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Profiler V3 Operation Manual CS-8500 Profilograph System Version 3.3.0.2.



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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.

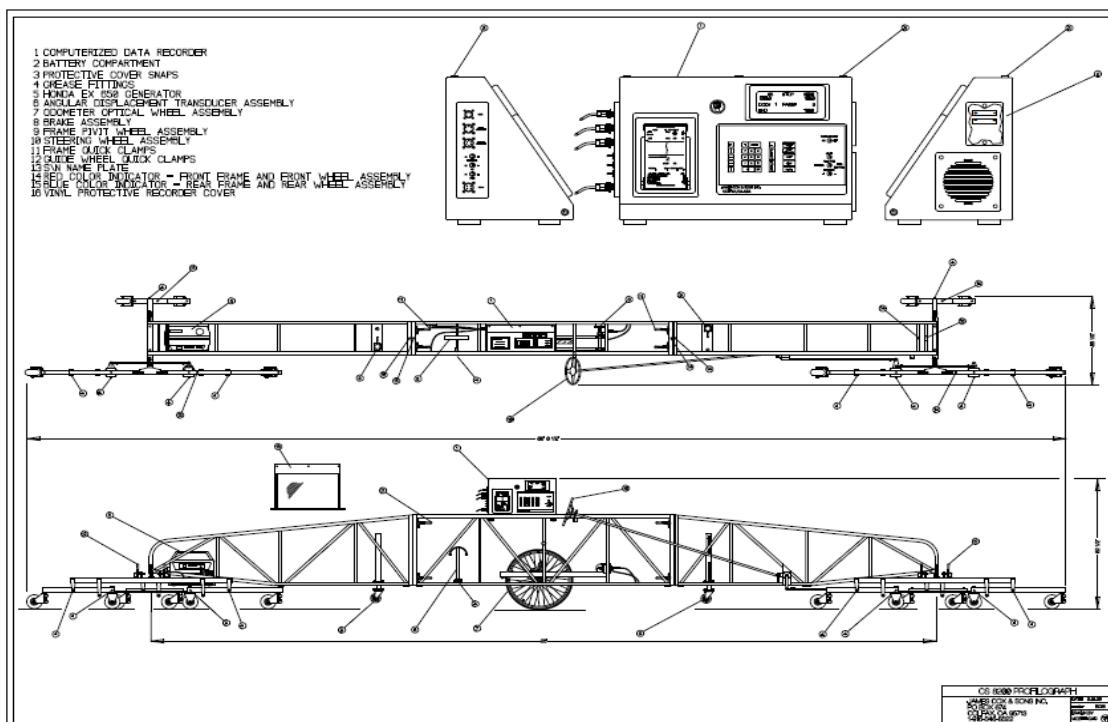


Figure 1: The top and side view schematic for the Profilograph system

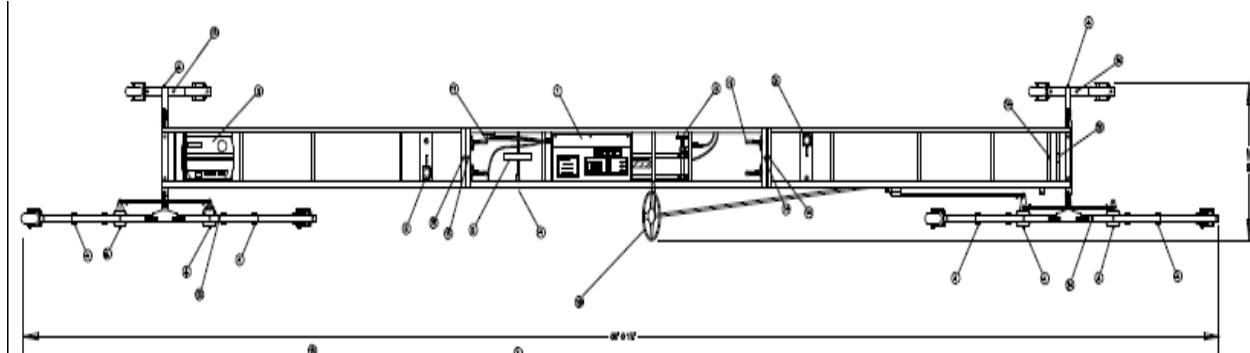


Figure 2: The top view of a correctly assembled Profilograph

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.

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.

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. If problems persist, contact SSI technical support.

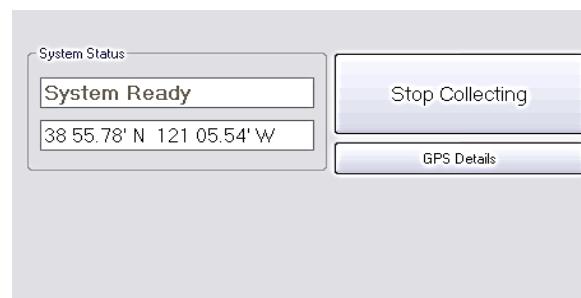


Figure 3: System Status and GPS

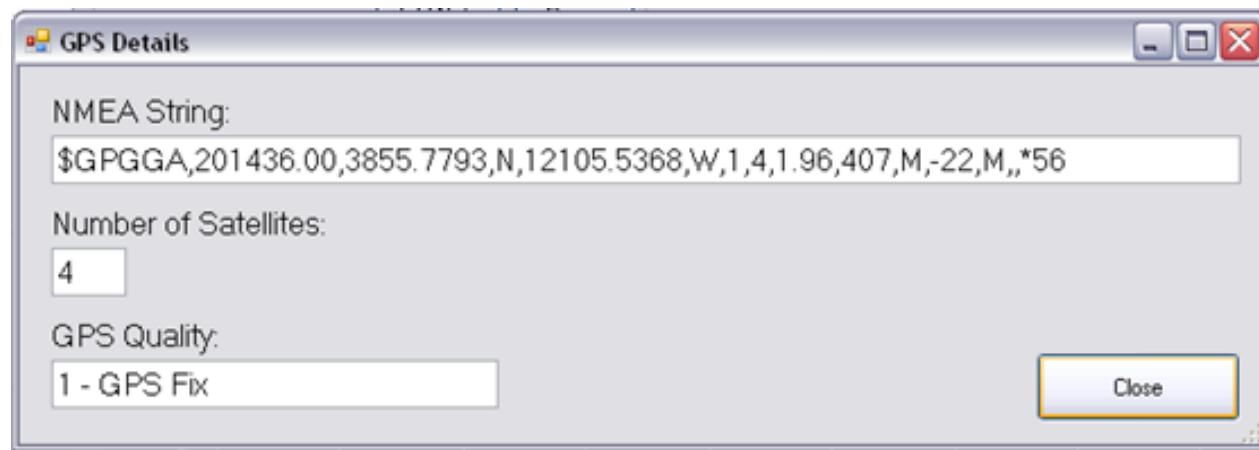


Figure 4: The GPS Details window

Data Collection

Collect

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

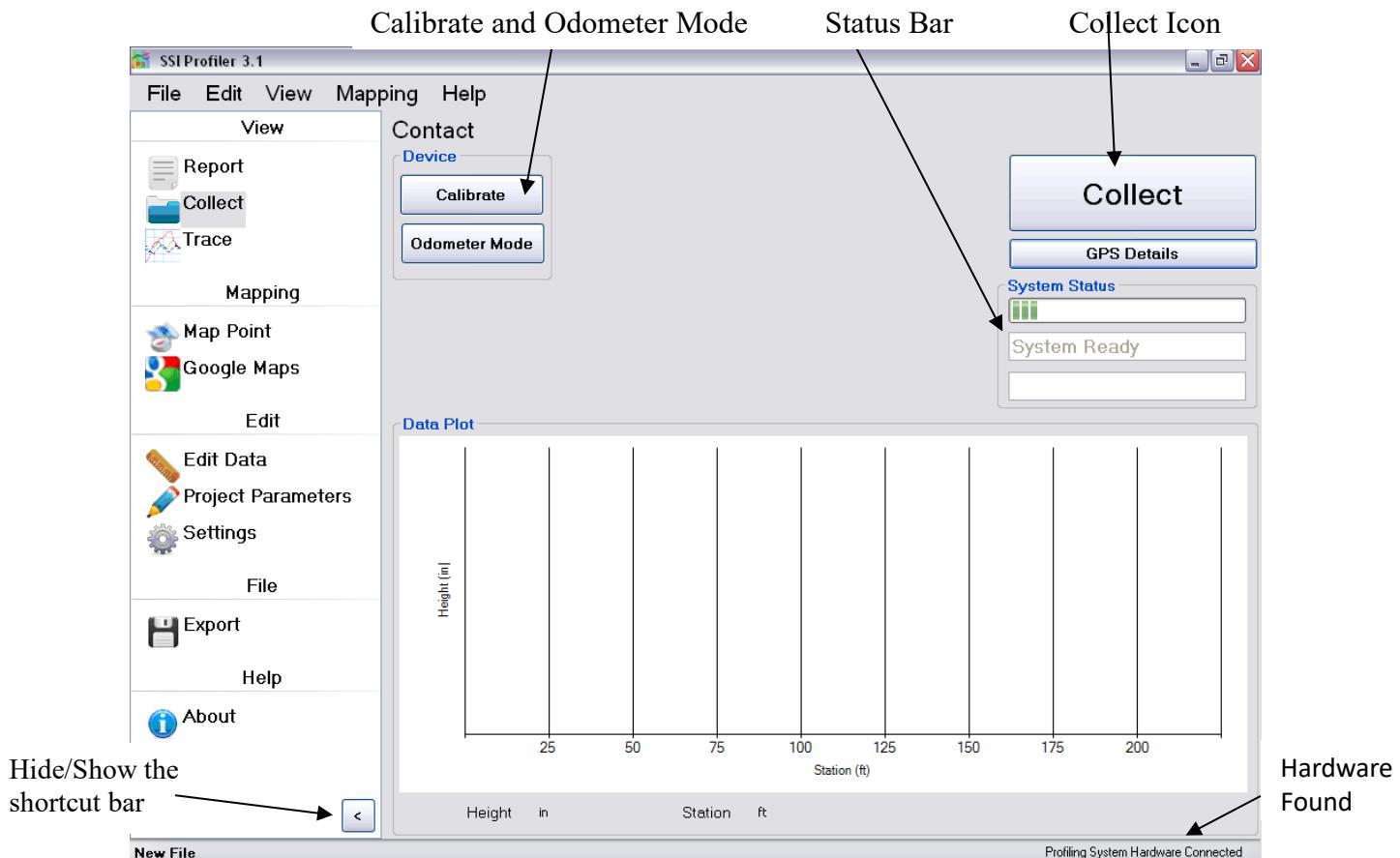


Figure 5: The Main Collection Window

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 “Calibrate” to open the Calibration

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.

Distance Calibration

A distance calibration should be completed at least once per day. The distance calibration is started by measuring 528 feet or 160 meters; a tenth of a mile, over a 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 from the Collect Window, then Distance Calibration.

When Distance Calibration is selected from the Calibration Options menu, the Track length window will appear. Set the track length as 528 feet or 160 meters, and select ‘Accept’. Follow the directions under the calibration instructions and proceed with the test. **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. The changing pressure in the tire will alter the circumference and the distance readout.

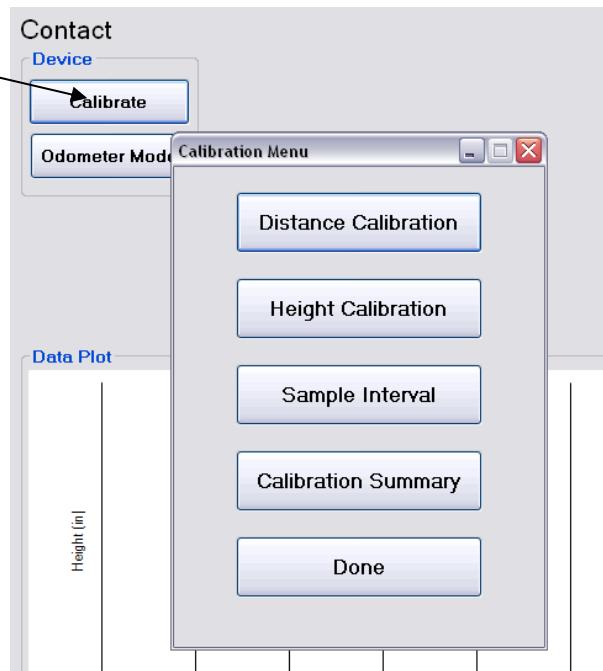


Figure 6: The Main Calibration Window

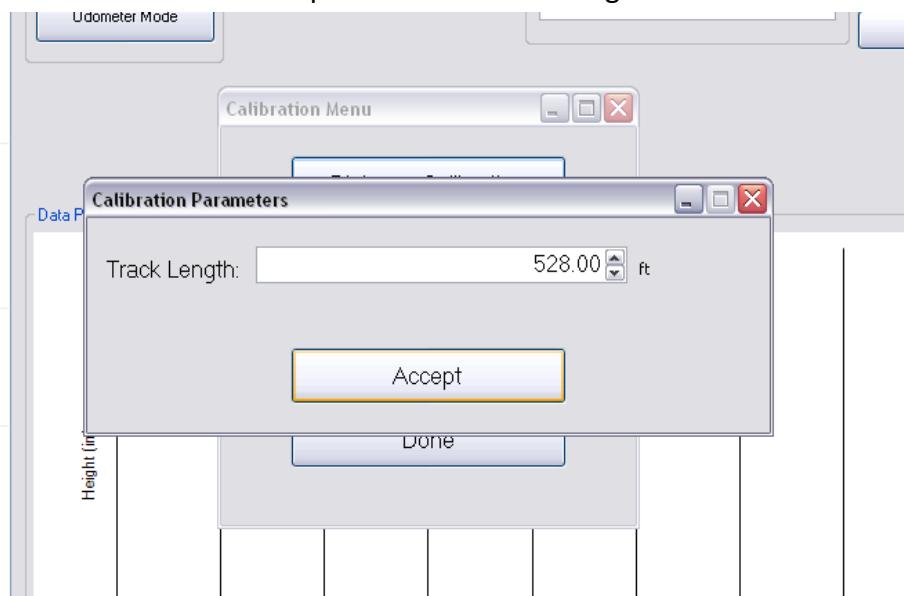


Figure 7: The First window of the distance calibration

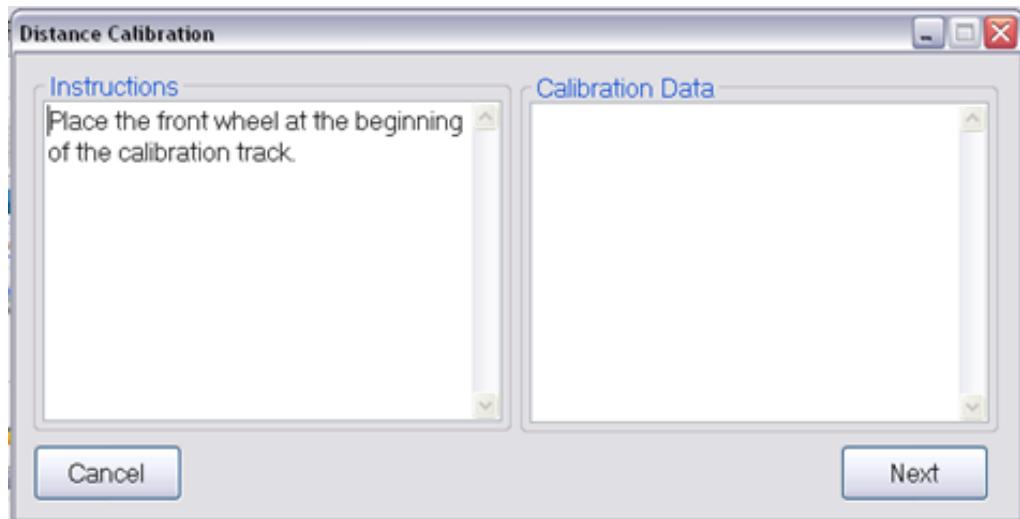


Figure 8: The instructions for the distance calibration.

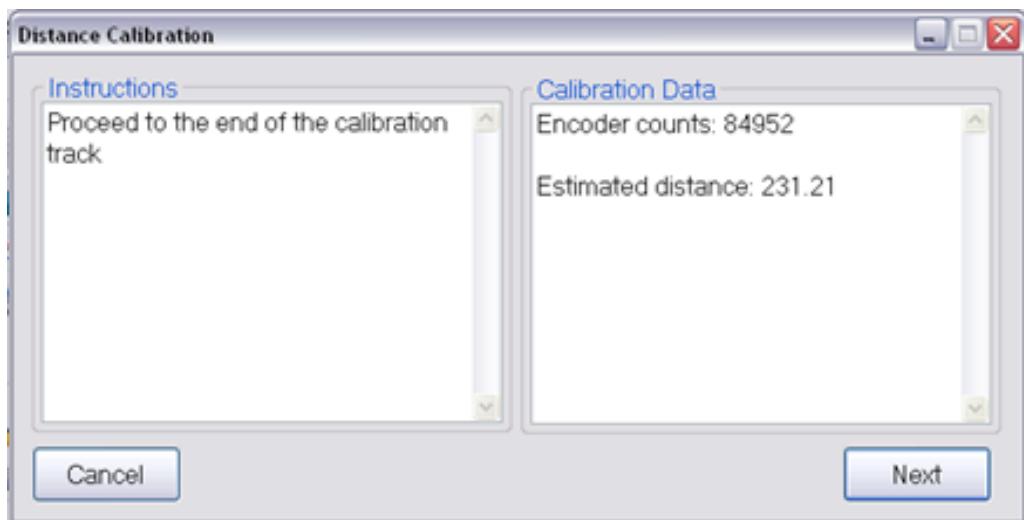


Figure 9: Screenshot taken near the halfway mark of the distance calibration

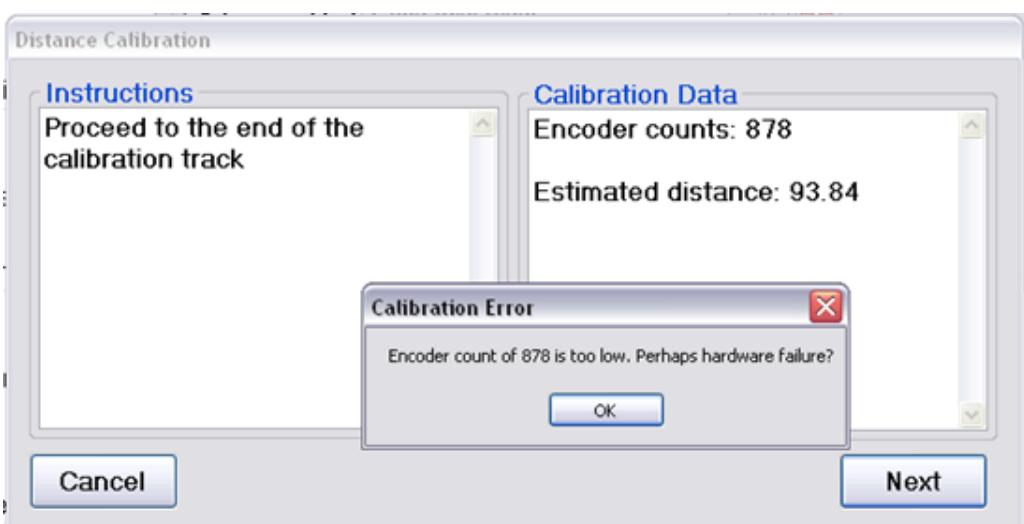


Figure 10: Distance Calibration Error

Height Calibration

The height calibration is found by opening the Collect Window and selecting the Calibration Icon. 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. The initial step is to enter the height of Block 1 as one inch, then select “Accept.” Place the measurement wheel upon the first block, and select next. The program will call for the height of the second block which is **one inch**. Once accepted, the Profiler program will ask for the second block to be placed under the measurement wheel. 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.

