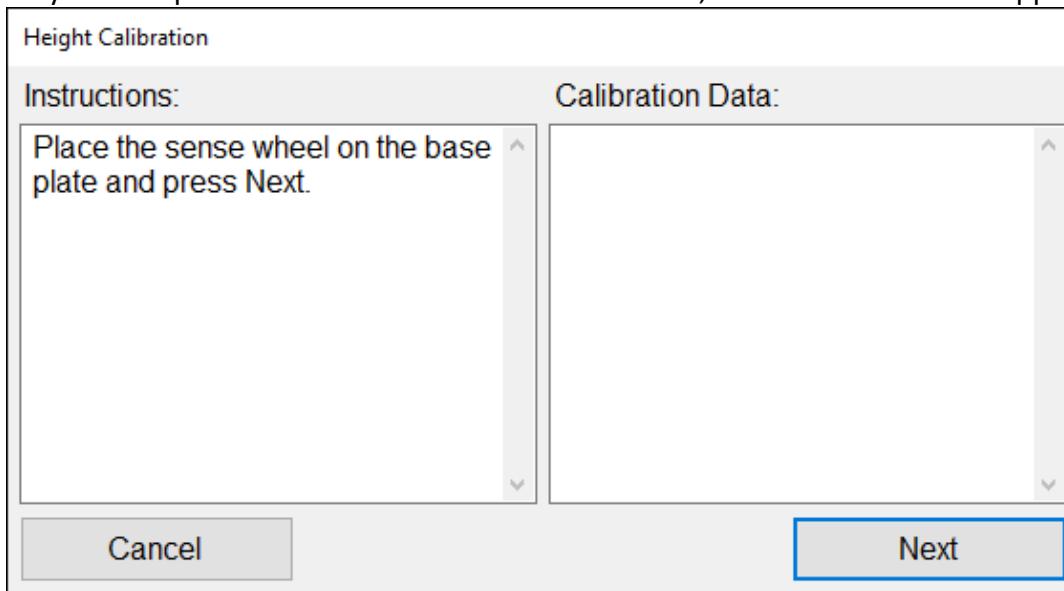


Figure 9. First window of height calibration

A new window will appear (see figure below). First enter the height of Block 1 as one inch, then select “Accept.” The defaulted height for the calibration blocks provided by SSI have 1 inch increments or its equivalent in metric. The units can be changed by clicking on the unites icon.

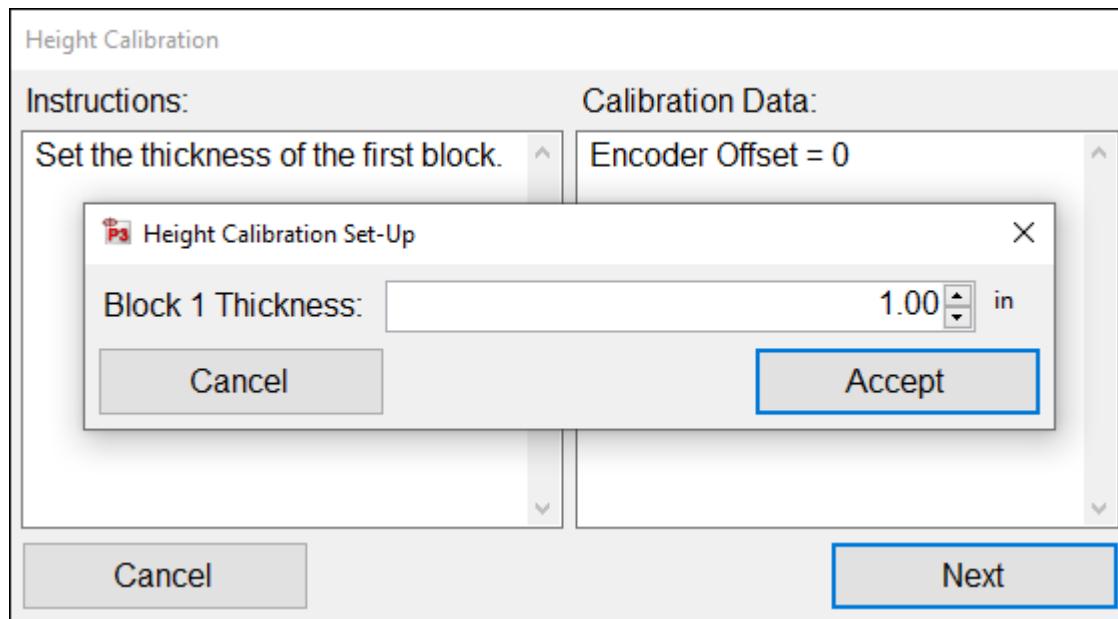


Figure 10. Enter the thickness of the first calibration block

Place the measurement wheel upon the first block and select next.

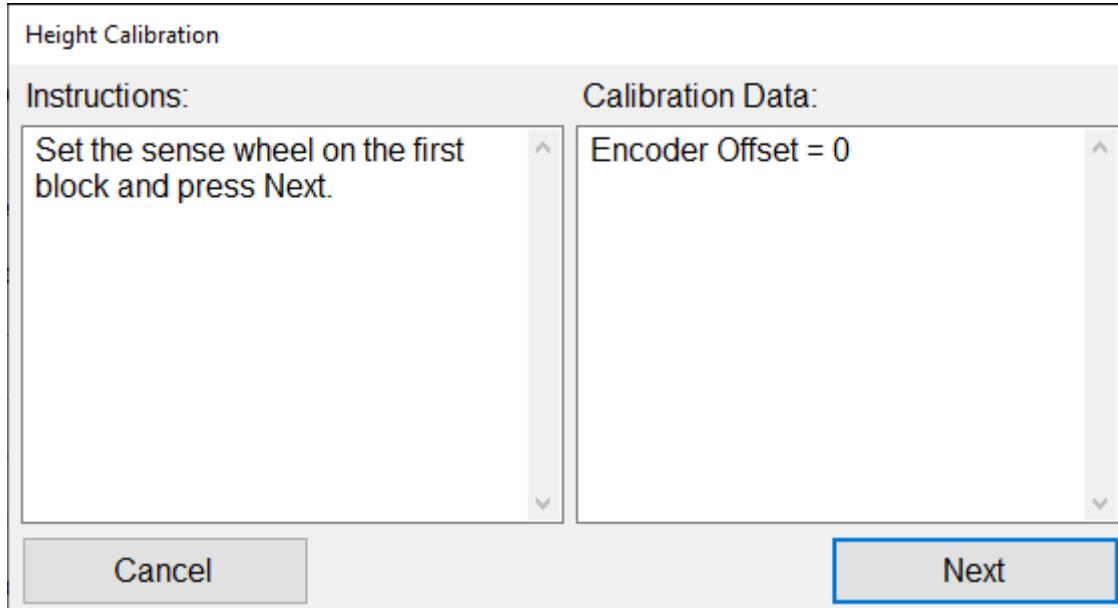


Figure 11. Set the measurement wheel on the first block and press Next.

The program will call for the height of the second block which is **one inch** (The height is not accumulative). See figure below.

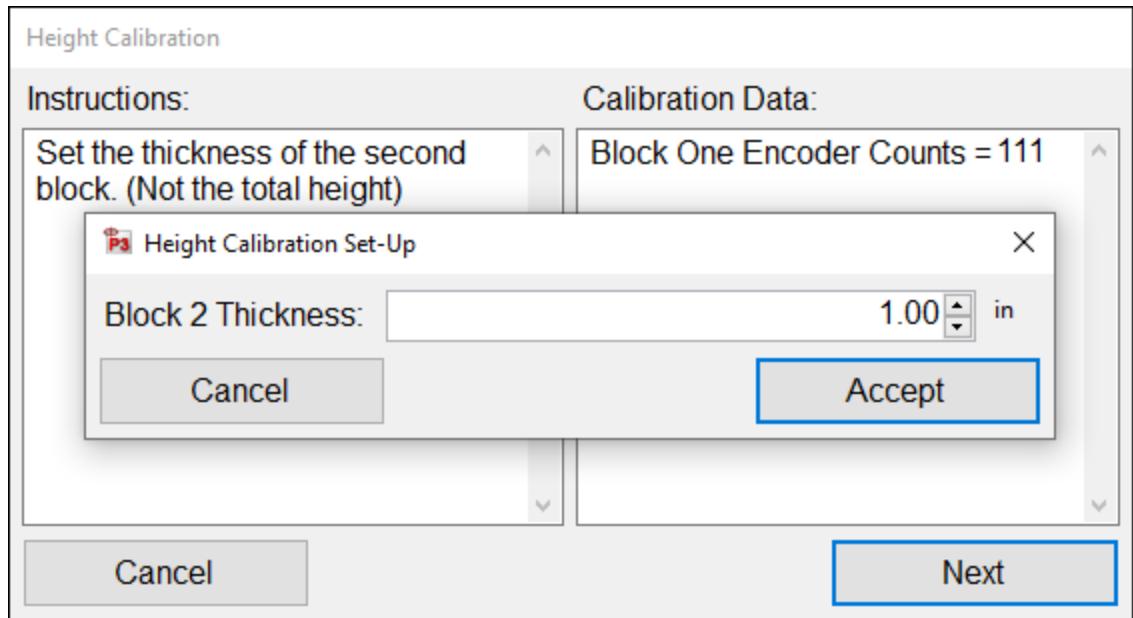


Figure 12. Set the thickness of the second calibration block

Once accepted, the Profiler program will ask for the second block to be placed under the measurement wheel. If the operator forgets this step or there is a problem with the encoder, an error message will pop up. See adjacent figure.

Figure 13. Error message for height calibration

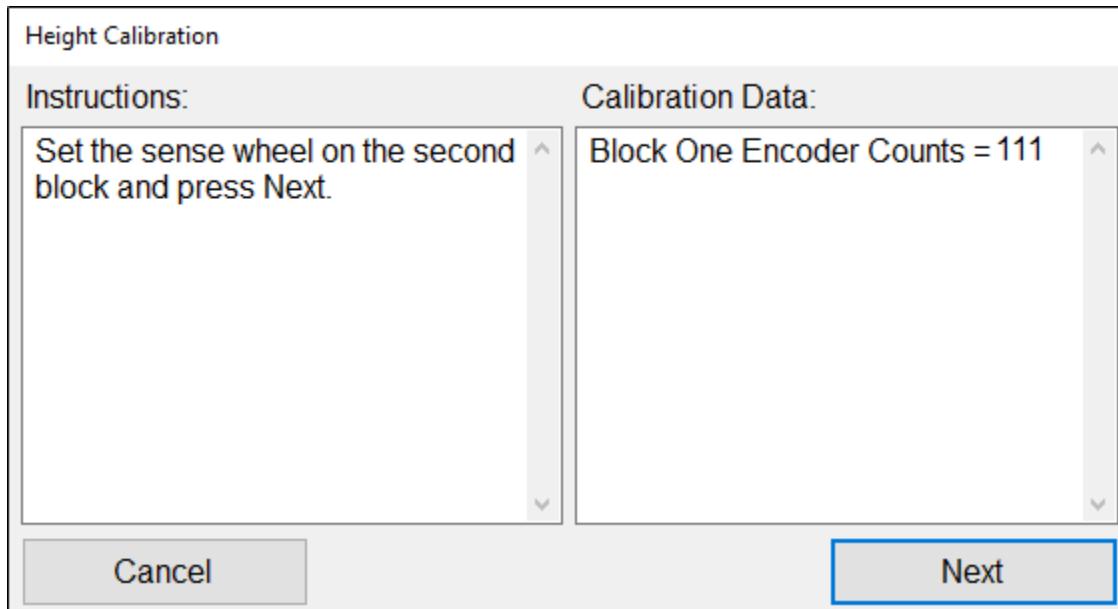
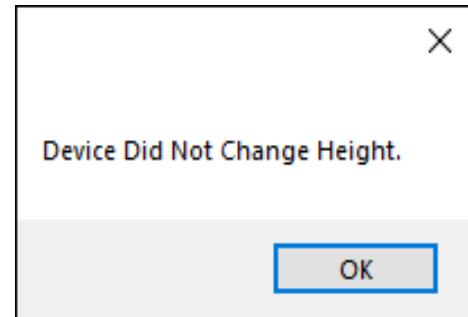


Figure 14. Set the center measuring wheel on the second block and press Next

At this time the blocks will be removed one by one as per the instructions. If the calibration passes the consistency test, the calibration settings will be saved. See pics below.

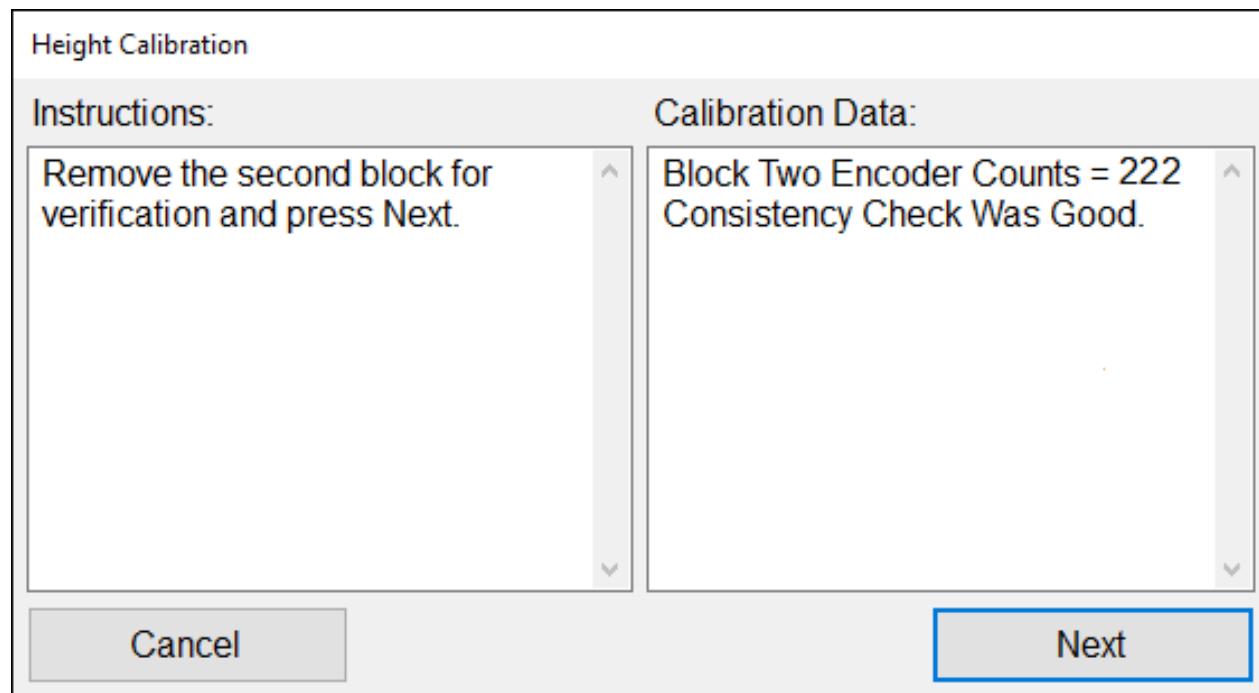


Figure 15. Remove second block for verification and press Next

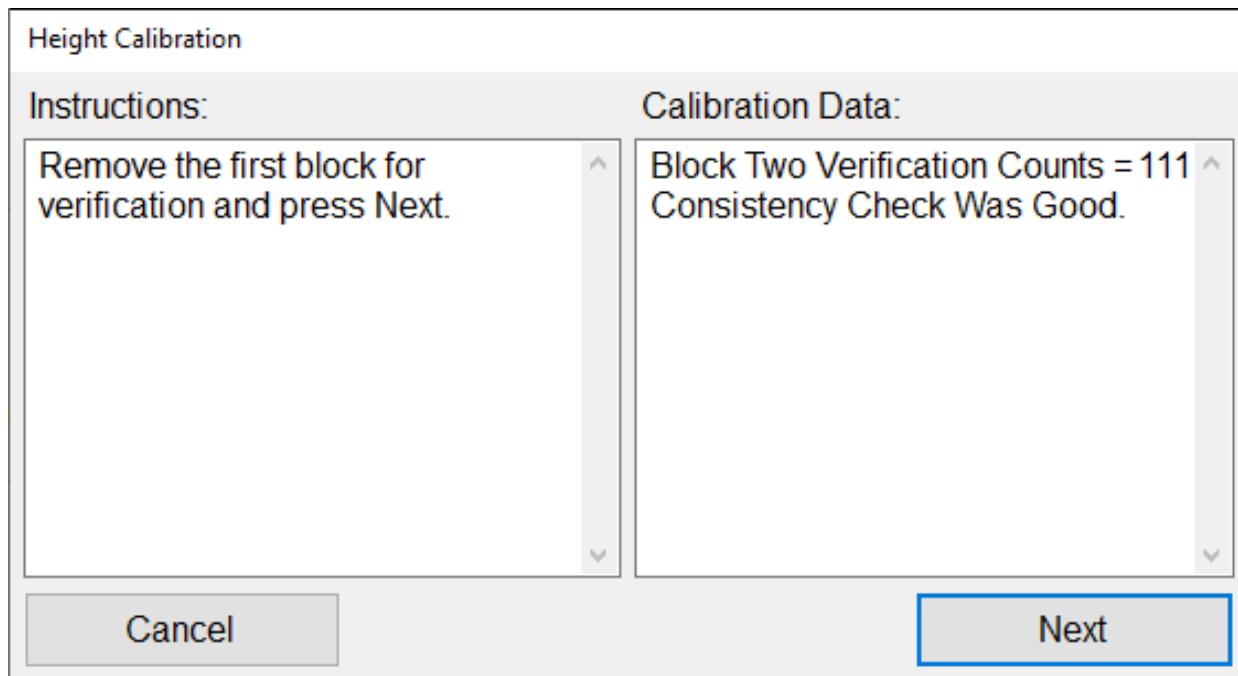


Figure 16. Remove first block and press Next.

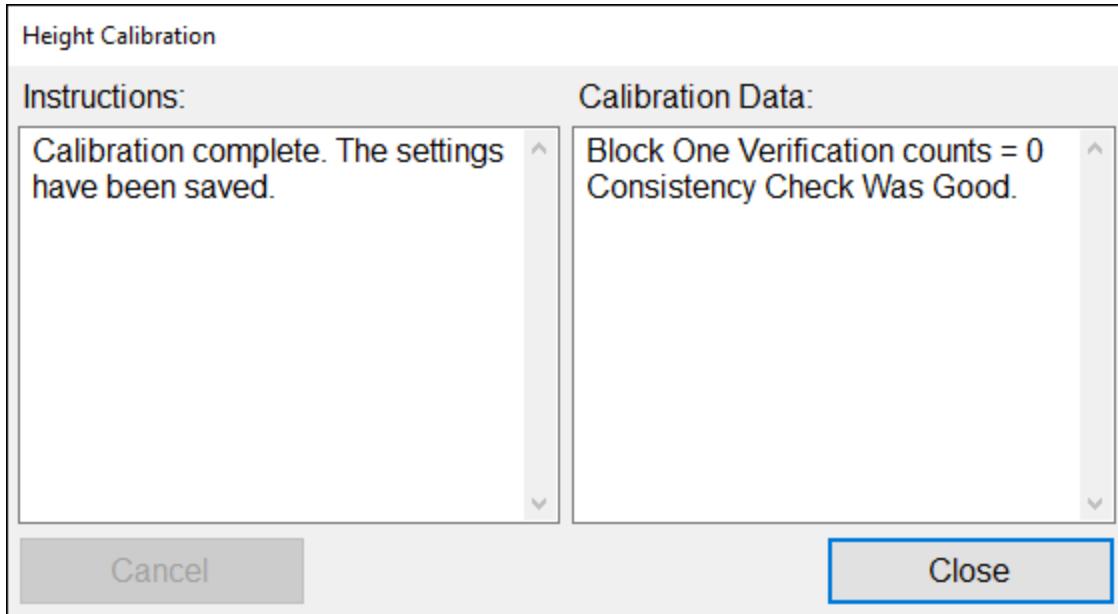


Figure 17. If the consistency check is good the calibration will be saved

Calibration Summary

To view the current saved calibrations, open the Calibration Menu and select Calibration Summary. The height and distance calibrations will be displayed within this window.

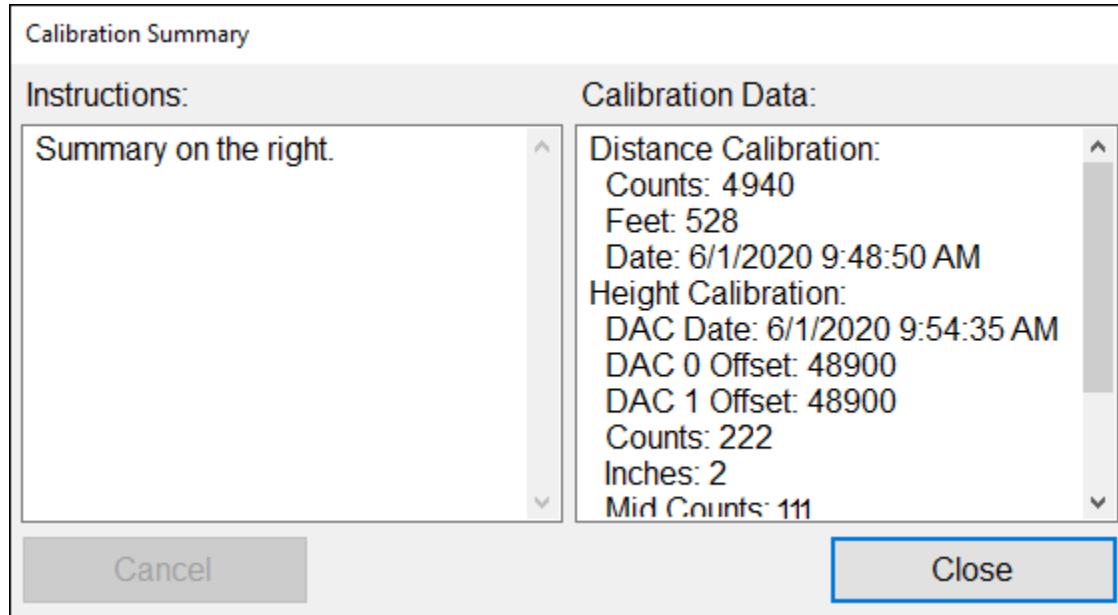


Figure 18. Calibration summary

Sample Interval

The sample interval is the distance between two points of length measurement. The default value for Profiler V3 is 1 inch.

Odometer Mode

The Odometer Mode button is located in the top right hand of the collection screen (see figure 4) under the Collection button and the System Status. A correctly calibrated Profilograph can also be used as a distance measuring tool. This feature is useful to find accurate localized roughness when a measuring wheel is not an option. The odometer can be used when the Profilograph is not collecting. Input the starting station and whether the system will be traveling up or down station. Distance will be measured when the measurement wheel begins to rotate. To reset the inputted values, select the reset icon on the Odometer Mode Window.

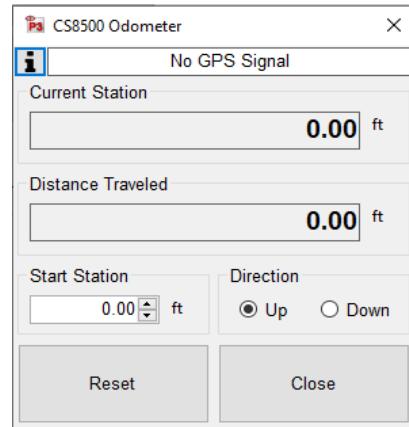


Figure 19. The odometer mode window

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.

Changing Settings and Parameters

All parameters within Profiler can be changed after initial setup ***except for the Lane Number, and Track Number***. It is possible to change the other settings under General Settings, Localized Roughness, Edit Data and Analysis Parameters at any time after collection.

Naming Files

The naming convention of V3 is set by the user in the Settings. Select "Configure File Naming" to populate the name of the file with certain collection parameters. The naming feature will be used after a collection has been completed and the user chooses either "Save As New" or "Save File". See the Default File Naming Section for more information.

Starting a Collection

Once the Profilograph has been properly assembled and calibrated, collections may begin with safety precautions being taken. Begin with the Profilograph on the starting line for the collection. Select the 'Collect' icon to initiate the collection procedure. When Collect is selected, enter the preliminary information for the analysis parameters and the localized roughness. These values may be changed later, however ***Direction and track number cannot be adjusted after the collection has started***.

When "Begin" is selected, the collection may start.

