*Smart Cameras made in Germany_*

VC 3D Smartshape Manual

Revision: Version 2.8
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Bildverarbeitungssysteme mbH
Geschäftsführer: Michael Engel, Jan-Erik Schmitt
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1 Introduction

The "3DSmartShape.exe" for all VC Laser Scanners is a MS Windows PC program for displaying the results from the Laser Scanner camera. It allows an easy setting of all scanner parameters.

The software provides two modes: online and offline. In online mode, the user has the option to save either calibrated or uncelebrated profile data for offline testing purpose. Additional product (function) such as angle measurement can be plugged in as module.

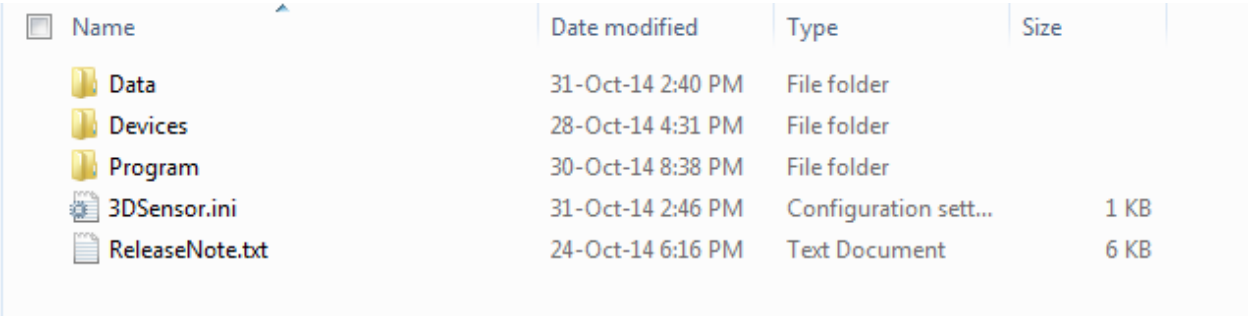
The software works together with the VC 3D Laser Scanner Cameras from Vision Components and the camera demo program vc3d_XX.cex. The cameras are based on Texas Instruments DSP's. A large variety of different Laser Scanner Camera types and resolution are available.

1.1 Installation

An installation for the Window Program "3DSmartShape.exe" is not necessary. Just call the exe-file and connect the Laser Scanner via 100 Mbits TCP/IP to the camera.

You will find all necessary files to run the software in the "VC3DSensor_Vxx.xx.zip". After you unzip the file, you should have the following directories:

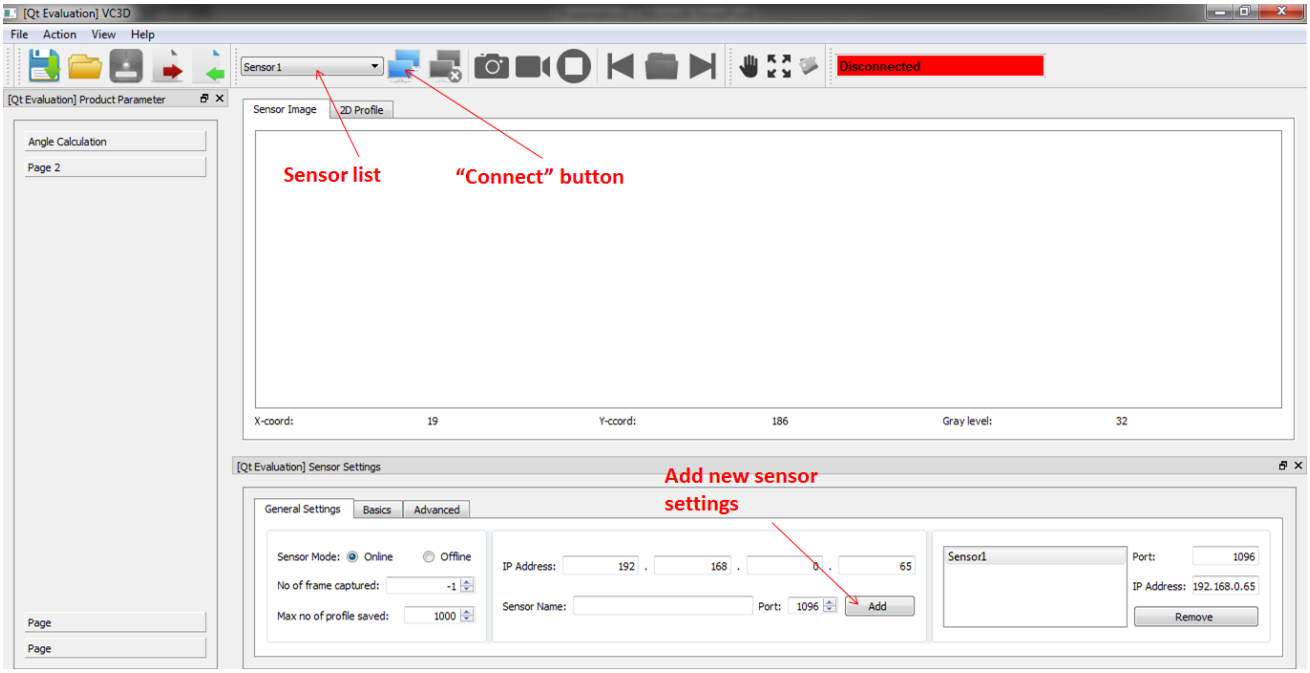
1. Data – all the saved profile data or sensor images are located here.
2. Devices – all the saved sensor settings and product parameters are located here.
3. Program – all the necessary files to run the software are located here.