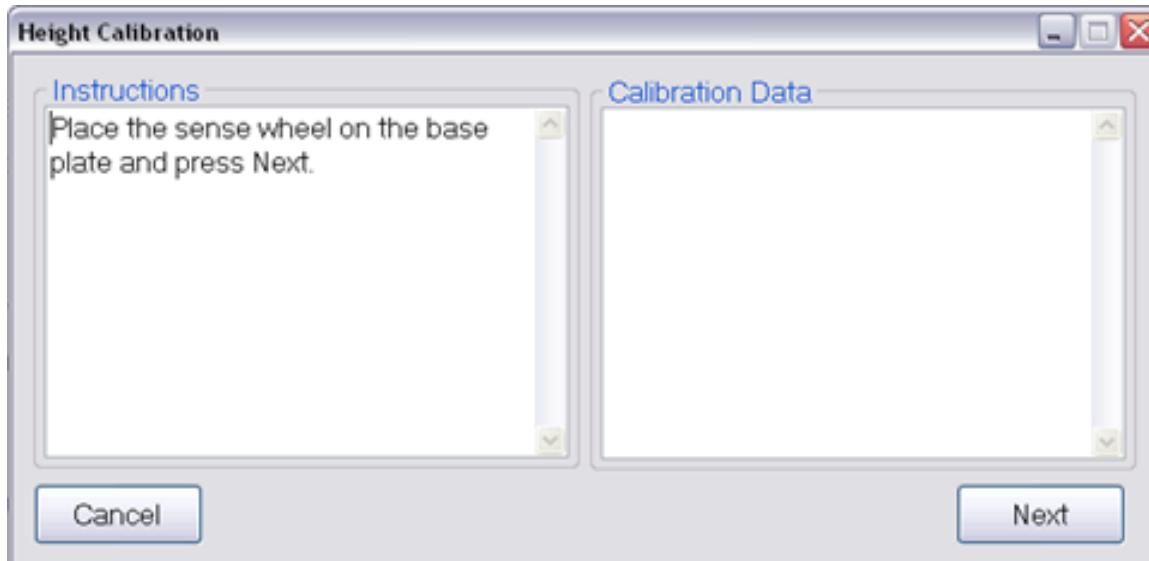


Figure 11: The initial step of the height calibration

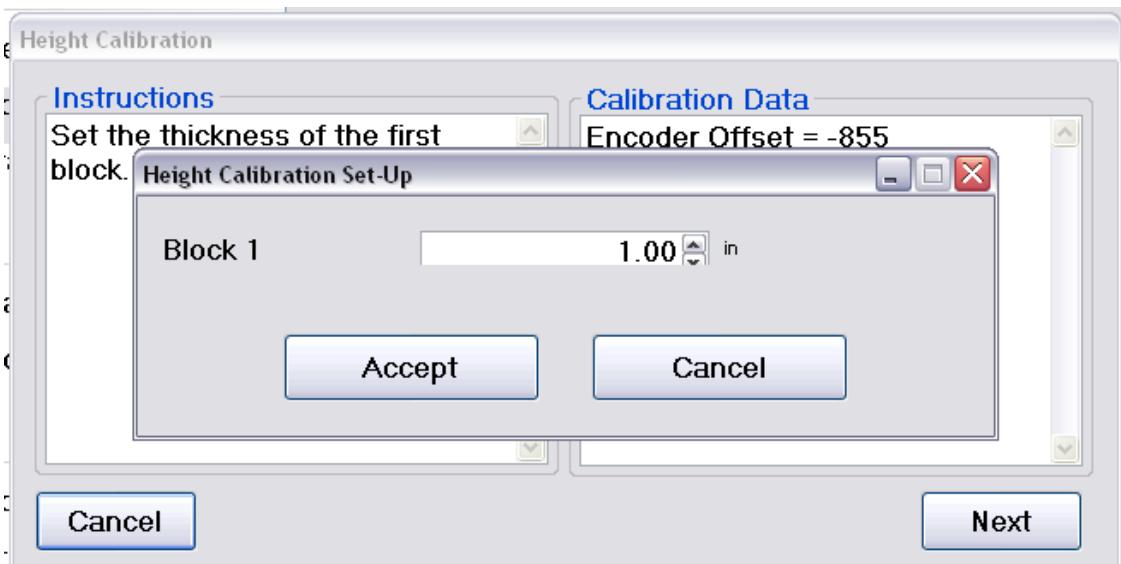


Figure 12: Enter the first block thickness for height calibration

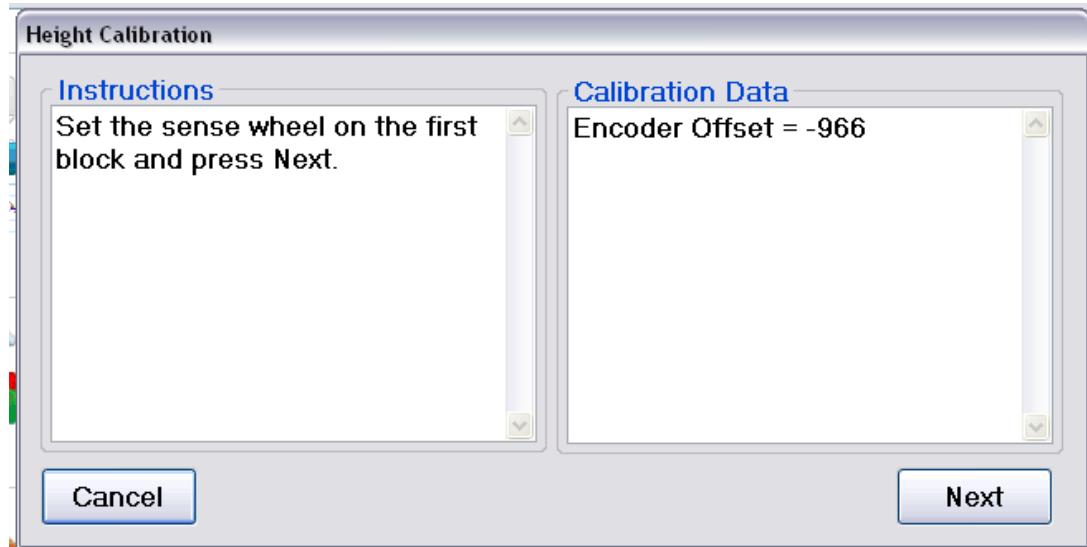


Figure 13: Place the first block under the measurement

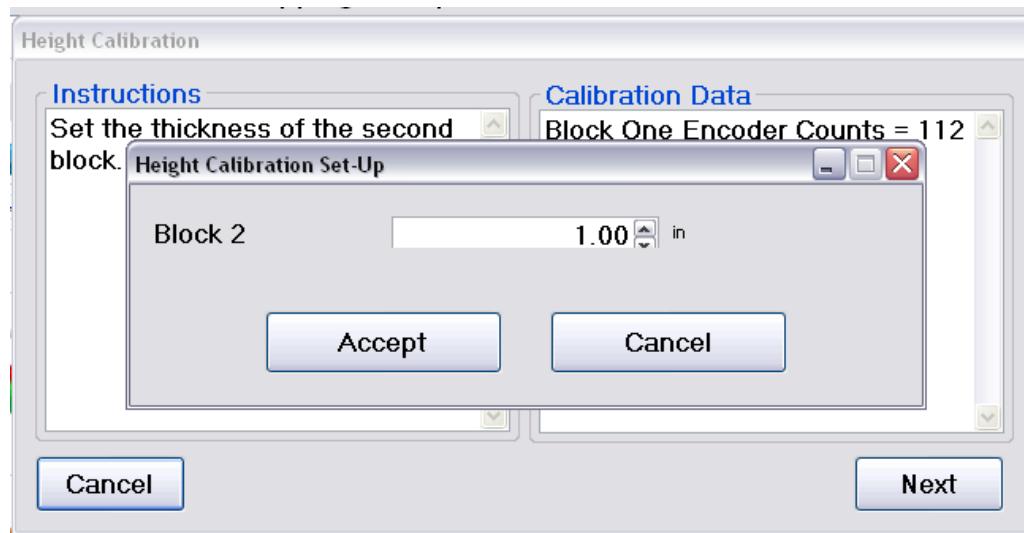


Figure 14: Set the height of the second block as **1 inch**

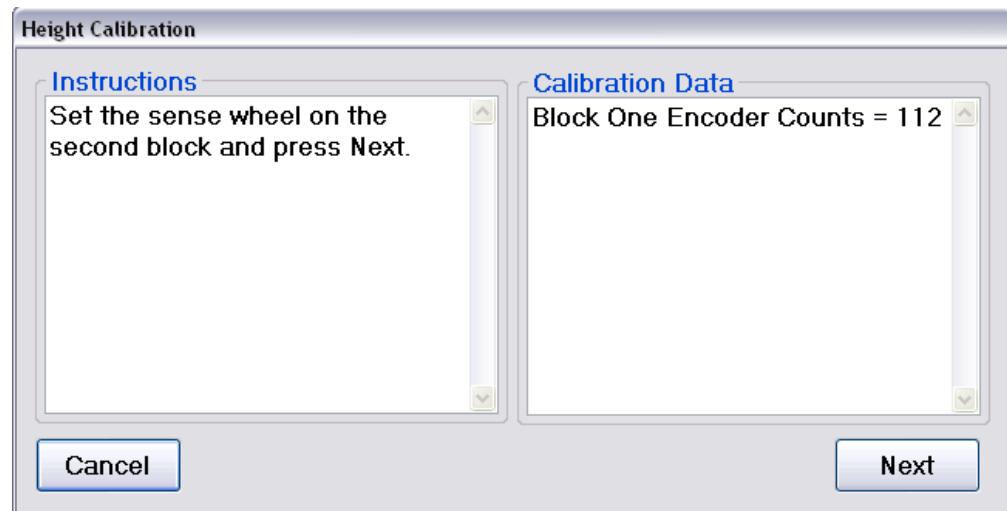


Figure 15: Place the measurement wheel upon the second block

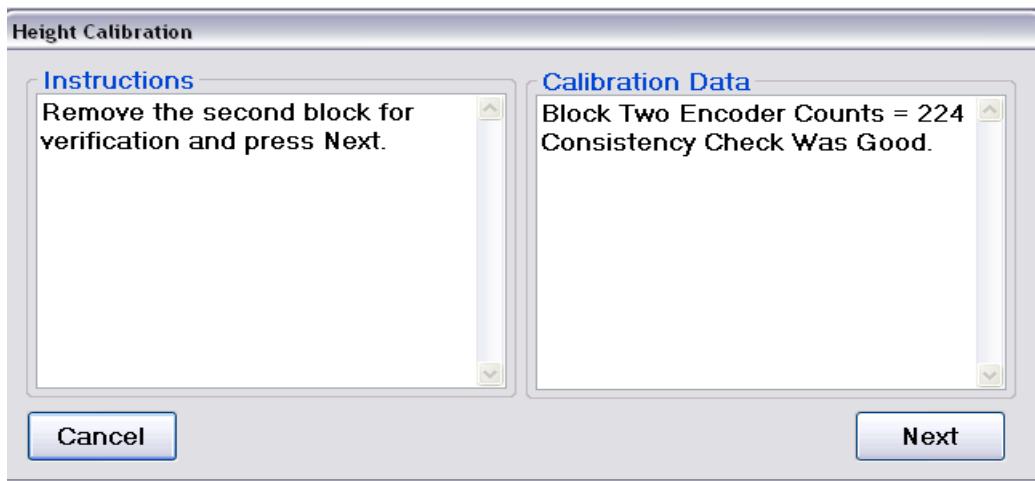


Figure 16: Calibration block removal

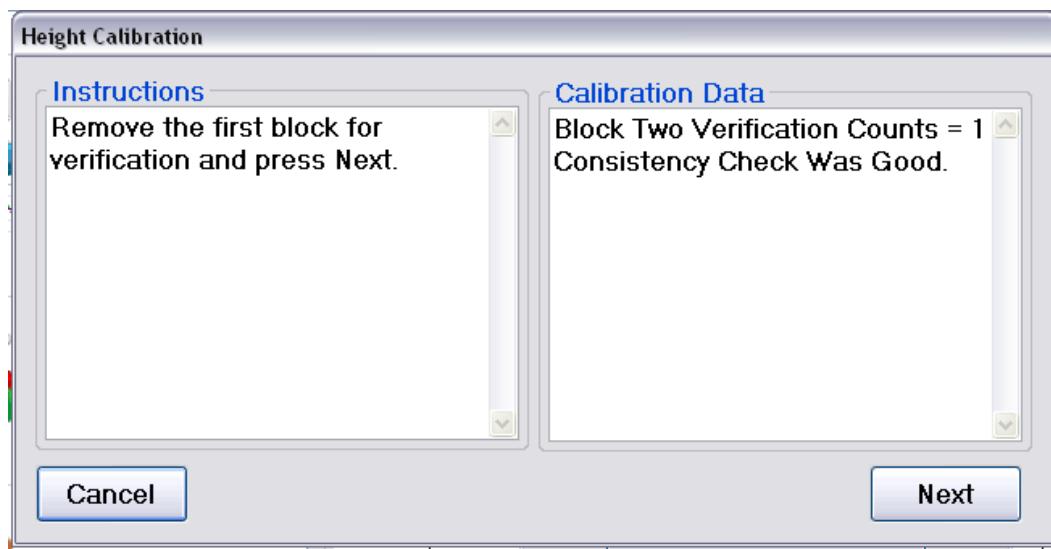


Figure 17: Removal of the first calibration block

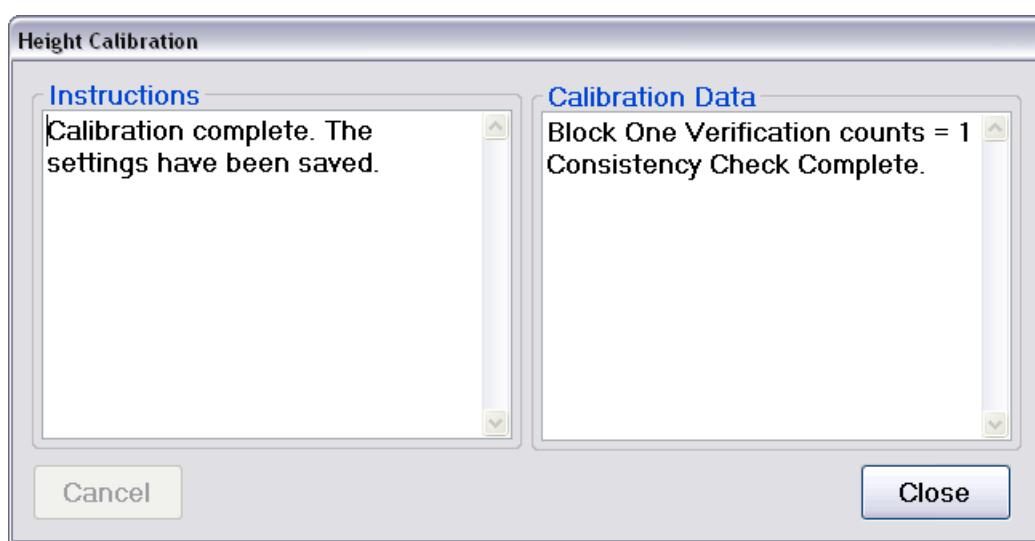


Figure 18: If the consistency check is a success, the calibration settings will be saved.

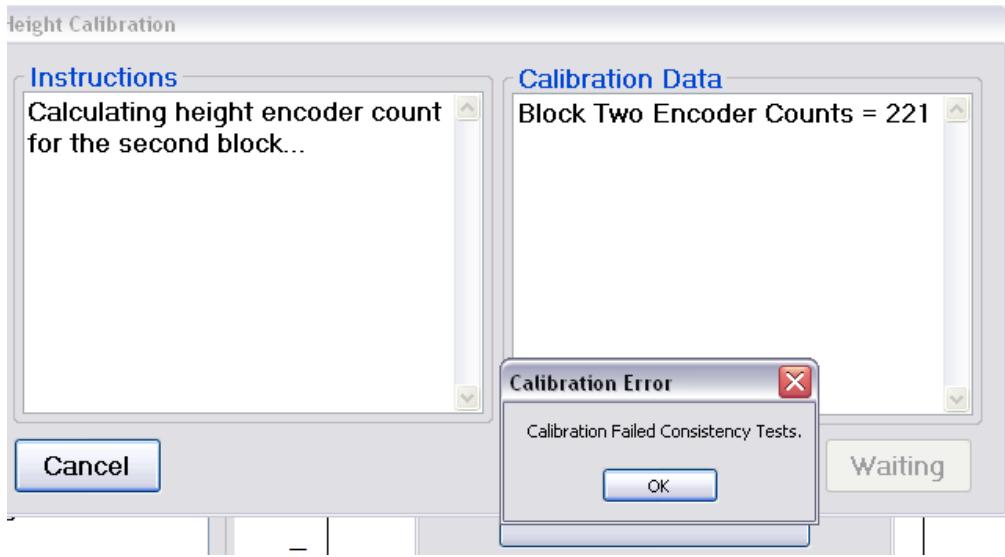


Figure 19: A failed consistency test for the height calibration. Perform correct procedure.

Sample Interval

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

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.

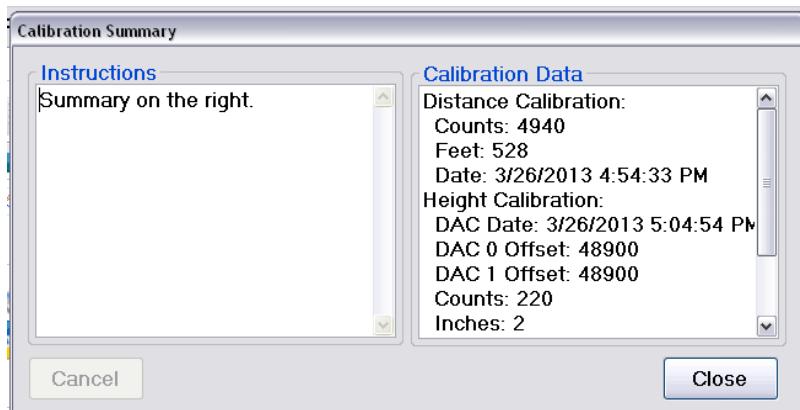


Figure 20: Calibration Summary

Odometer Mode

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.

To open the odometer, select Odometer Mode from the main Collect window.

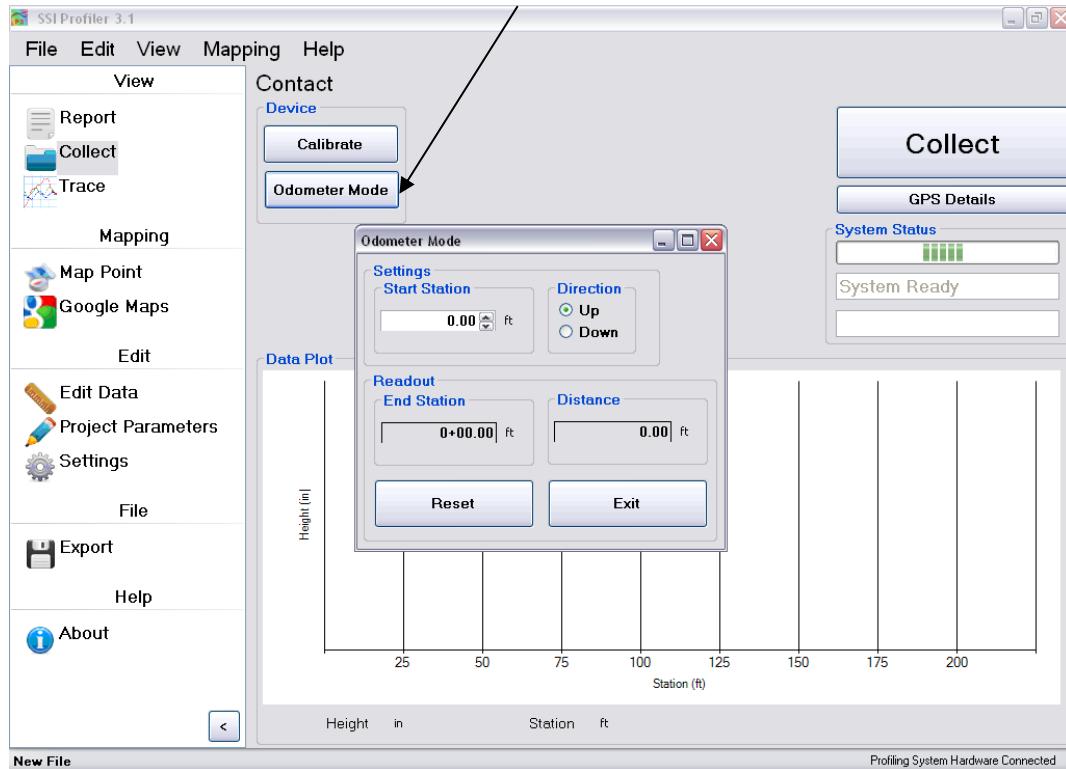


Figure 21: The odometer mode

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 default file name chosen will be used after a collection has been completed and if an unsaved collection is saved through File>Save As. 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.

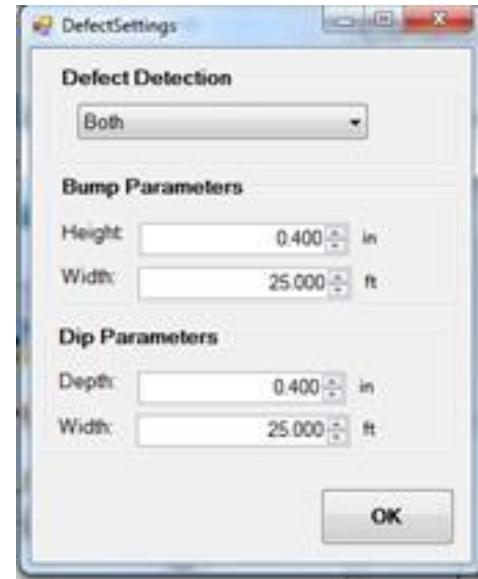
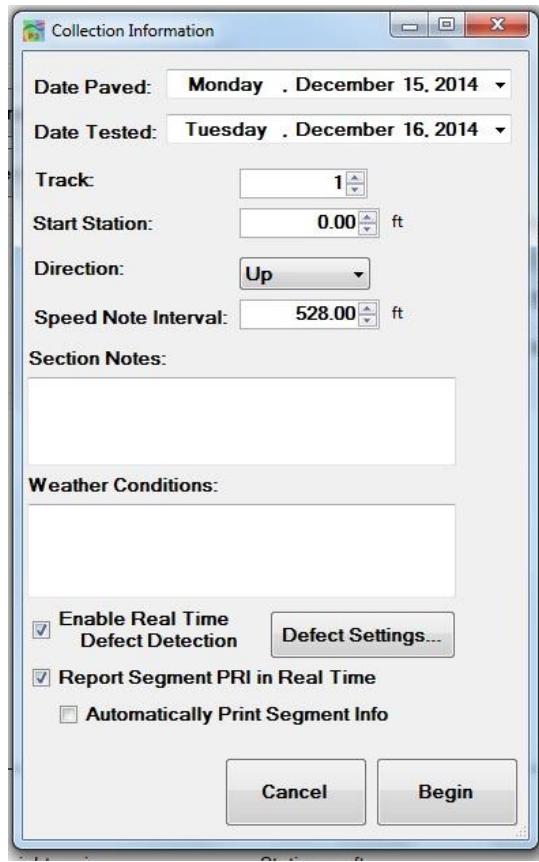


Figure 22: The Defect Detection Parameters after selecting “Defect Settings” in figure 22

Figure 23: The Collection Information window

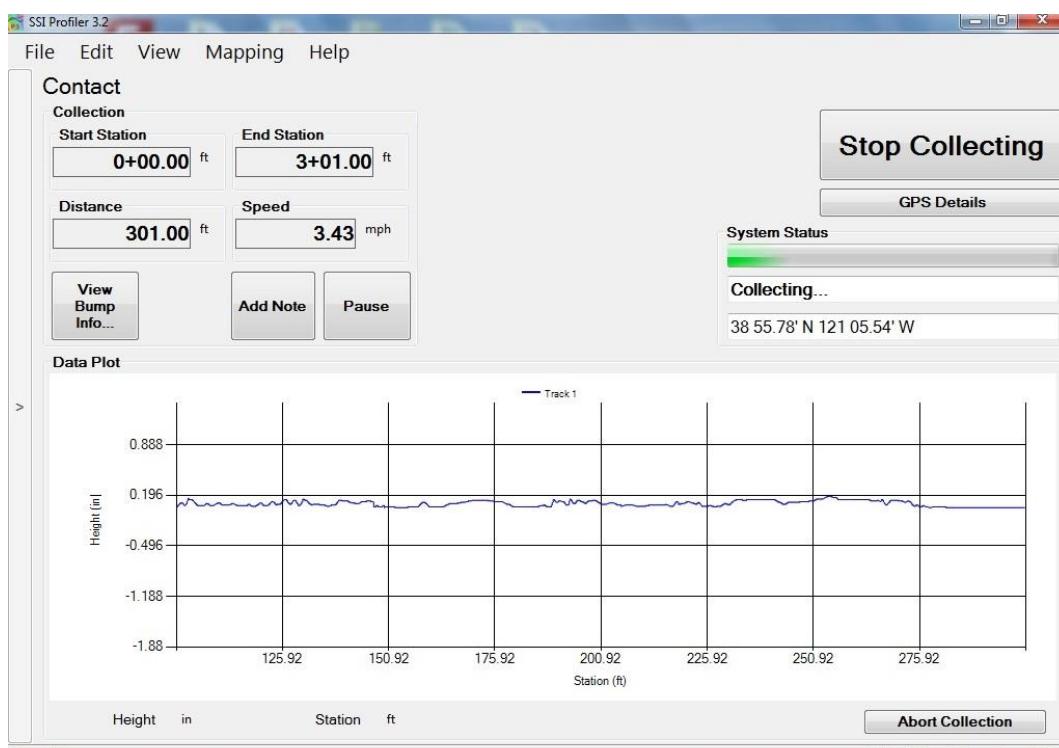


Figure 24: The collection window with a collection in progress

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.

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.



Figure 25: Backing up during a collection

Pause

Pauses are enacted when the stationing needs to continue, but height data needs to be excluded. This happens when the Profilograph approaches bridge decks, manholes or drainage areas that were paved by hand. Review the overseeing agency's specifications on paused data before using this feature. The pause 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.

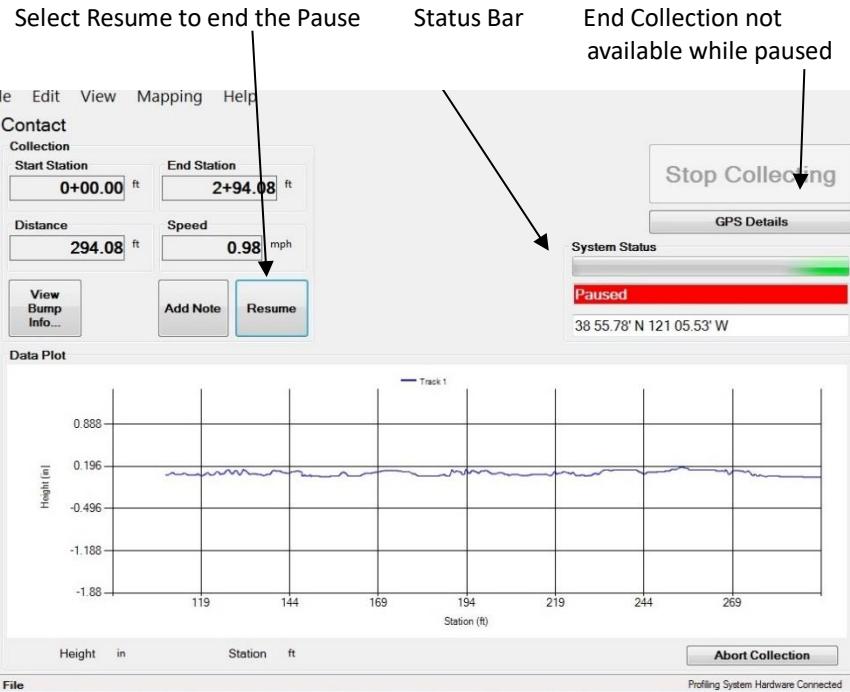


Figure 26: A paused collection

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" the pause and select "End Collection."

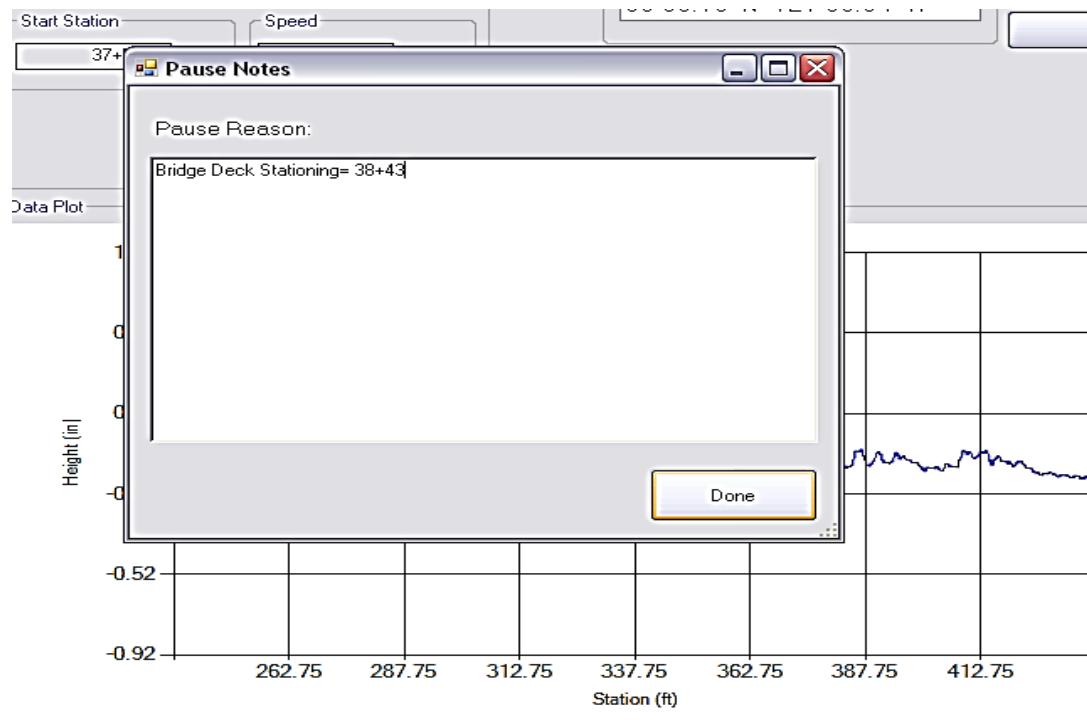


Figure 27: The pause note

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.

The Note icon will flash red and blue when it is selected to assure the operator a note was added.