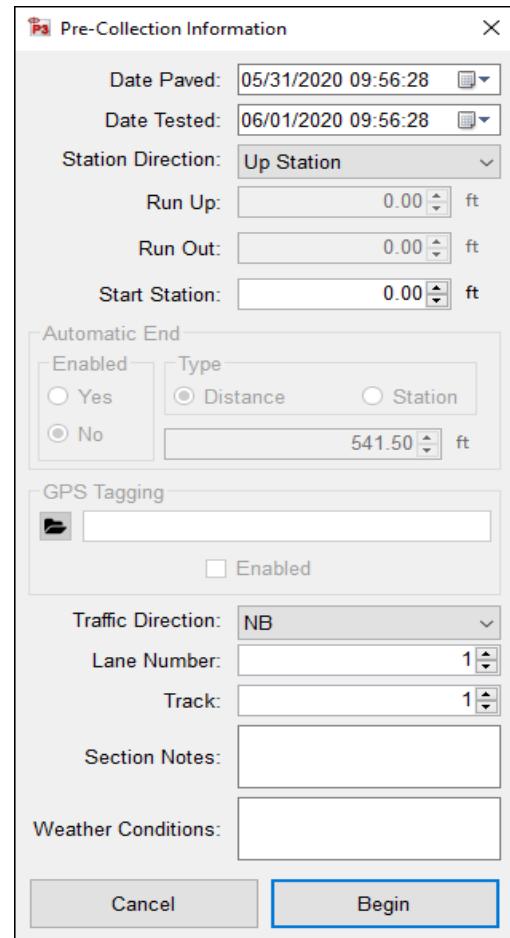


Figure 20. The precollection window

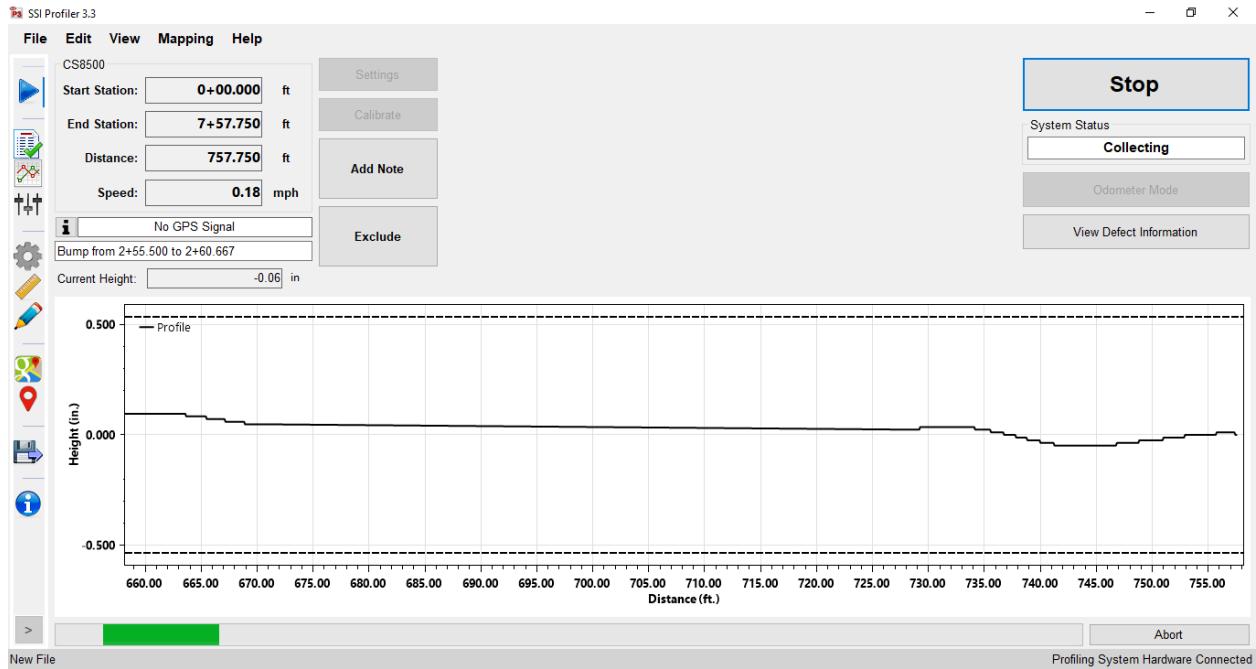


Figure 21: The collection window with a simulated collection in progress

Add Note

Notes can be used to explain defects, to leave notes for improvements or for adding any information about the current collection. The note locations will appear on the data traces in the report section. A window will appear that allows the operator to enter the information on the reason for the note.

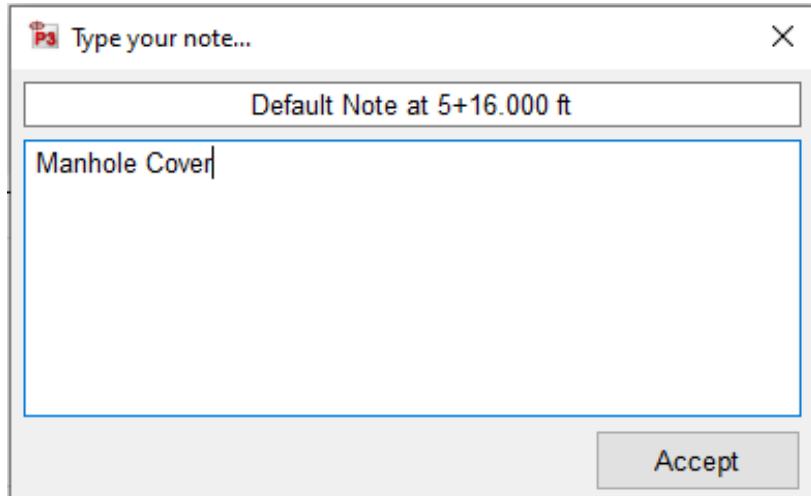


Figure 22. The Add Note window

Exclude

Exclude is used when the stationing/distance measurement needs to continue, but height/profile data needs to be excluded. Depending on the spec, this can happen when the Profilograph approaches bridge decks, manholes or drainage areas that were paved by hand. Review the overseeing agency's specifications on excluded/paused data before using this feature. The Exclude function will continue to record longitudinal distance but will exclude the height measurements. The ride values or localized roughness on paused segments will not be calculated.

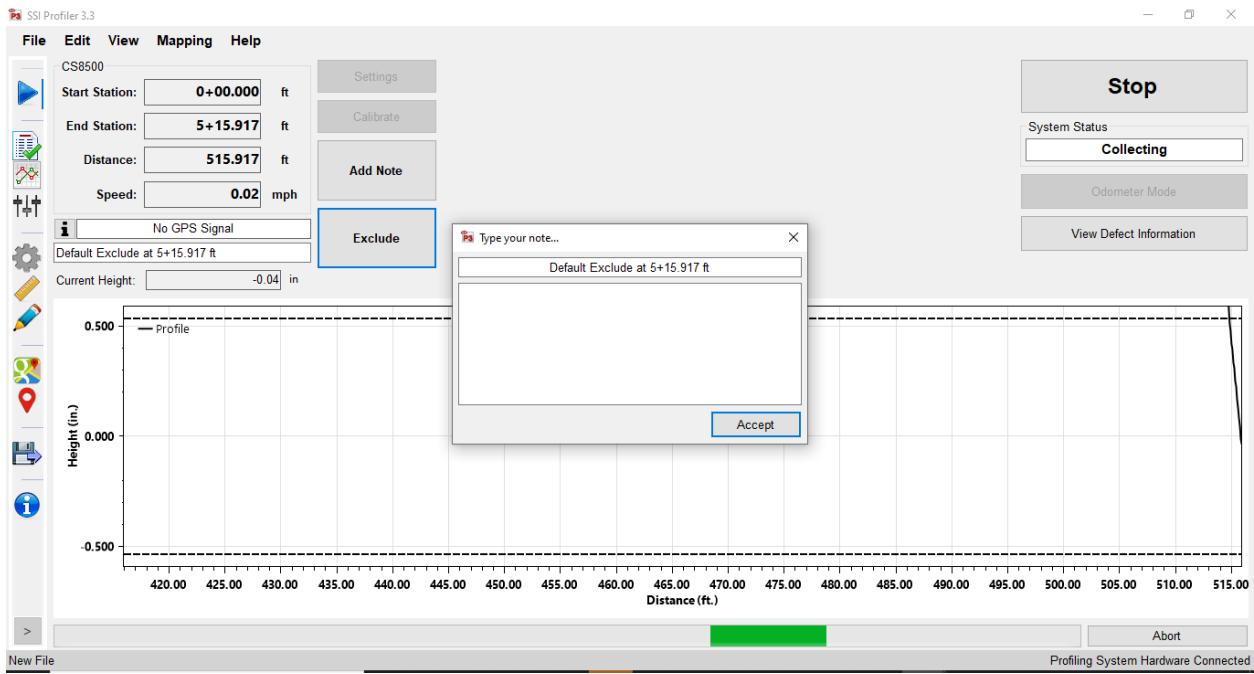


Figure 23. Collection window right at the start of the exclusion

When the collection is paused, the status bar will be red and will display “Paused.” The user can still insert notes into the data while the collection is paused. The collection cannot be ended when the pause is enacted. To terminate the collection, “Resume” and select “End Collection.”



Figure 24. The Collection window during an exclusion

Defect Detection in Real Time

The operator will have the option to choose the "Enable Real Time Defect Detection" checkbox from the Collection Parameters Window prior to a collection. Use the drop down menu to choose the type of defect and adjust the bump template values according to the specification of the project. When a defect is found while profiling, the system computer will beep and add the defect's information to the defect list.

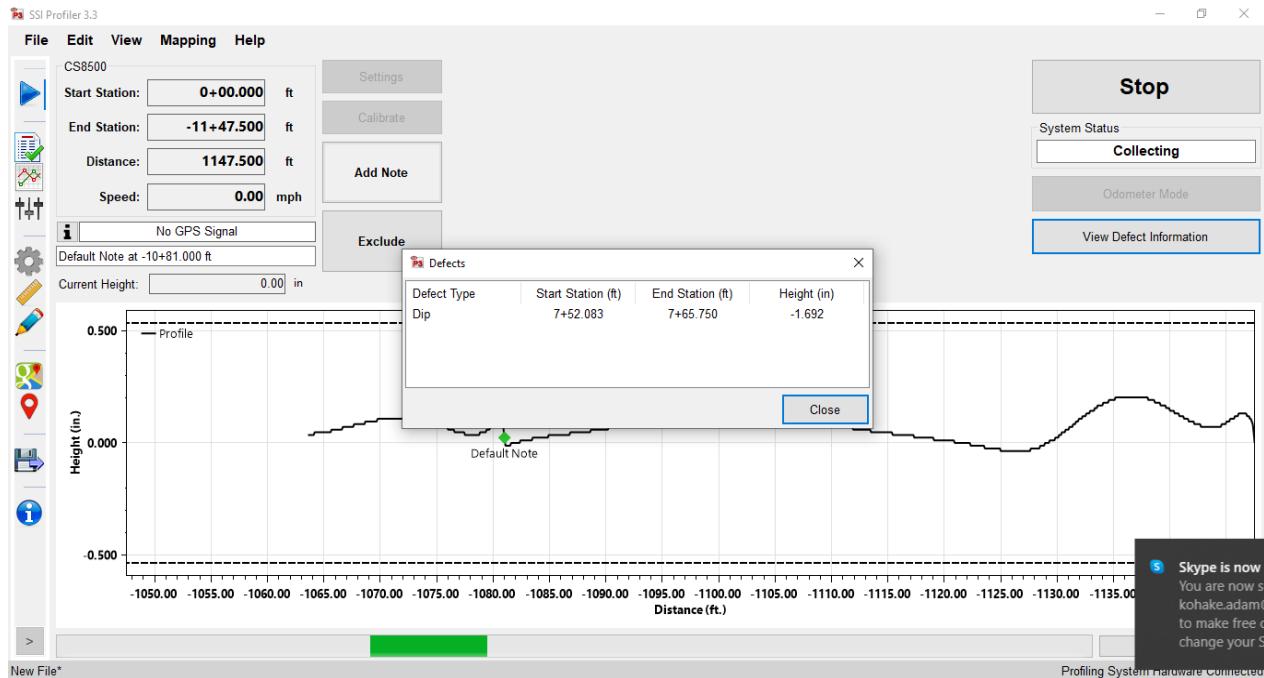


Figure 25. Window for real time bump detection during a collection

Backing Up

The operator may erase data that was just collected by moving the Profilograph in reverse with respect to the direction of collection. When the measurement wheel begins to rotate in reverse, the status bar turns red and the queue says "Backing Up." While backing up, the operator will see the collected trace disappear at the same rate that the Profilograph is moving in reverse.

Start Station

The start station is entered with the preliminary data prior to collection. This value cannot be changed after collection begins.

End Station

The end station is the current stationing location of the Profilograph after a collection has been started. The end stationing is based off of the starting station values entered prior to collection. The stationing cannot be adjusted after collection.

Ending a Collection

To finish a collection, select the “Stop Collection” icon. The program will open another window giving the user the options to save the file, save file and open a new file, and do not save file.

If the **Do Not Save** is selected, there will be no record of the data collection.

If **Save Only** is selected, the current file will remain open for the operator to collect more data on the file or to look at the collection in Reports.

If **Save and Start New File** is selected, the program will save the current file and open a new file to collect data.

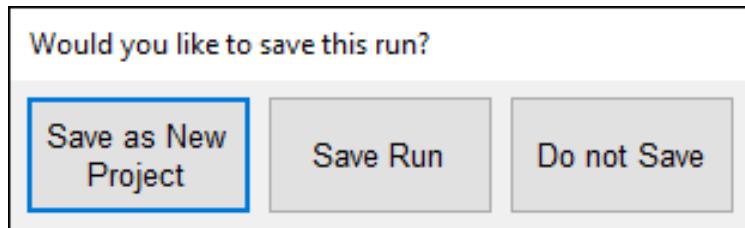


Figure 26. The saving run options

Note: If multiple tracks are to be associated with one file, choose the **Save Only** option, then collect the next track.

Distance

Distance is the distance traveled from the starting station to the current position. If the operator believes the distance is incorrect, review the calibration settings. If necessary perform a distance calibration.

Real Time Ride Values

If the operator selects the option to display the ride values in real time, the ride number for each segment will appear on the plot during collection. This feature is selected in the Collection Information window that appears when “Collect” is originally selected from the main Collect window. The real time ride values are displayed less than 25 feet from the end of the segment.

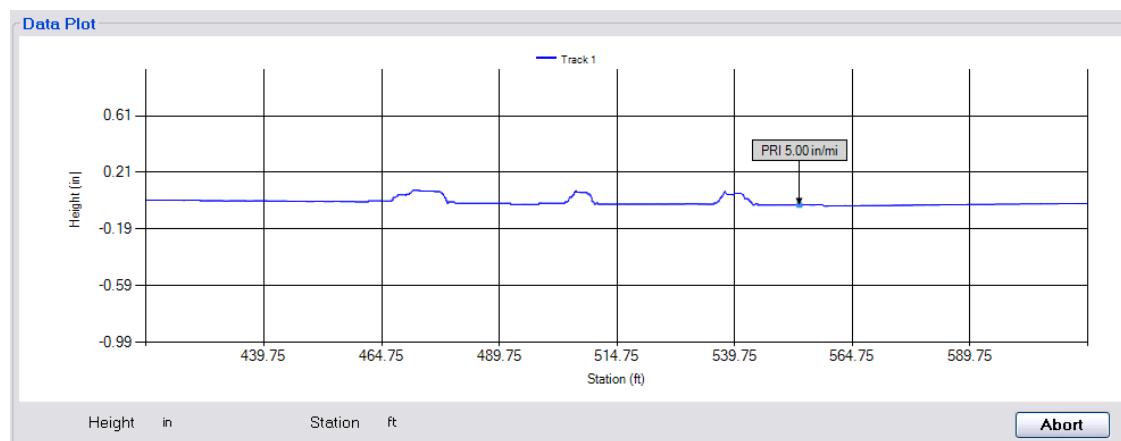


Figure 27. The Ride Values of PRI after segment length

Speed

The speed is the speed of the Profilograph based on the rotation of the wheel and the current distance calibration. Never exceed 7mph when profiling. Excessive speed will introduce artificial roughness into the collected data.

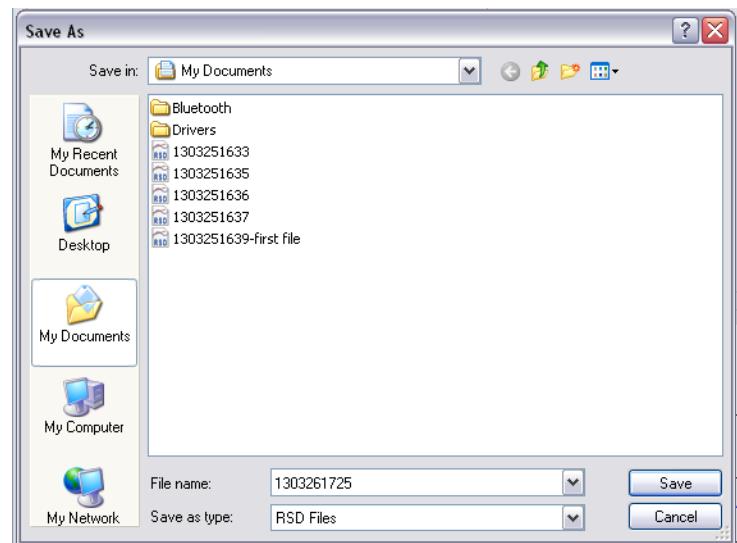
If the Profilograph is moving during a collection, but the speed and distance are not changing, inspect the hardware of the system, especially the coupling between the distance encoder axle and the measuring wheel axle. Also verify that all cables and wires within the Amphenol connections are secure.

Saving the Data

Select File>Save or ctrl+s to save changes and collected data. A windows explorer window will open and allow the operator to choose a destination to save the file. The format that Profiler can save collected data in is RSD. Once saved as an RSD file, the operator can export or convert the file into

Figure 28: The "Save as" Window for saving files

compatible formats.



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 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.

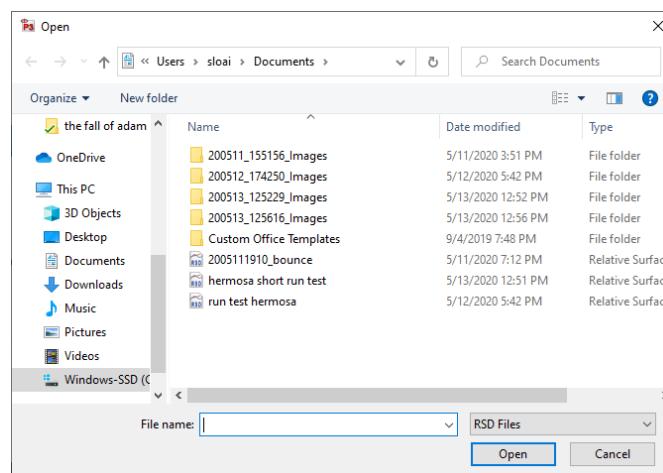


Figure 29. Opening a data file in the Profiler V3 program

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."

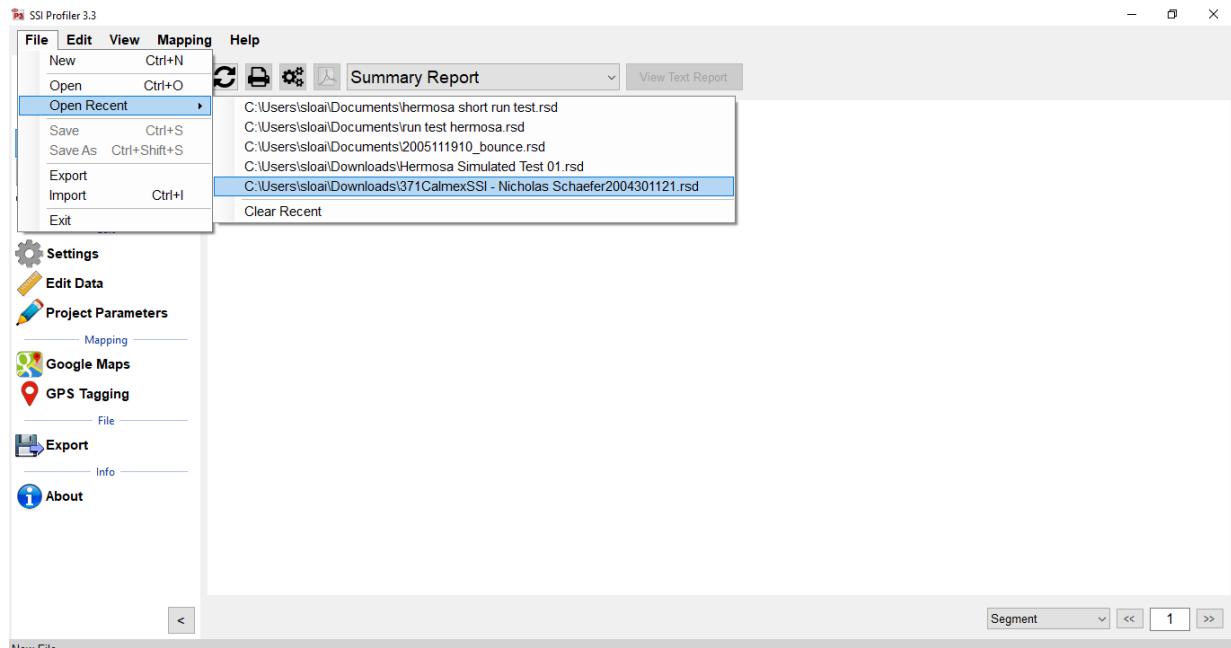


Figure 30: The Open Recent feature

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.

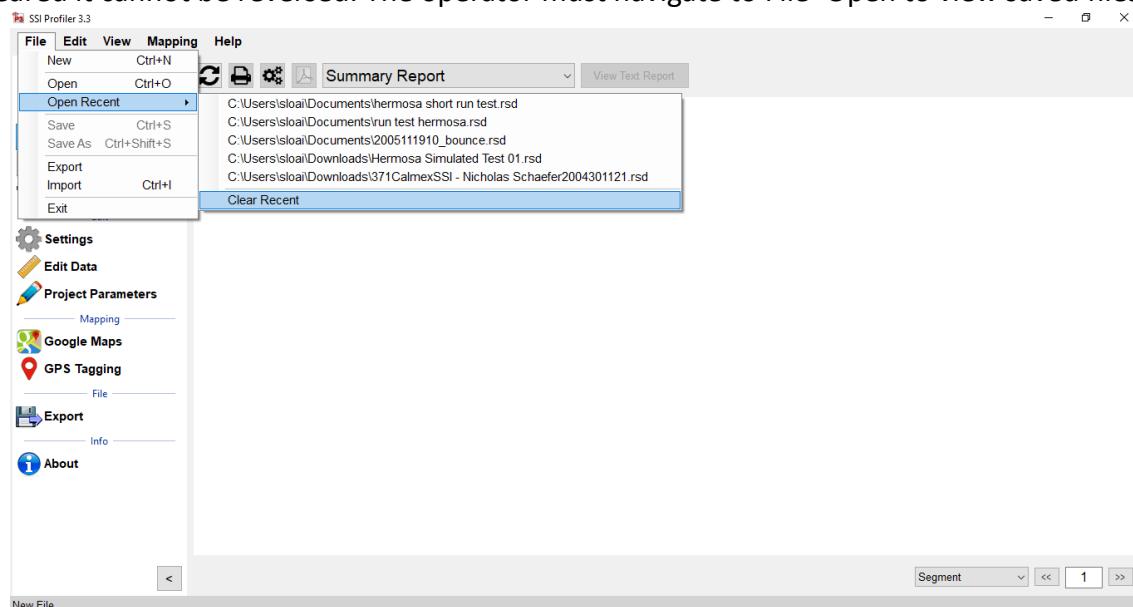


Figure 31: The clear recent feature

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.

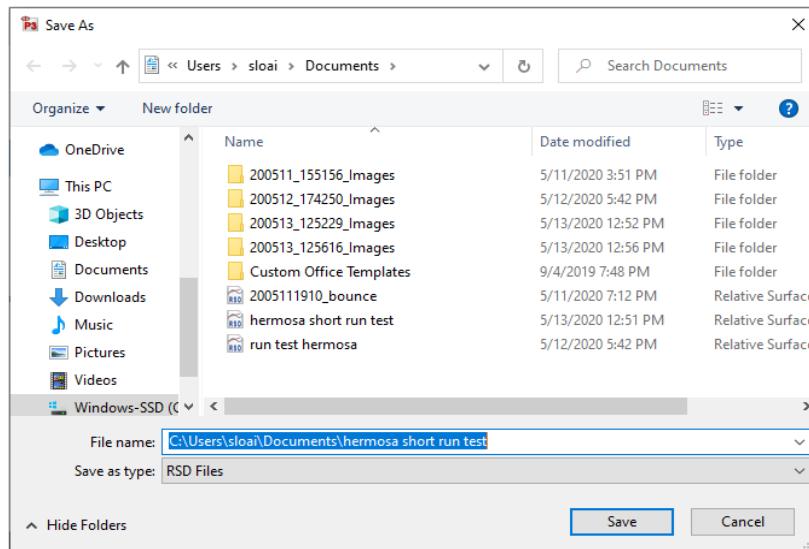


Figure 32: Saving a file through Save As in RSD format

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.