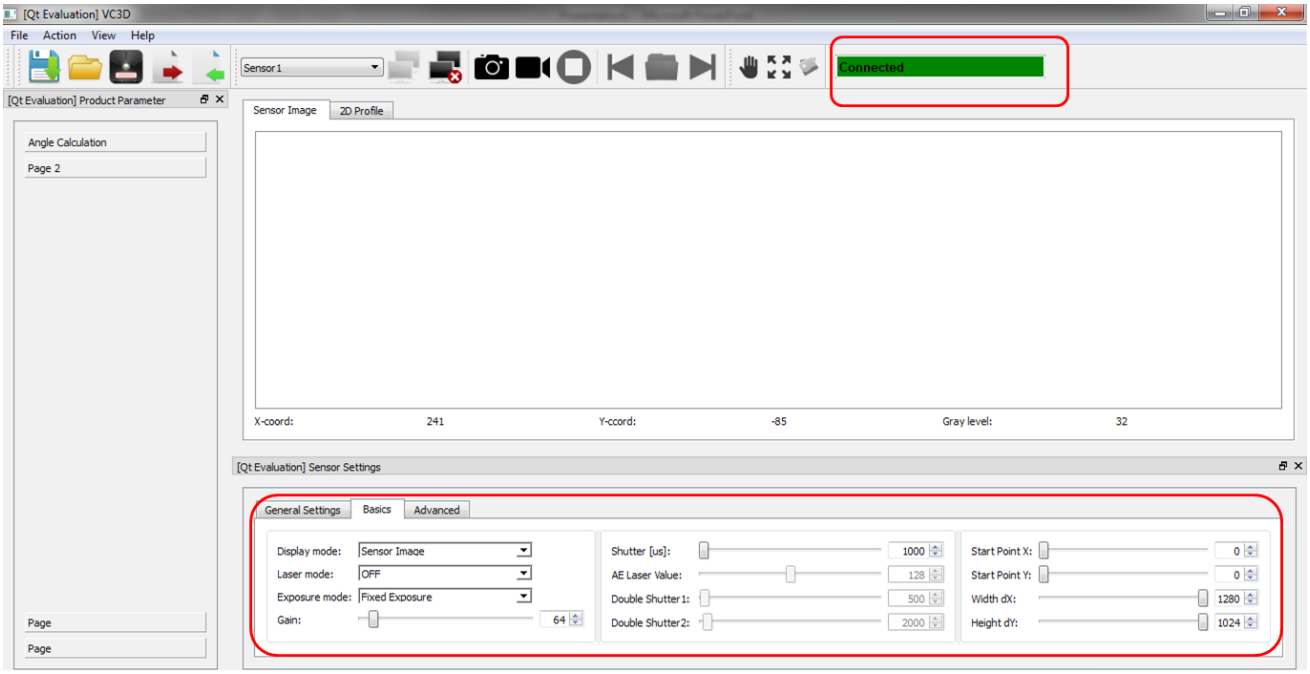
You can find the "3DSmartShape.exe" in "Program" directory.

1.2 Getting started

First step start the "3DSmartShape.exe". Select a sensor from the sensor list and then press "Connect" button. If necessary, you can add your own sensor settings into the list by defining a new sensor name with IP address and Port number (default IP: 192.168.0.65, default Port: 1096).



After a successful connection is established to the sensor (scanner camera), the software reads all the sensor setting parameters.