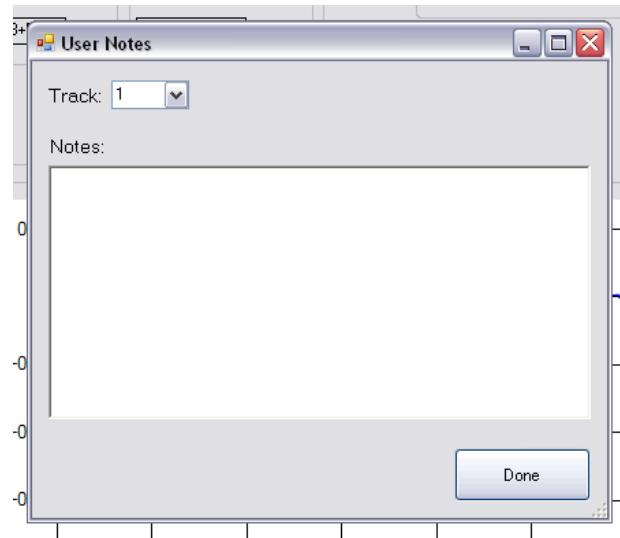


Figure 28: The add notes window

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.

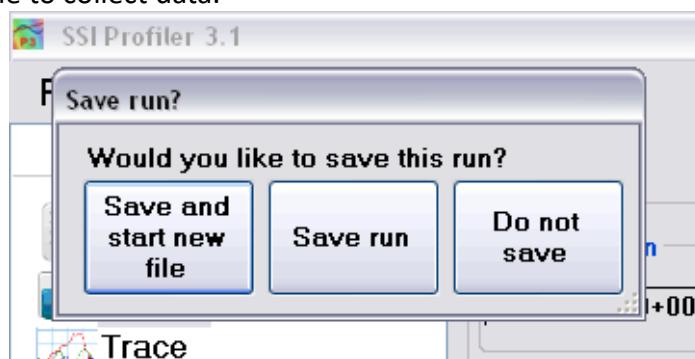


Figure 29: Saving Options After a Collection

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

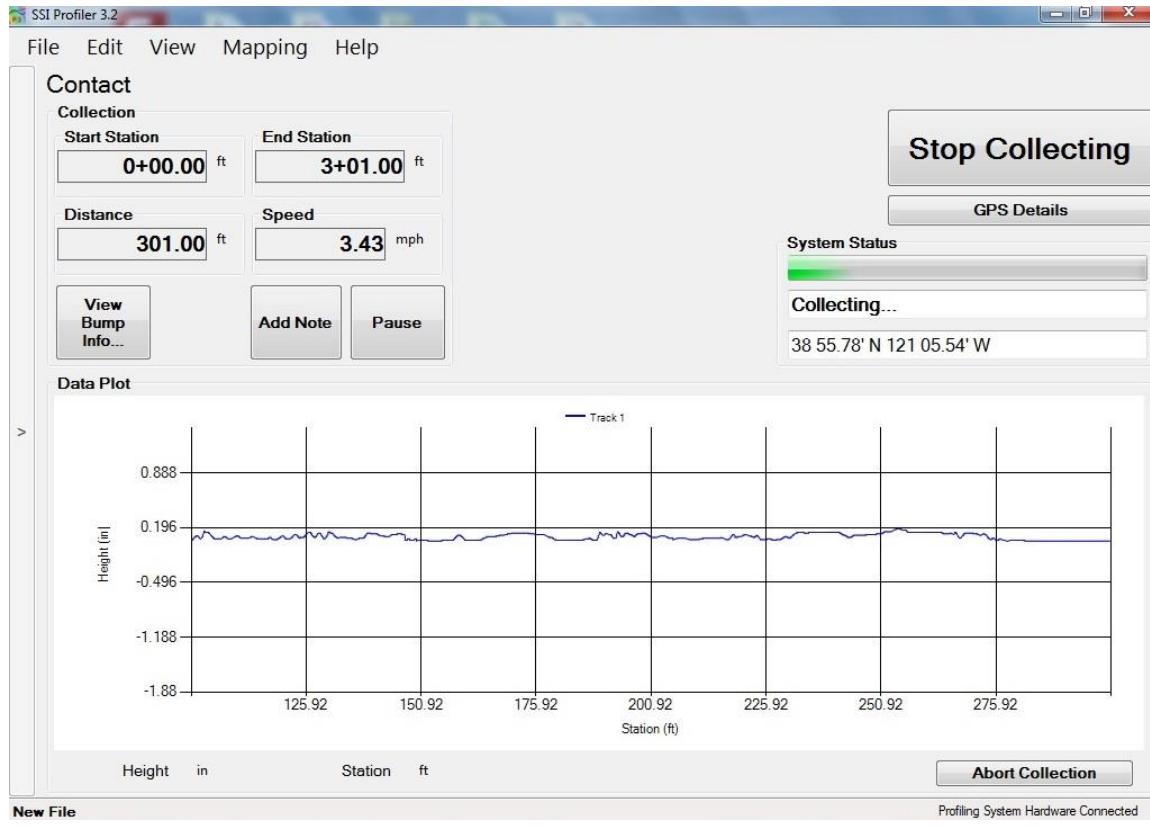


Figure 30: The start and end stations, distance traveled and the speed are displayed in the

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.

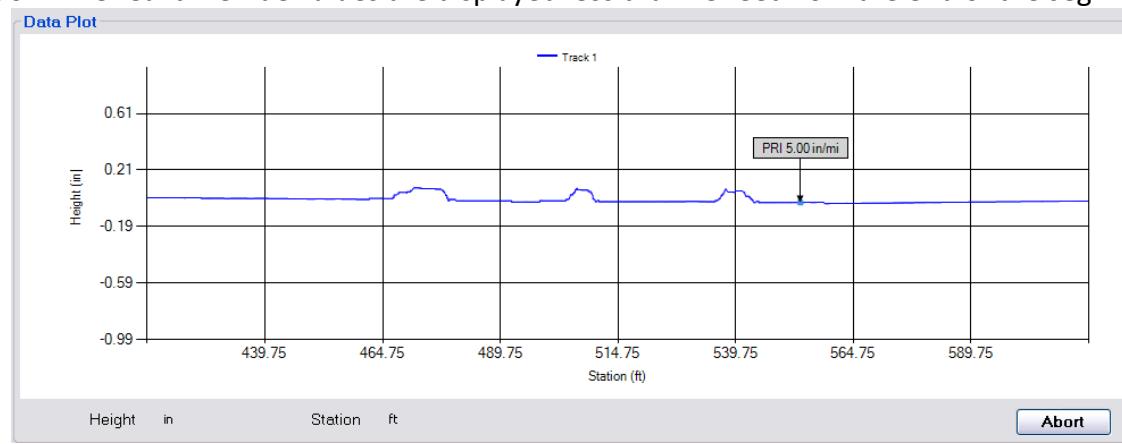


Figure 31: The Ride Values of PRI after segment length

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 compatible formats.

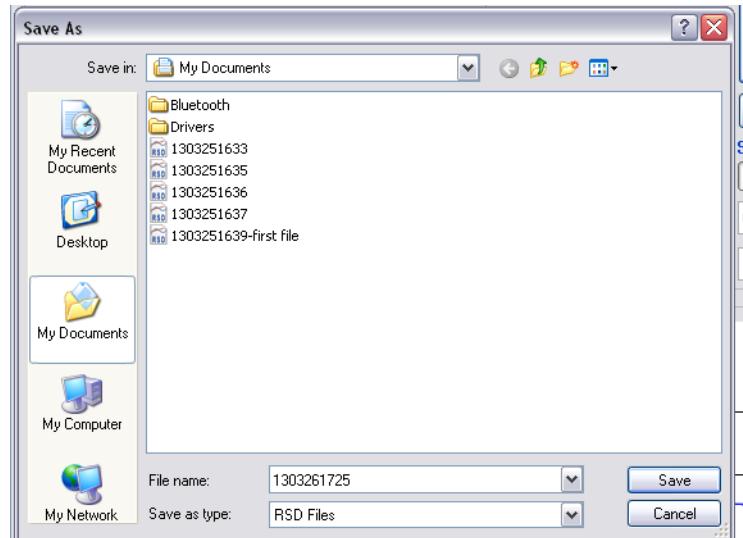


Figure 32: The "Save as" Window for saving files

Reporting

File Tab

New

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

Open

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

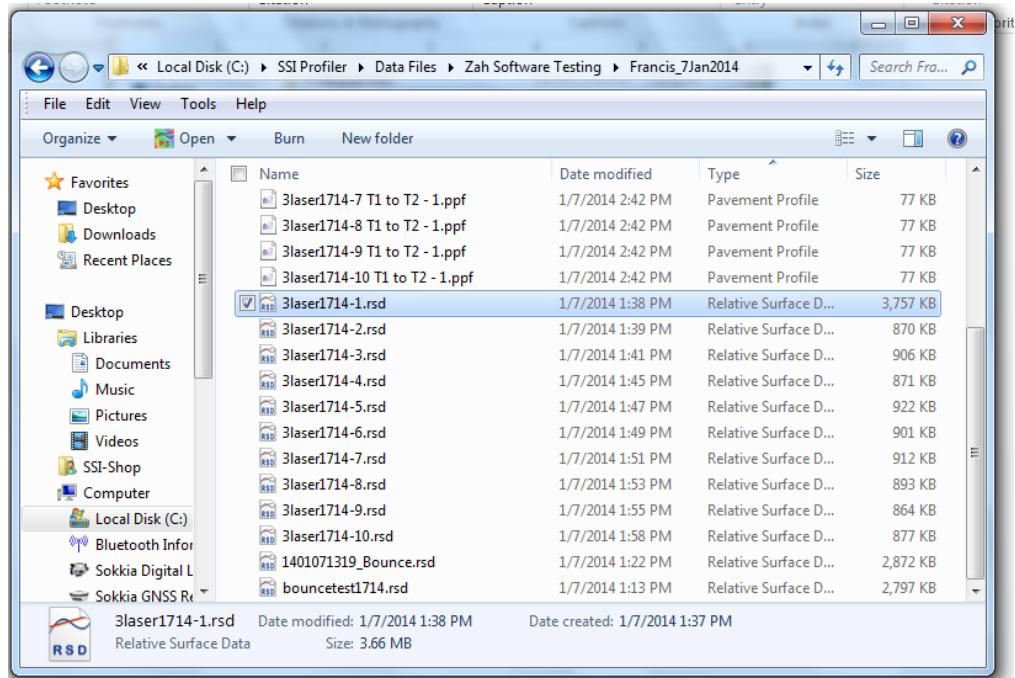


Figure 33. Opening a data file in the Profiler V3 program

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."

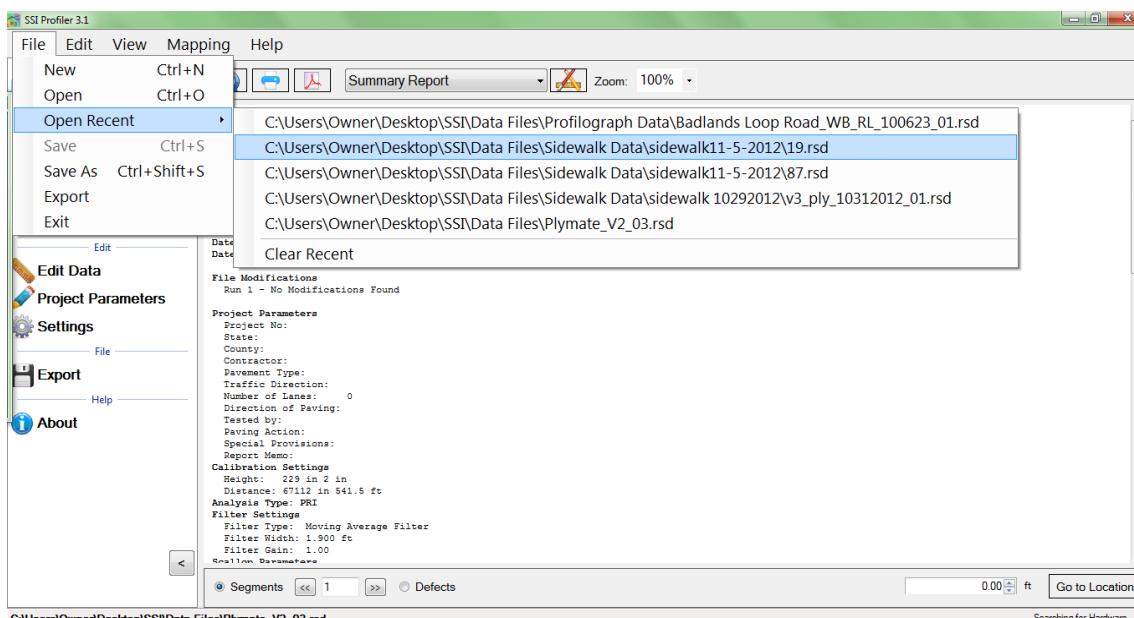


Figure 34. The Open Recent feature

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.

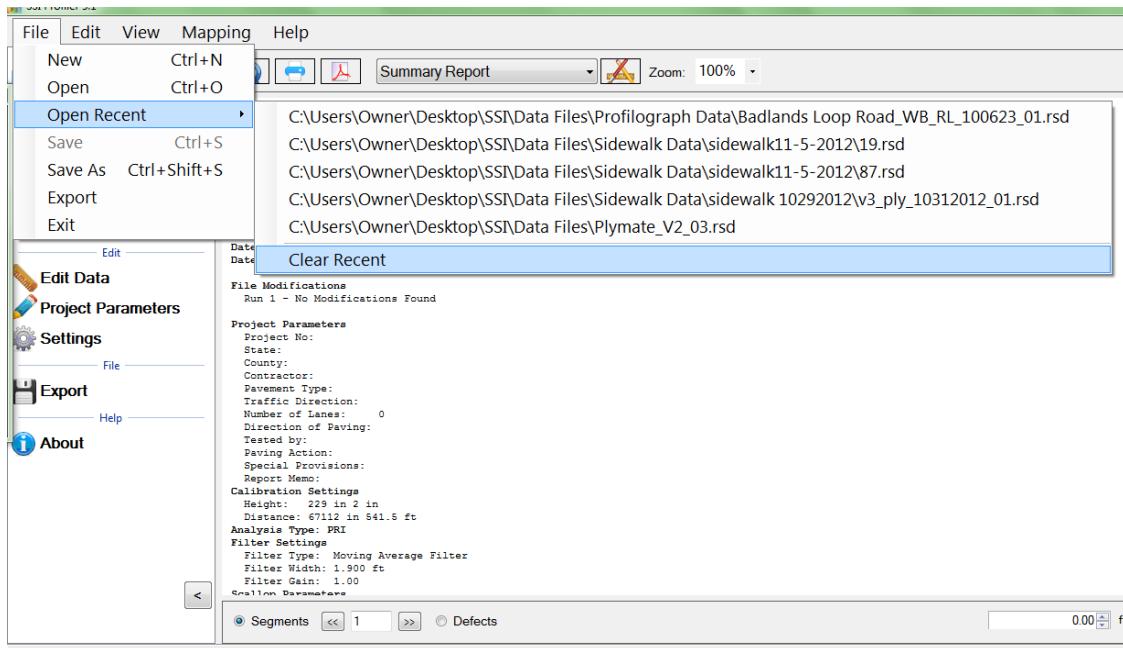


Figure 35. The clear recent feature

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.

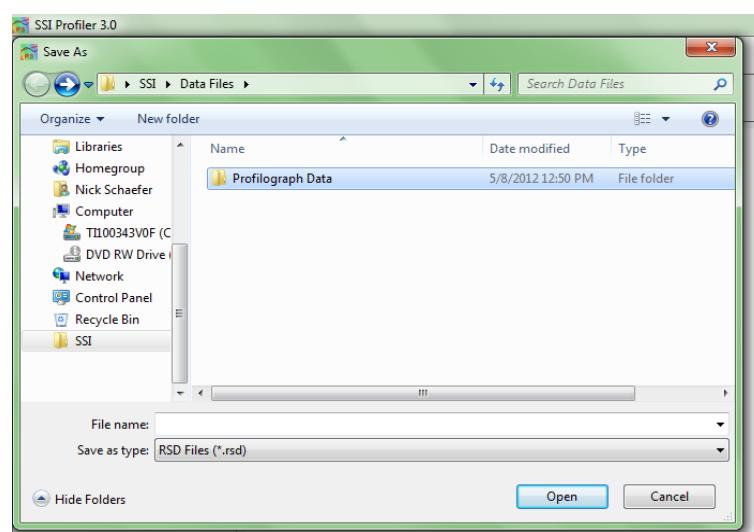


Figure 36. Saving a file through Save As in RSD

Exporting

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

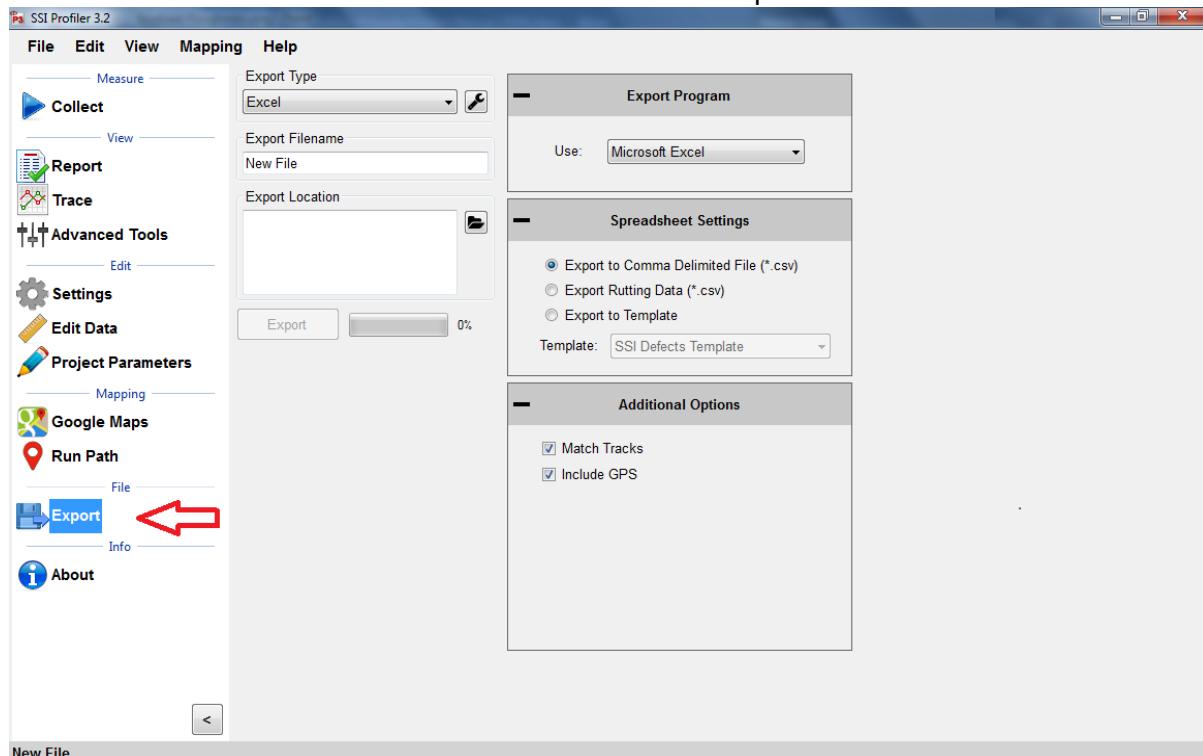


Figure 37. Window for exporting the data into Excel format

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.

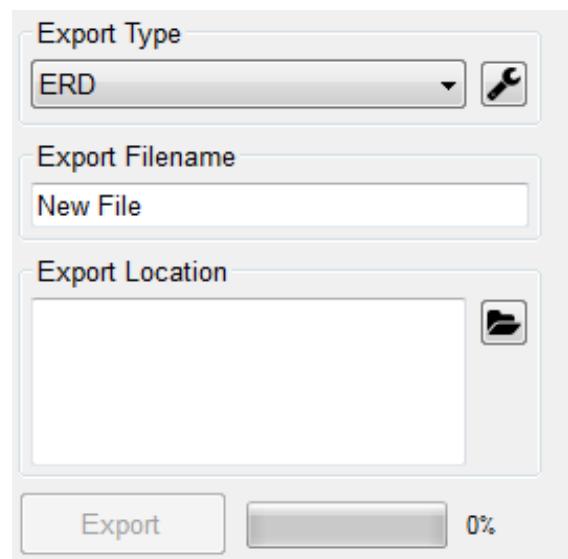


Figure 38. Select location to save the exported file

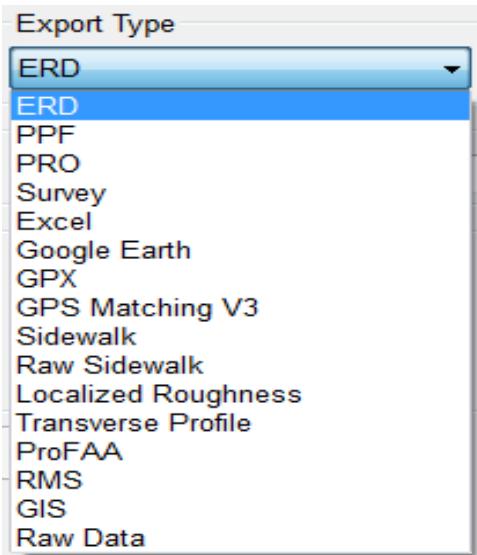


Figure 39. The export type drop down menu

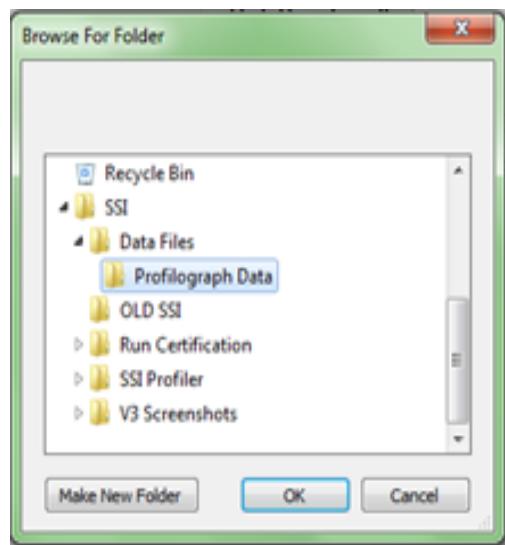


Figure 40. The export folder location selection

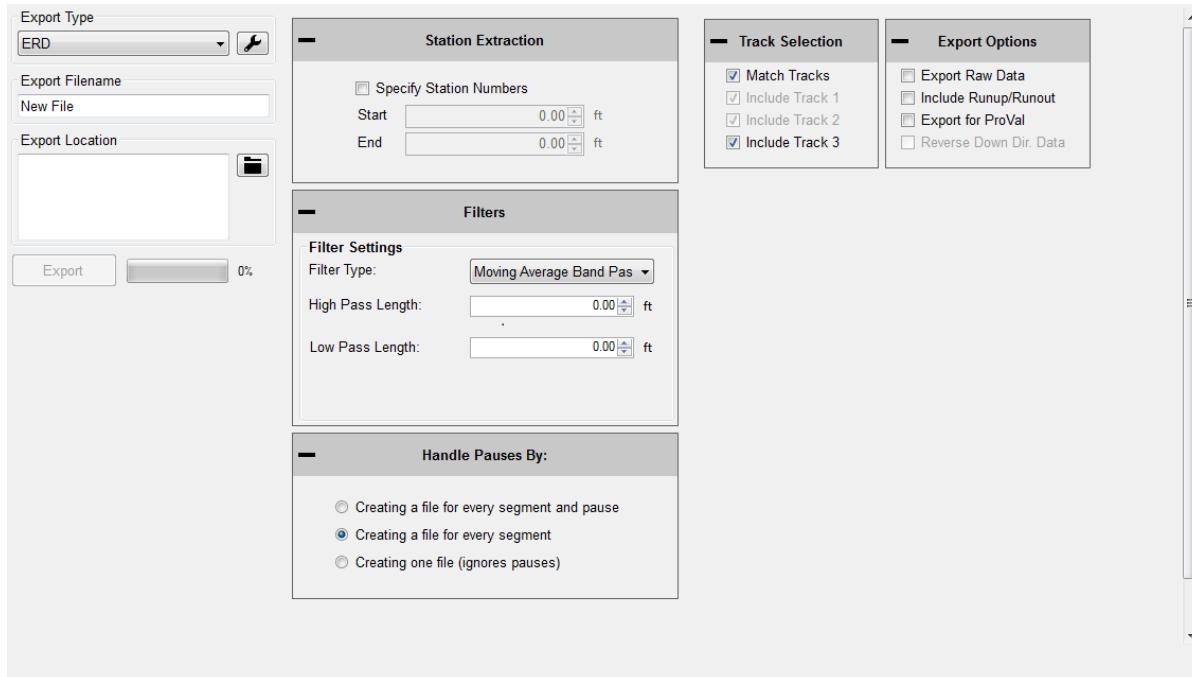


Figure 41. The ERD format export window with match tracks selected.

Exporting to ERD Format

Station Extraction

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

the point where the exported file will finish. These values can be adjusted by typing values into the box or by using the arrow keys to the right of the box.