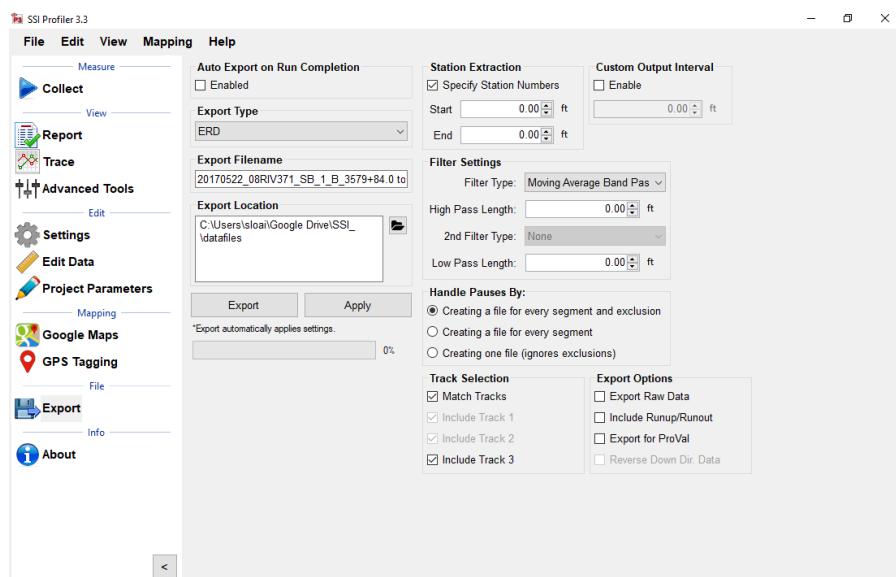


Figure 33: Window for exporting the data into Excel format

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.

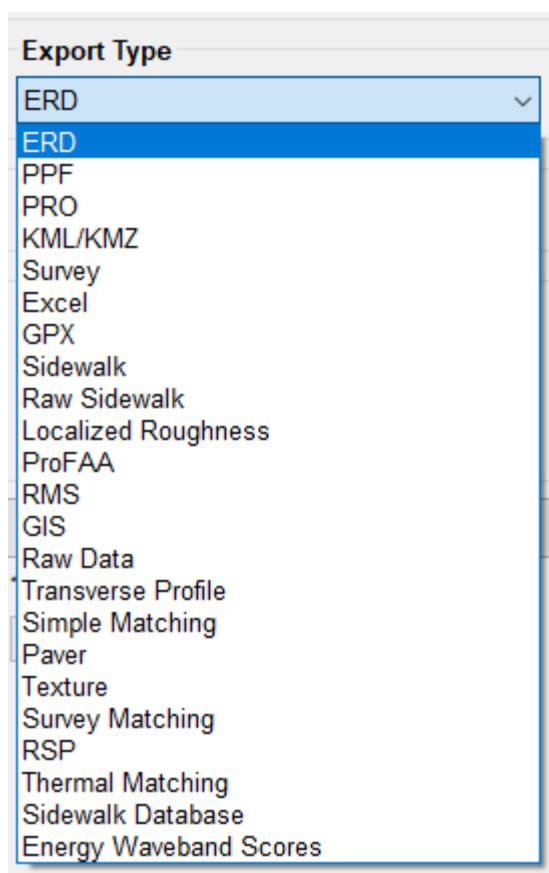


Figure 35. The export type drop down menu

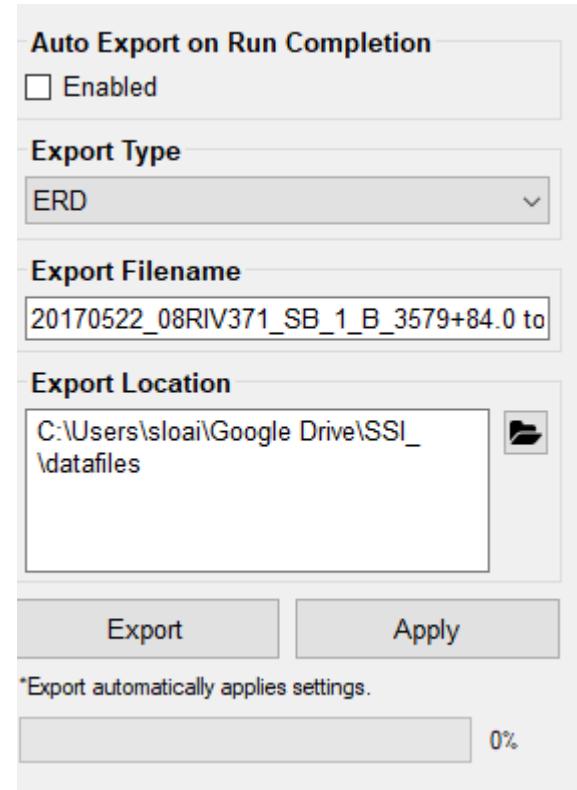


Figure 34. Select location to save the exported file

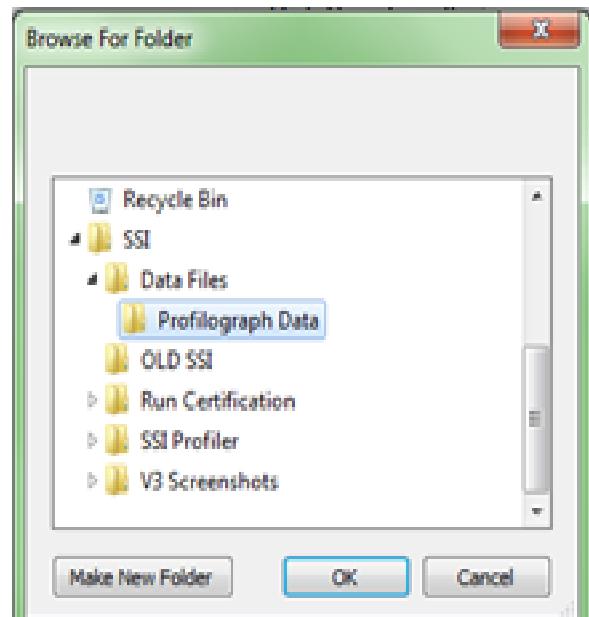


Figure 36. The export folder location selection after pressing the Icon in figure 60

Exporting to ERD Format

The screenshot shows the 'Exporting to ERD Format' dialog box. It includes sections for 'Auto Export on Run Completion' (checkbox), 'Export Type' (dropdown set to 'ERD'), 'Export Filename' (text input 'New File'), 'Export Location' (button with folder icon), and two buttons 'Export' and 'Apply'. Below these is a note: '*Export automatically applies settings.' A progress bar at the bottom indicates '0%'. The main configuration area contains several sections:

- Station Extraction:** Includes a checked checkbox for 'Specify Station Numbers', and input fields for 'Start' (0.00 ft) and 'End' (0.00 ft).
- Custom Output Interval:** Includes an unchecked checkbox for 'Enable'.
- Filter Settings:** Includes a dropdown for 'Filter Type' set to 'Moving Average Band Pas', and input fields for 'High Pass Length' (0.00 ft), '2nd Filter Type' (None), and 'Low Pass Length' (0.00 ft).
- Handle Pauses By:** Includes three radio button options:
 - Creating a file for every segment and exclusion
 - Creating a file for every segment
 - Creating one file (ignores exclusions)
- Track Selection:** Includes four checked checkboxes: 'Match Tracks', 'Include Track 1', 'Include Track 2', and 'Include Track 3'.
- Export Options:** Includes four unchecked checkboxes: 'Export Raw Data', 'Include Runup/Runout', 'Export for ProVal', and 'Reverse Down Dir. Data'.

Figure 37. 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.

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.

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 ‘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.

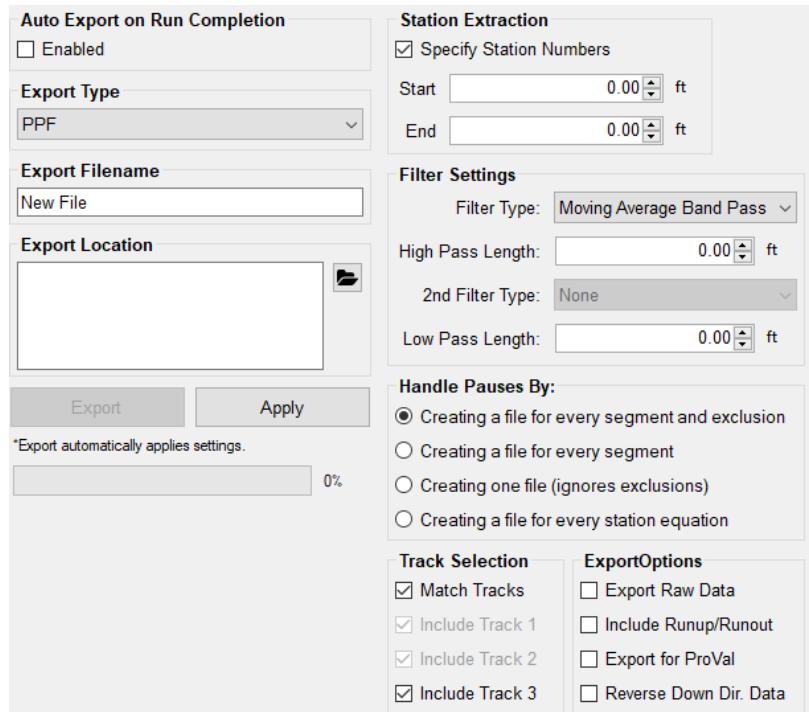


Figure 38: The PPF export window

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.

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.***

Exporting to PRO Format

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.

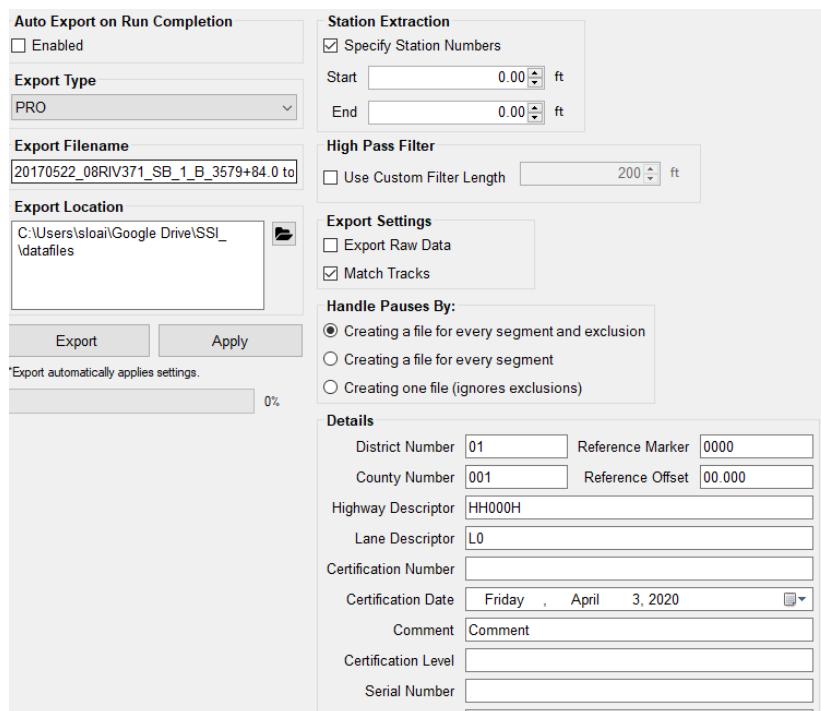


Figure 39. The PRO export window

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.

The screenshot shows a dialog box titled "Details" containing various input fields for job-specific information. The fields include:

- District Number: 01
- Reference Marker: 0000
- County Number: 001
- Reference Offset: 00.000
- Highway Descriptor: HH000H
- Lane Descriptor: L0
- Certification Number: (empty)
- Certification Date: Friday, April 3, 2020
- Comment: Comment
- Certification Level: (empty)
- Serial Number: (empty)
- Operator Name: (empty)
- Profiler Model: SSI_CS9100

Figure 40. The Details input options for PRO export

Exporting to KML/KMZ Format

The operator can choose to export in the KML/KMZ formats. This format is used for viewing the file as graphic data in an Earth Browser such as Google Earth. This feature allows operators with Google Earth installed on their computers to view the test data in the real environment, showing the traces superimposed onto the window. The user may view the traces and project from any view or angle.

The screenshot shows a dialog box for "Export to KML/KMZ" settings. It includes the following sections:

- Auto Export on Run Completion:** A checkbox labeled "Enabled" is checked.
- Export Type:** A dropdown menu set to "KML/KMZ".
- Export Filename:** An input field containing "New File".
- Export Location:** A browse button (represented by a folder icon) and a text input field.
- Features:** A list of checkboxes:
 - Path Reference Line (checked)
 - Include Profile Data (checked)
 - Station Notes (checked)
 - Localized Roughness (checked)
 - Grind Sections (checked)
 - Include Images (unchecked)
 - Use KMZ (unchecked)
- Buttons:** "Export" and "Apply" buttons at the bottom.
- Note:** A note at the bottom states "*Export automatically applies settings."
- Status Bar:** A progress bar at the bottom right showing "0%".

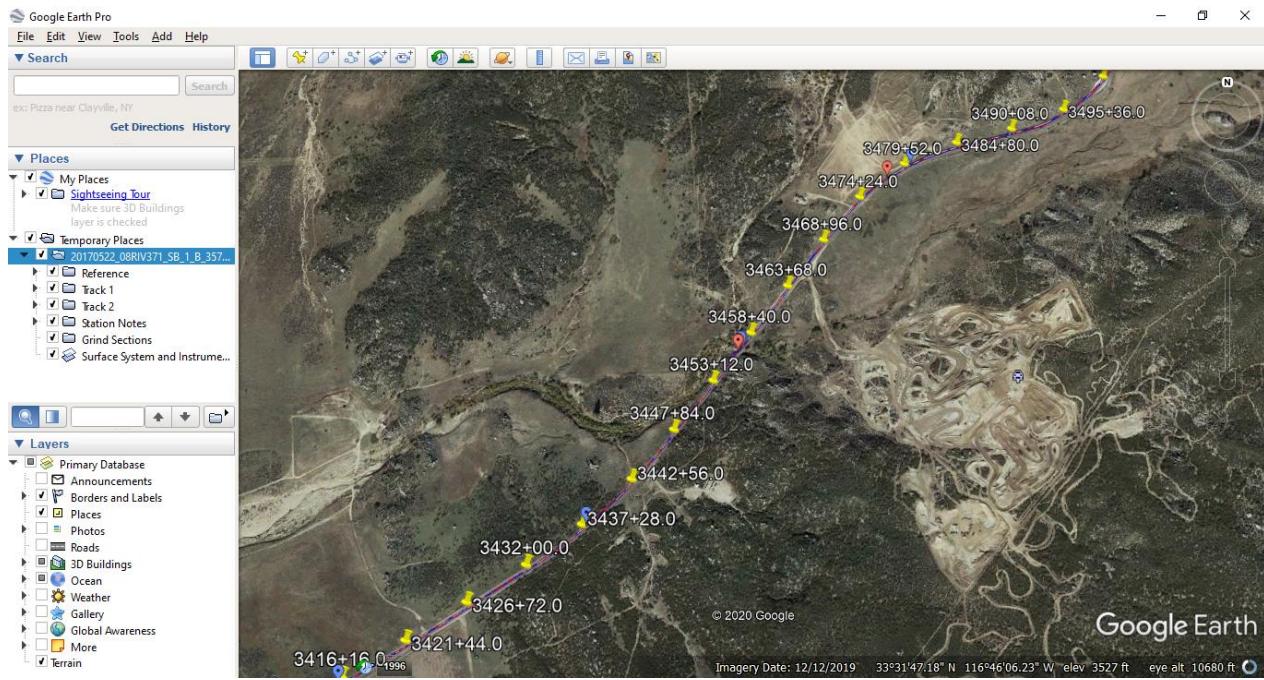


Figure 42. The KMZ/KML file opened in Google Earth

Exporting to Excel Format

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

Export to Template

To choose an 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.

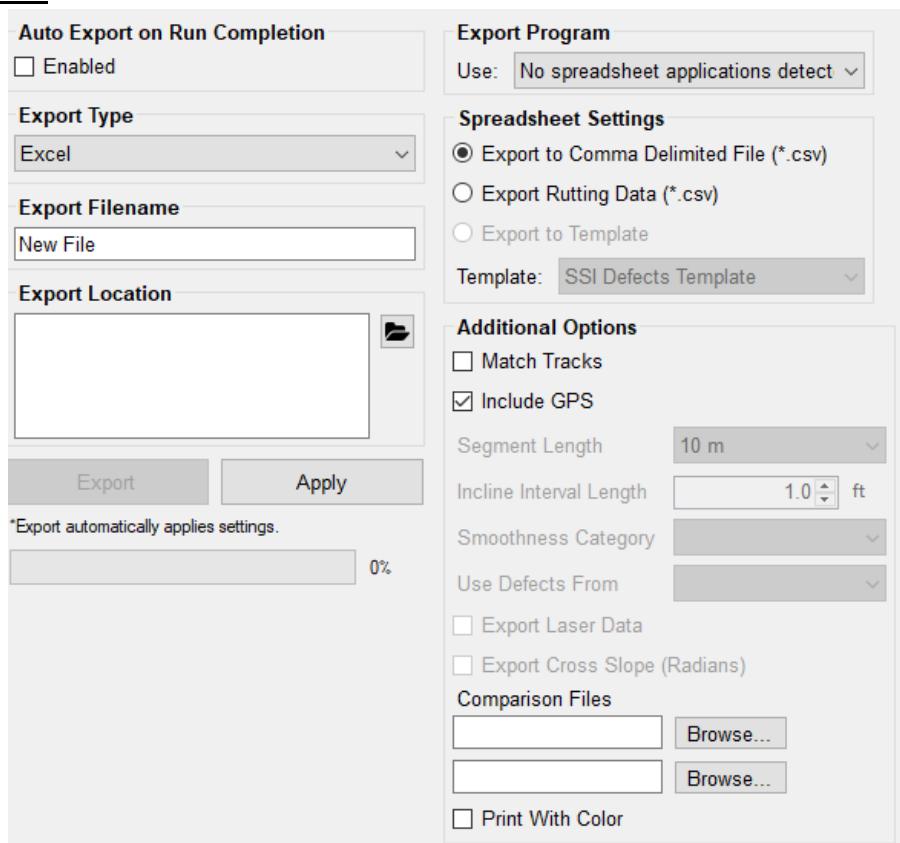


Figure 43. Exporting the data into Microsoft Excel format

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.

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.

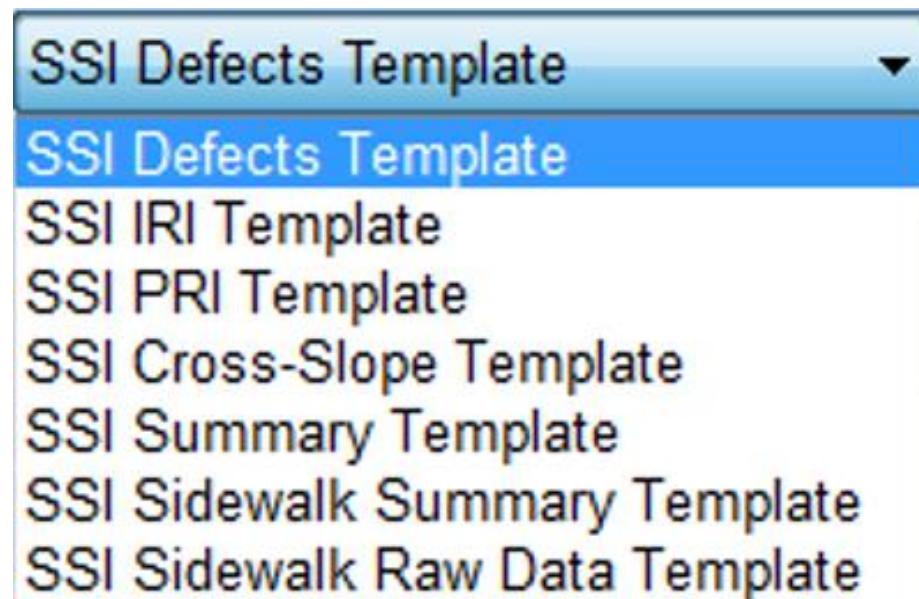


Figure 44: The types of excel formats are listed

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."

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.

Figure 45: 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 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.

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 47: The Customize Window

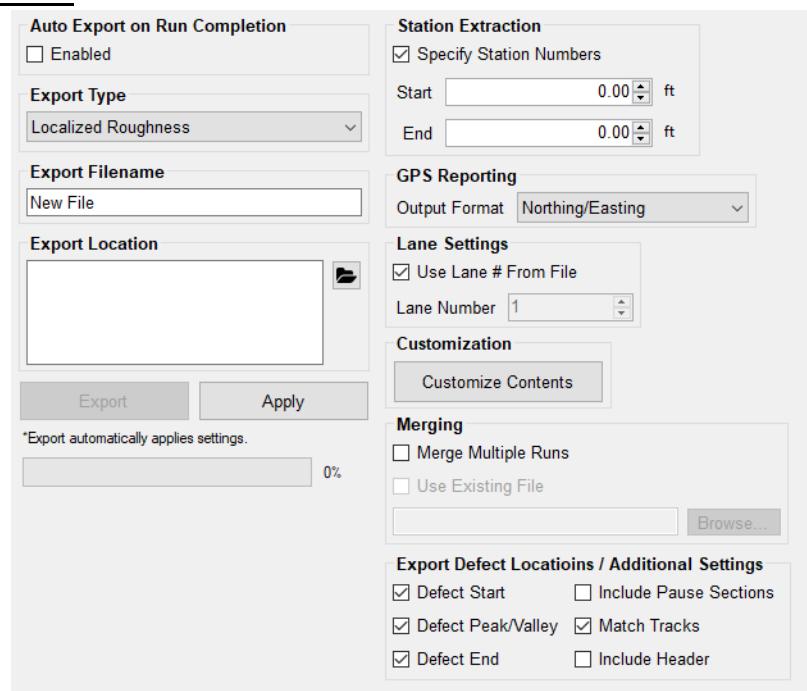
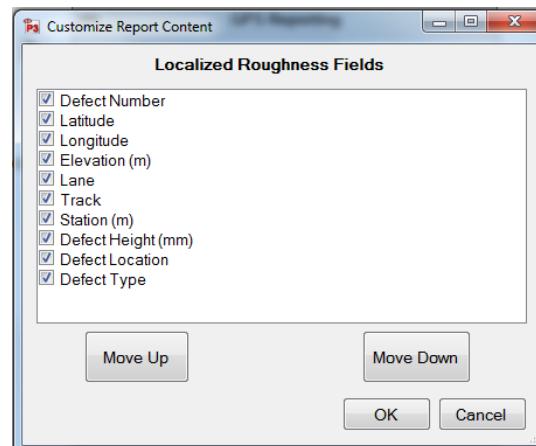


Figure 46. The Localized Roughness export options window



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 Export

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.

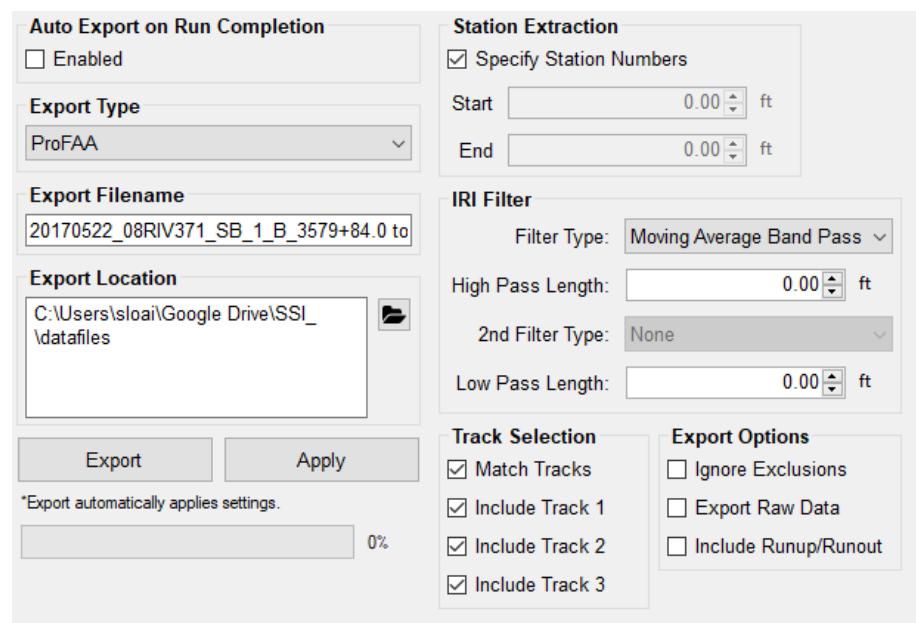


Figure 48: ProFAA window

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.

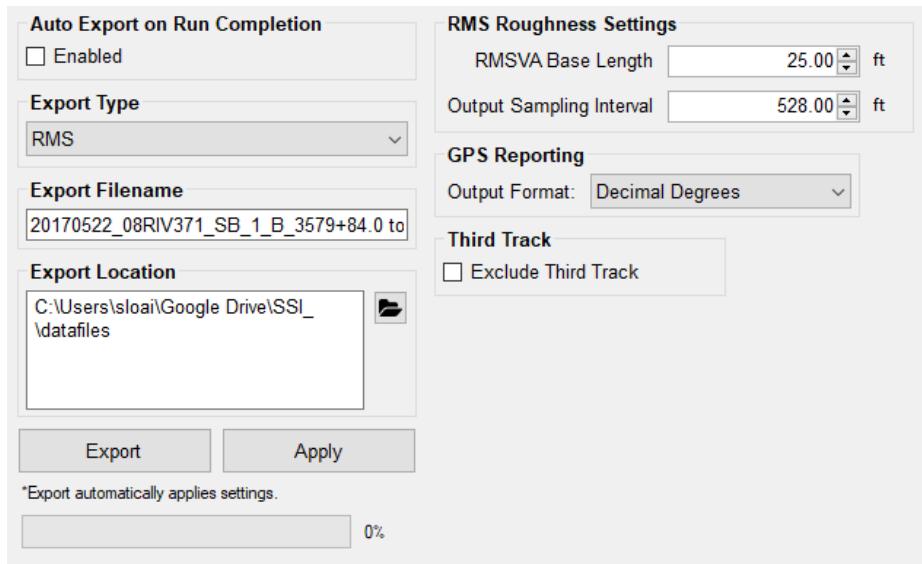


Figure 49: RMS export settings

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 are under the destination folder.