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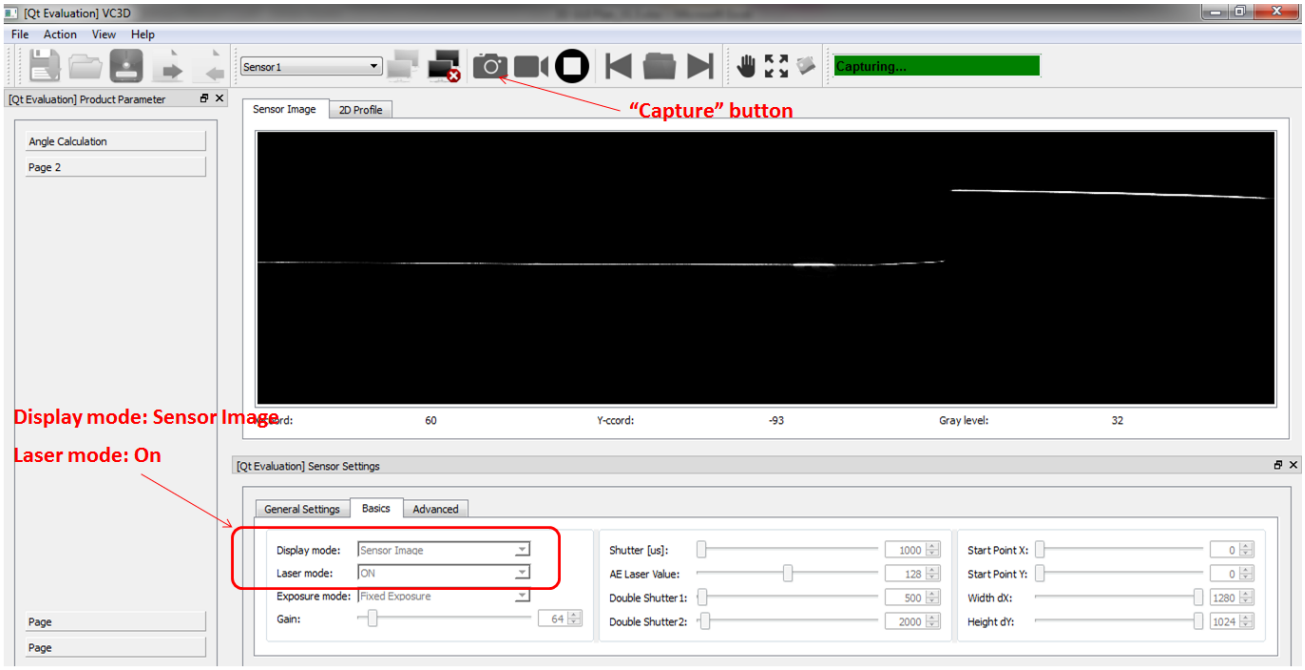
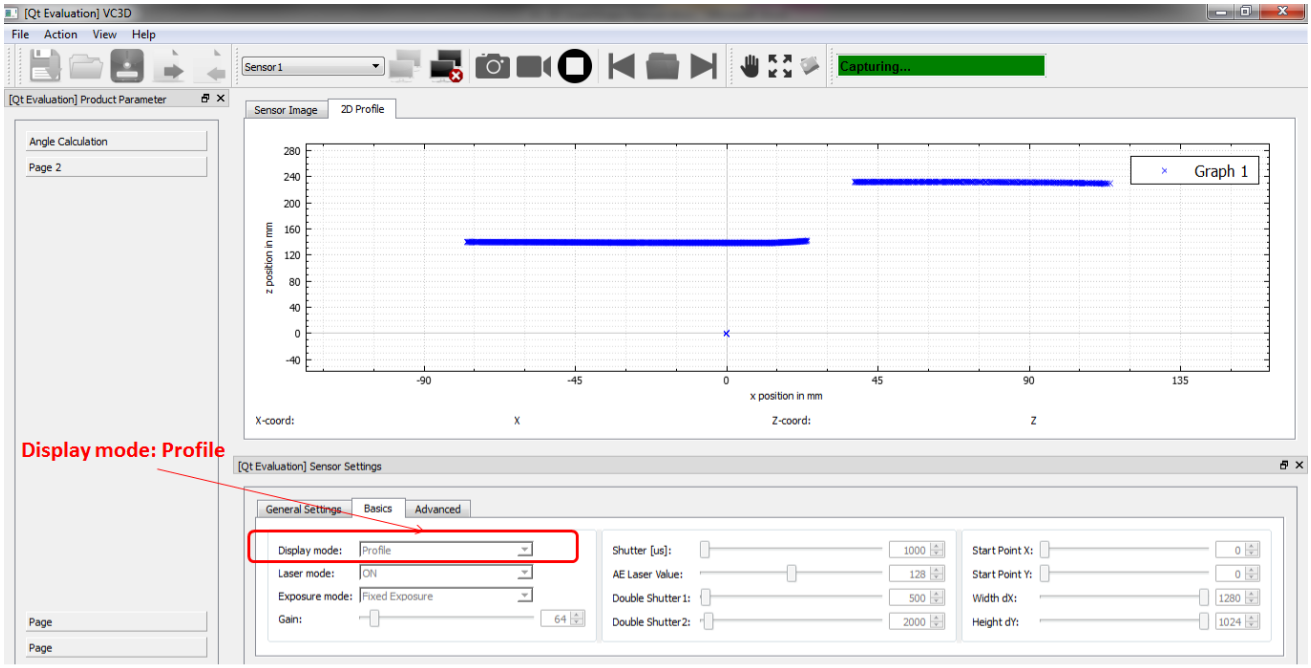
Choose “ON” for Laser Mode and “Sensor Image” for Display Mode and then press “Capture” button. You will get a live image of the sensor scene. Please adjust shutter time and sensor position for stable image detection. Stop the capture mode in order to change the parameters.