Filter Settings—High & Low Pass length

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

Moving Average High Pass Filter

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

Moving Average Band Pass Filter

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

Butterworth High Pass Filter

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

Butterworth Band Pass Filter

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

Include Run Up – Run Up Data

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

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

Export Raw Data

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

Match Tracks and Choosing Tracks

Match Tracks

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

Choosing Tracks

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

Ignore Pauses

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

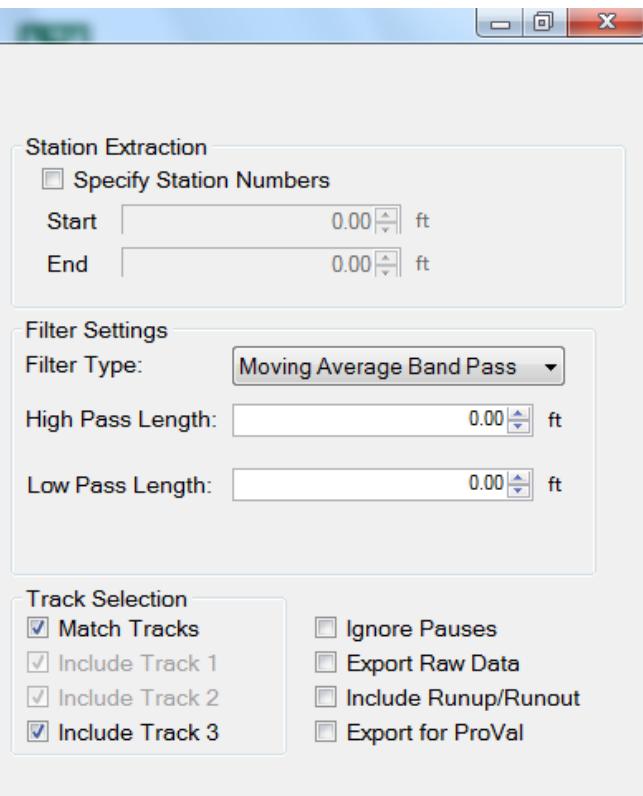
Include Run Up/ Run out

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

Export for ProVal

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

Figure 42. The ERD export window settings



Exporting to PPF Format

Station Extraction

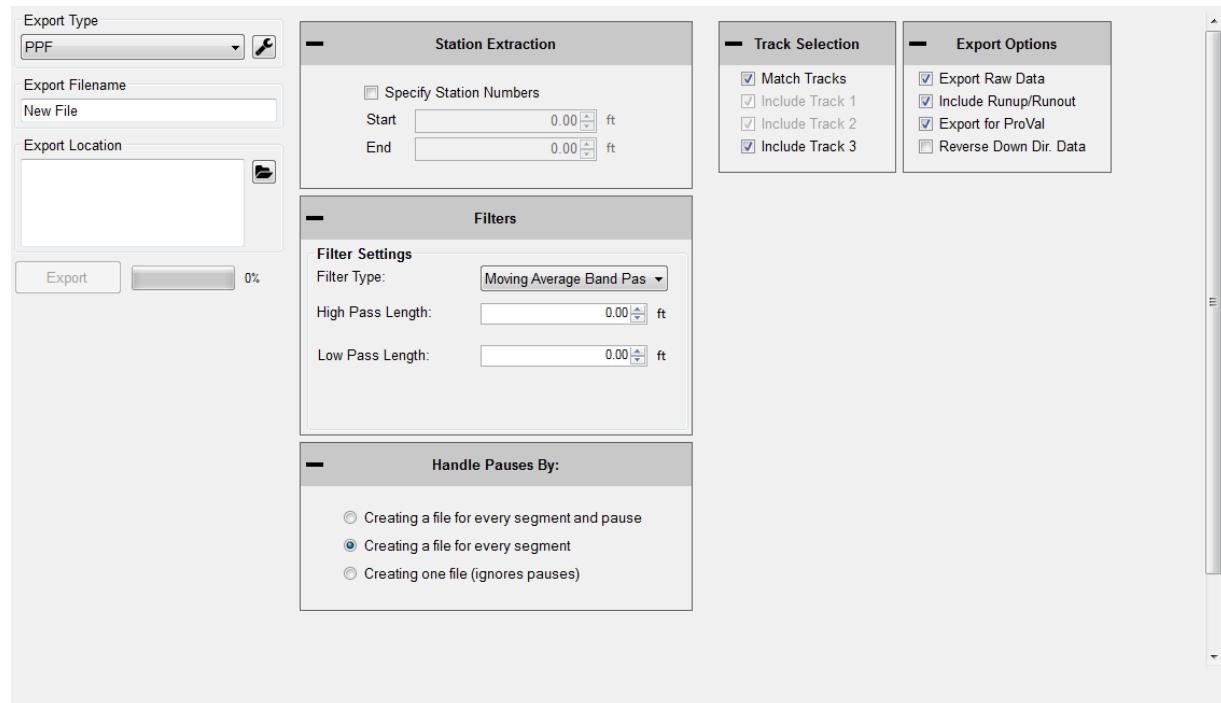


Figure 43. The PPF export window

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.

Filter Settings—High & Low Pass Length

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

Available Filters:

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

Include Run Up and/or Run out Data

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

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

Match Tracks

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

Ignore Pauses

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

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

Export for ProVal

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

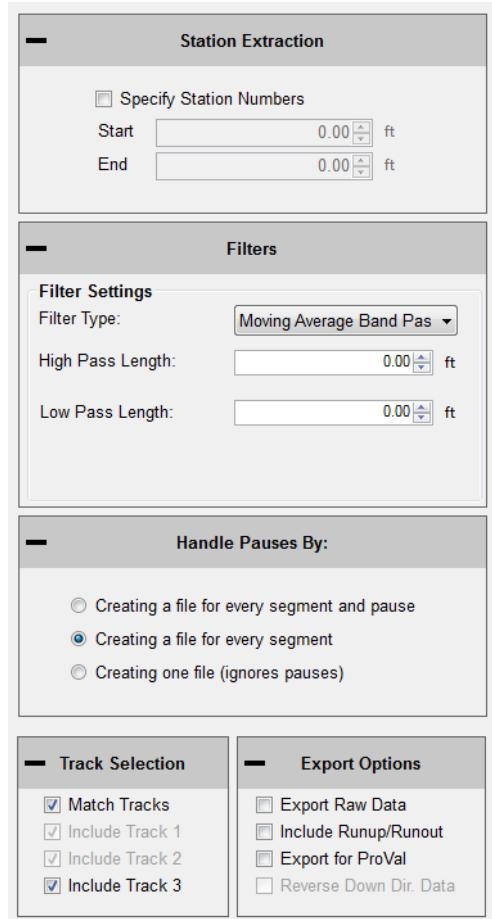


Figure 44. Optional settings when exporting in PPF format

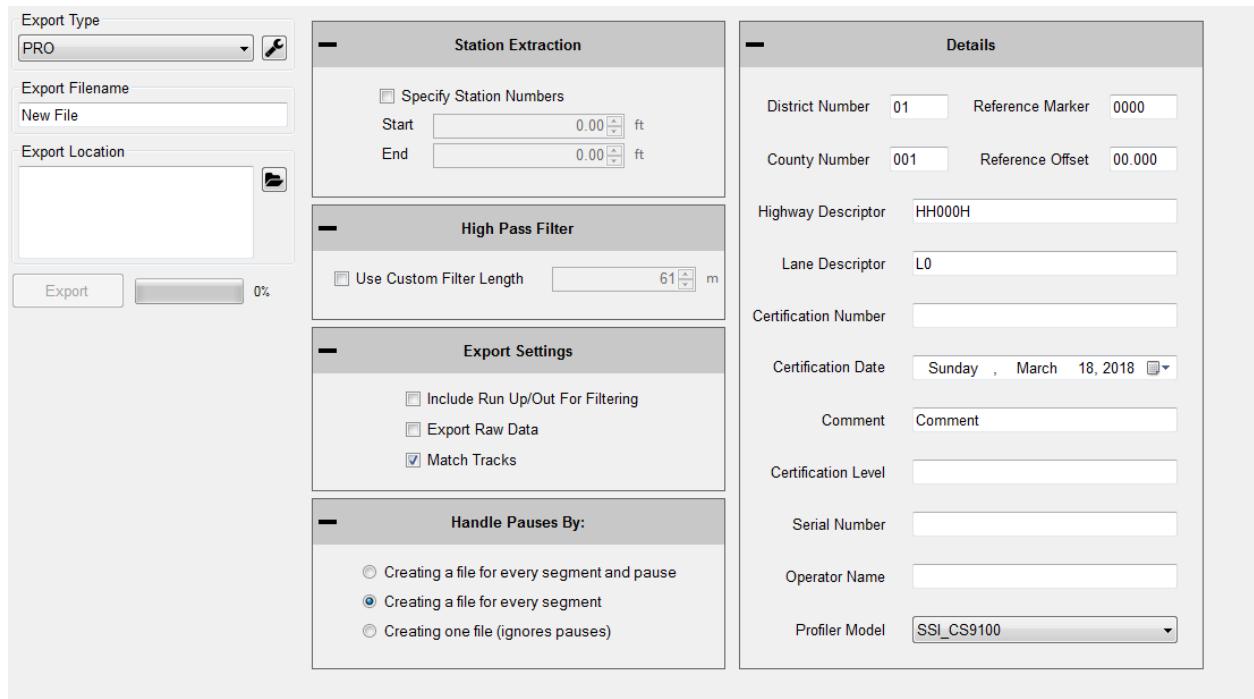


Figure 45. The PRO format window

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.

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.

Details			
District Number	01	Reference Marker	0000
County Number	001	Reference Offset	00.000
Highway Descriptor	HH000H		
Lane Descriptor	L0		
Certification Number			
Certification Date	Sunday, March 18, 2018		
Comment	Comment		
Certification Level			
Serial Number			
Operator Name			
Profiler Model	SSI_CS9100		

Figure 46. The Details tab contains information about the project

Exporting to Survey Format

Station Extraction

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

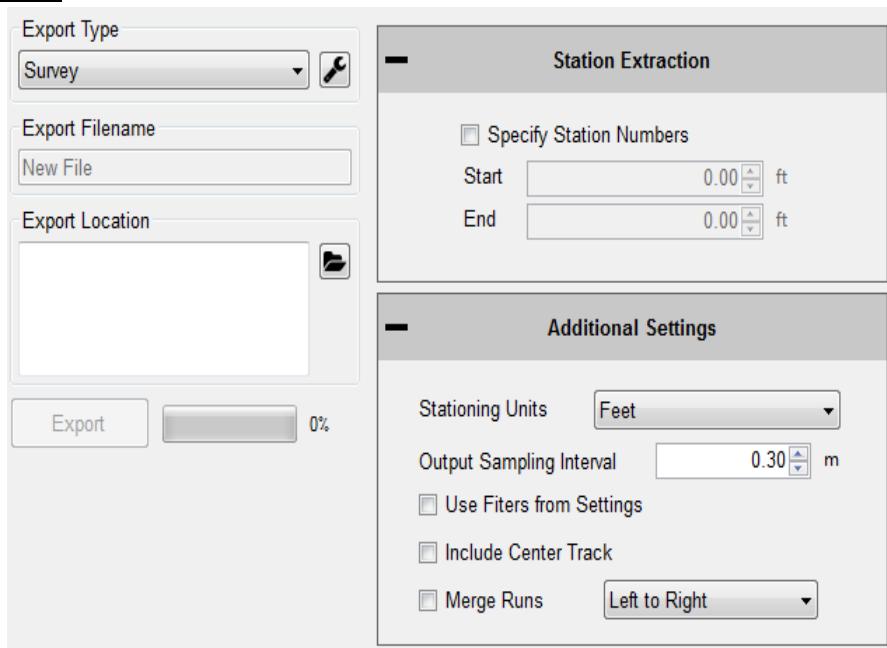


Figure 47. The window for exporting in Survey format
exported file will finish. These values can be adjusted by typing values into the box or by using the arrow keys to the right of the box.

Filter Settings

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

Available Filters:

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

Output Sampling Interval

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

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

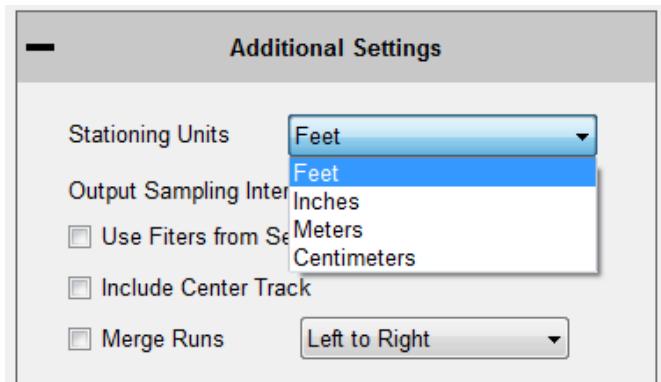


Figure 48. Stationing units dropdown menu and options

Exporting to Excel Format

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

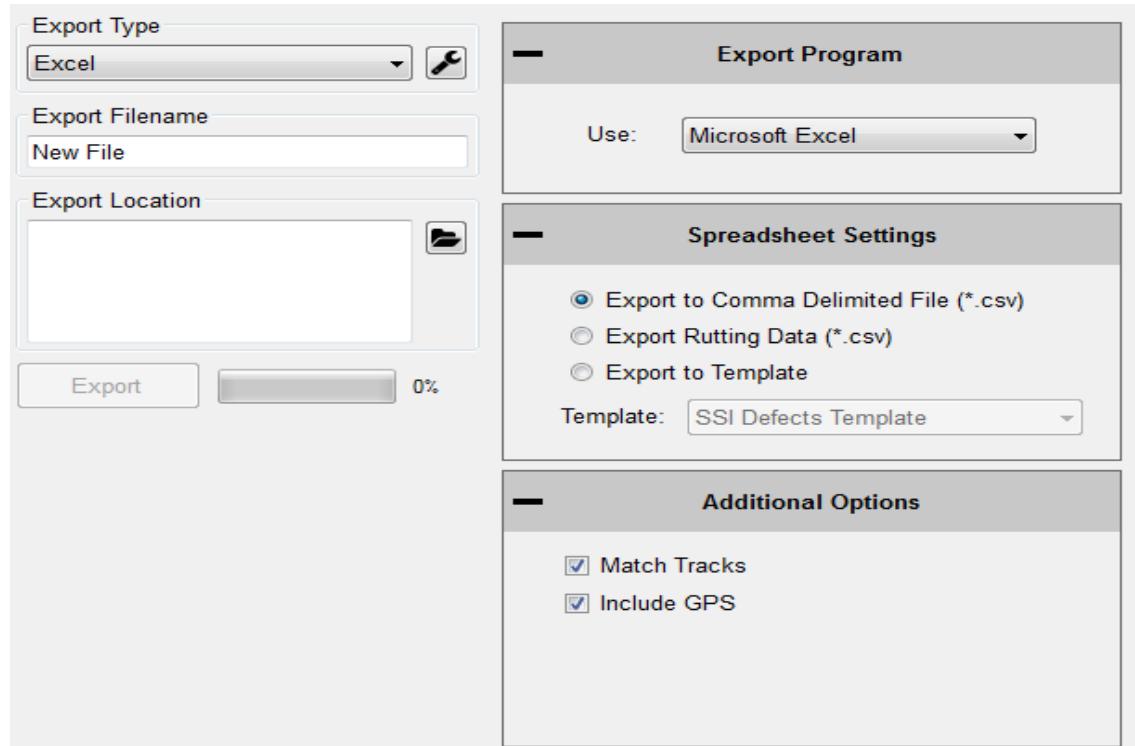


Figure 49. Exporting the data into Microsoft Excel format

Export to Template

To choose a SSI Excel Template, select "Export to Template."