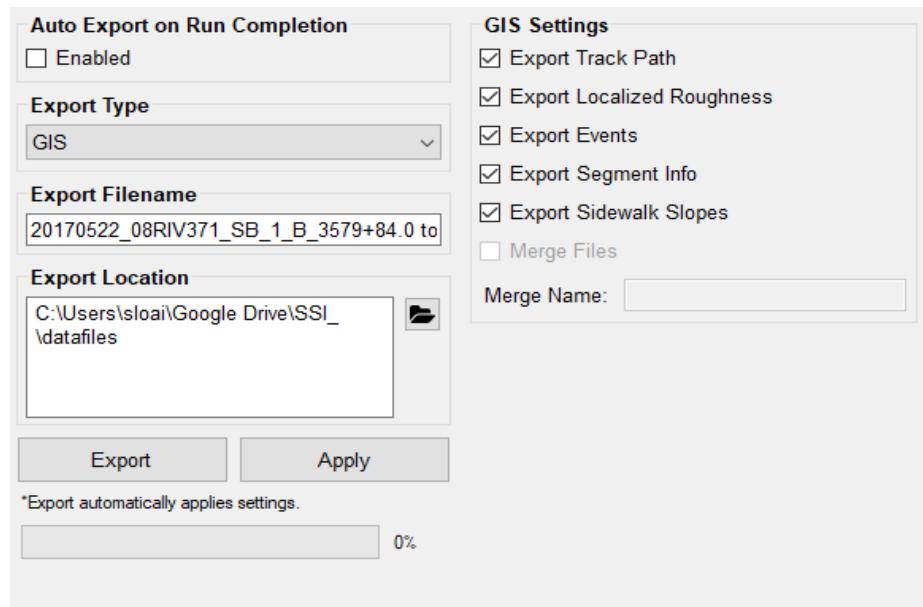


Figure 50: GIS export settings

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.

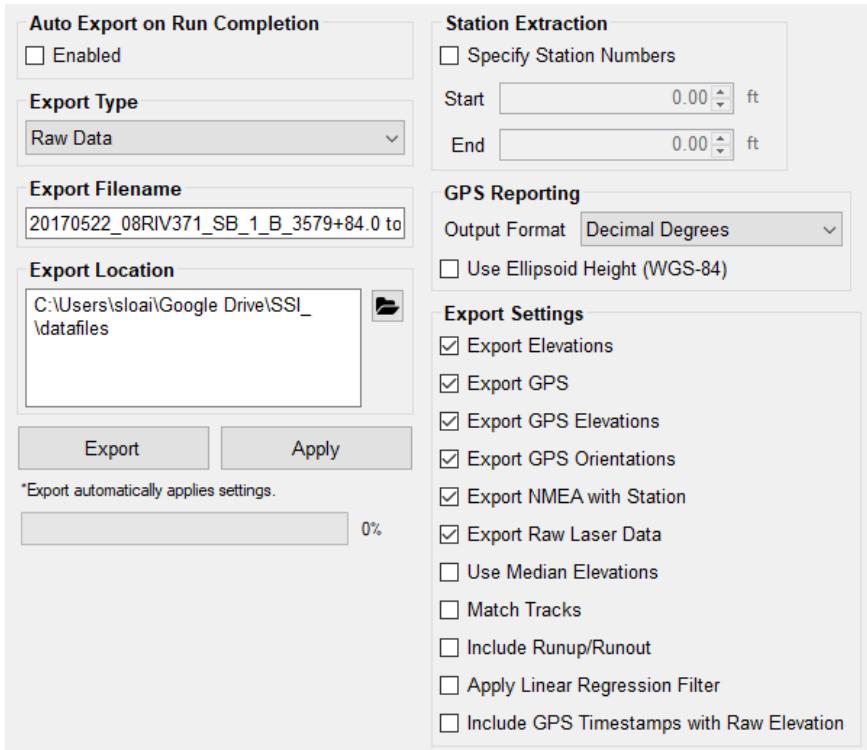


Figure 51: Exporting Raw Data Settings

General Settings

Configuration

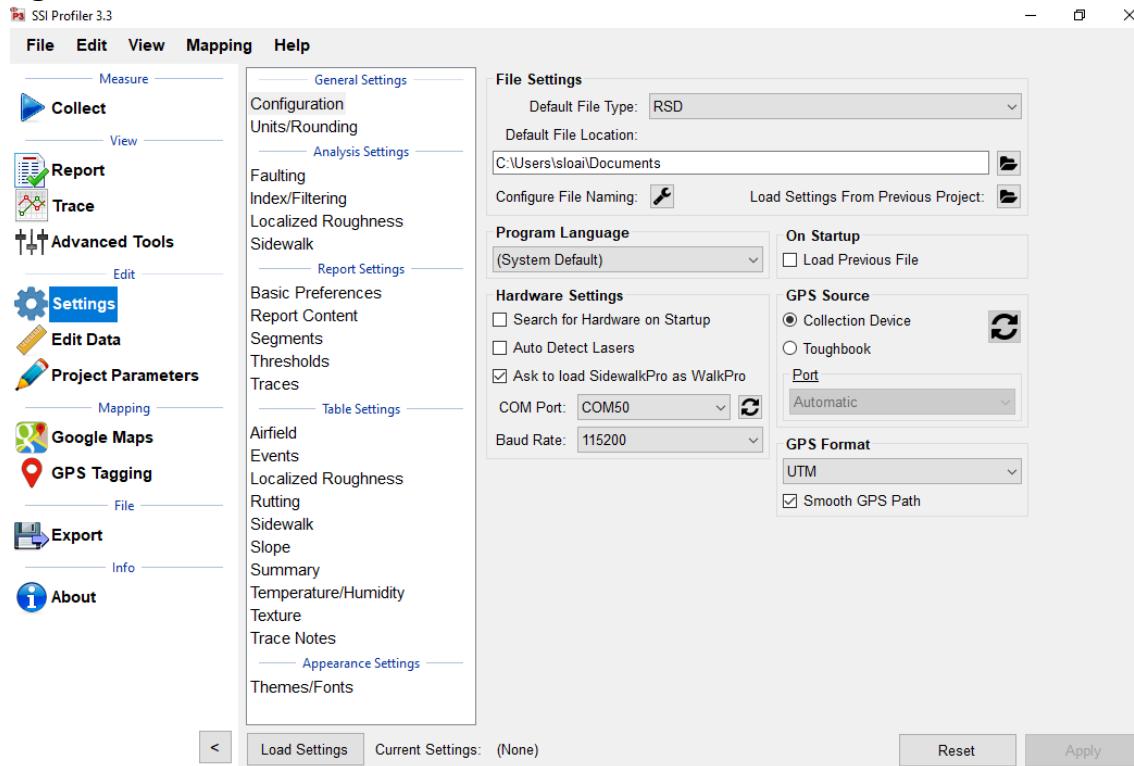


Figure 52. Configuration window under General Settings

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.***

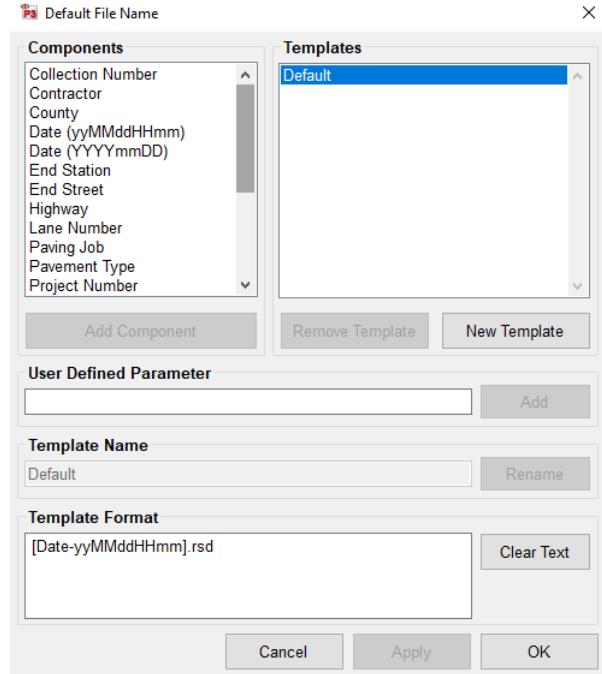


Figure 53. Custom file naming convention

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.

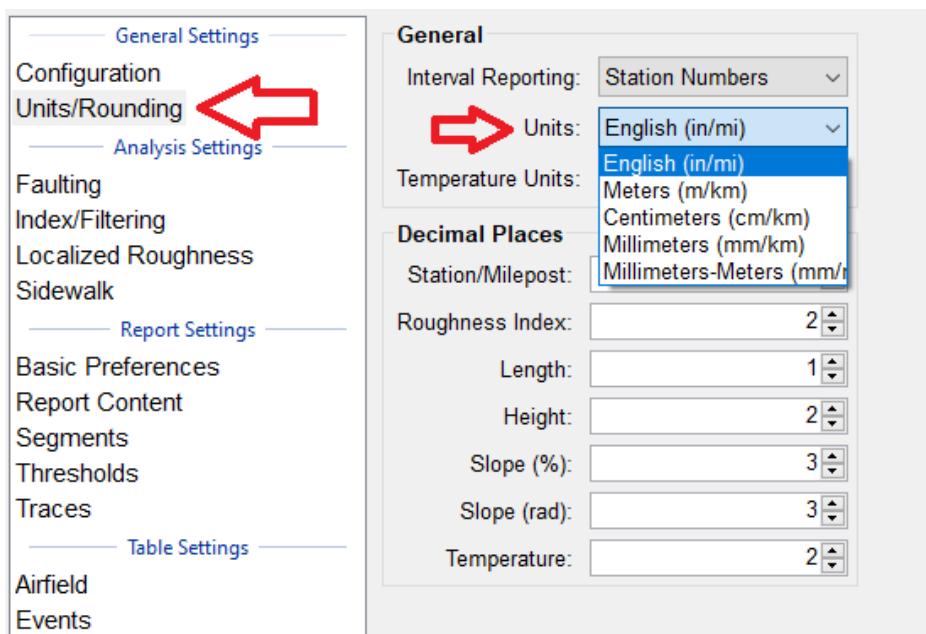


Figure 54. Units and rounding section of the General Settings

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.

Interval Reporting and Temperature Units

The operator can choose between Station numbers and Miles Posts for Interval Reporting and choose between Fahrenheit, Celsius, Kelvin, and Rankine for Temperature Units.

Decimal Places

The operator can choose how many decimal places he wants reported to his final value of: Stationing/MilePost, Roughness Index, Length, Height, Slope(%), Slope(rad), Temperature.

Shortcut Bar

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.

Edit Data

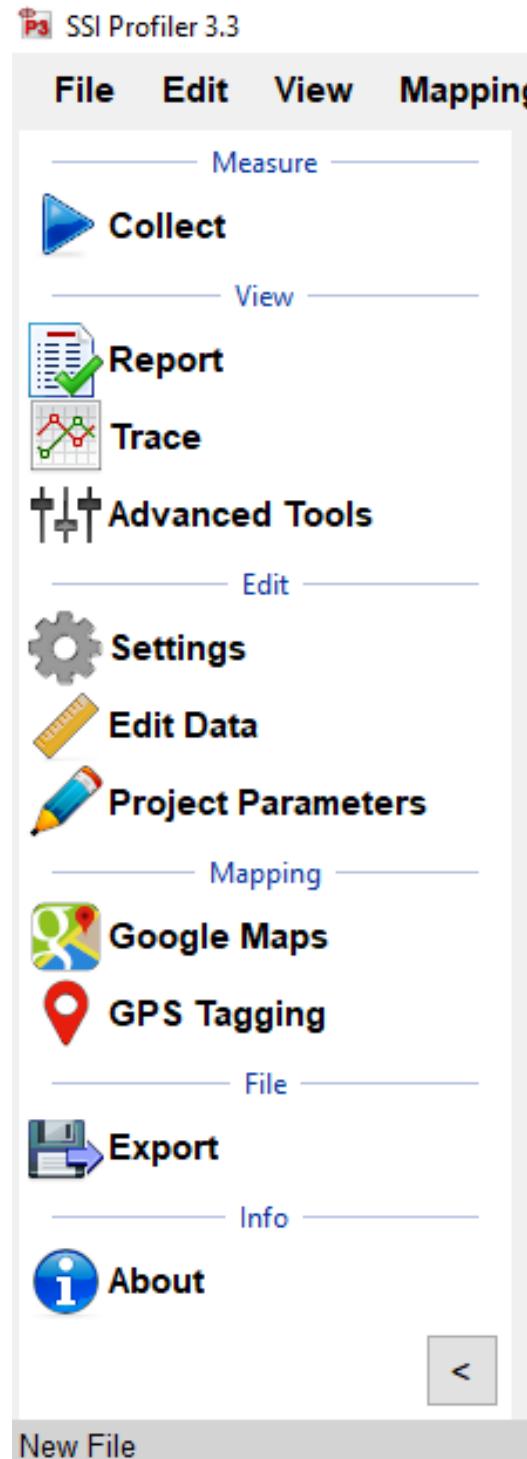
Note: Any edit to the data will be described in the report header under File Modifications.

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 completed.

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.

Figure 55. Shortcut bar with all the frequently used windows



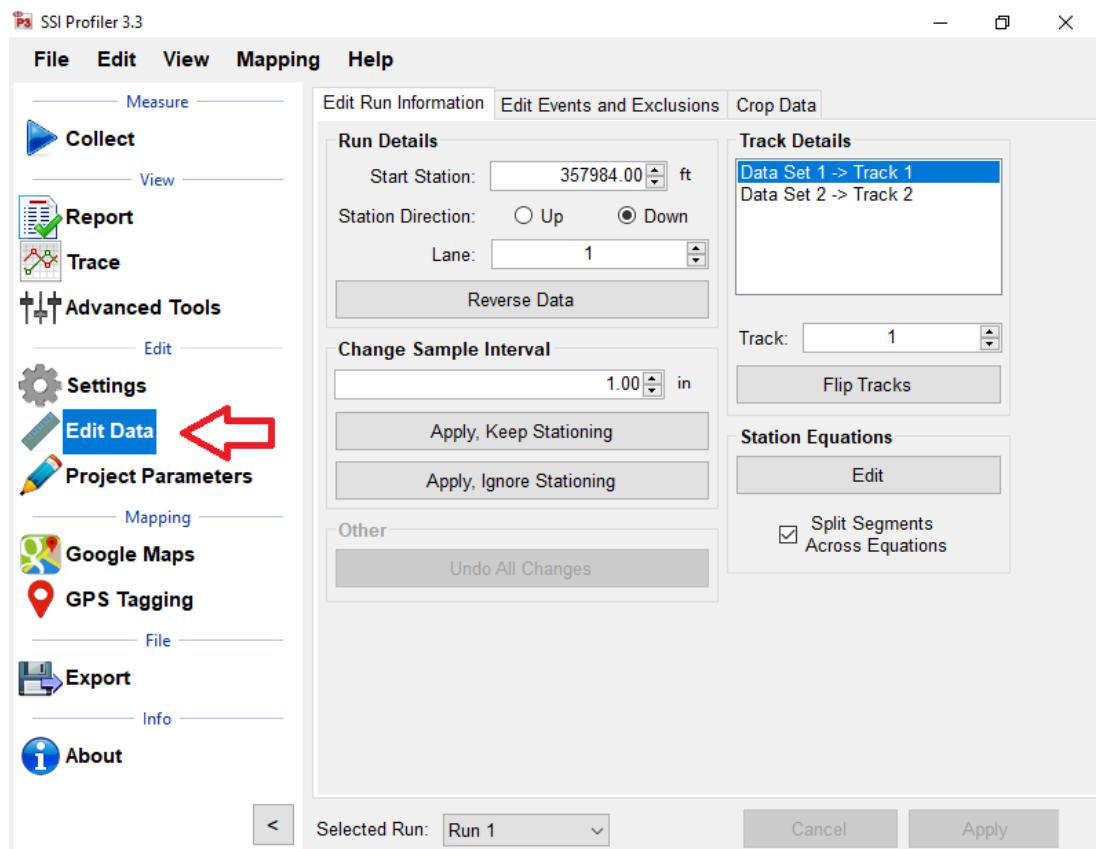


Figure 56. The Edit Data Options

Edit Segments and Exclusions

This feature allows the user to add and edit events and exclusions (sometimes called pauses) to the collection or to ignore a certain distance of collected data at the beginning or end of the run.

The Resulting Events and Exclusions list shows the type of event and exclusion and its start and end station. To edit or add events and exclusions, press the “Edit” button on the lower left corner of the window.

The screenshot shows the SSI Profiler 3.3 software interface with the 'Edit Events and Exclusions' tab selected. The main panel displays a table titled 'Resulting User Events and Pauses' with columns for Type, Start Station, End Station, and Note. The table lists several entries: Driveway from 0+00.0 ft to 0+22.5 ft, Driveway from 1+35.7 ft to 1+59.8 ft, Driveway from 3+23.8 ft to 3+60.1 ft, Default from 5+29.2 ft to 5+29.2 ft, and Driveway from 7+15.6 ft to 7+39.2 ft. A note 'Water Line access' is associated with the last entry. At the bottom of the table, there are buttons for Edit, Export, Import, GPS Export, and GPS Import. The status bar at the bottom shows 'Selected Run: Run 1' and 'CSIManuals\Segway\Segway Manual'.

Type	Start Station	End Station	Note
Driveway	0+00.0 ft	0+22.5 ft	
Driveway	1+35.7 ft	1+59.8 ft	
Driveway	3+23.8 ft	3+60.1 ft	
Default	5+29.2 ft	5+29.2 ft	
Driveway	7+15.6 ft	7+39.2 ft	Water Line access

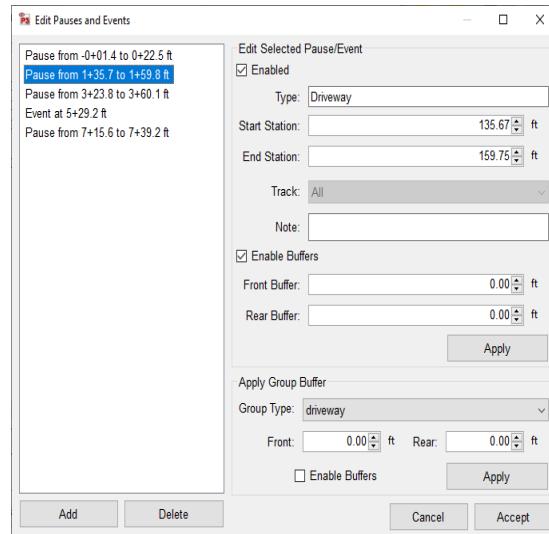
Figure 57. Table of current Event and Exclusions.

Edit or Add Exclusion/Event

1. Select the exclusion or event to be edited in the left column list. It is selected when the blue bar is highlighted the Pause/Event title.
2. Check the Enable checkbox.
3. Change the Type of Exclusion/Event.
4. Change the Start and End Station.
5. Add a Front and Rear buffer
6. Add a group Buffer.
7. Select the Apply button

Note: If the event/exclusion is to be deleted, select the Delete button to remove it from the list.

Figure 58. Edit events/exclusions window



Add a Exclusion/Event

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

Exclusion Definition

During an exclusion, height data is omitted but distance is still collected. 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.

Track

Select from the dropdown menu which tracks you wish to apply the Event or Exclusion to.

Note

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 Exclusion/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.

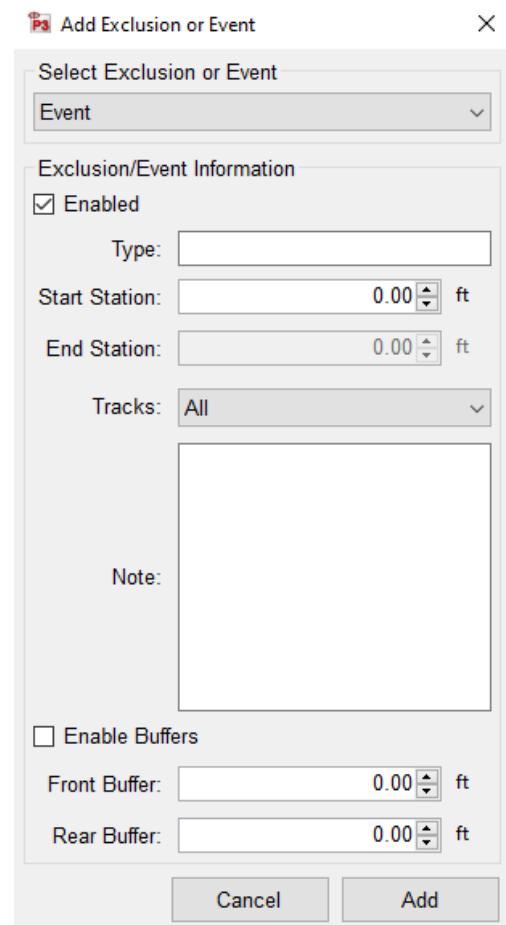


Figure 59. Add Pause/Event window

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.

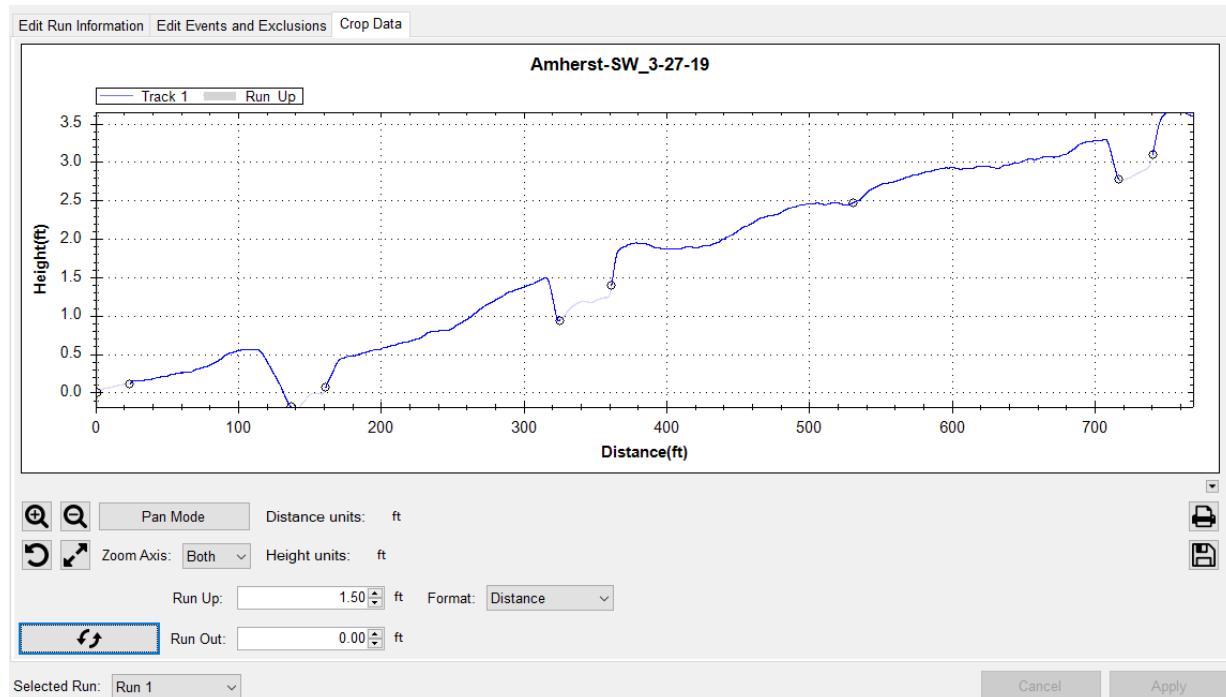


Figure 60. Crop Data Tool

Project Parameters

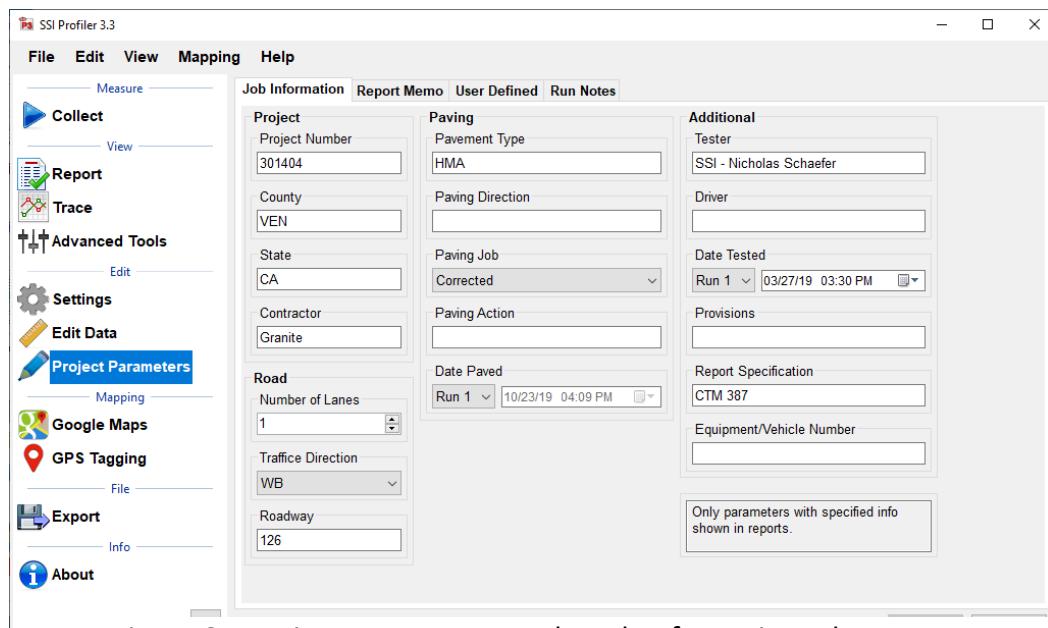


Figure 61. Project Parameters on the Job Information tab

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.