Defects Template

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

IRI Template

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

PRI Template

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

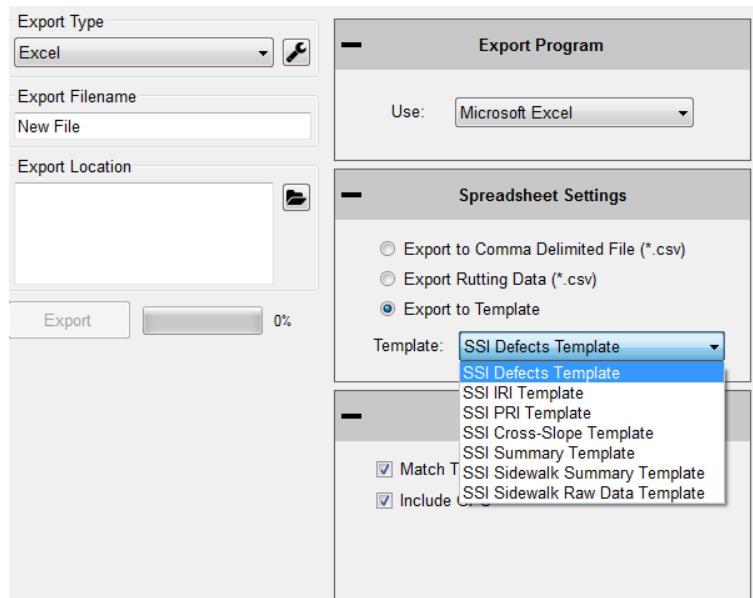


Figure 50. The types of excel formats are listed

Summary Unmatched

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

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

Exporting to Google Earth

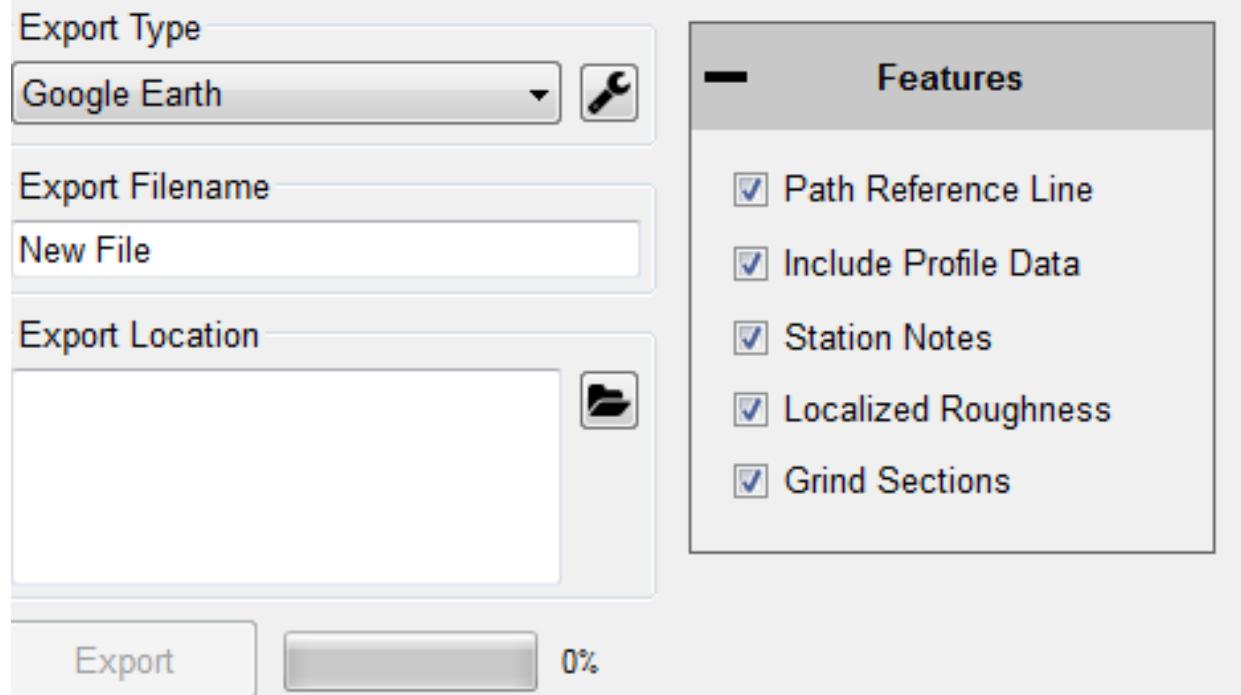


Figure 51. Google Earth export settings

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

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

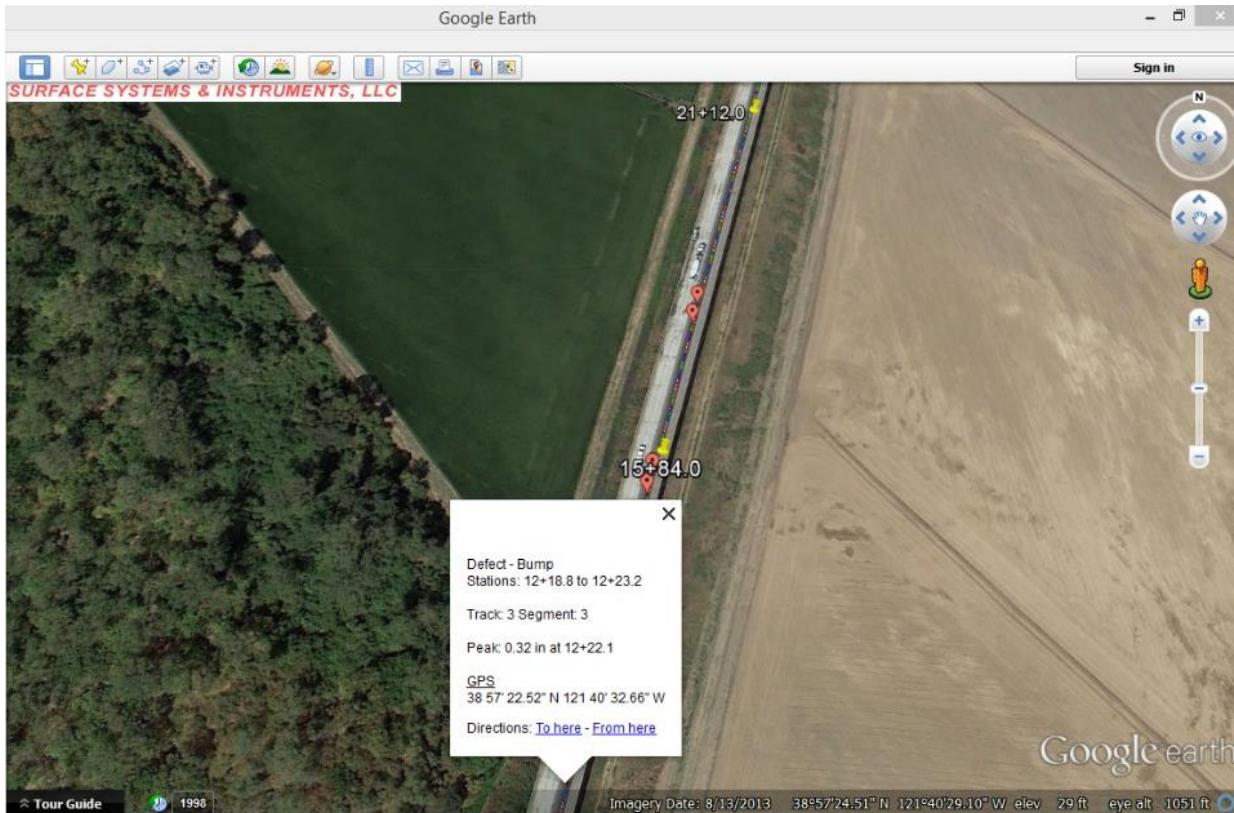


Figure 52. Google Earth view on

Exporting to GPX Format

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

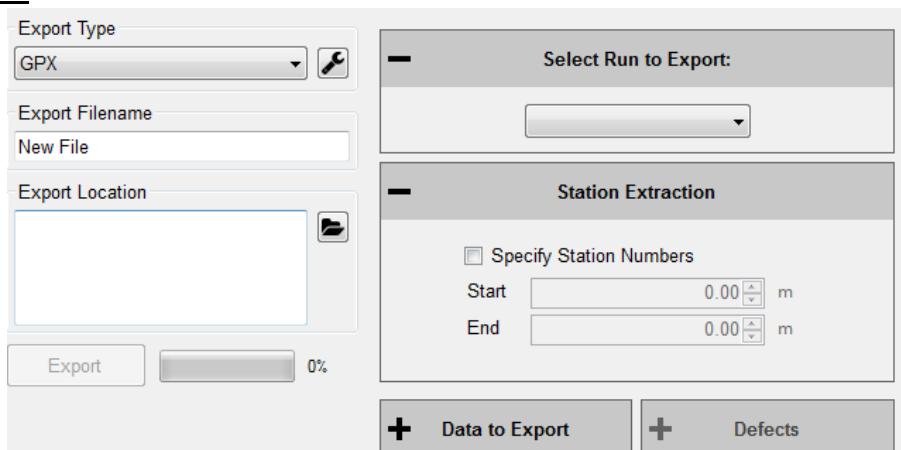


Figure 53. The export window for GPX format

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

Exporting to Sidewalk Format

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

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

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

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

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

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

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

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

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

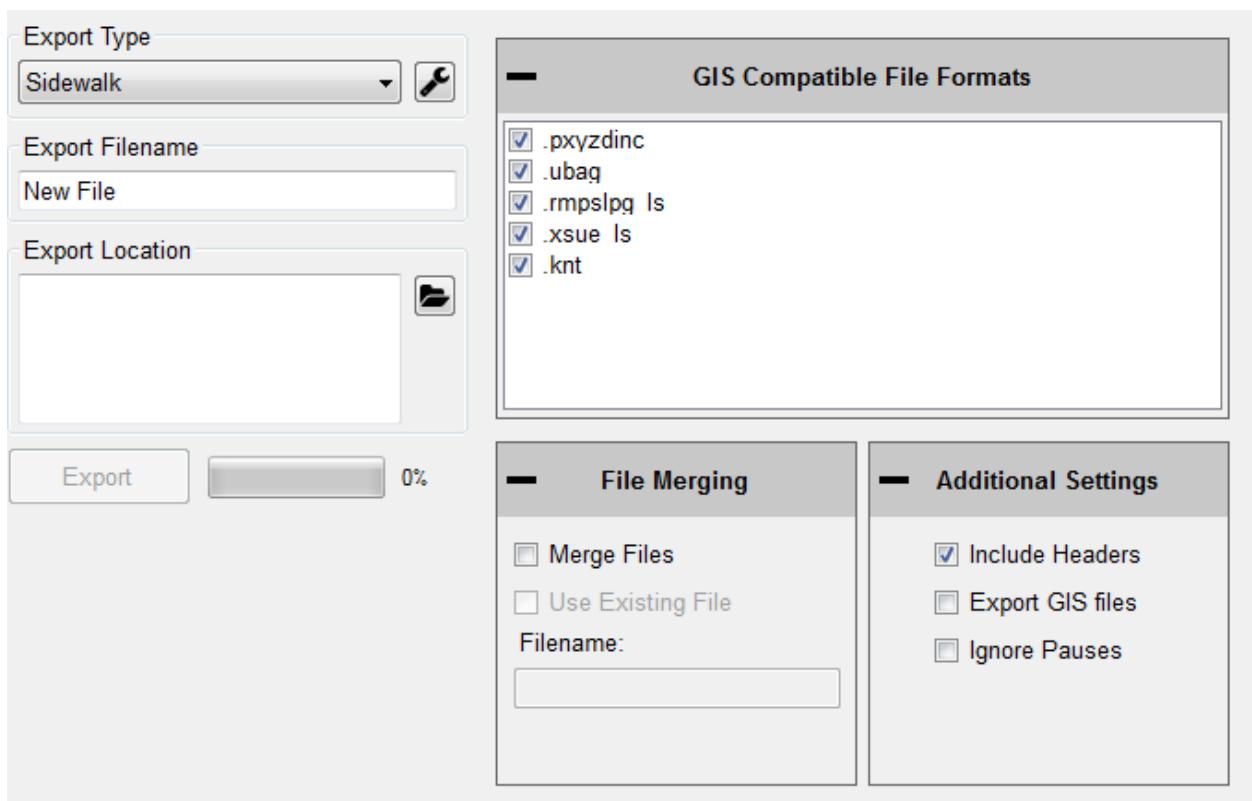


Figure 54. Export to Sidewalk window

Exporting to Localized Roughness

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

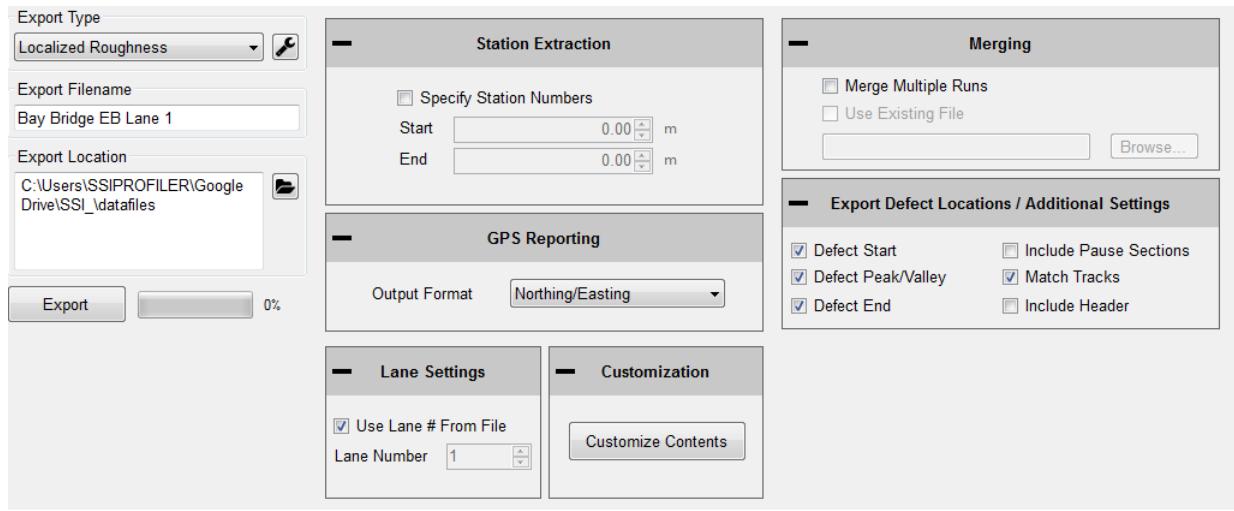


Figure 55. The Localized Roughness export options window

Specify Station Numbers

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

GPS Reporting

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

Lane Settings

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

Customization

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

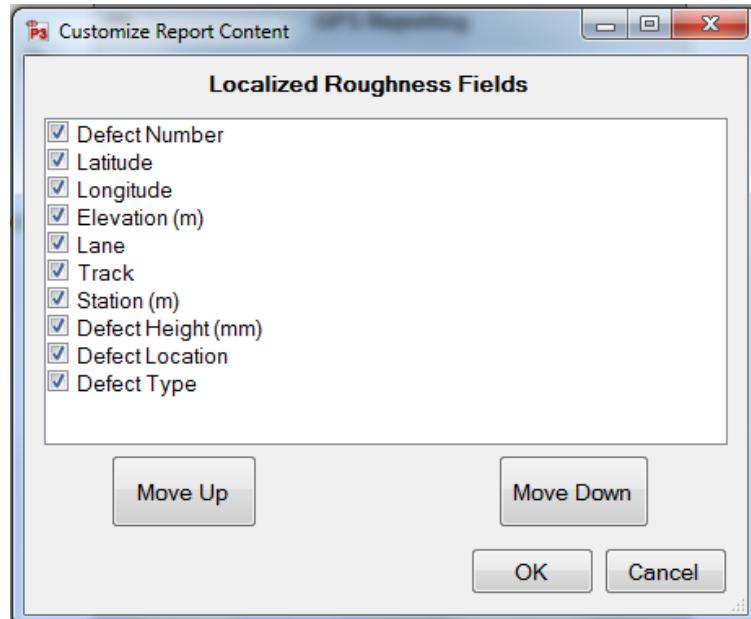


Figure 56. The Customize Window

Merging

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

Export Defect Locations

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

ProFAA

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

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

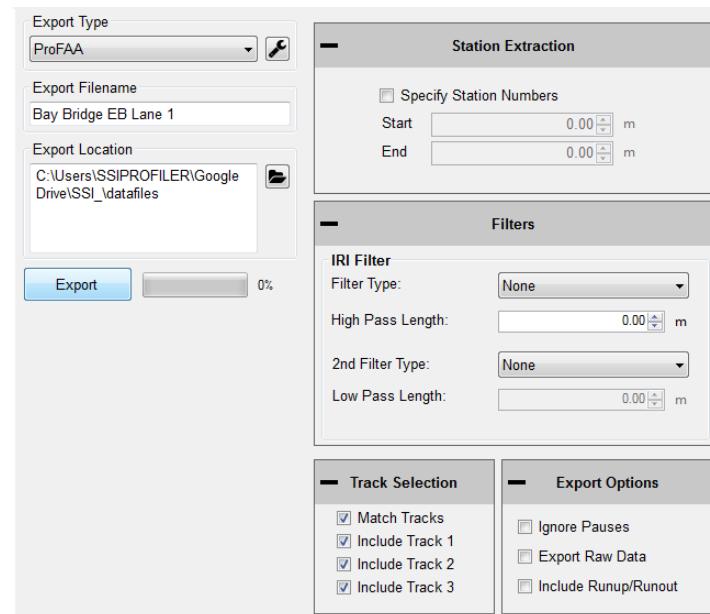


Figure 57. ProFAA window

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.

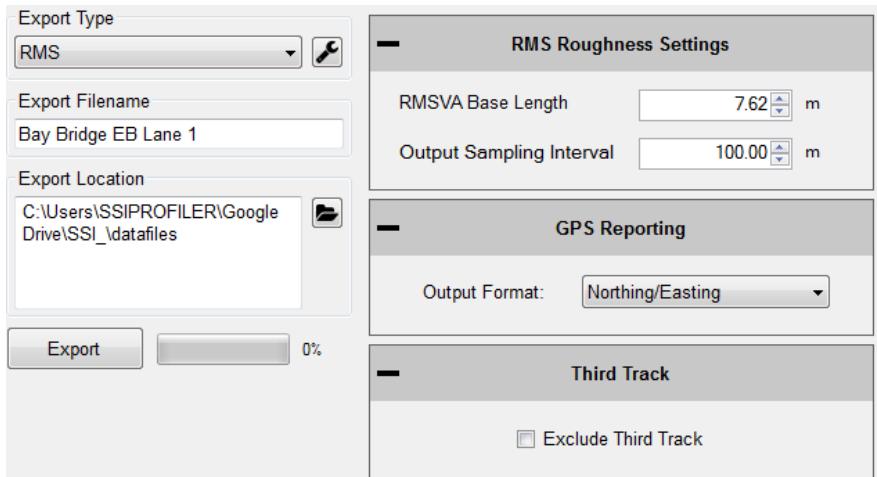


Figure 58. RMS export settings

GIS Export

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

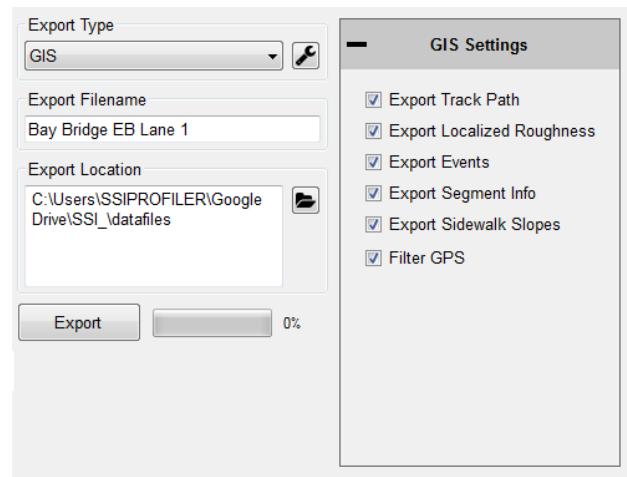


Figure 59. GIS export settings

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.

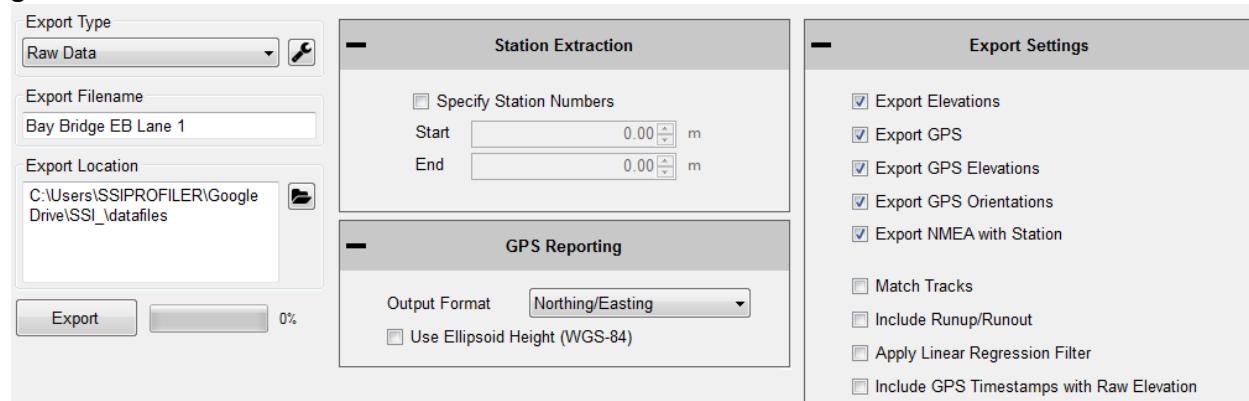


Figure 60. Exporting Raw Data Settings

Exiting Program

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

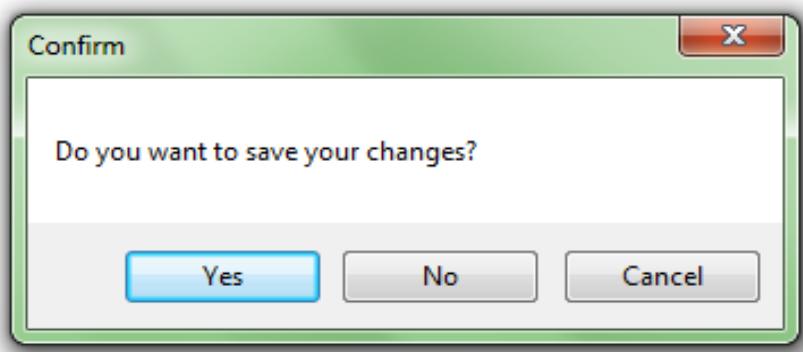


Figure 61. Exiting the program- Saving

General Settings

Configuration

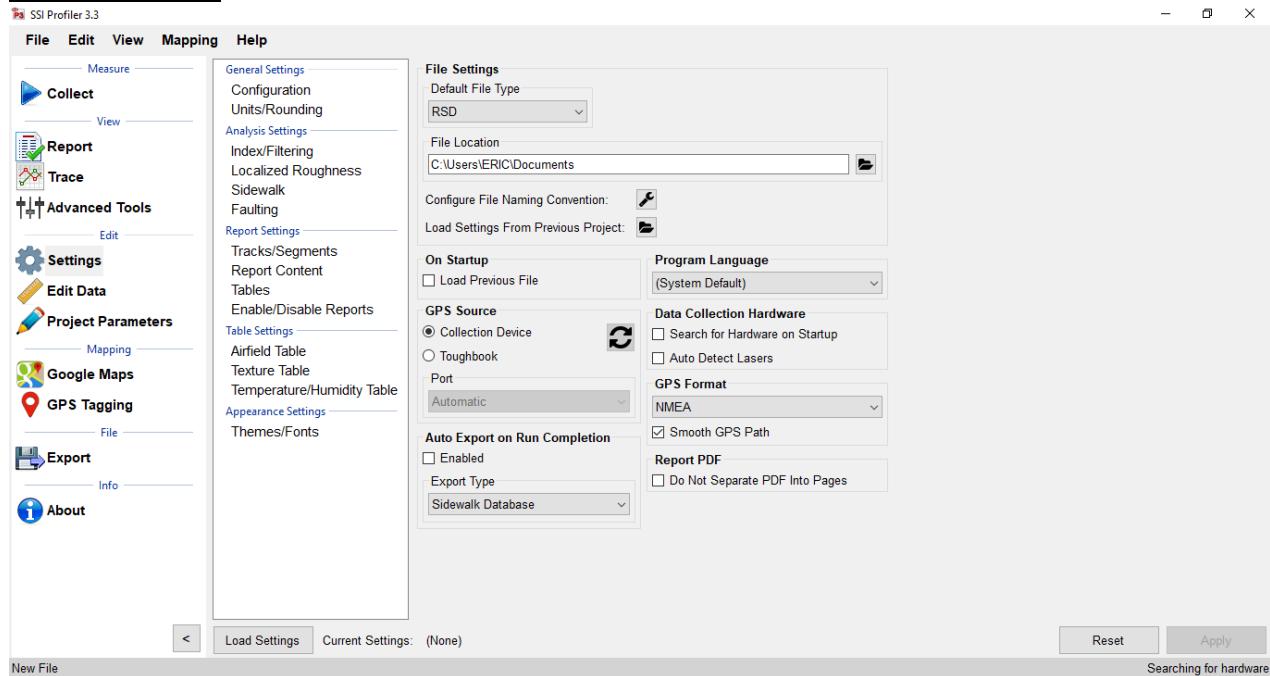


Figure 62. Configuration window under General Settings

File Settings

Default File Type (RSD, RHD)

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

Default File Location

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

Default File Name

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

Creating a New Template

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

User Defined Parameter

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

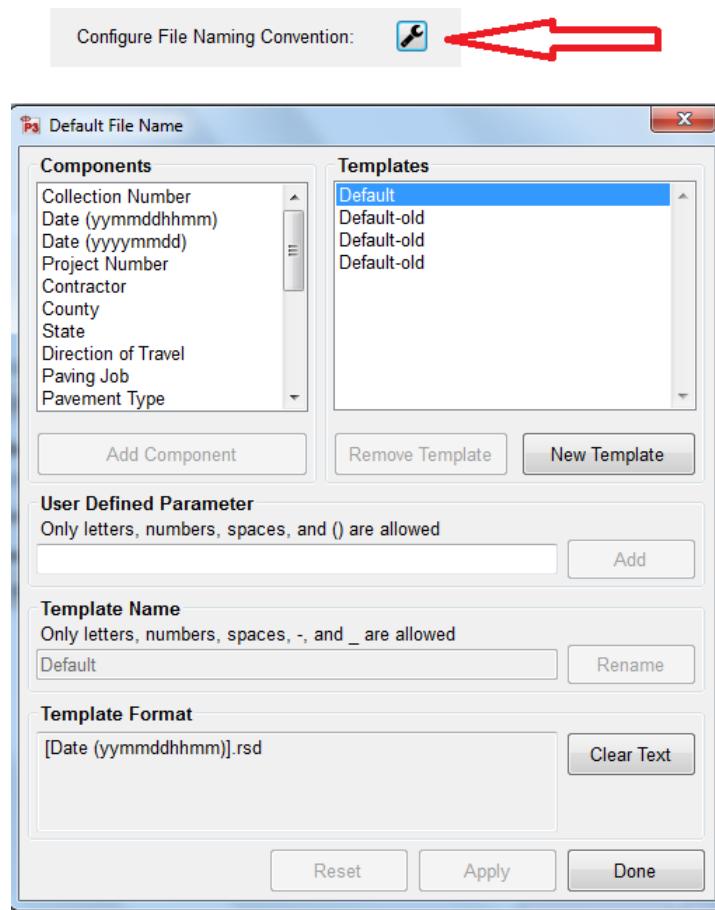


Figure 63. Custom file naming convention

Changing the Template Name

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

Adding Parameters to the Template

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

On Startup

Load Previous File on Startup

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

Load Previous File’s Settings

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

Use Last File’s Parameters

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

Choose from a Previous File (Browse)

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

Set File Parameters after Collection

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

Automatically Refresh Reports

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

Data Collection Hardware

Search for Hardware on Startup

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

Disconnect Hardware When Changing Tabs

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

Report Generation

Generate Reports in Color

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

Include the Footer

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

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

Enable Animations

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

Formatting

Font Settings

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

Image Scaling

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

Profiler Software Update

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

Program Language

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

Analysis Parameters (Ride Values)

Profiling Units

English

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

Metric Meters

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

Metric Centimeters

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

Metric Millimeters

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

Exclude Paused Sections

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

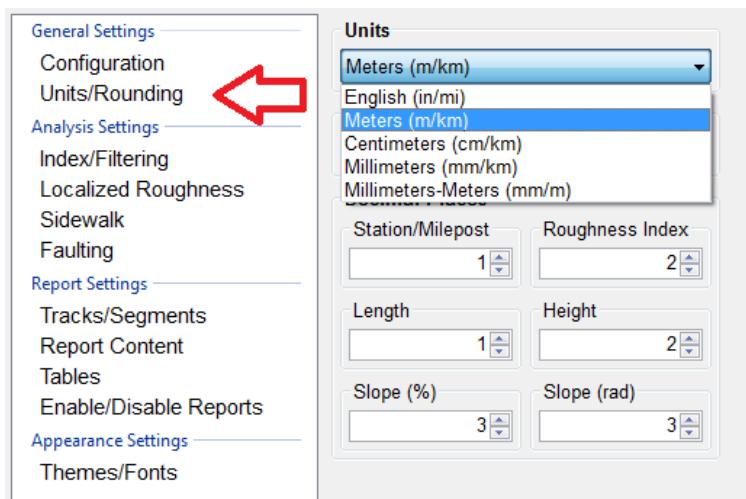


Figure 64. Units and rounding section of the General Settings

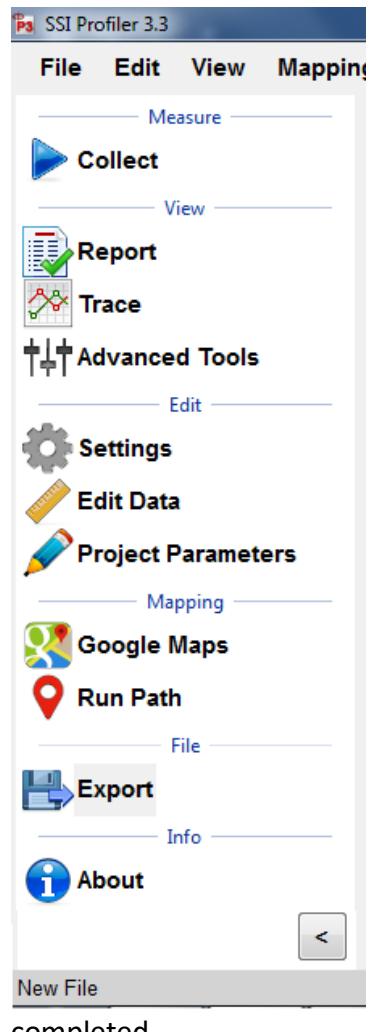
Include Paused Sections

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

Paused Sections Only

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

Shortcut Bar



completed.

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

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

Figure 65. Shortcut bar with all the frequently used

Edit Data

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

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

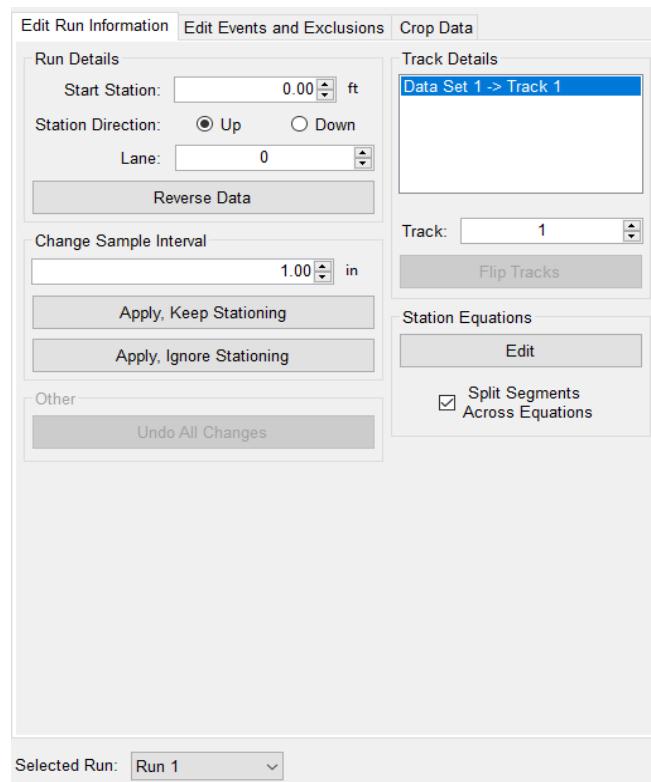


Figure 66. Edit run information tab

Edit Run

Open the Edit Data feature in the shortcut bar (Look for the ruler icon). Under Edit Run Information Tab, the user can adjust starting station, Lane, Track, and Station Equations. If the data was collected in the wrong

station direction, the operator can change to Station Direction to Up or Down or use the 'Reverse Data' button.

Sampling Interval

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

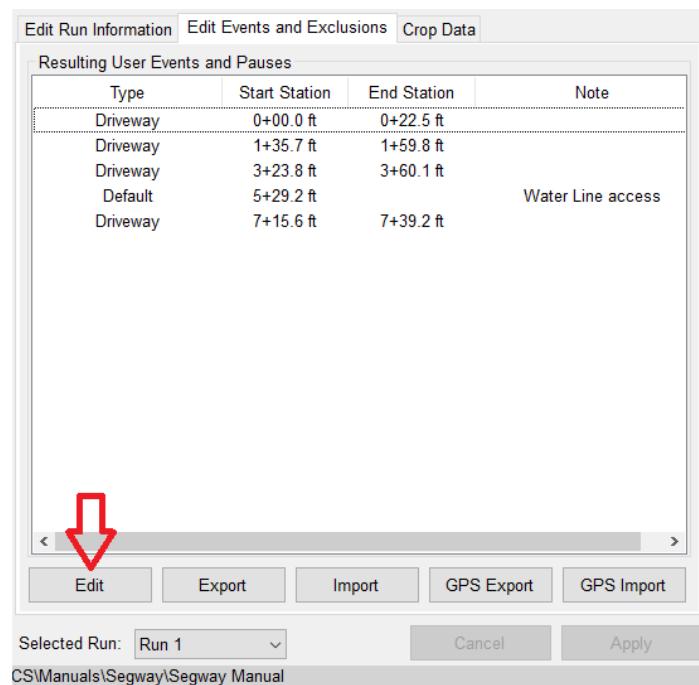
Edit Segments

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

Pause List

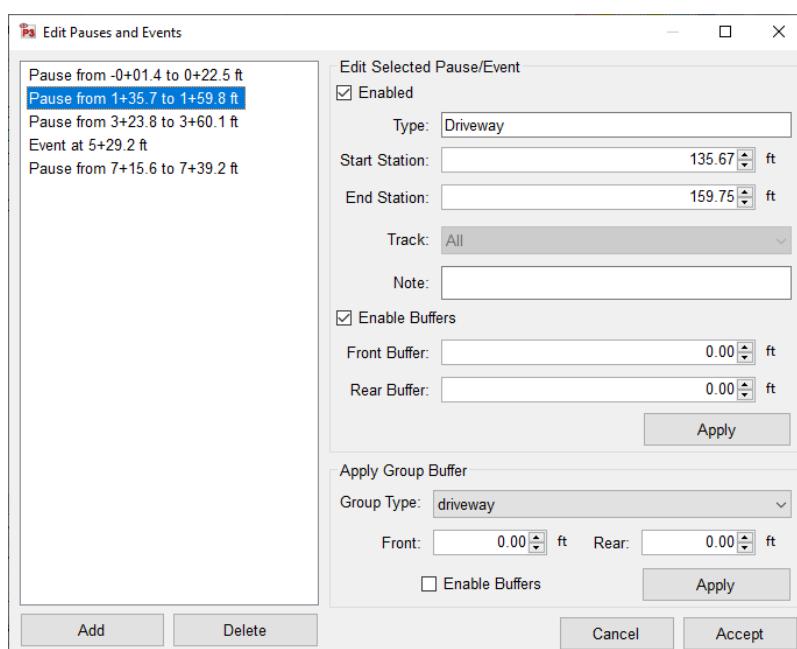
The Pause List shows all of the paused sections of the selected runs. The runs are selected from the drop-down menu of "Add Pause to Run."

Figure 67. Adding or removing pauses from the collection



Edit a Pause/Event

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



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

Figure 68. Edit pause and events window

Add a Pause/Event

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

Pause Definition

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

Start Station

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

End Station

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

Pause Notes

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

Pause/Event Buffers

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

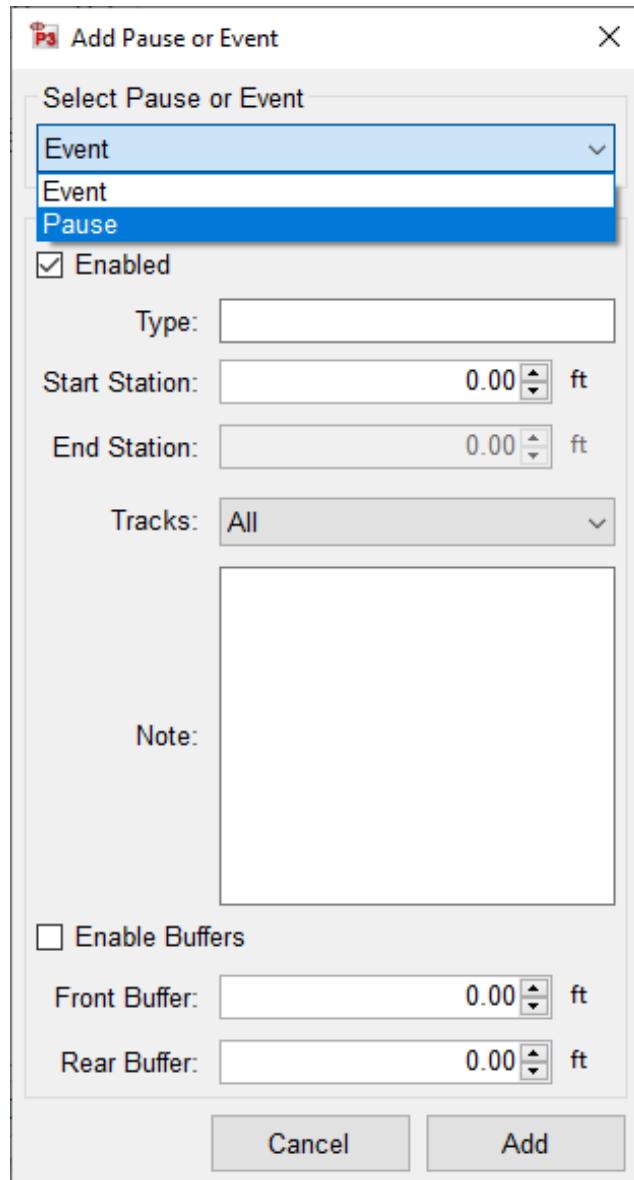


Figure 69. Add Pause/Event window

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.

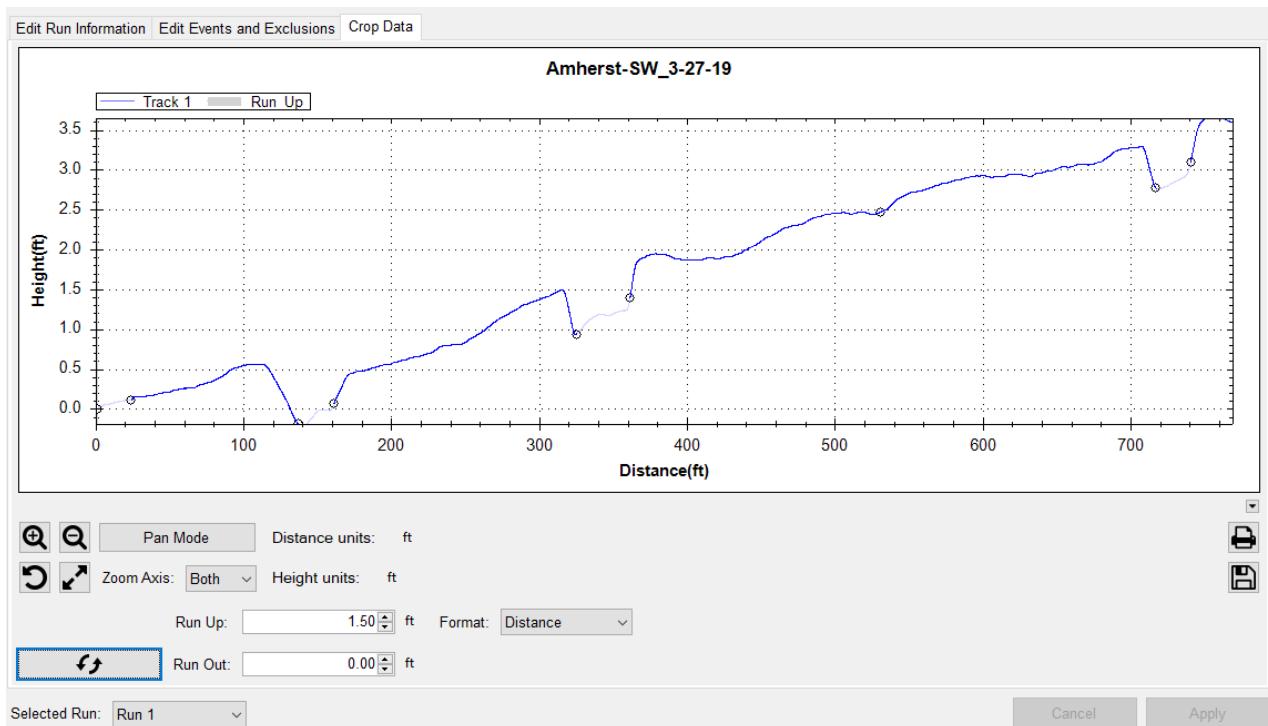


Figure 70. Crop Data Tool

Project Parameters

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

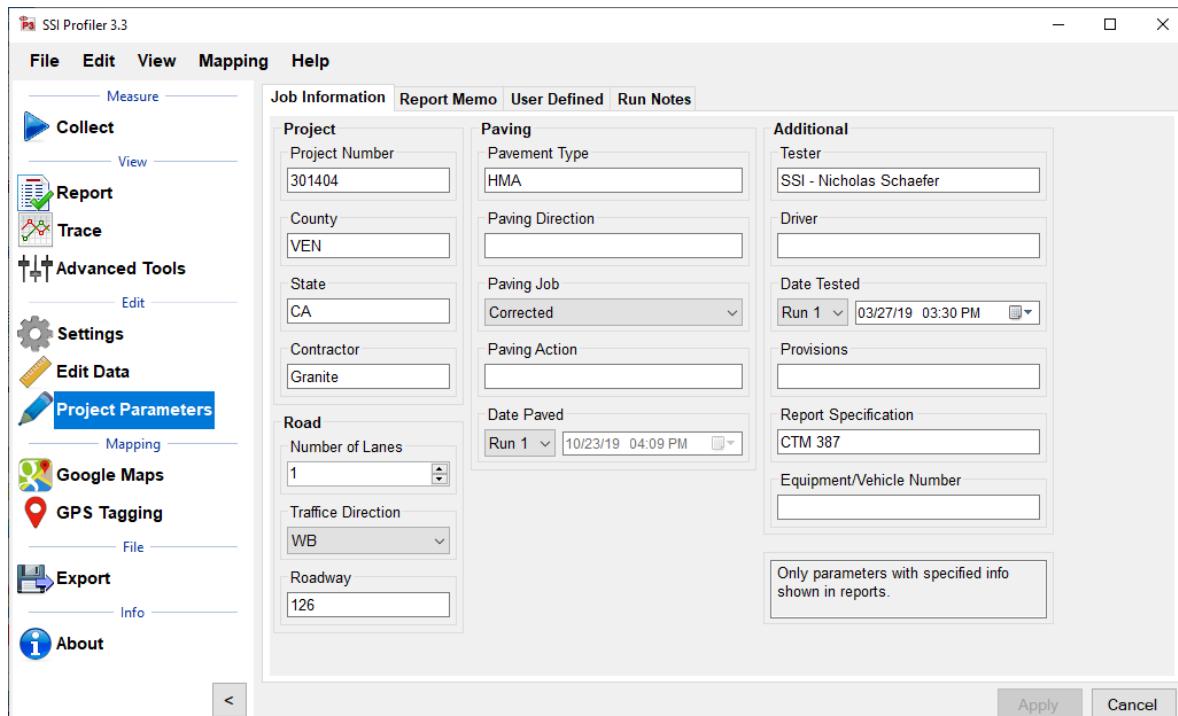


Figure 71. Project Parameters on the Job Information tab

Job Information

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

Project

Project Number

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

County

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

State

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

Contractor

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

Road

Traffic Direction

The traffic direction of the lane to be profiled.

Number of Lanes

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

Paving

Pavement Type

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

Paving Direction

Enter the direction of the paver when placing the pavement.

Paving Job

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

Paving Action

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

Additional

Tester

The individual operating the profiling equipment over the pavement surface.

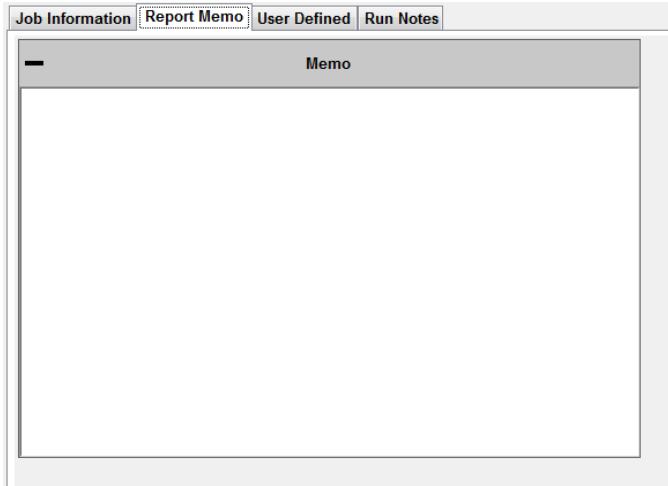
Provisions/Weather

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

Report Memo

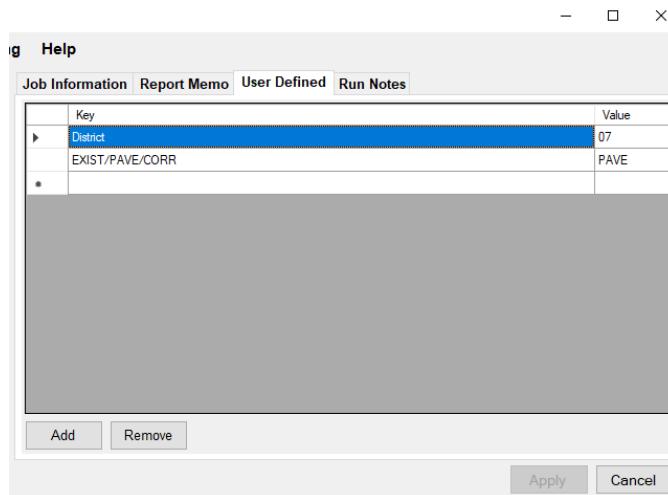
Report Memo is a section available for inputting large amounts of text to be saved along with the data file. Anything from reminders to stationing can be inputted into the Report Memo and not influence the data.

Figure 72: Report Memo window



User Defined

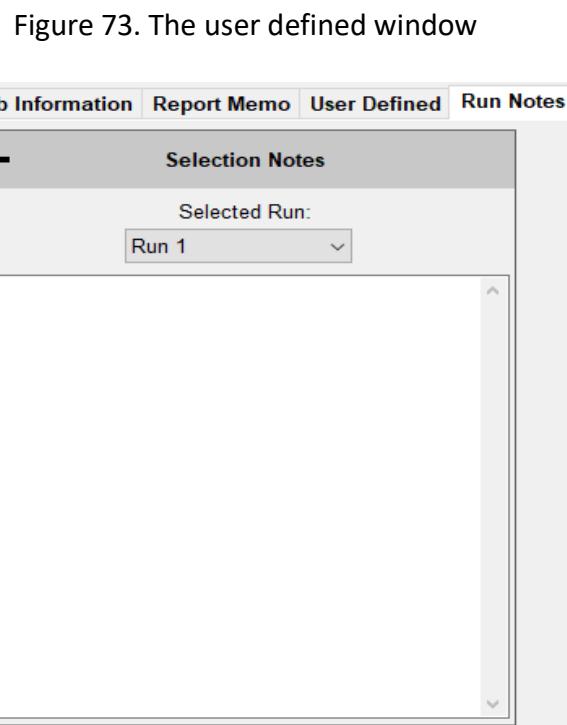
Additional parameters can be stored in the data file as desired by the operator. Consult the contract for any additional user defined parameters that may be required for the profile data files. Add new parameters by selecting 'Add' at the bottom of the window. The parameters are entered by double-left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



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 74. The Run Notes window.



Settings

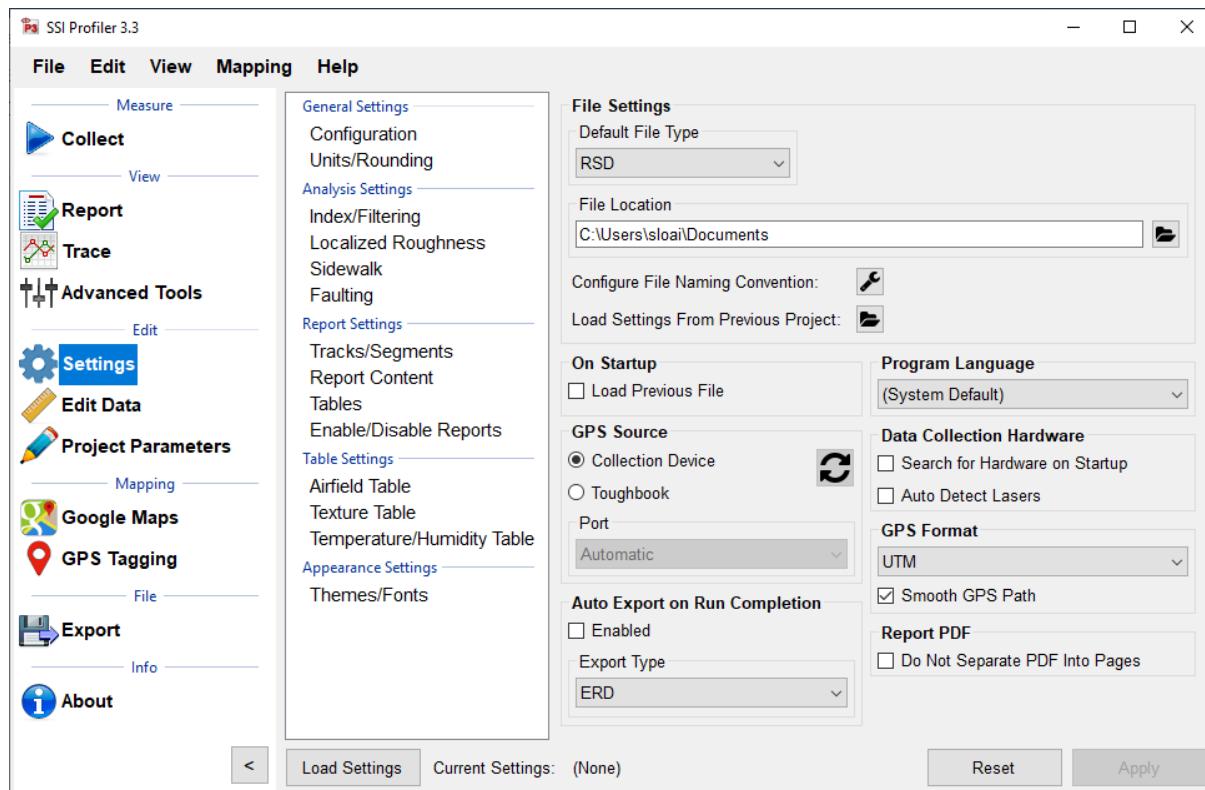


Figure 75: Report options window

Report Content

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

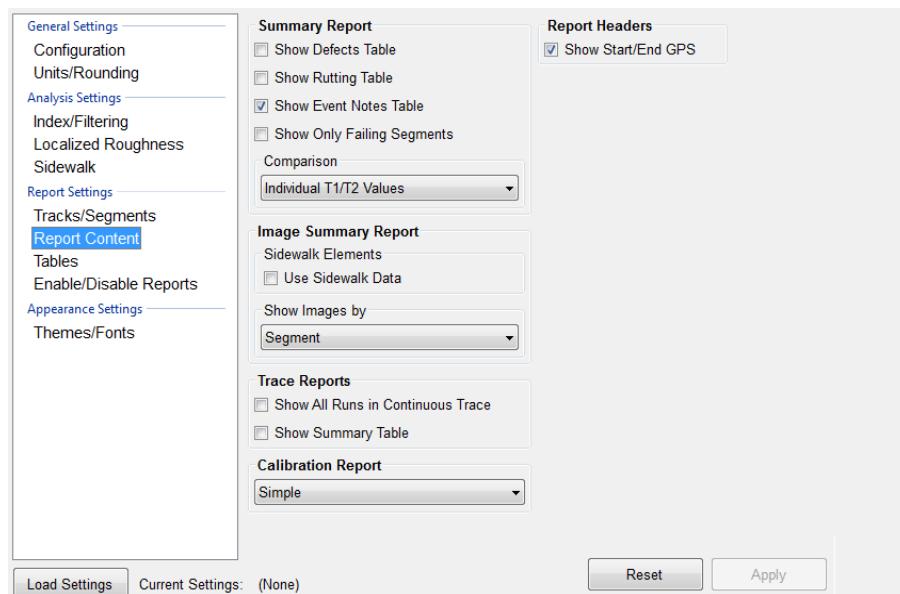
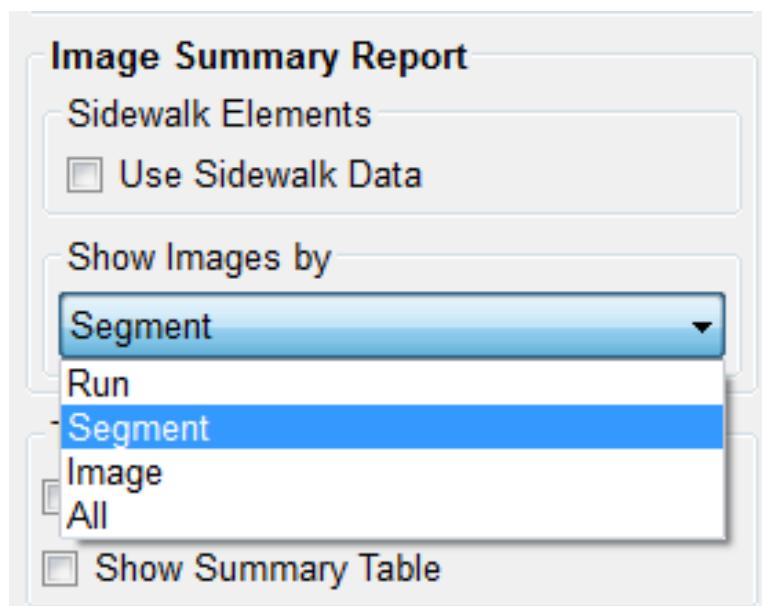


Figure 76. Report Content window

Image Summary Report

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

Figure 77: Image Summary Report options under Report Content.



Trace Reports

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

Calibration Reports

Simple Calibration Report

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

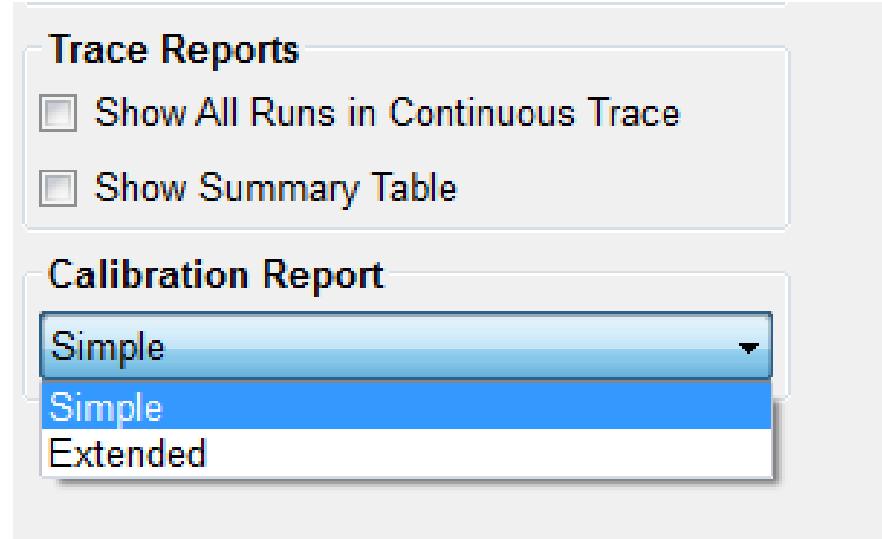


Figure 78. Calibration Report

Extended Calibration Report

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

Tables

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

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

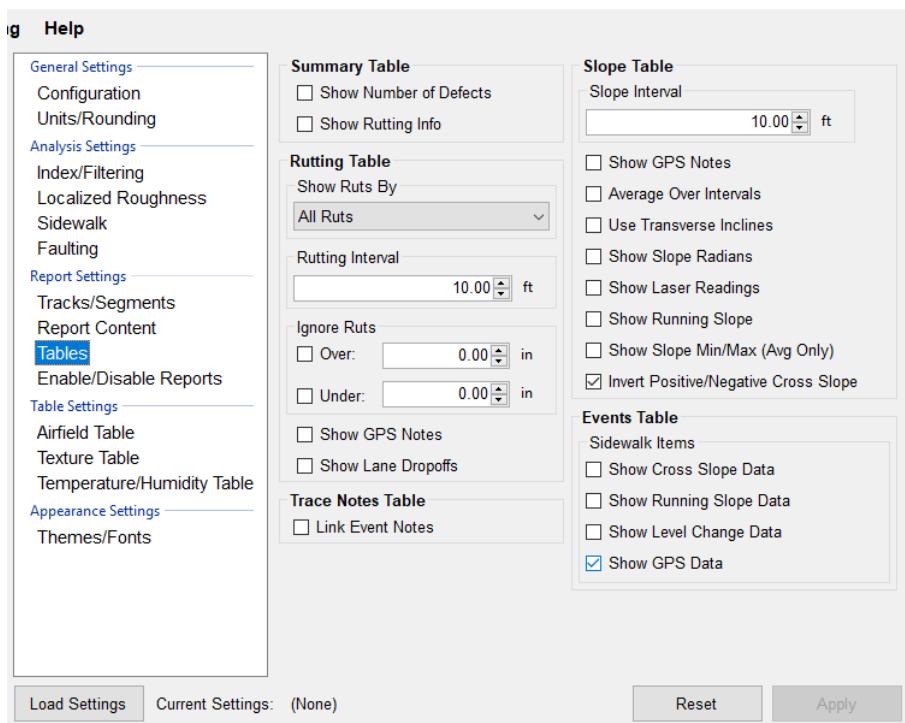


Figure 79. The Table options in Report Settings.