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.

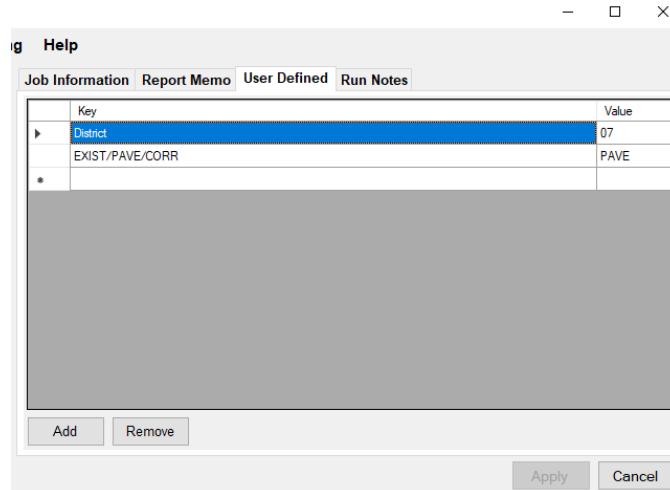
Figure 62: Report Memo window



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.

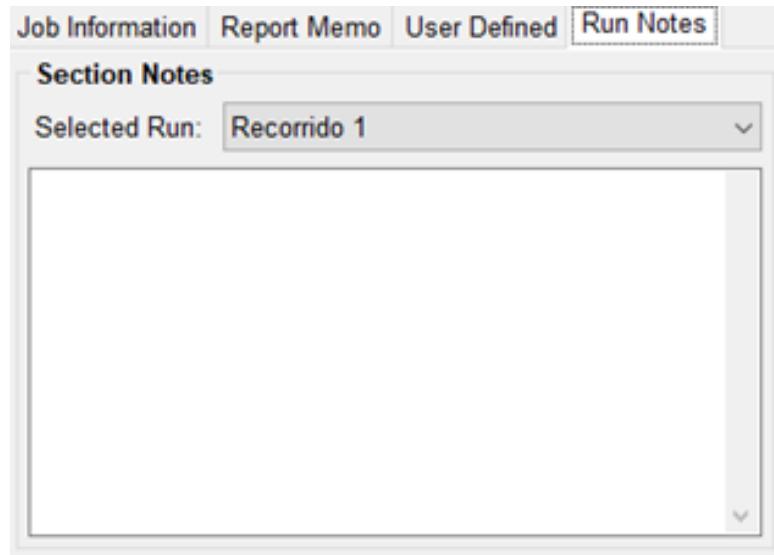
Figure 63. The user defined window



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 64. The Run Notes window.



Settings

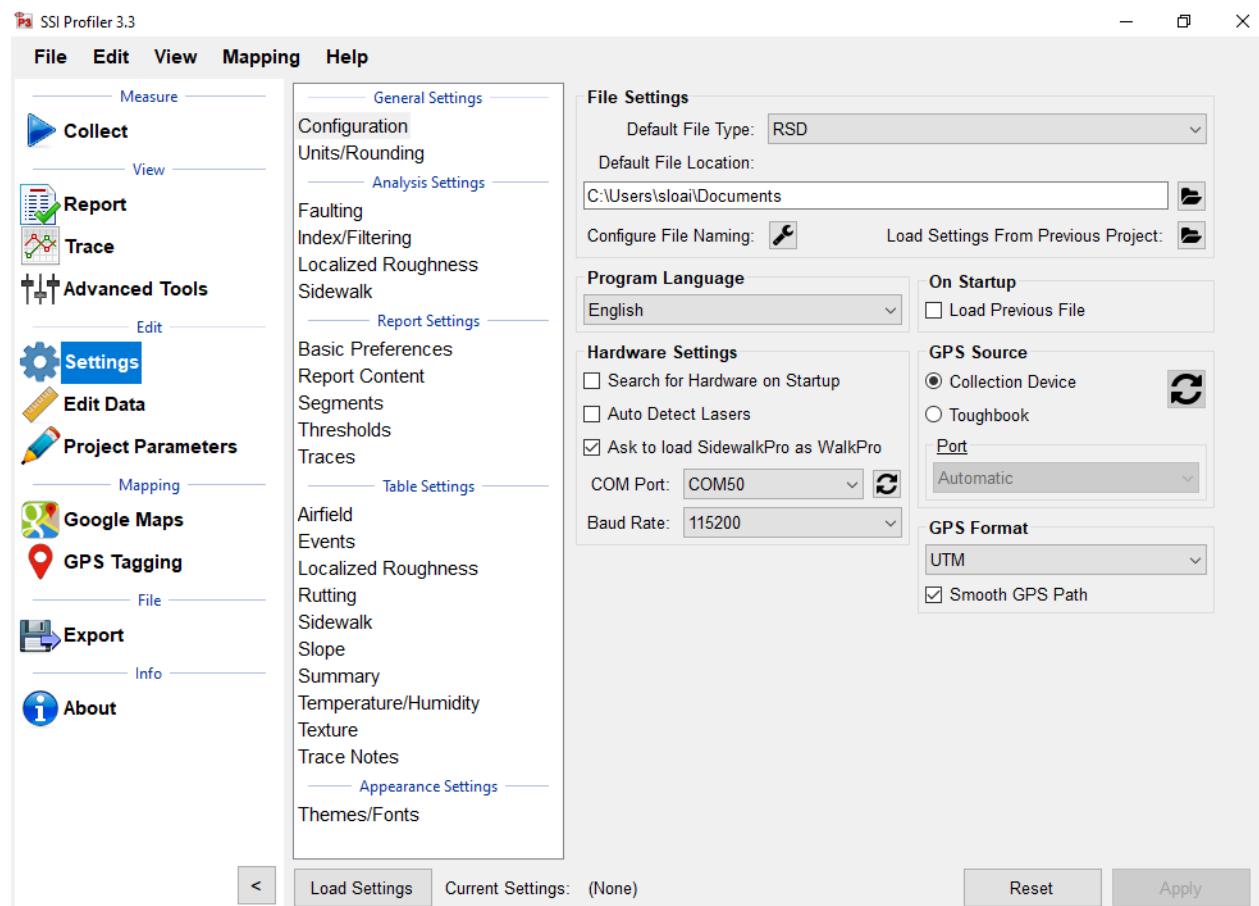


Figure 65. The settings window

Default File Type

Use the default RSD file type for collections and analysis on the Profiler V3 software. The RHD file type option is for working with older versions of collections and may apply only to files collected with Profiler V2 systems.

Default File Location

The default file location shows the folder under your computer where collection files will be saved. The folder icon to the right of the location box (see figure above) opens a Windows Explorer window where the operator can choose and or create the folder where the files will be saved. SSI recommends being clear and orderly when choosing where to save. Example:
C:\Users\SSI Profiler\Collection Files\Kansas\Manhattan-Ft. Riley I-70 Project

Load Settings from Previous Project

If the operator is collecting and saving different files for the same project, Choose the Load Setting form Previous Project folder icon (see figure above). The icon will open a Window Explorer window where the operator can choose an already collected and saved collection to import all the previous setting without having to fill them in a second time.

Configure File Naming

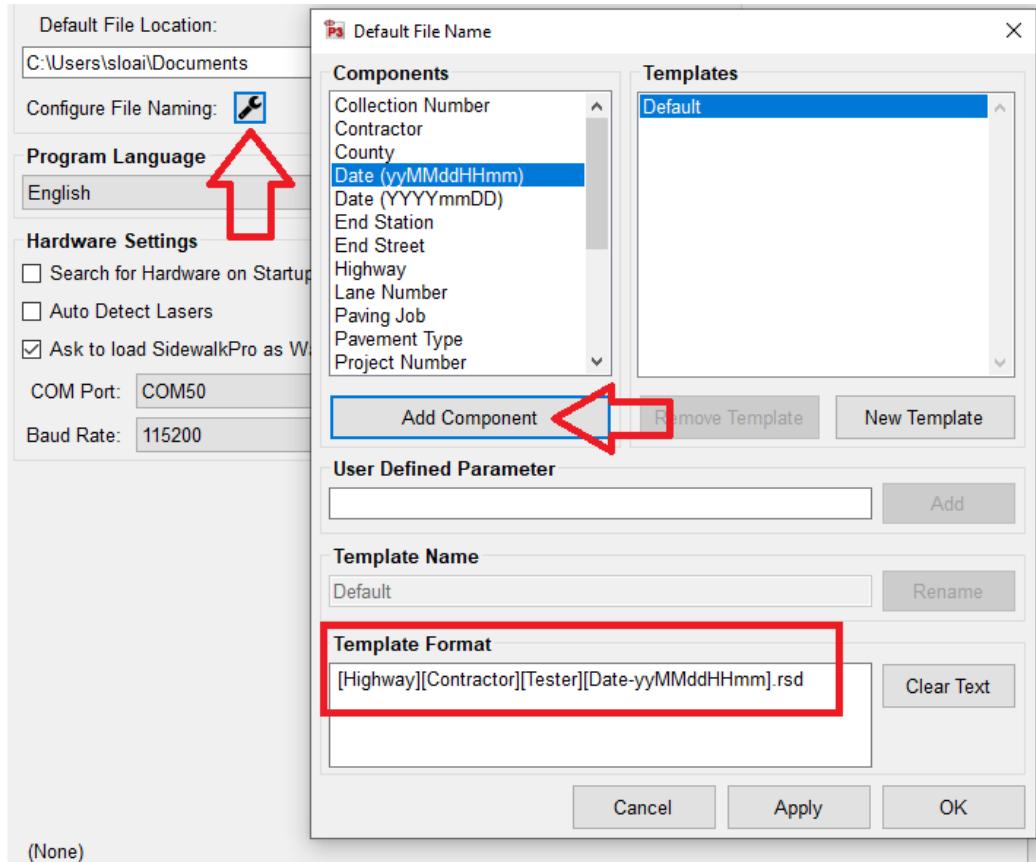


Figure 67. The Configure File Naming window option

In order to simplify and help the organization of collection files, SSI recommends using the Configure File Naming option by clicking on the wrench icon (See figure). This function allows the software to automatically name the collection files. Choose from the Components list and press Add Component. The resulting file name will automatically include the desired job parameters helping future identification and improving data organization. The example in figure 98 include Highway, Contractor, tester and Date for the file name nomenclature.

Program Language

Pick between English, Spanish North/Central America, and Spanish South America. The program Profiler V3 must be restarted for the changes to take effect. English is the default language.

On Start Up and Hardware Settings

Under On Start Up (see figure 97 above), Choose the Load Previous File check box to automatically load and open the previous file the operator was working on. This is useful when finishing a particular unfinished run. SSI recommends saving separate collections in different files and only appending to an existing file when necessary. The Hardware Setting allows the operator to automatically activate various hardware settings. See figure 97 above.

GPS Source and GPS Format

Choose the GPS Source the operator wishes to use during collection, the port to be used, and the format (UTM or the degrees variations). See figure 97 above.

Units and Rounding

Choose the profile index units to be calculated during the collection of data. Typical units used in the United States of America and Great Britain are English (in/mi) Units. Typical units in most other countries are one of the 4 metric options.

Also choose the Interval reporting and the Temperature Units.

Below Choose the Decimal Places3 to be used when rounding off the result values.

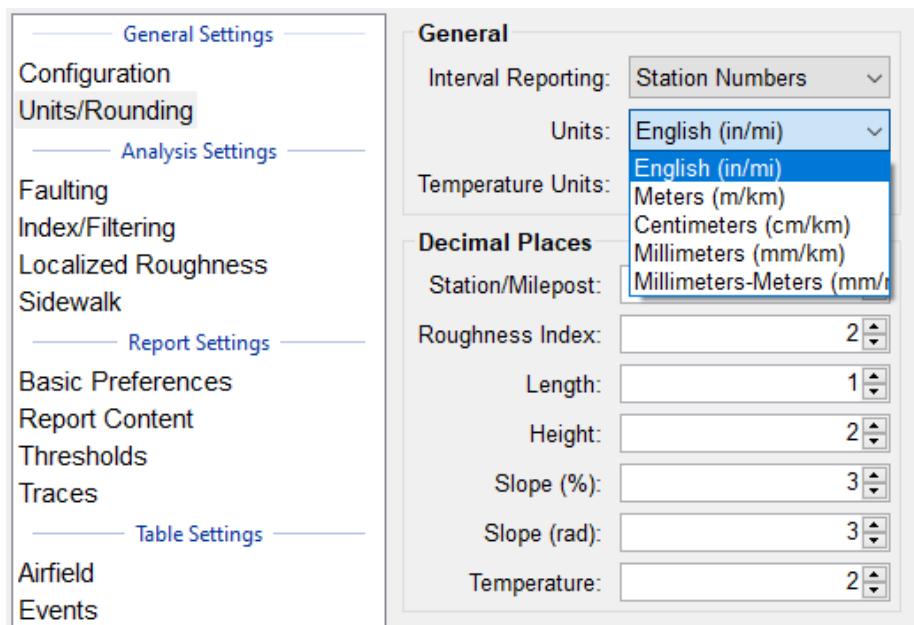


Figure 68. Units and value Rounding under General Settings

Analysis Settings

Profile Index, Segment Length and Filtering

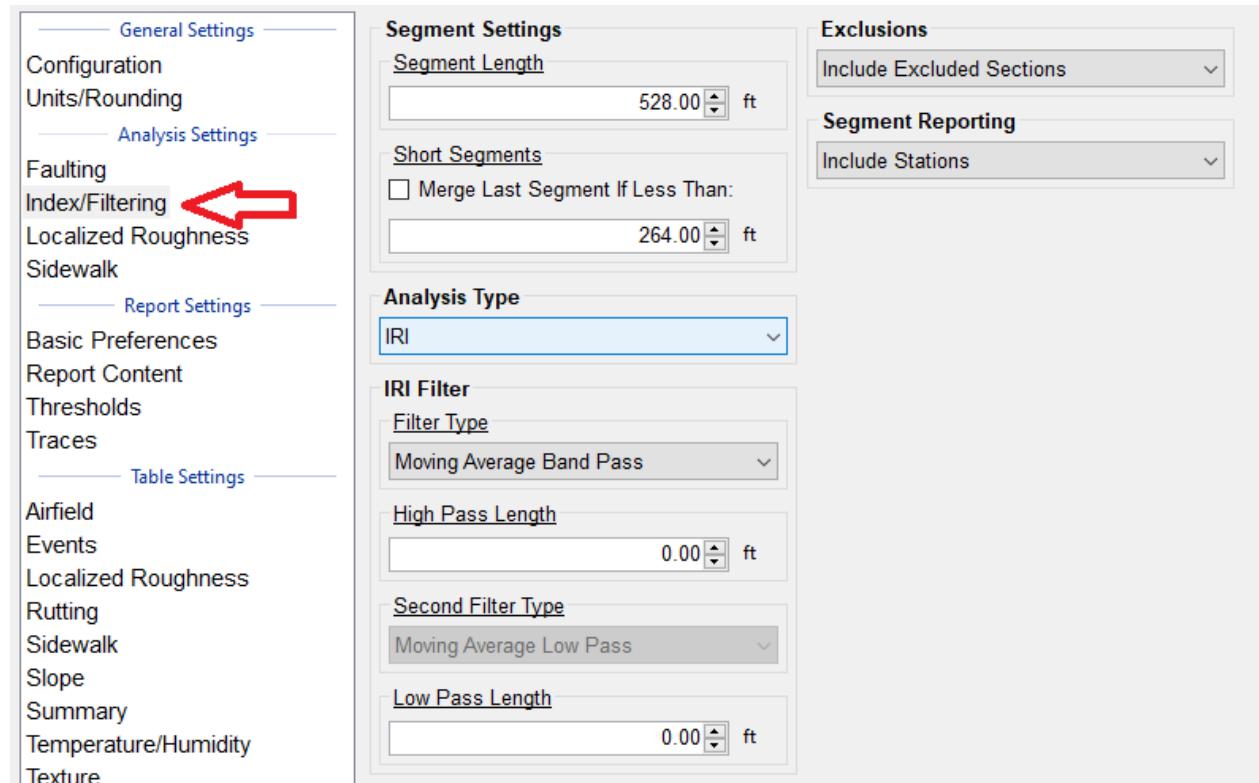


Figure 69. The Index and Filtering options under Analysis Settings

Segment Settings

Segment Length

Segment length is the interval of profiling that is used to calculate ride values. Traditionally the distance used for segment length is one-tenth of a mile, or 528 feet (160 meters). This section is adjusted by using the arrow keys or double-left clicking in the box to type the segment length.

Short Segments (Merge Last Segment if Less Than)

If the last segment is shorter than the segment length, it can be merged into the segment before it. This will prevent large ride values from short distances. Only use if your specification does not require a specific segment length for pay incentives. The last segment length will be changed if this feature is used.

Exclusions

Ignore Excluded Sections

When 'Ignore Excluded Sections' is selected, the excluded sections created during collection or through the Segment Adjustment window will not be included in the report or the calculation of the ride values.

Include Excluded Sections

When Include Excluded Sections is selected, the excluded sections are included with the actual collection when calculating the ride values. The report will show the excluded sections in the segment summary and the trace view.

Excluded Sections Only

When 'Excluded Sections Only' is selected from the drop-down menu, only the excluded sections created during collection or through the Segment Adjustment Window will be displayed in reports and used to calculate ride values and counts for roughness.

Ignore Exclusions, Keep Stationing

When 'Ignore Exclusions, Keep Stationing' is selected, the excluded sections created during collection or through the Segment Adjustment window will not be included in the report or the calculation of the ride values, but the Stationing will remain constant.

Analysis Type

IRI

The International Roughness Index is a universal ride index for concrete and asphalt roads around the world. The profile is analyzed using a quarter-car simulation that is weighted towards the frequencies of body and vehicle bounce; the most uncomfortable riding conditions.

To calculate IRI in Profiler V3, select IRI from the drop-down menu, then adjust the filter settings if necessary according to the contract specifications. View the report under the Report Tab to observe IRI.

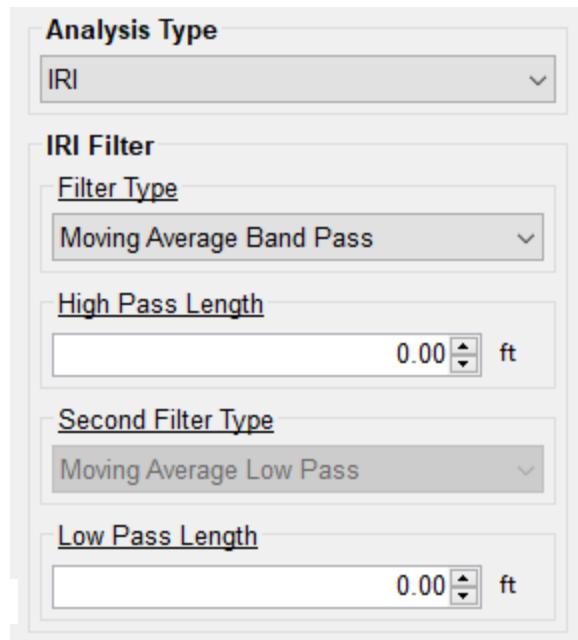


Figure 70. IRI Analysis type options.

PRI

The Profile Ride Index is a simple calculation to classify the smoothness of a road profile against other roads. The formula for this calculation is:

English Units:

5280 ft × (Total Roughness in inches in Segment)/(Segment Length [ft])

Metric Units:

1000 m × (Total Roughness in m, cm, or mm in segment)/(Segment Length [m])

To calculate the PRI in Profiler V3, select PRI from the Analysis Type drop down menu. Once the settings are correct, select Apply and then view a report to observe the PRI ride values.

Figure 71. The PRI analysis type options.

PRI Parameters

Note that the PRI Parameters are only for the calculation of the Profile Ride Index (PRI). Blanking Band, and Scallops have no connection to the manner in which defects are found. For defect settings, see *Localized Roughness*.

Scallop Definition

Scallops are the deviations of the profile trace from the blanking band. If the trace exceeds the defect height but the minimum width of the scallop is not reached, the deviation is not included as a defect. Although defects are not included in Ride Values, if the deviation still exceeds the defect height parameter, it adds to counts for roughness.

Blanking Band

The blanking band is a null area that classifies the height of all sections of the trace within its borders as zero. Therefore, a trace that remains within the borders of the blanking band would have zero counts for roughness and a PRI of zero.

Minimum Scallop Height

The minimum scallop height is the minimum deviation height from the blanking band or null line. Frequently, the value for minimum scallop height is 0.035 or 0.9mm, which is the default value for the Profiler V3 program.

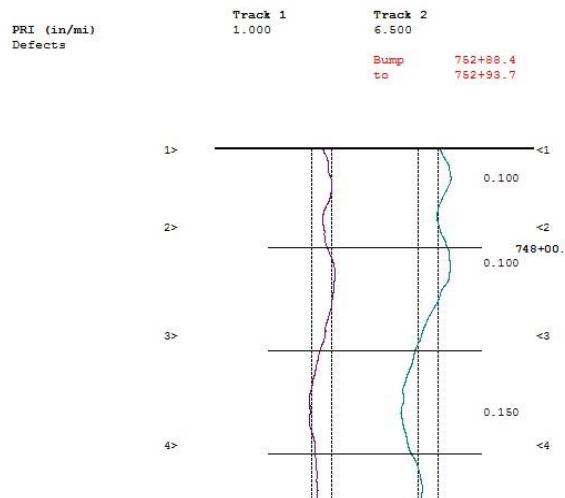


Figure 72. An example of the blanking band in the trace report.

Minimum Scallop Width

The minimum scallop width is traditionally 2 feet (0.61 meters). Review the Department of Transportation

smoothness specification that pertains to the project. The minimum scallop distance is the minimum longitudinal length (the direction of traffic) that is used to find the deviations of the profile off of the null line or blanking band. The setting of 2 feet or 0.61 meters is the default setting for Profiler V3.

Scallop Resolution

The scallop resolution is the accuracy of the height measurement. Current equipment is accurate to 0.01 inches, the default value for Profiler V3 software. A resolution of one-hundredth of an inch means that the scallop heights will always be rounded to the hundredth decimal. Consult the recent smoothness specification released by the overseeing agency to confirm the scallop resolution value.

Reset File Settings

Selecting this icon brings all values in Settings to their default program values.

Minimum Scallop Height Inclusive

When this box is selected, the minimum scallop height will be included as a scallop. Meaning, if the minimum scallop height is 0.035, 0.035 will be the minimum instead of 0.0351.

HRI

The Half Car Ride Index (HRI) is found by applying IRI to an average of two profiles. HRI uses a half car simulation, unlike IRI which uses a quarter car simulation. To calculate the HRI in Profiler V3, select HRI from the Analysis Type drop down menu and verify the settings of filter length based on the project specifications. Once the filters are correct, select Apply to save the settings.

To view the calculated HRI, view one of the reports under View>Report.

RN

The Ride Number (RN) can be calculated in Profiler V3 by selecting RN from the Analysis Type drop down menu and verifying the settings of filter length based on the project specifications. Once the filters are correct, select Apply to save the settings. To view the calculated RN values, view one of the reports under View>Report.

RMS Roughness

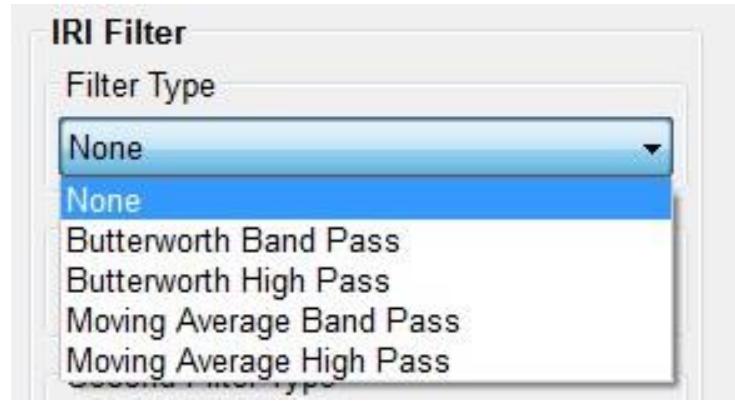
The RMS roughness is a ride value method calculated by profile height over a base length of 25 feet. This is how RMS roughness gets inches as its units. The RMS Roughness report gives a depiction of the amplitude and wavelength but does not necessarily give the frequency that this amplitude and wavelength occurs. The output is similar to a PSD plot.

Analysis Parameters: Filters

High Pass Filter

The High Pass Filter will remove any trend in the data that is less than the chosen length. The length can be selected by typing the value in the box or by using the arrows to adjust the input.

Figure 73. The filters within the IRI analysis parameter window



Low Pass Filter – The Low Pass Filter will remove any trend in the data greater than the chosen length. The length can be selected by typing the value in the box or by using the arrows to adjust the input.

PRI Filter

Type Moving Average

A length of 2.0 feet can be chosen for the Moving Average Filter, depending on the contract specification. The use of the moving average filter was initially used by the Kansas Department of Transportation (see Report No. K-TRAN: KSU-9302 “An Automated System for Determination of Pavement Profile Index and Location of Bumps for Grinding from the Profilograph Traces.)

Butterworth

The third order Butterworth filter has a default length of 2.0 feet. The Butterworth filter is not required for updated profiling specifications. The Butterworth filter was used for the original automated Profilograph systems.

Available Filters:

Moving Average High Pass Filter

Moving Average Band Pass Filter

Butterworth High Pass Filter

Butterworth Band Pass Filter

Filter Gain—1.00

The filter gain is only used for necessary adjustments while comparing different profiling systems. The filter gain does not need to be used in normal profiling environments. When comparing high speed profiling systems to other Profilograph systems, the filter gain may be used to change the output of the data files. A filter gain setting of 1.00 does not affect the collected data. For typical profiling, use the default setting of 1.

Localized Roughness

Localized roughness refers to the bumps and dips that occur over a determined distance.

Defect Detection

The operator may choose the mode of defect detection in Profiler V3. The options to choose from are Bumps, Dips, Both, and None. To select the type, use the drop down menu labeled Defect Detection. **No filters are associated with localized roughness.** “Both” is selected by default.

The dialog box shows the following settings:

- Defect Data Type:** Profilograph
- Defect Detection:** Bumps
- Bump Parameters:**
 - Height: 0.30 in
 - Length: 25.00 ft
- Dip Parameters:**
 - Depth: 0.30 in
 - Length: 25.00 ft
- General:**
 - Exclude Defects Less Than: 2.00 ft
 - Merge Defects Within: 27.00 ft

Figure 74. Profilograph Localized Roughness Bumps and Dips

If only one defect type is chosen, be sure to change the correct settings. Do not change the dip parameters instead of the bump parameters by mistake. The report section of Profiler V3 can be used to review the settings and traces of the collection.

Bump Parameters Height

Bump height is the maximum distance that a profile may deviate within the width of the bump. The width of the bump is the length of a Profilograph, or 25 feet (7.62 meters). A typical value for bump height is 0.3 inches. When the settings are changed for the bump parameters, always select **Apply** to save changes.

Width

The width of a bump is based on the length of a Profilograph; 25 feet or 7.62 meters. This is the default value for the Profiler software.

Dip Parameters

Depth

The depth of a dip is the maximum distance a profile trace may deviate within the width of the dip (25 ft or 7.62 m). The default value for dip height is 0.4 inches or 10.2 millimeters. When the settings are changed for the dip parameters, always select **Apply** to save changes.

The dialog box shows the following settings:

- Defect Data Type:** Profilograph
- Defect Detection:** Dips
- Bump Parameters:**
 - Height: 0.30 in
 - Width: 24.61 ft
- Dip Parameters:**
 - Depth: 0.40 in
 - Width: 25.00 ft

Width

The defect width is based on the length of the original SSI-Cox profilograph (25ft), as the system couldn't physically measure widths greater than itself. 25 ft or 7.62m is the default value for the Profiler.

Figure 75. Reporting only dips

Localized Roughness/Defect Data Type

Profilograph

The Profilograph defect data type is the most common method used to find defects. The settings are the same as described above in Analysis Parameters, defect detection, bump parameters and dip parameters.

Relative Height

Relative Height defect data type finds the defects of the profiled surface through the local differences in the trace. The settings required to be inputted within the Localized Roughness tab of the Settings Window are the bump and/or dip parameters.

Texas-1001-S Method

The Texas 1001-S Method is used mainly by the Texas DOT for profiling with inertial profilers. The procedures and information for this test method can be found on the Texas DOT website; a direct link is below.

ftp://ftp.dot.state.tx.us/pub/txdot-info/cst/TMS/1000-S_series/pdfs/spe1001.pdf

The Texas-1001-S method detects localized roughness (defects) of the profiled surface by applying the base length and the threshold values saved in the Settings Window.

IRI

When IRI Defect Data type is selected, the IRI calculation will be used to find the road's defects (localized roughness) of the profiled surface. If this setting is selected the IRI ride value will not be shown in the summary. To list the IRI ride values on the reports, select the analysis type to be IRI in the Analysis Parameters tab. The ride interval is set (usually to 25 feet, in English units) and is used as a sliding guide across the profile. When the summation of the profile's IRI exceeds the threshold, the entire continuous length which exceeds the threshold will be an area of localized roughness.

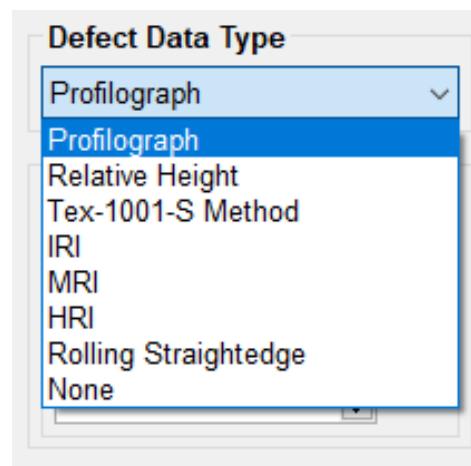


Figure 76. Defect detection types.

General in Localized Roughness

Merge Defects within:

The operator is able to merge multiple defects into one defect to eliminate high frequency grinding patterns. The action of merging defects does not affect the ride values or the defect heights. Merging adjusts the start and end stationing of two defects into one length. The default value of the merge defects tool is 5 feet. To use this feature, select the check box next to "Merge Defects Within."

General	
<input checked="" type="checkbox"/> Exclude Defects Less Than:	2.00 <input type="button" value="ft"/>
<input type="checkbox"/> Merge Defects Within:	27.00 <input type="button" value="ft"/>

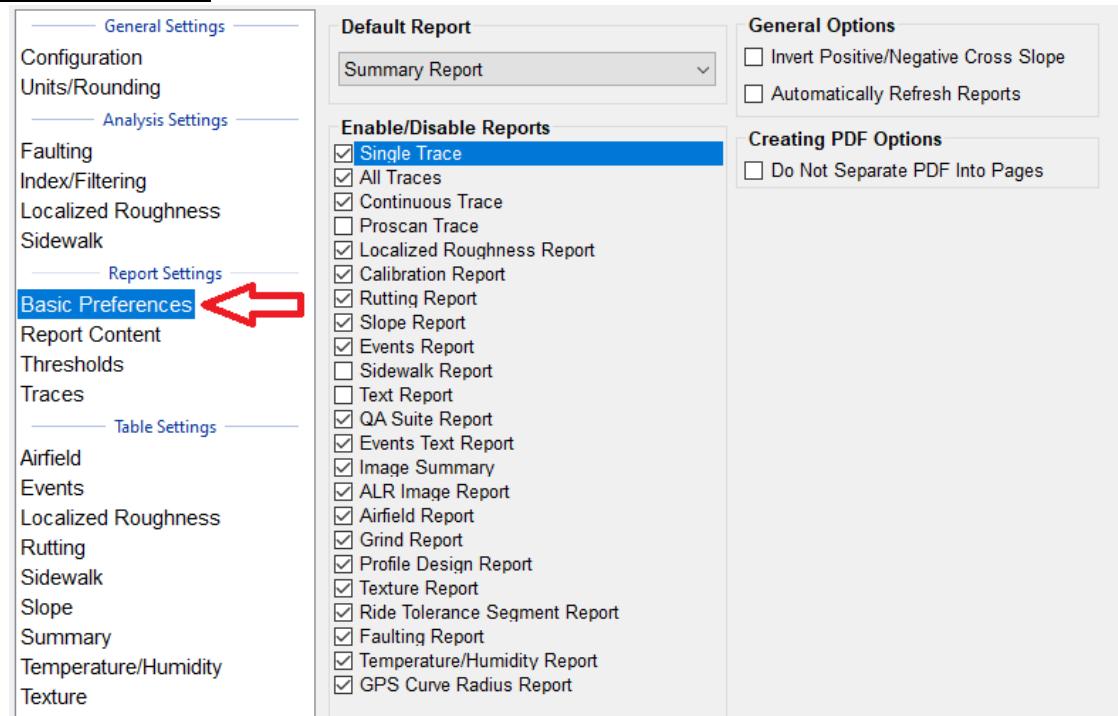
Figure 77. General Option in Localized Roughness

Exclude Defects Less Than

The operator can choose to exclude defects that are smaller than a certain threshold.

Report Settings

Basic Preferences



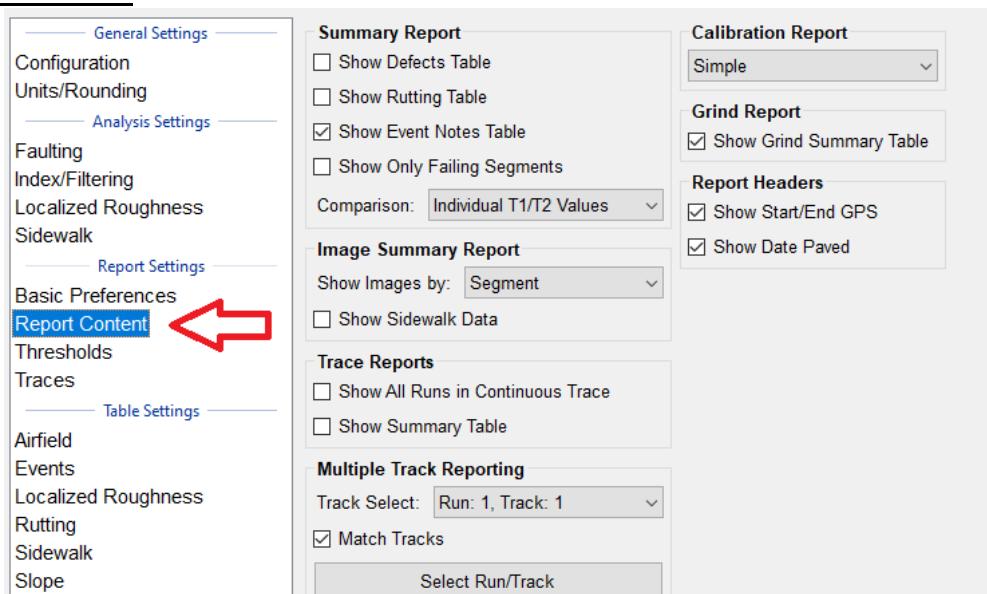
The screenshot shows the 'Report Settings' interface. On the left, there's a sidebar with various settings categories. The 'Report Content' option is highlighted with a red arrow. The main panel contains several sections: 'Default Report' (set to 'Summary Report'), 'Enable/Disable Reports' (with many checkboxes like 'Single Trace', 'All Traces', etc., some of which are checked), 'General Options' (checkboxes for 'Invert Positive/Negative Cross Slope' and 'Automatically Refresh Reports'), and 'Creating PDF Options' (checkbox for 'Do Not Separate PDF Into Pages').

Figure 78. Basic Preferences under 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 'Default Report' dropdown menu above and also in the Reports Section of Profiler V3.

Report Content



The screenshot shows the 'Report Settings' interface. The 'Report Content' option is highlighted with a red arrow. The main panel contains several sections: 'Summary Report' (checkboxes for 'Show Defects Table', 'Show Rutting Table', 'Show Event Notes Table', 'Show Only Failing Segments', and a dropdown for 'Comparison' set to 'Individual T1/T2 Values'); 'Calibration Report' (dropdown set to 'Simple'); 'Grind Report' (checkbox for 'Show Grind Summary Table'); 'Report Headers' (checkboxes for 'Show Start/End GPS' and 'Show Date Paved'); 'Image Summary Report' (dropdown for 'Show Images by:' set to 'Segment', and checkboxes for 'Show Sidewalk Data'); 'Trace Reports' (checkboxes for 'Show All Runs in Continuous Trace' and 'Show Summary Table'); and 'Multiple Track Reporting' (dropdown for 'Track Select' set to 'Run: 1, Track: 1', and a checkbox for 'Match Tracks').

Figure 79. Report Content Under Report Settings

Summary Report

Choose 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.

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.

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. Track 1 will always be the left driverside laser (Wheelpath).

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.

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.

Grind Report and Report Header

Choose to show the Grind Report Summary Table and choose the Report Header Options.

Multiple Track Reporting/Track Select

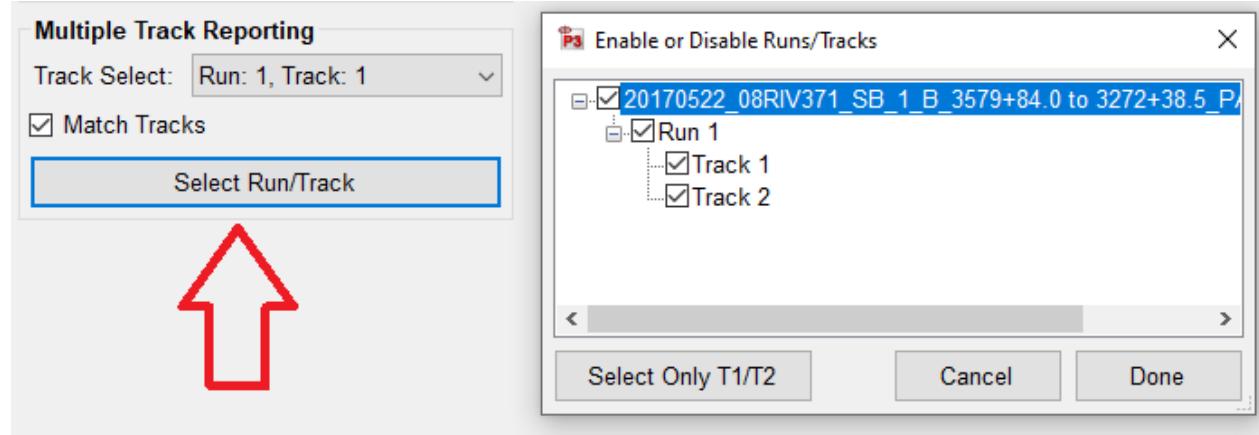


Figure 80. The Multiple Track Reporting tool

Track Select is the tool that is used to select the track which will be shown in the reports. From the drop-down menu, select a single track based on the label of [Run: Number, Track: Number].

When Match Tracks is not selected, the reports will only show one trace. The selected run in the drop-down menu will be the only run shown in the Reports of Single Trace, Continuous Trace, and All Traces.

To plot multiple or all tracks that are saved within the file, select Match Tracks. See below for information on Match Tracks. When Match Tracks is selected, the run shown on the collapsed Track Select drop down menu will be on the left side of the trace in the report. The figure above will have Run 1, Track 1 on the left side trace report.

To report specific runs and tracks, select the “Select Runs” under Multiple Track Reporting. Here the user can select certain tracks or runs that will be included in the reports, localized roughness and ride value calculations.

Match Tracks

When the Match Tracks check box is selected, all of the tracks associated with the file will be displayed in the reports of Single Trace, Continuous Trace, and All Traces.

With Profilograph profiles for the Profilograph, there are only two-wheel paths, while with some High-Speed Profiling Systems there have three traces. When dealing with multiple traces, the Track Select can change the order in which the tracks are displayed in the reports. The track that is selected in the drop-down menu within “Track Select” will be the trace that is on the left side of the report of the single trace, continuous trace and all traces plots. In order to save changes made to the Multiple Trace Reporting Section, always select Apply.

Thresholds

Ride Index

The operator can choose the Over and Under thresholds limits for the ride index. Segment values over the Over limit will appear in red in the report for easy identification. Values under the Under limit will appear in blue in the report.

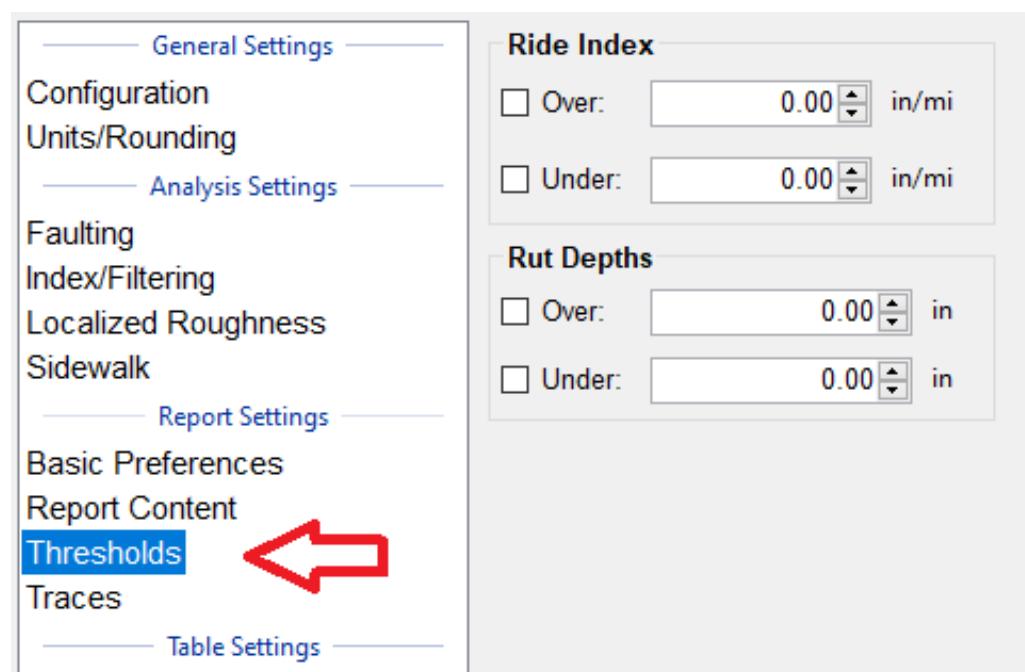


Figure 81. Threshold options under Report Settings

Rut Depths

For laser systems with a center laser, the operator can choose over and under limits for the RUT depth.

Traces

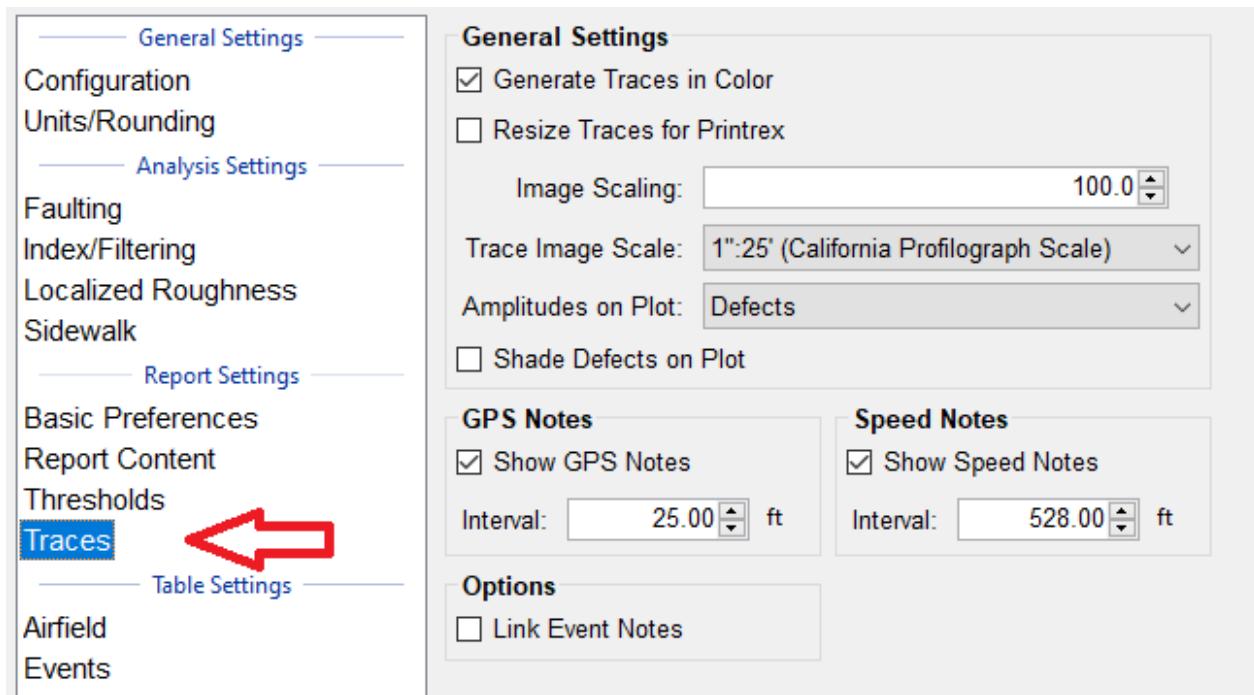


Figure 82. The Traces options under Report Settings

General Trace Settings

The operator can choose to generate the traces in color and resize traces for the Printex Thermal printer. Image Scaling can also be changed along with the Trace Image Scale.

Amplitudes on Plot

The operator has the option of showing the amplitudes for either the scallops or the defects on the plot. When comparing the reports to the SSI spreadsheet defects templates, the operators should choose to show only the defect heights. Scallops are the deviations of the trace outside of the centerline or blanking band in PRI analysis. The defect heights will also be shown when scallops are selected, however there will be more labels on the deviations.

Note Reporting

GPS Notes

To have the GPS notes included in the trace report, select this box. If this box is not selected, the GPS notes will not be shown at the bottom of the report.

Speed Notes

To have the speed notes included in the printed report, the check box to the left of "Report Speed Notes" should be selected. To change the interval which the notes are reported, select the "Customize Reporting Intervals" icon. If changes are made, select Apply.

Customize Reporting Intervals (GPS/Speed Notes)

The reporting intervals are the distances traveled while collecting data to between a GPS and or the Speed note on the report. A new note will be shown each time the distance of the interval is traveled.

Tables Settings

Select content and options for all the different tables available. Certain tables like Rutting, Sidewalk, Slope, and Texture are specific to the profiling system. For example, the Rutting table only applies to laser systems with a center laser. The Slope table only applies to systems with IMUs including some laser systems and the CS8600 system. The Sidewalk table only applies to Sidewalk systems. The Texture table only applies to systems with texture capabilities.

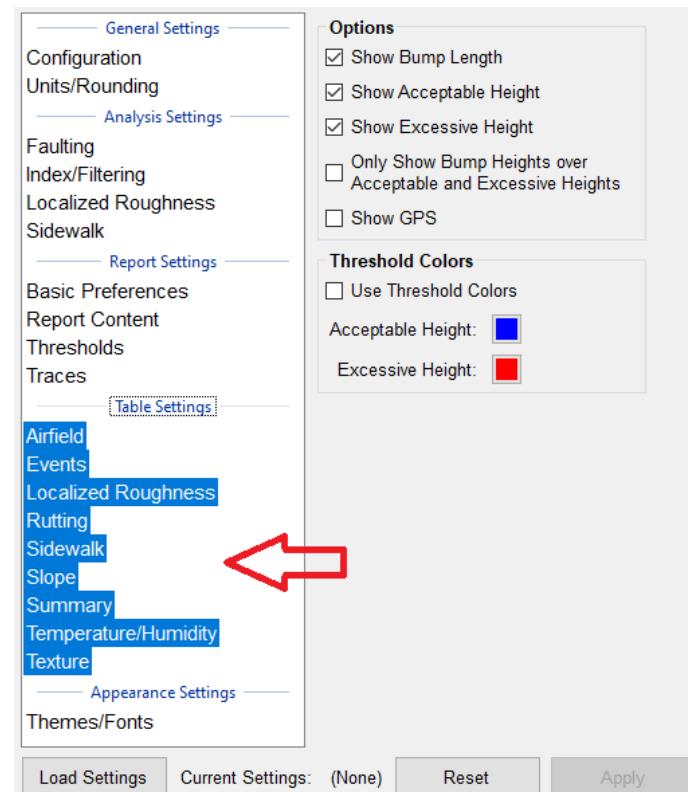


Figure 83.The Table options in Report Settings.

Appearance Settings

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.