Enable/Disable Reports

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

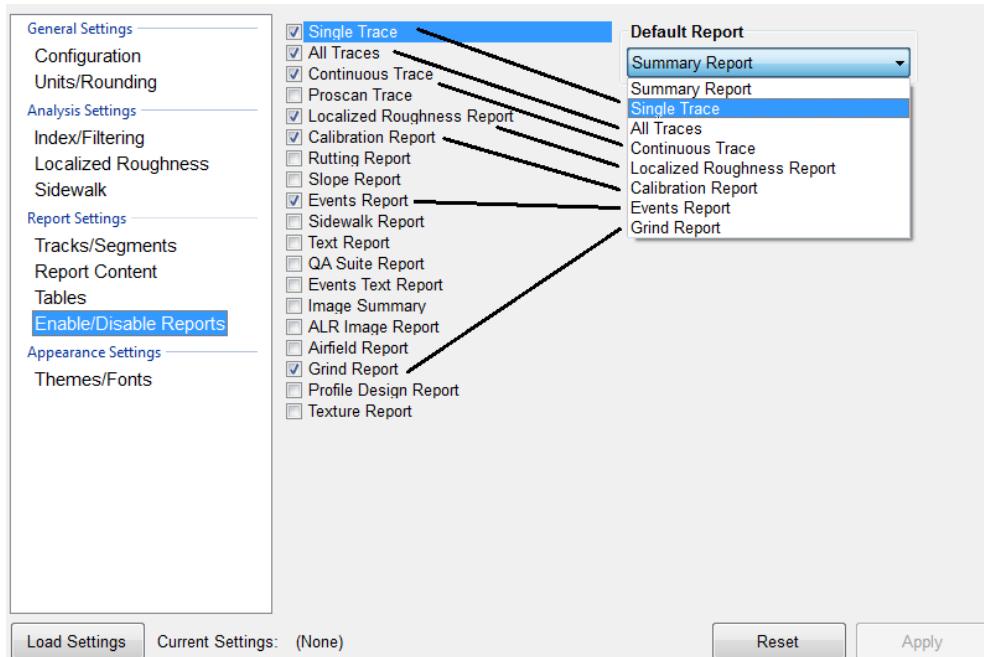
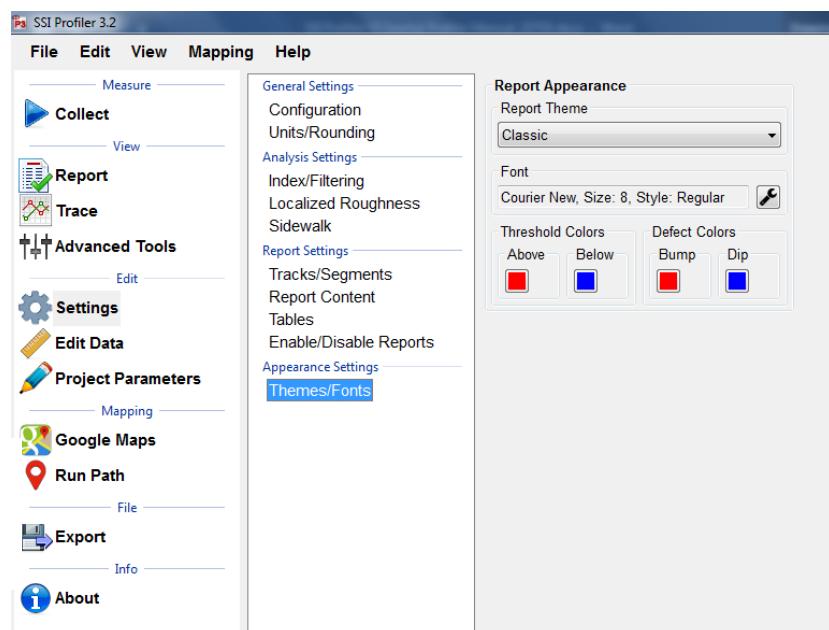


Figure 80. Enable/Disable Reports window

Themes/Fonts

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

Figure 81. Themes and Fonts option under Appearance settings.



View

Refresh Icon Print Icons Page Setup PDF Drop Down Report Menu

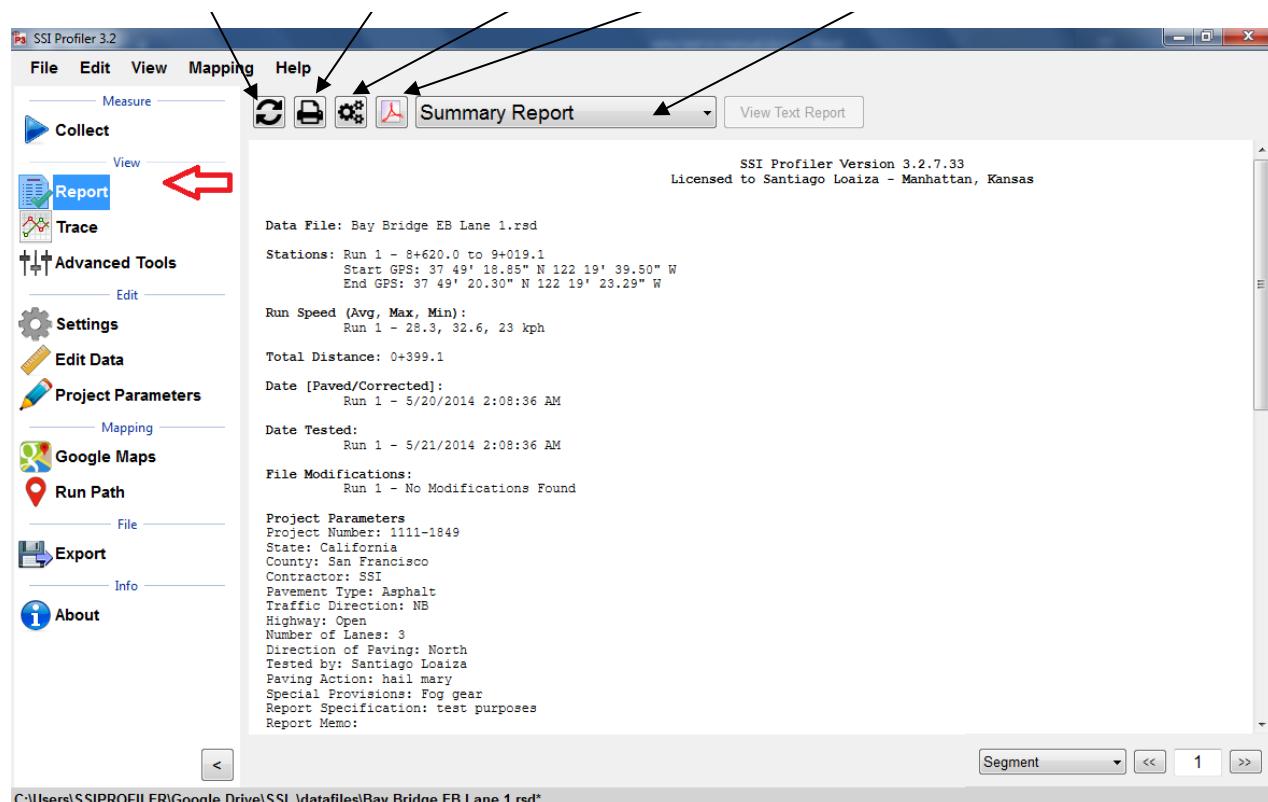


Figure 82. Summary header for single trace report

Report

Refresh

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

Print

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

A Connected Local Printer

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

If more printing options are needed, select the 'Preferences' icon. This icon will open a window that is

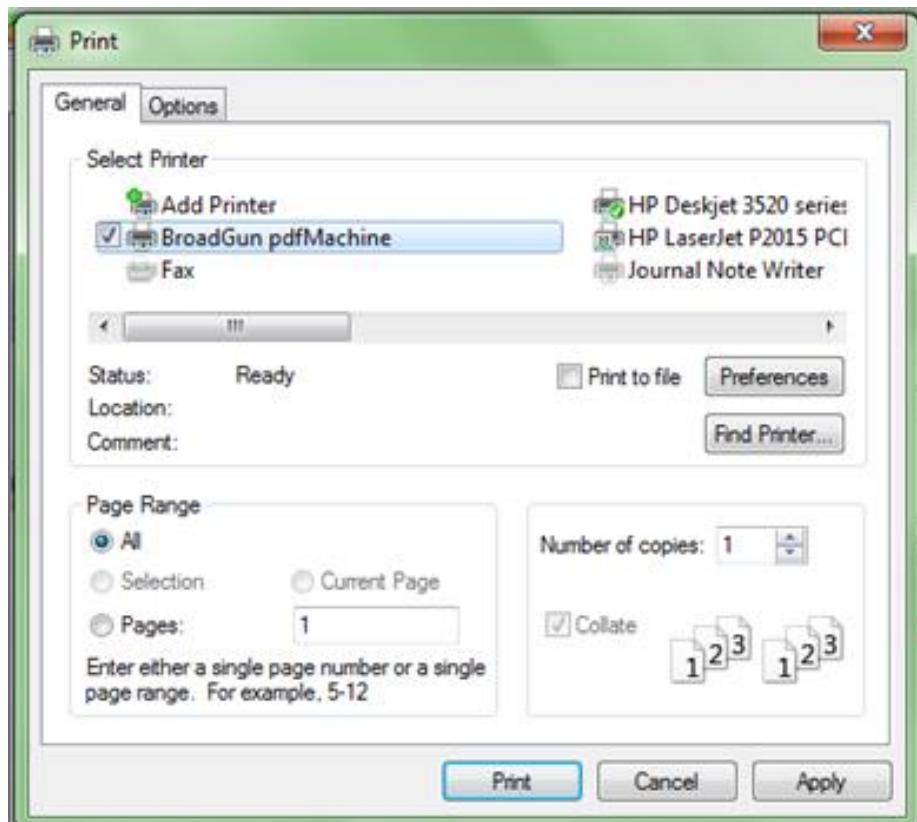


Figure 83. Printing Options Window

To PDF

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

Report Options

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

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

Figure 84. Drop-down menu for the report options



Collect

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

Trace

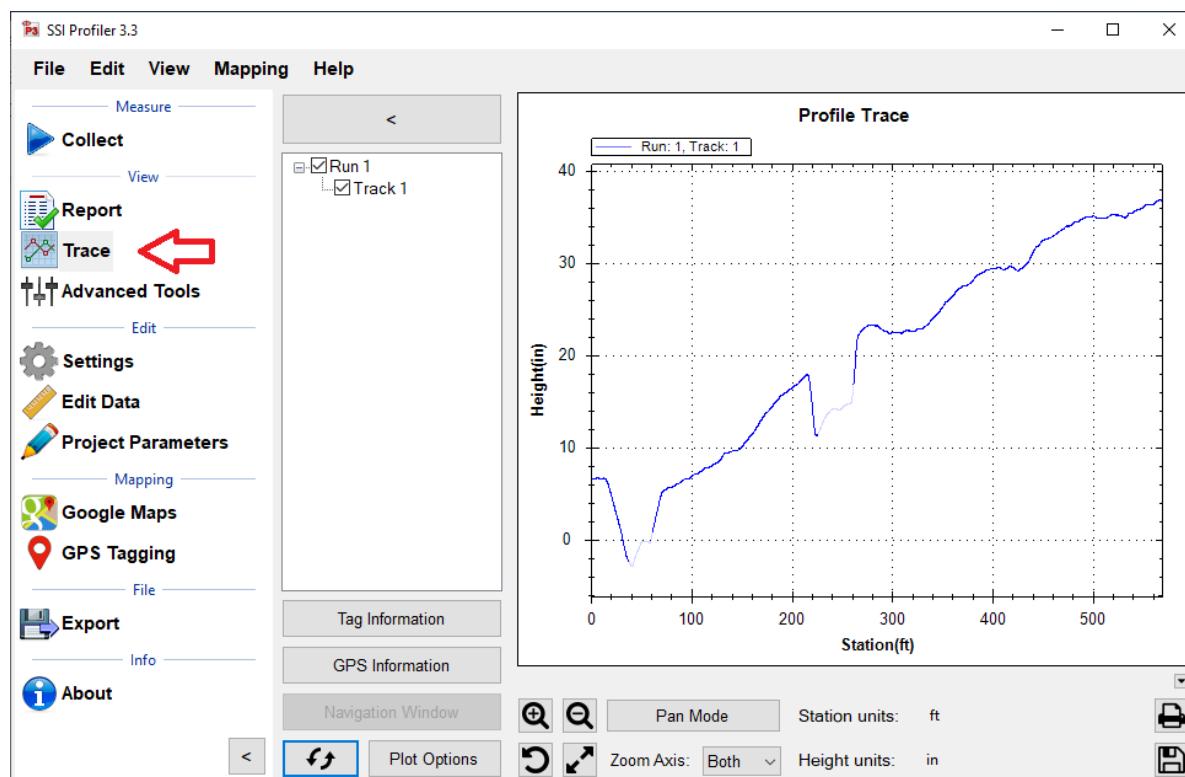


Figure 85: An example of the profile

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

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

Apply filters

To apply filters select the check box “Apply Filters.”

Show Point Labels

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

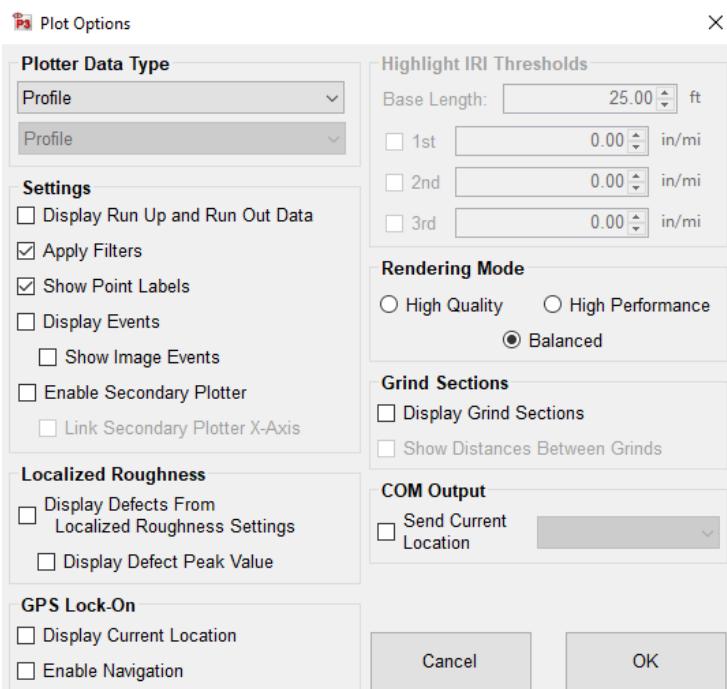


Figure 86. The plotter options window.