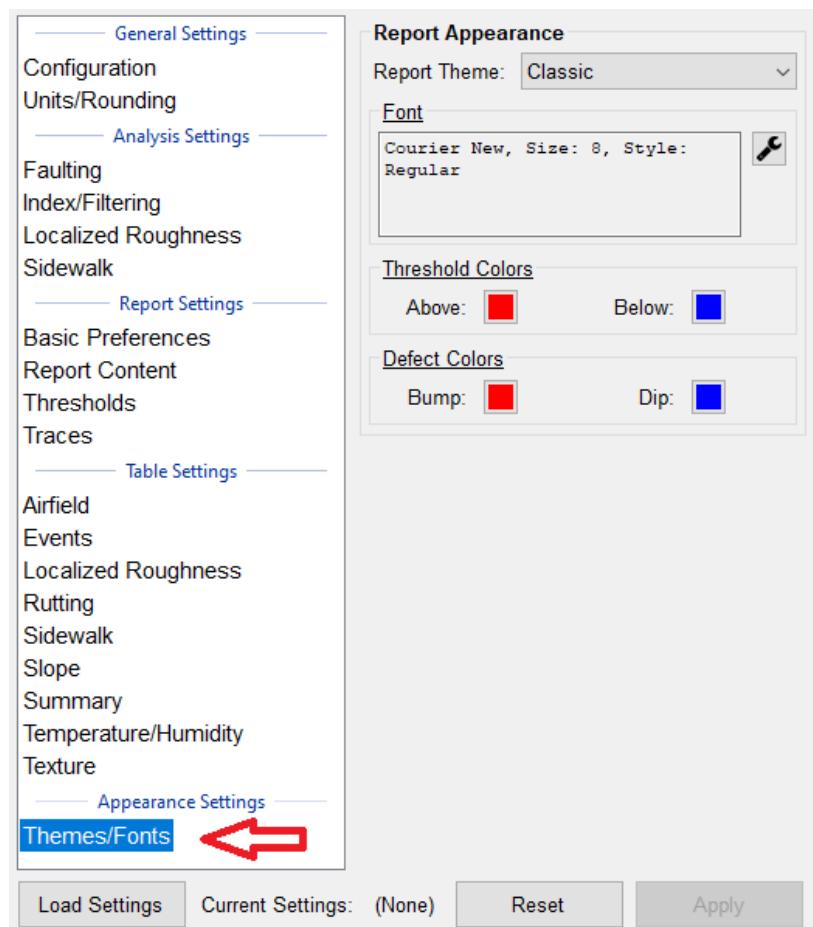


Figure 84. Themes and Fonts option under Appearance settings.

View

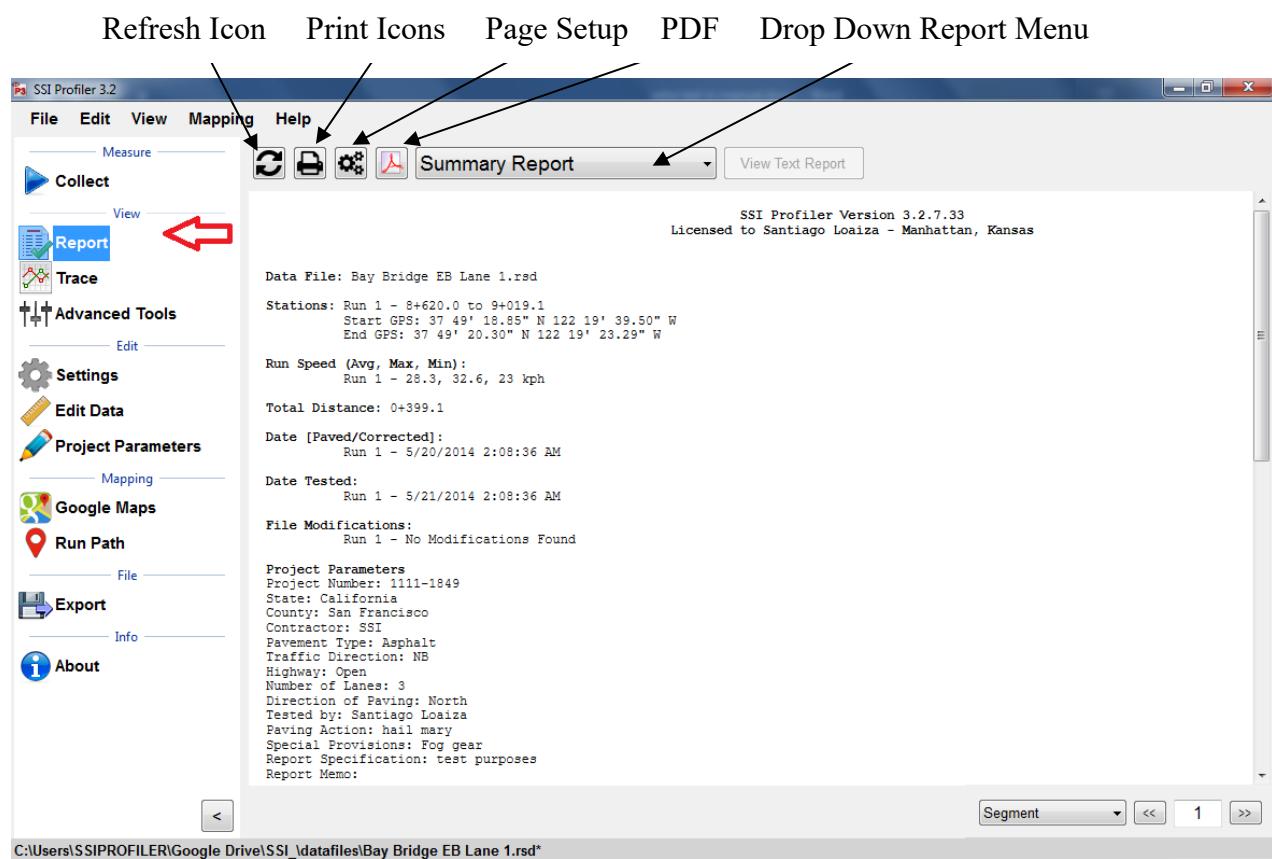


Figure 85. Summary header for single trace report

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

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.

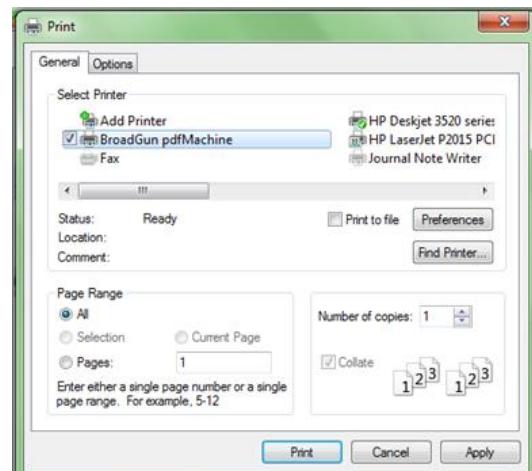


Figure 86. Printing Options Window

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”.

The most commonly used reports are the Summary Report, Single Trace, Continuous Trace, and Calibration report. All these reports have the defect locations, localized roughness and information entered in the project parameters.

Figure 87. Drop-down menu for the report options



Jump to

Using the arrows in the lower right hand side of the screen, the operator can jump from Segment to Segment, Defect, to Defect, Event to Event, Run to Run, and Image to Image. Each parameter function with the appropriate report.

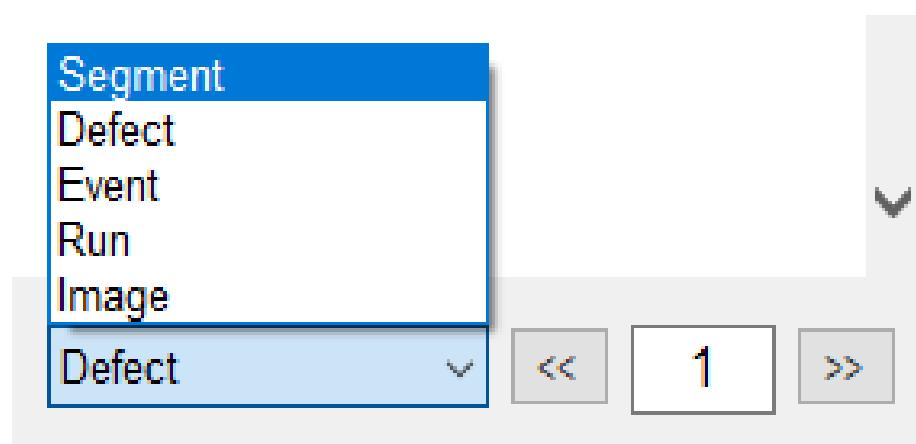


Figure 88. The Jump to navigator

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

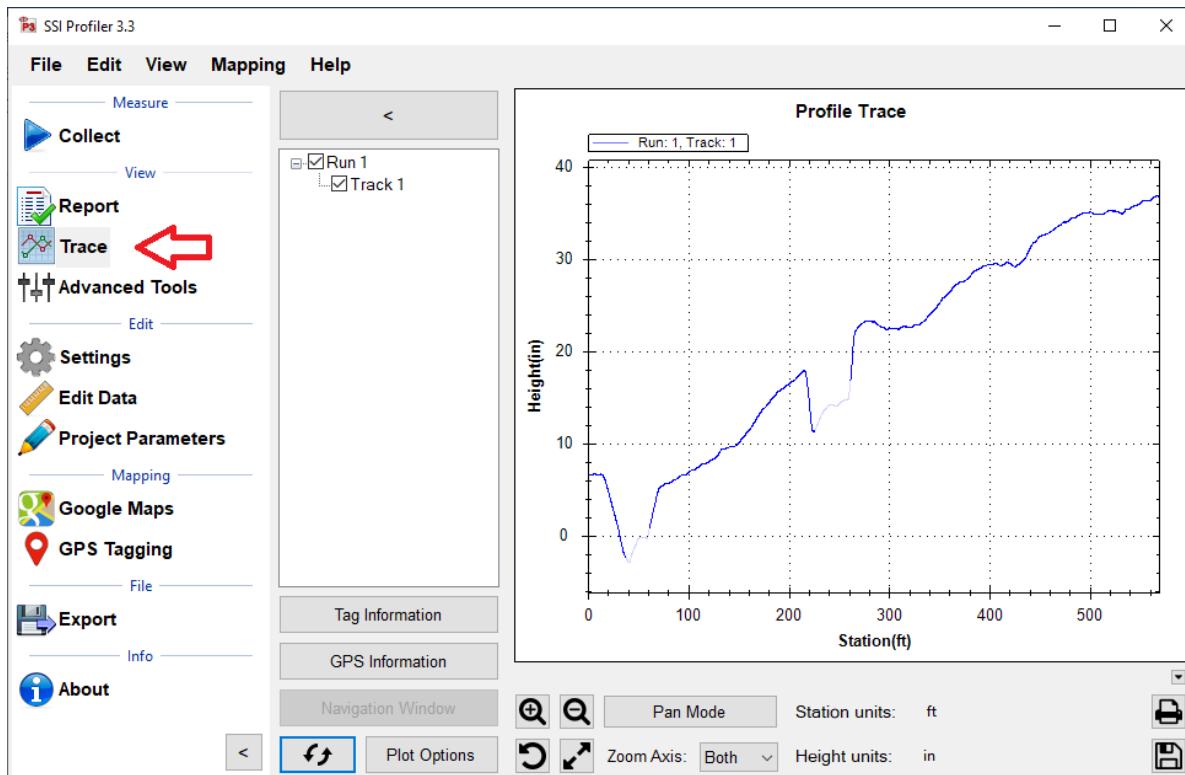


Figure 89: An example of the profile

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

The Plot Options button can be found at the bottom of the trace window next to the refresh button. Select between Profile, Continuous IRI, MRI and HRI, Median Profile, Segmented Bar IRI, Birds Eye View, Continuous IRI vs Speed, Rolling Straight Edge, Cross Slope, Running Slope and Rutting Depth.

Settings

Use the checkboxes to select the available options to be applied to the final graph.

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.

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

GPS Tag Information

The tag feature allows the user to add exclusions, events and station markers to previously collected data. The system must be connected to GPS for it to work. Use the 'Undo' and 'Undu All' buttons to eliminate any changes.

The 'Set Static Location' button will pop-up 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.

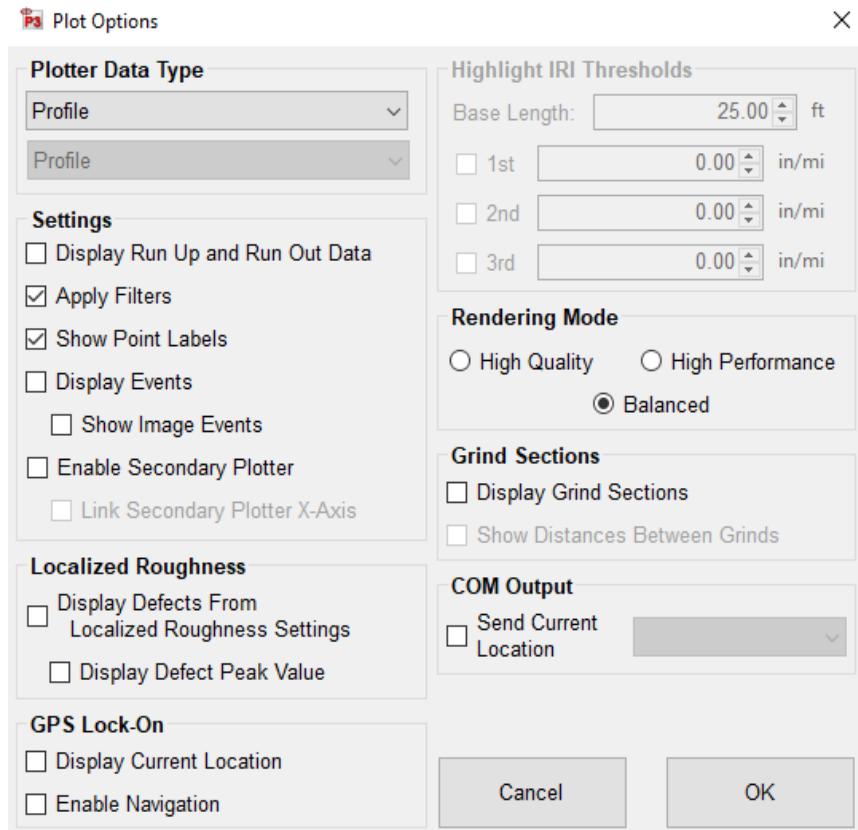


Figure 90. The plotter options window.



Figure 91. The GPS tag information window

Grinding Simulation and Navigation

SSI has developed a feature to assist contractors in the removal of IRI Areas of Localized Roughness (ALR). The Grinding Simulation is included in a deluxe license of Profiler. ***Navigation tolerances are dependent on the accuracy of the GPS system used to collect and layout roughness.***

After collecting the data ALR can be determined from the amount of suspension movement over certain locations. These areas can be determined in SSI Profiler's Localized Roughness section. However, grinding the ALR does not have the best result in removing roughness. This is because ALR can now include dips and bumps. Grinding dips takes a special procedure.

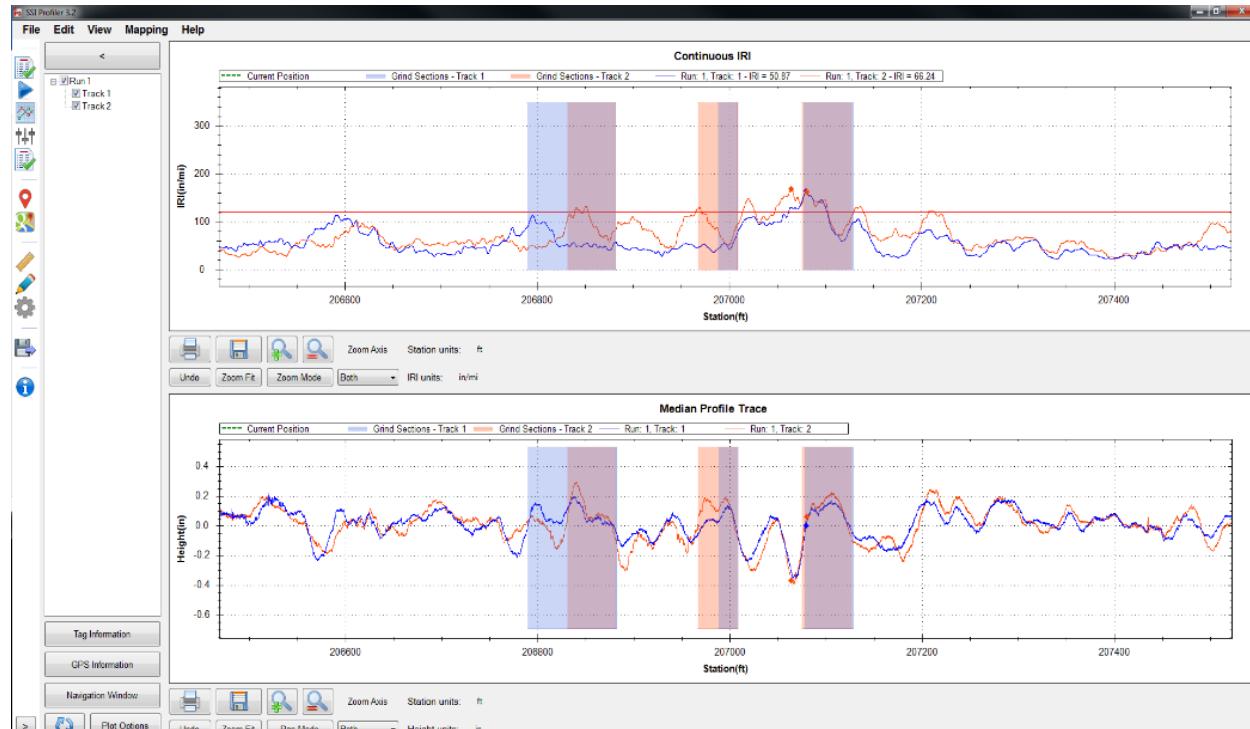


Figure 92. Grinding Navigation with green current location displayed

The FHWA program ProVal (roadprofile.com) has a tool to simulate the best grinding strategy for grinding. Input the correct settings for the IRI tolerances in ProVal's SAM analysis and choose AutoGrind, then Grind. This will give you locations along to profile to grind. Unfortunately, ProVal does not accept GPS coordinates so the table can be copied (right click in the grind table) and pasted into a notepad file and saved for the lane and wheel path. This notepad file can be imported into the SSI Profiler program within the Advanced Tools>Grind Sections>Manage Grind Info. Confirm that the track is correct before applying these locations.

The locations for track 1 and 2 will appear in the trace window with paired GPS coordinates. You can use the green line to display current location and visually track your position until you get to the beginning and end of a grind, in order to layout the location on the pavement.

Under the navigation window icon in trace view you may choose to auto-center the current location and choose the Simple Grinds option. The simple grinds window displays the location of the grinds relative to the current position through numbers and colors.

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.

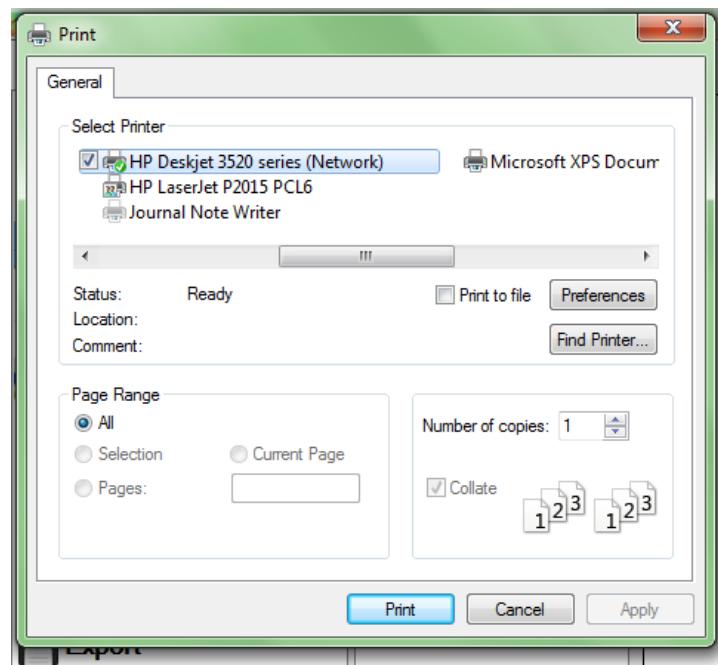


Figure 93. Print window after print icon pressed s

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.

Mapping

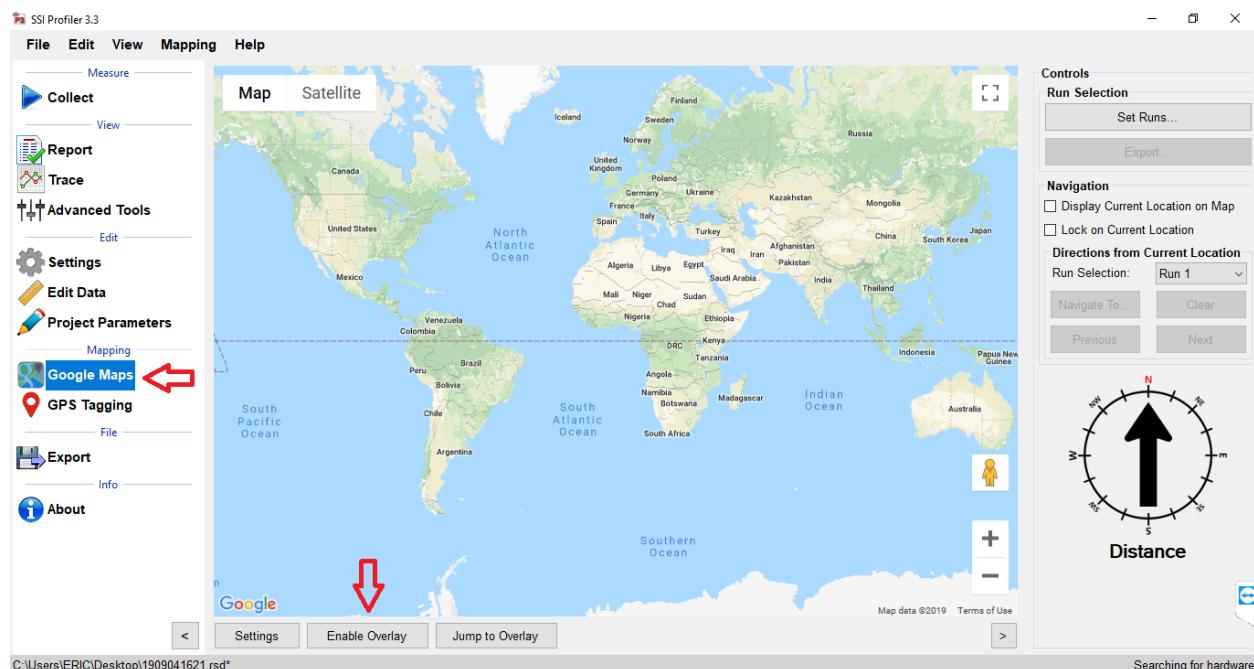


Figure 94. Google Maps Initial Screen

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**

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

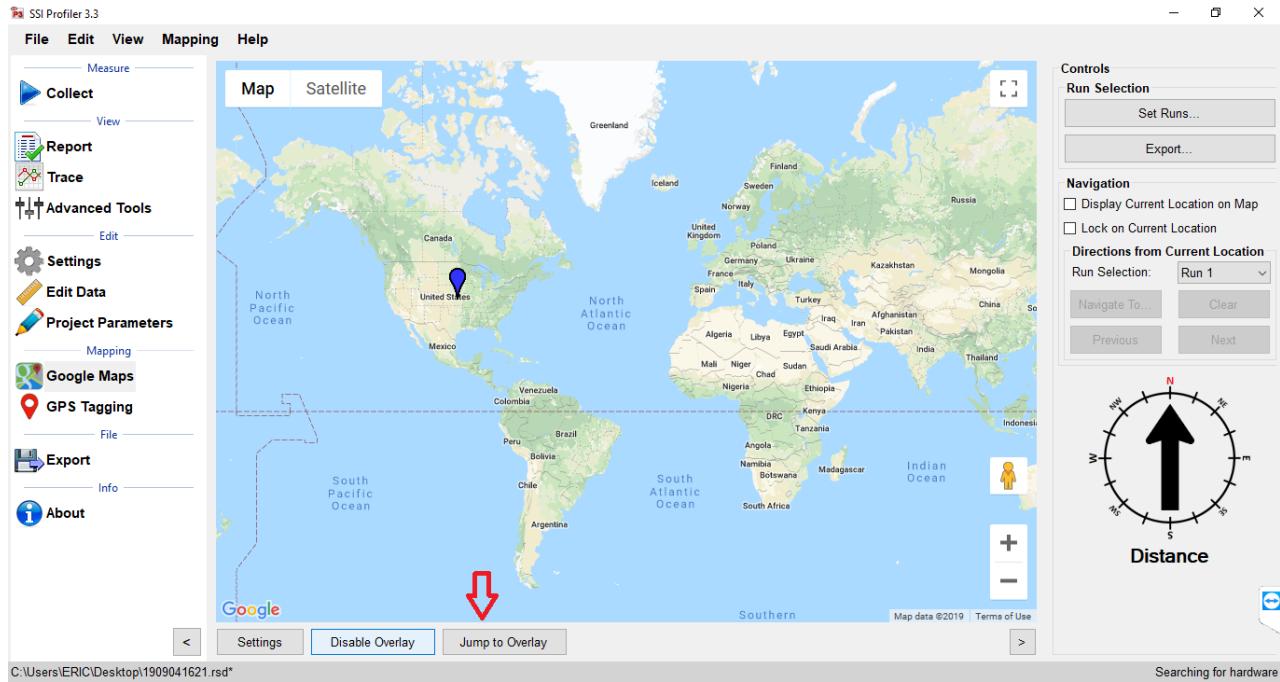


Figure 95. Google Maps Jump to Overlay

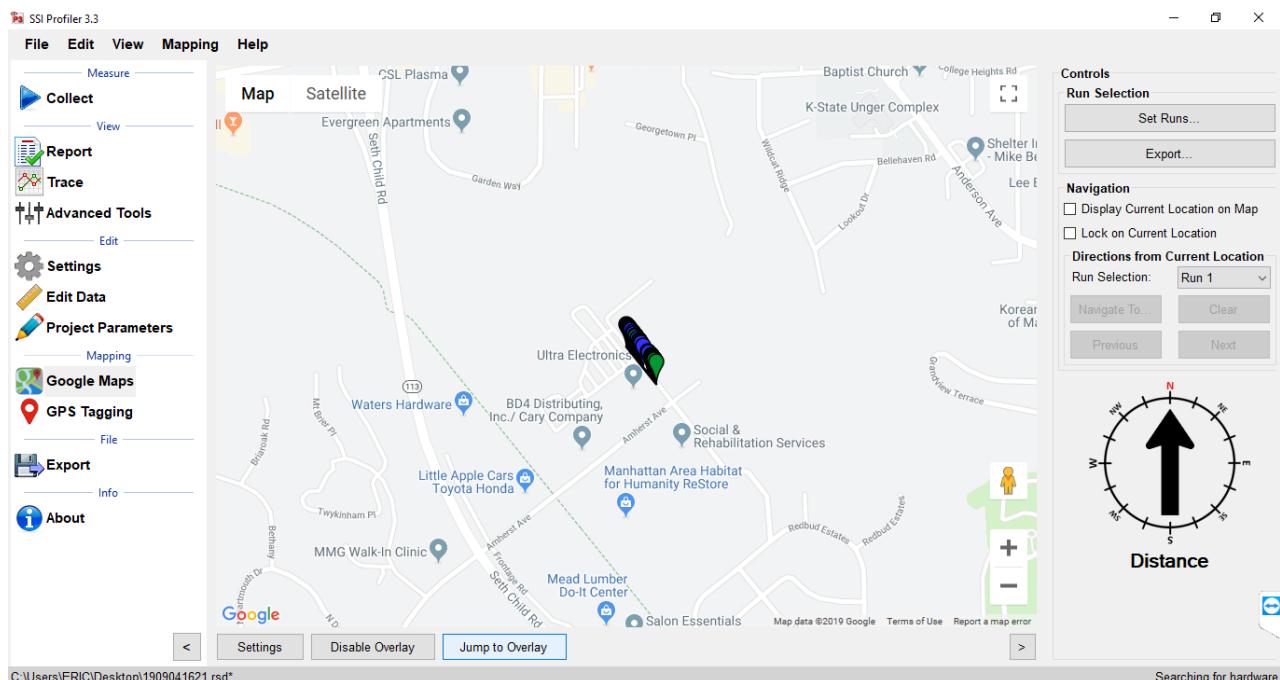


Figure 96. Google Maps after Jump to Overlay

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

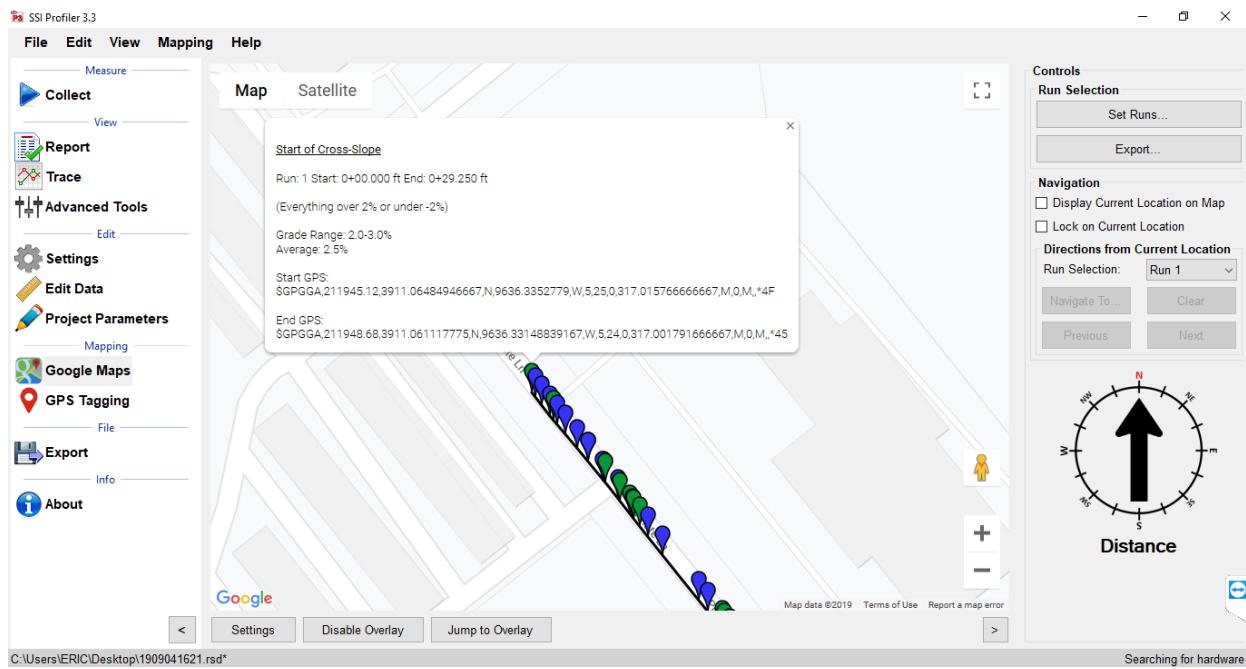


Figure 97. Google Maps Overlay zoomed in with pin clicked for information

“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.

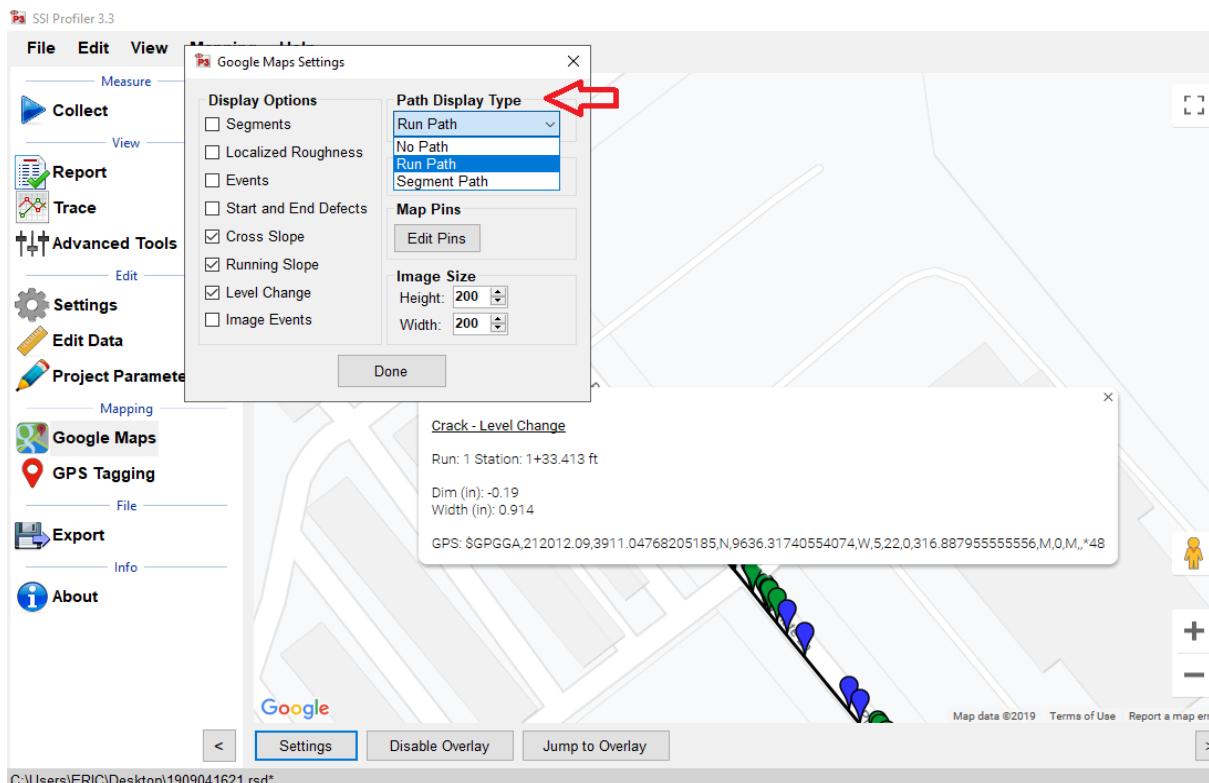


Figure 98. Google Maps Settings: Path Display Type.

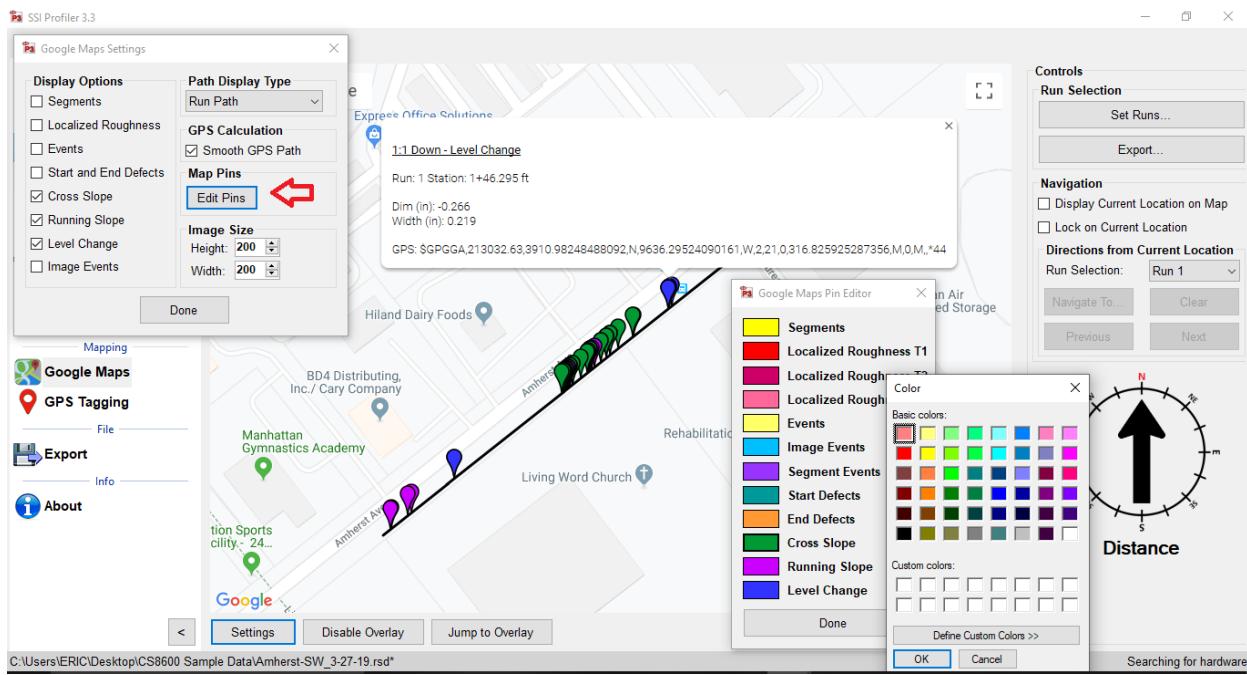


Figure 99. Google Maps Settings: Edit Pins

Data can be exported to .kml format through the Google Maps window by clicking “Export” under Run Selection in the upper right of the window. 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 Google Maps Navigation.

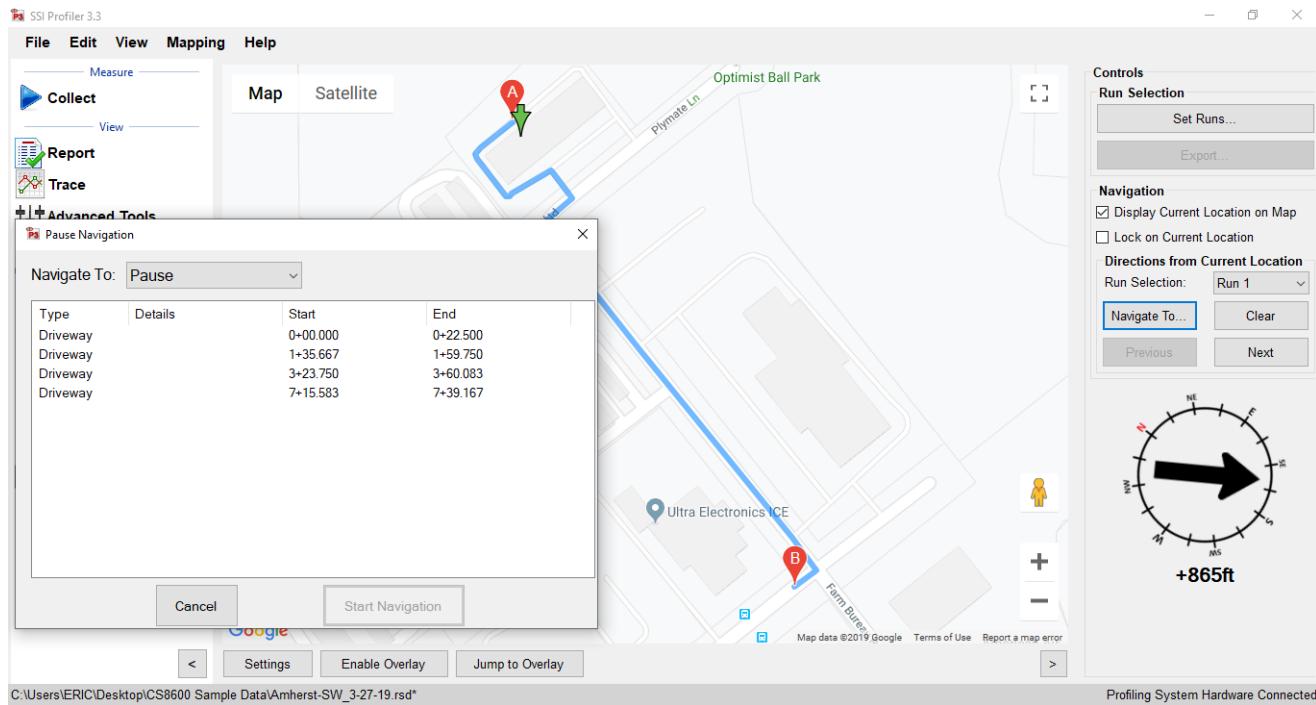


Figure 100. Google Maps Navigation

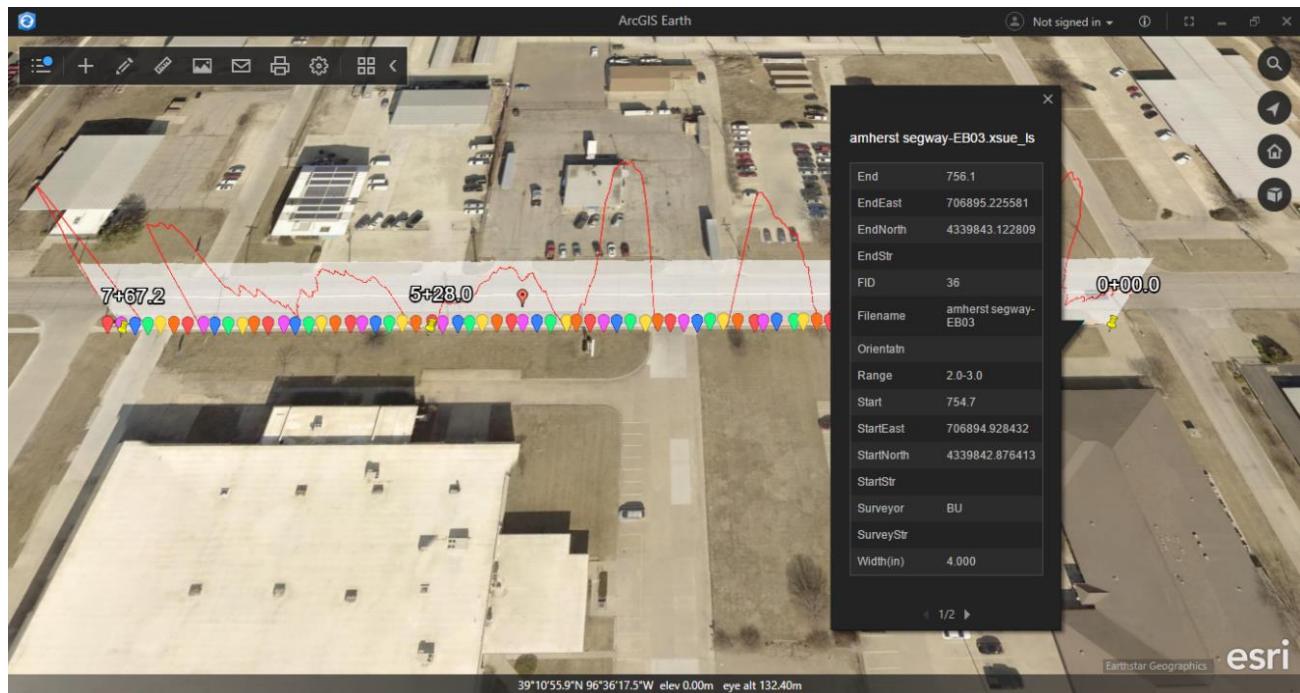


Figure 101. KML export in ArcGIS Earth

About

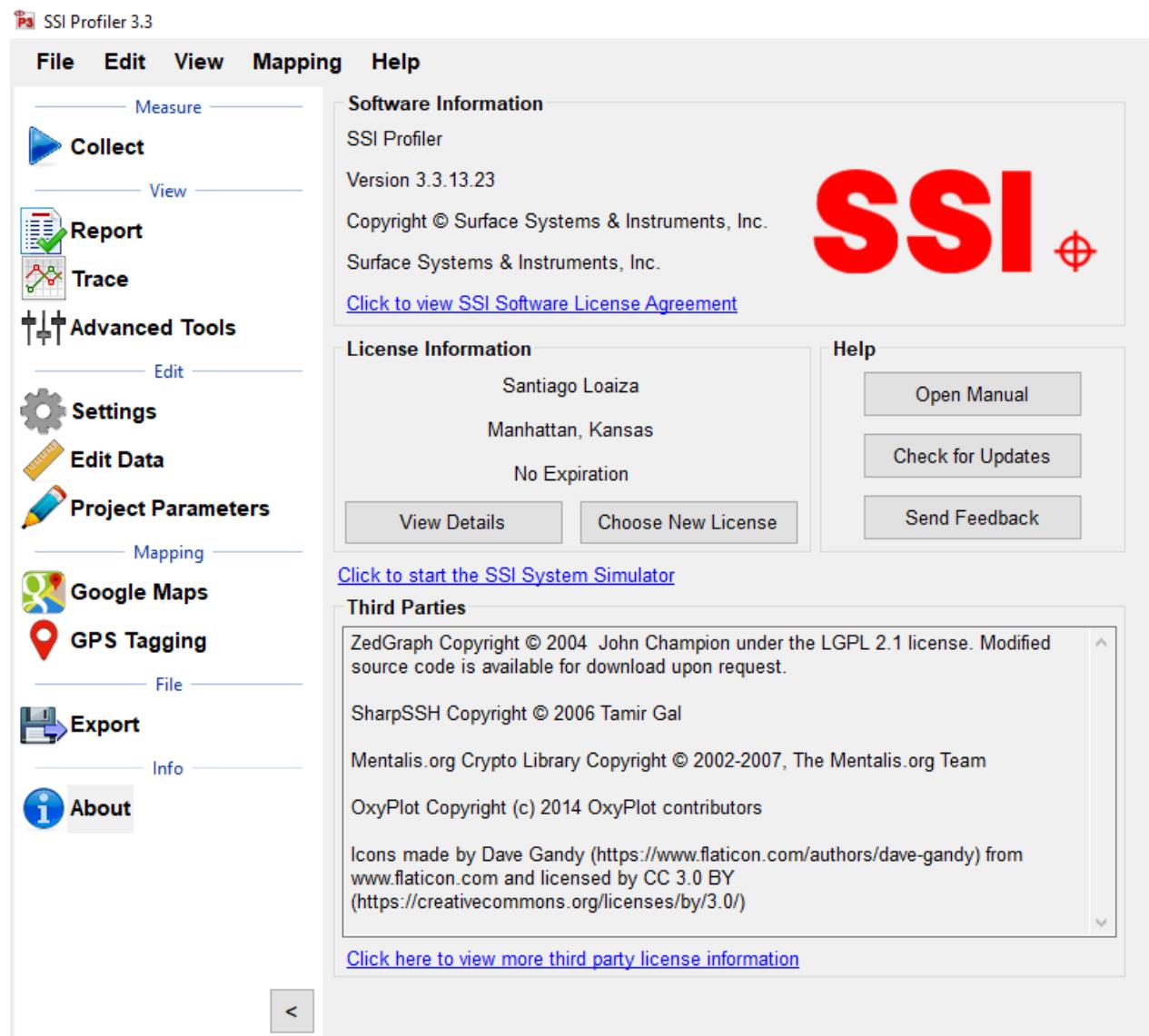


Figure 102: About Window

The About section has information concerning Profiler V3 software version, copyright, terms, license and software features enabled. 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. Contact Support@smoothroad.com for any manual requests.

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.

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.

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.

Distance Not Correct

- When was the last calibration performed?
- Was the actual distance traveled during calibration entered correctly?
- Is the encoder damaged or loose?
- Is the encoder to distance wheel axel coupling loose?
- Is the Amphenol cable attached correctly?
- How long is your calibration track?
- Is there a large temperature gradient?
- Is the calibration track a straight line?

Height not Correct

- When was the last calibration performed?
- Is the encoder damaged or loose?
- Is the encoder to height axel coupling loose?
- Is the Amphenol cable attached correctly?
- Was the height calibration correctly performed?

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.

Wiring Diagram for Distance and Height Cables

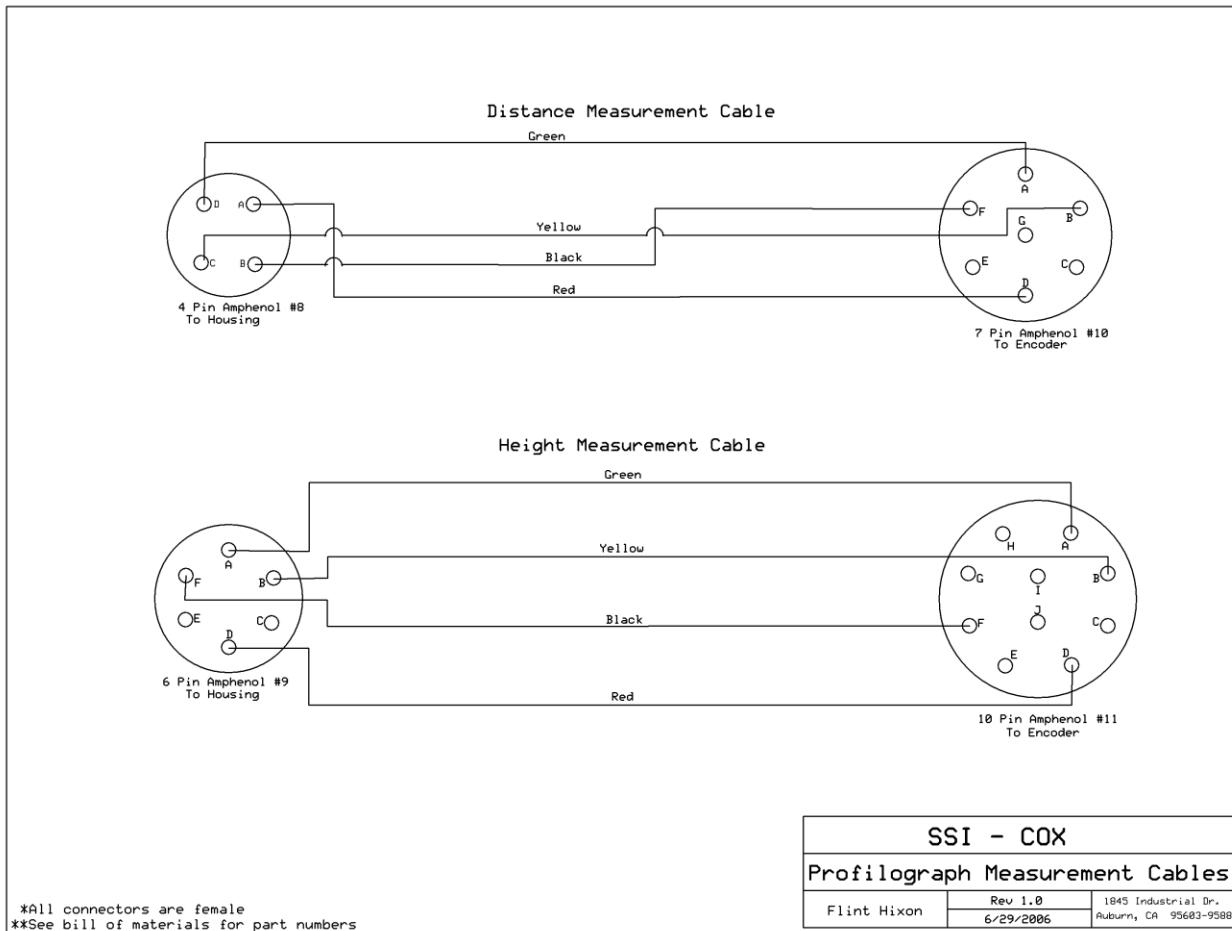


Figure 103. Wiring diagram for Distance and Height cables