Enable Secondary Plotter

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

Localized Roughness

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

GPS Lock-On

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

Rendering Mode

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

Grind Sections

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

COM Output

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

Tag Information

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

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

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

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

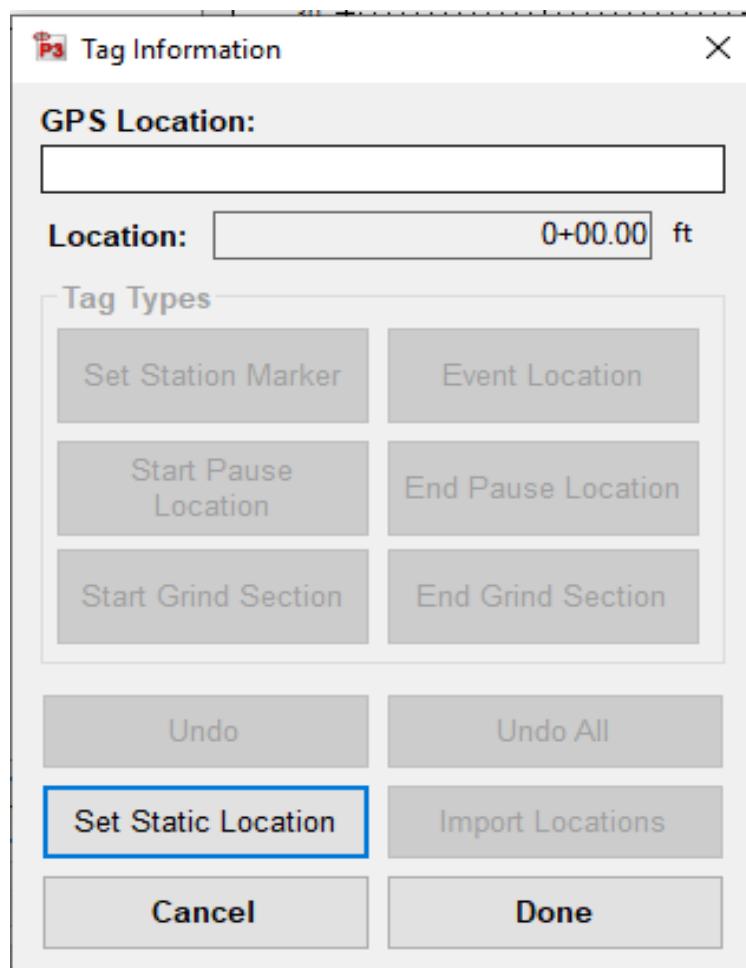


Figure 87: Static Tagging Feature

Print

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

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

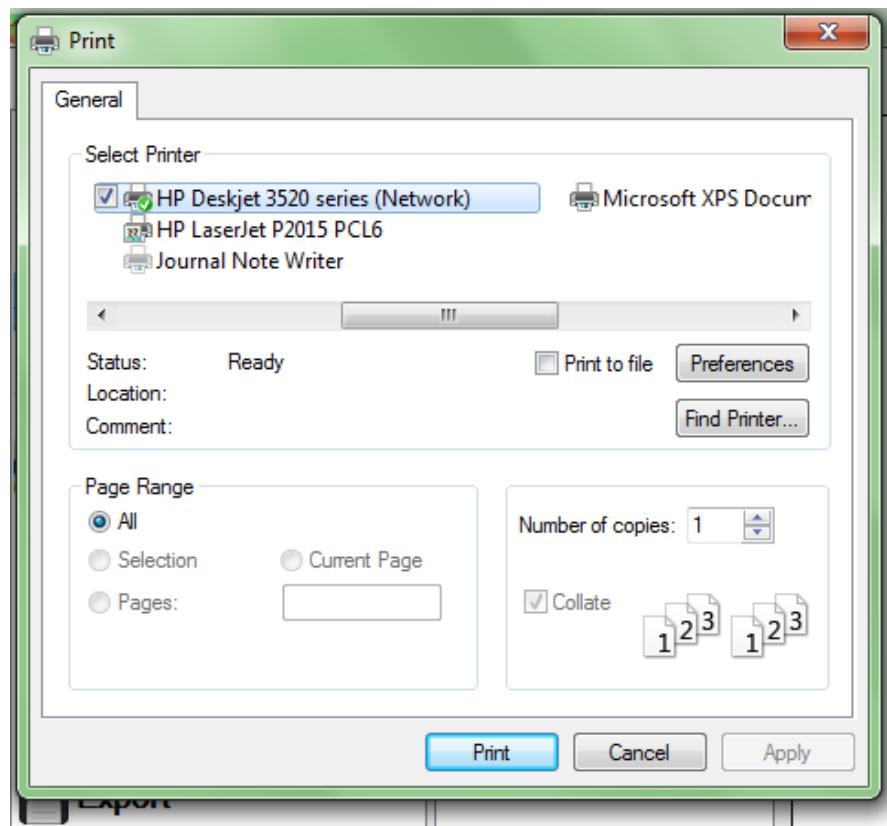


Figure 88. Print window after the print icon is selected

Save

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

Zoom

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

Zoom Previous Icon

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

Zoom Fit Icon

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

Pan/Zoom Mode Icon

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

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

Units for Height and Station

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

GPS Editing and Tagging

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

Advanced Tools

Images Window

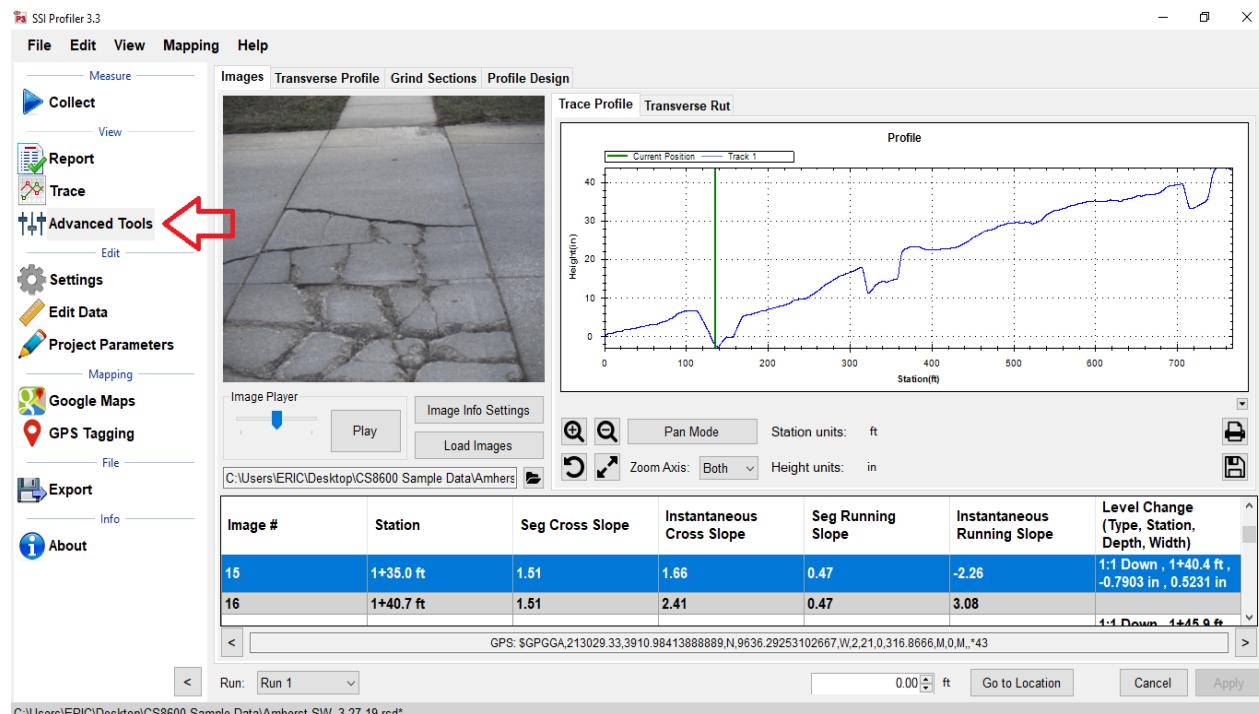


Figure 89. Advanced Tools Images window with an image loaded

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

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

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

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

Mapping

Google Maps

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

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

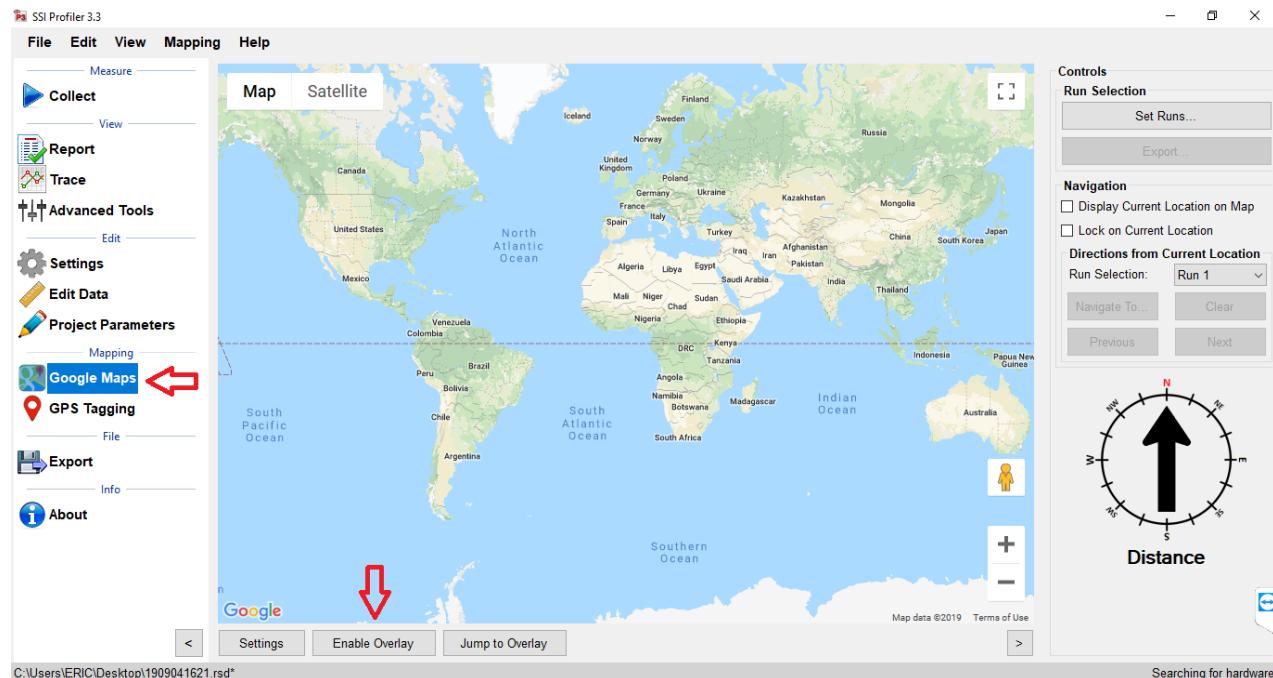


Figure 90. Google Maps Initial Screen

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

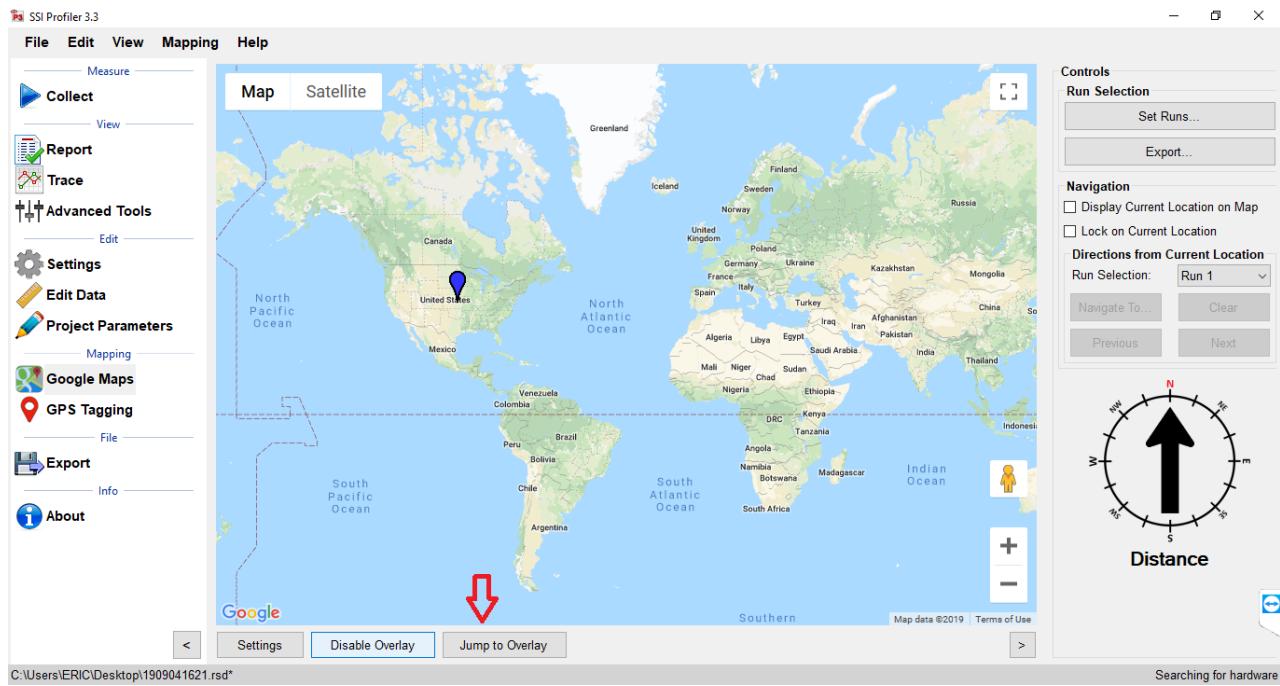


Figure 91. Google Maps Jump to Overlay

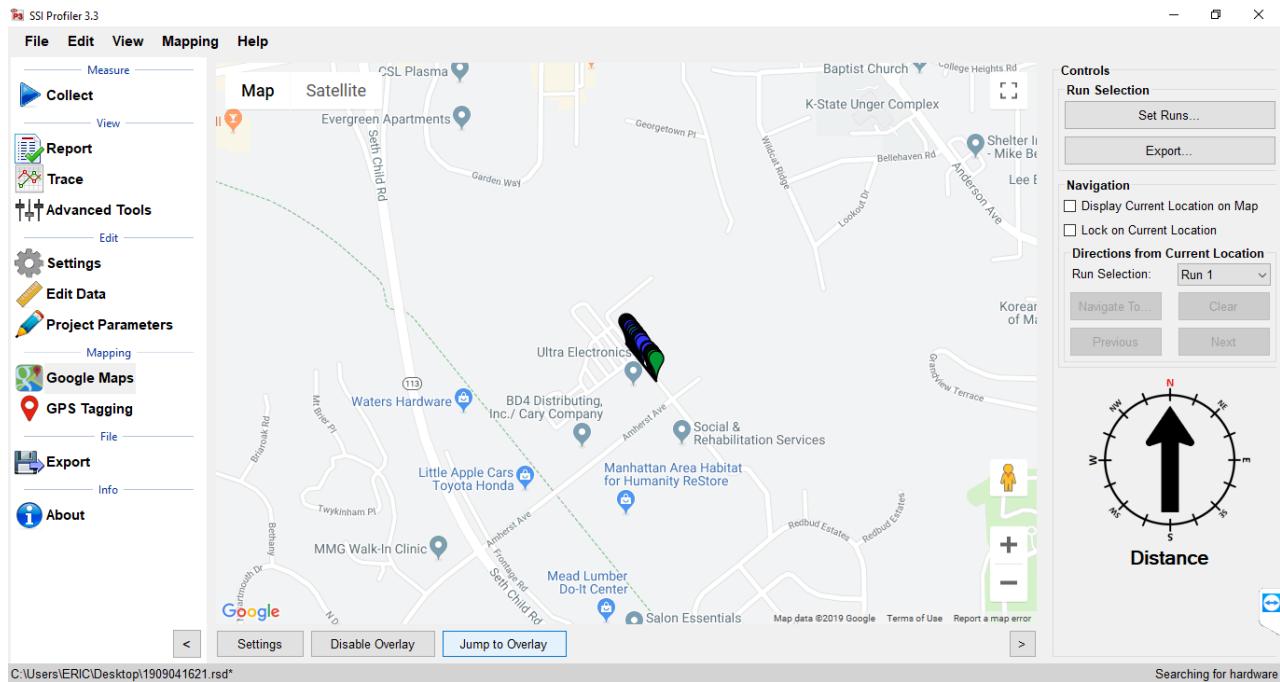


Figure 92. Google Maps after Jump to Overlay

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

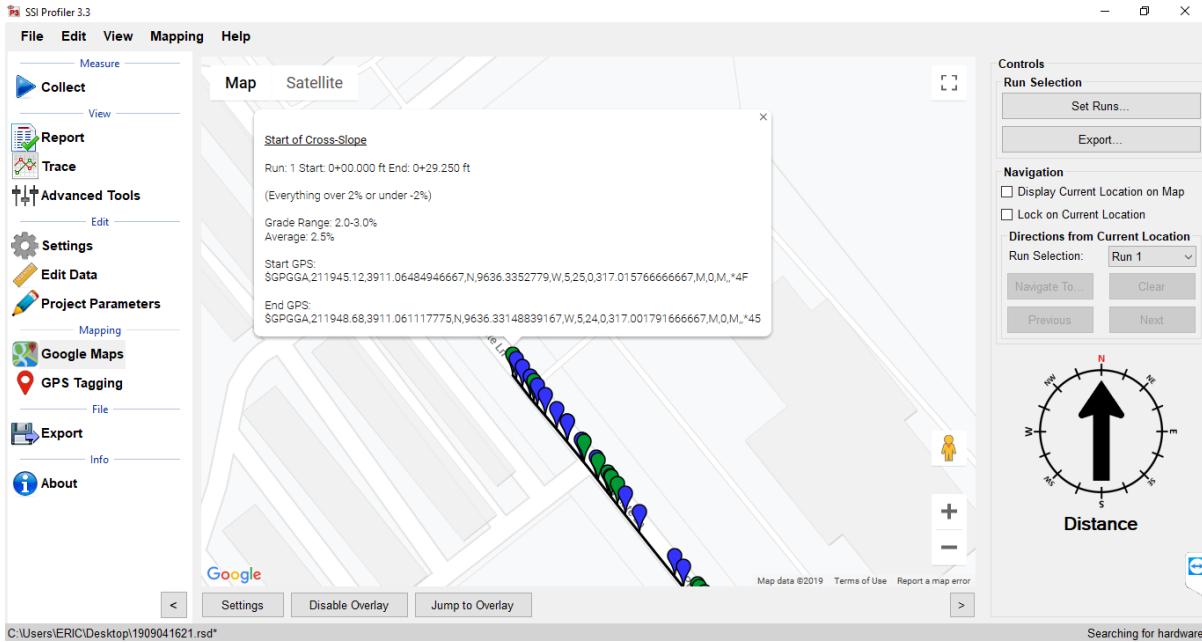


Figure 93. Google Maps Overlay zoomed in with pin clicked for information

“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.

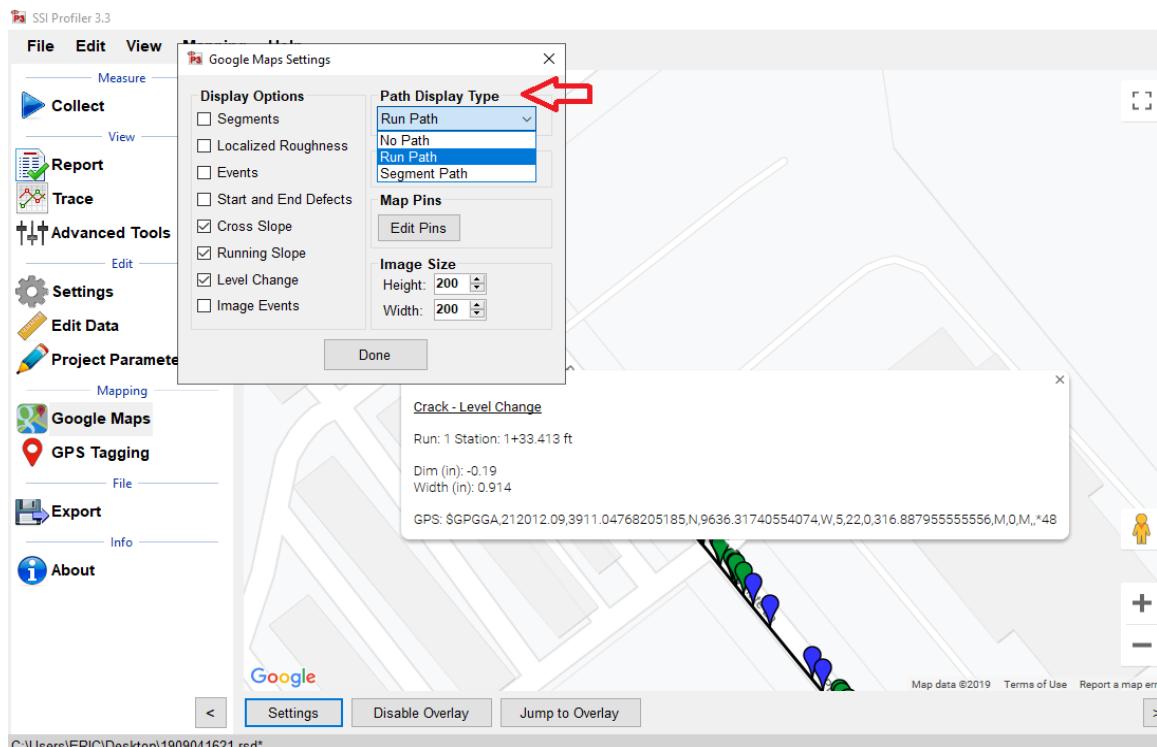


Figure 94. Google Maps Settings: Path Display Type

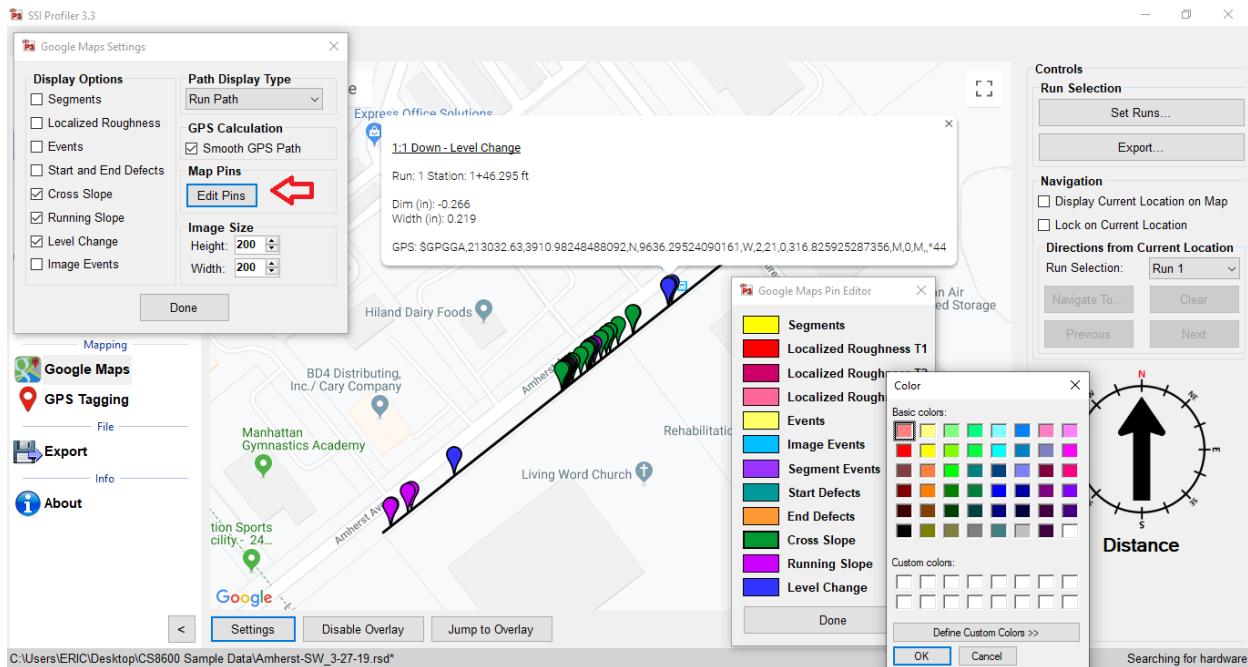


Figure 95. Google Maps Settings: Edit Pins

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

Display Current Location on Map

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

Lock on Current Location

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

Directions from Current Location

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

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

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

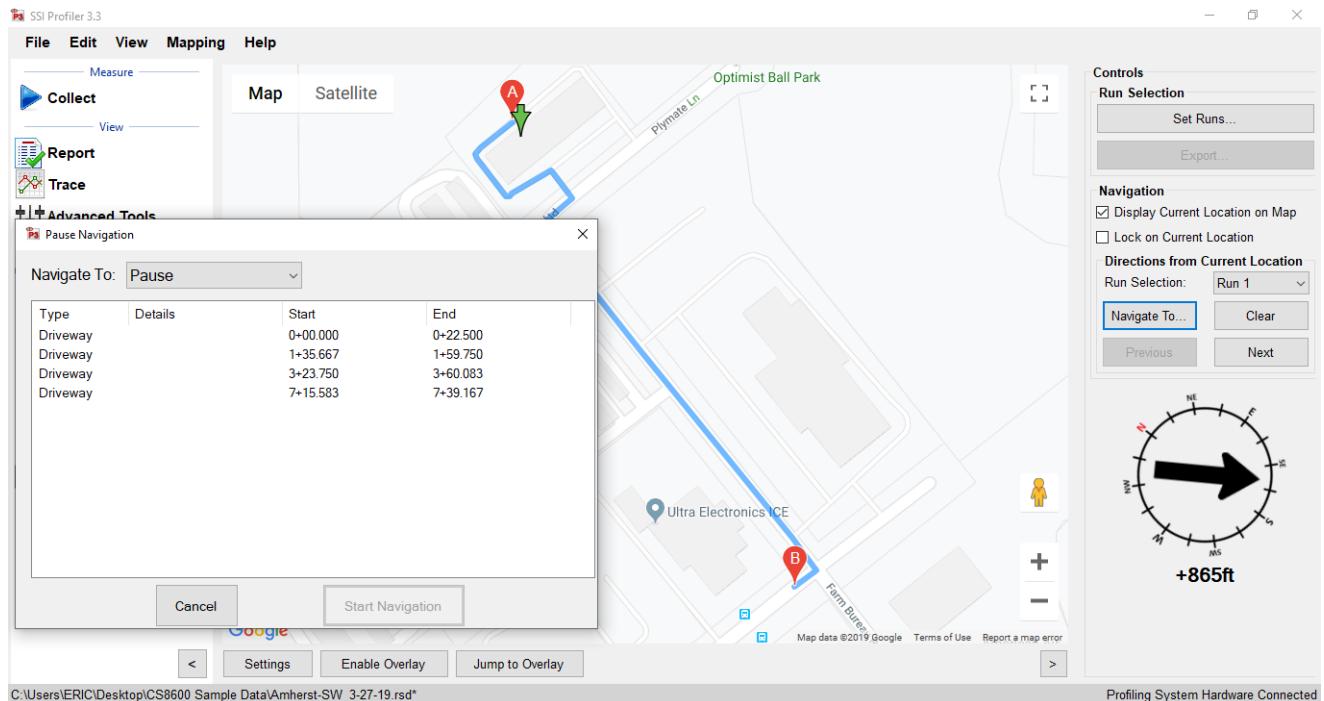


Figure 96. Google Maps Navigation

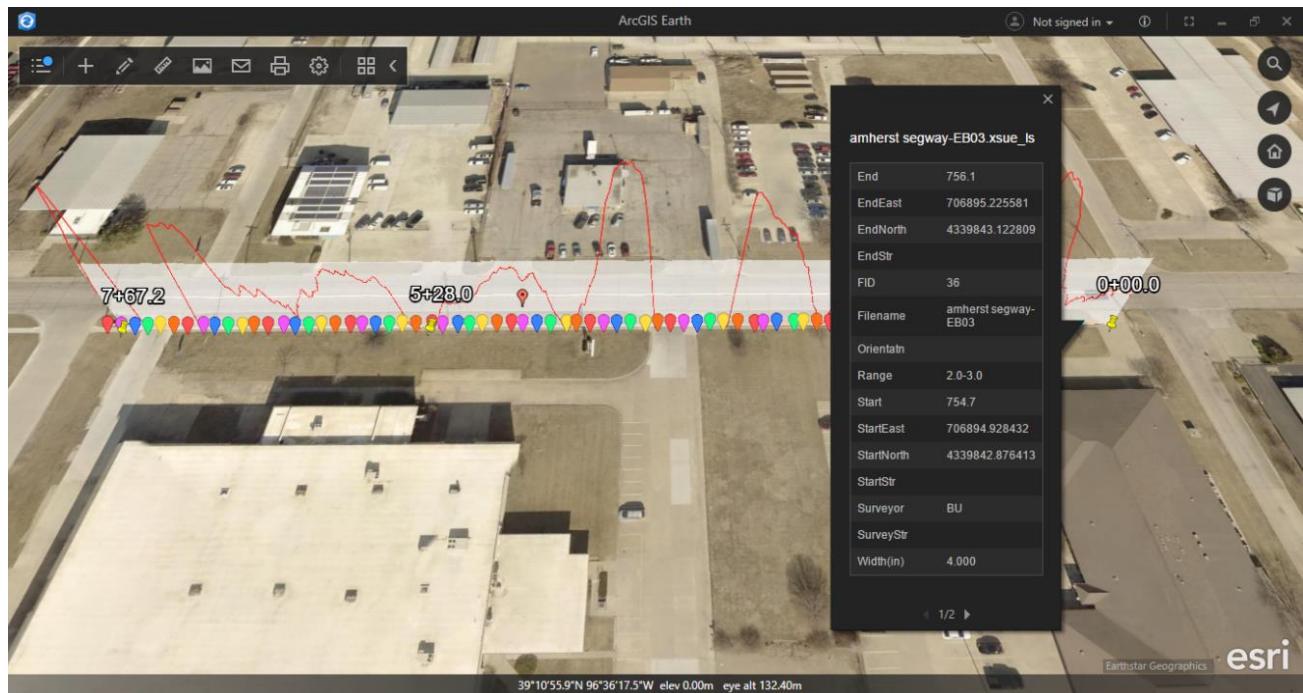


Figure 97. KML export in ArcGIS Earth

About

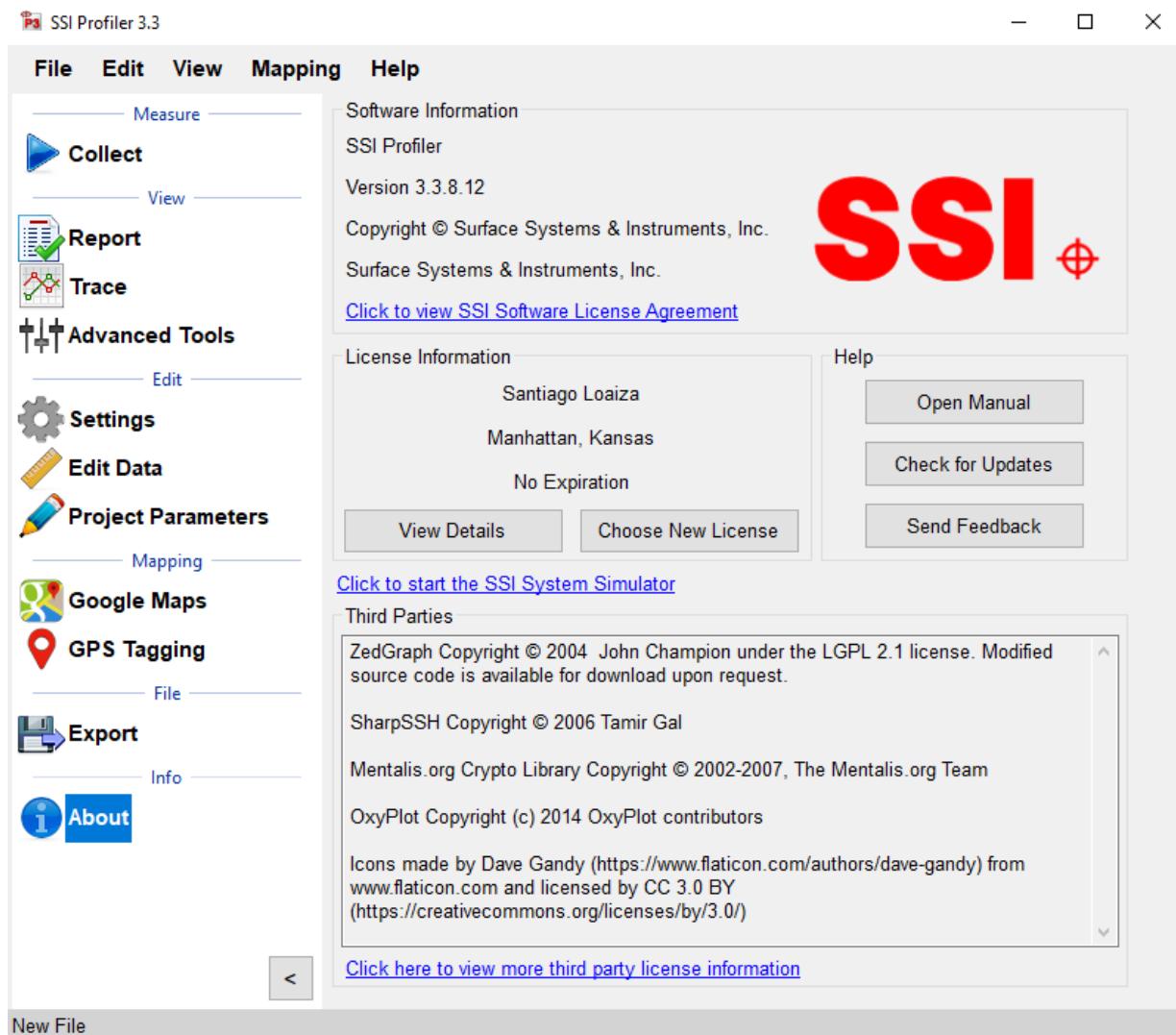


Figure 98: About Window

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

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

Manual

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

Check for Updates

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

Send Feedback

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

Third Party Components

The Third Party Components of Profiler V3 are:

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

Modified source code is available for download at:

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

SharpSSH Copyright © 2006 Tamir Gal

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

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

Exiting Program

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

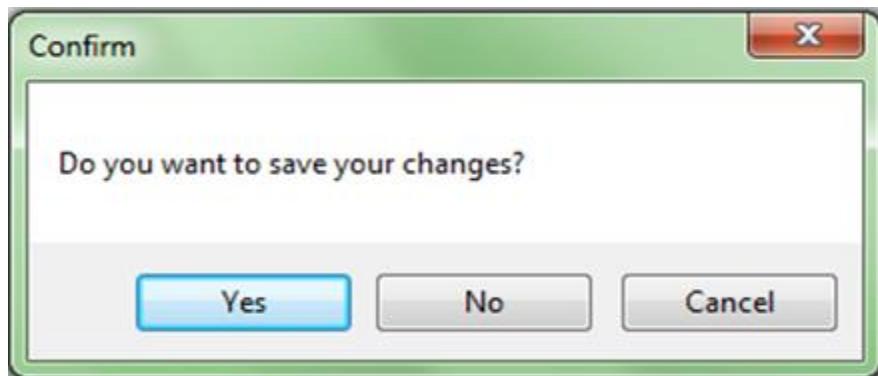


Figure 99. Exiting Program window, chose 'Yes' to save changes, 'No' or 'Cancel'

Recommended Tools

Create a personal default file name convention for your project

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

Load analysis parameters and settings from previous projects

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

Set a default file location

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

Use hot keys during collection

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

Troubleshooting and Support

When Contacting SSI Technical Support

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

Attaining Profiler Software and Replacement Parts

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

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

Panasonic Toughbook Computer

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

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

Paper Supplies or Printer Servicing.

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

Is your Software Up to Date?

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

Do Not Attempt To Repair Electronic Components

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

Is your Power LED Illuminated?

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

Hardware Not Found

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

Example Diagnostics

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

SSI Profiler 2.1: Q0g0r0r0x0x0x0

'0' means that the device is connected.

Q is the encoder symbol

g is Trimble GPS

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

x is an open port

Failed Height Verification

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

Lasers Not Firing

Main Cause: No/ insufficient power reaching the lasers

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

Distance Not Correct

When was the last calibration performed?

Was the actual distance traveled during calibration entered correctly?

Is the DMI damaged or loose?

Is the DMI Amphenol cable attached correctly?

How long is your calibration track?

Is there a large temperature gradient?

Is the calibration track a straight line?

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

Is the correct EE turned on?

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

Is DOT-C2 reflective tape being used?

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

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

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

The Camera is not taking color pictures

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

Advanced User Options (Custom Resolution)

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

Profiler Hardware Not Found

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

Do Not Replace the Device Components with Store Bought Items

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

Updating the Software

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