Select “Profile” for Display Mode in order to get an attitude profile of your scan.



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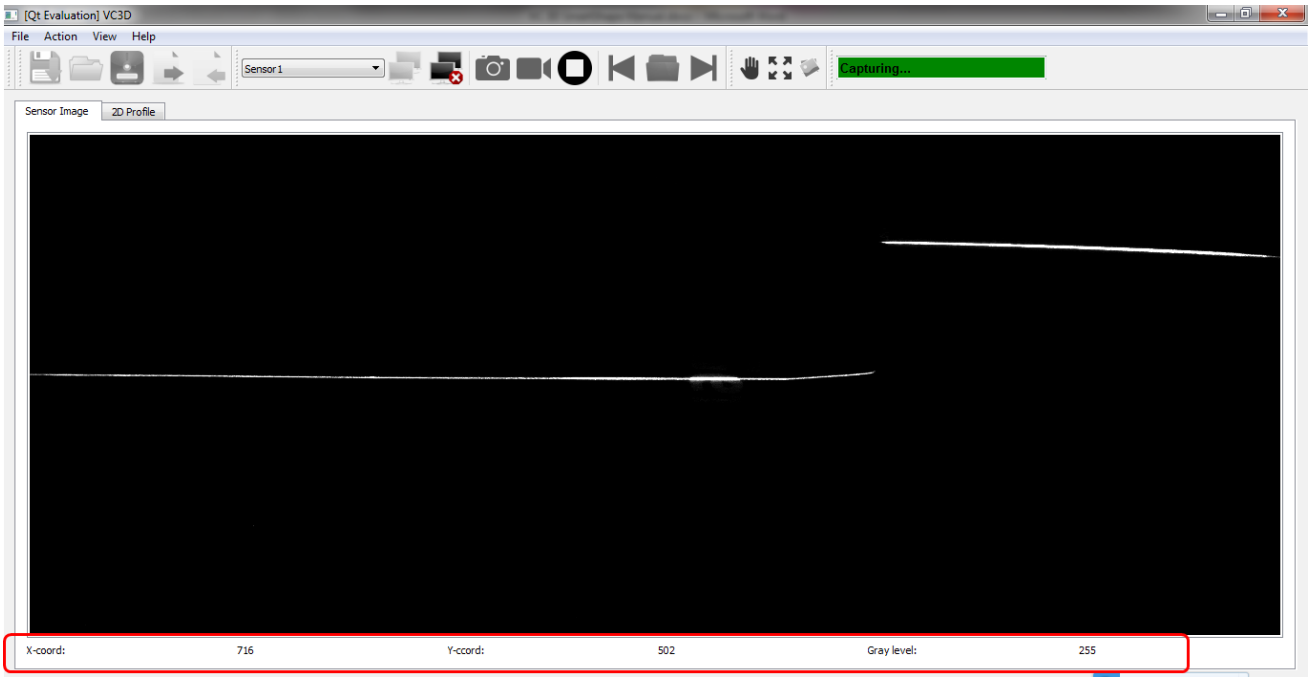
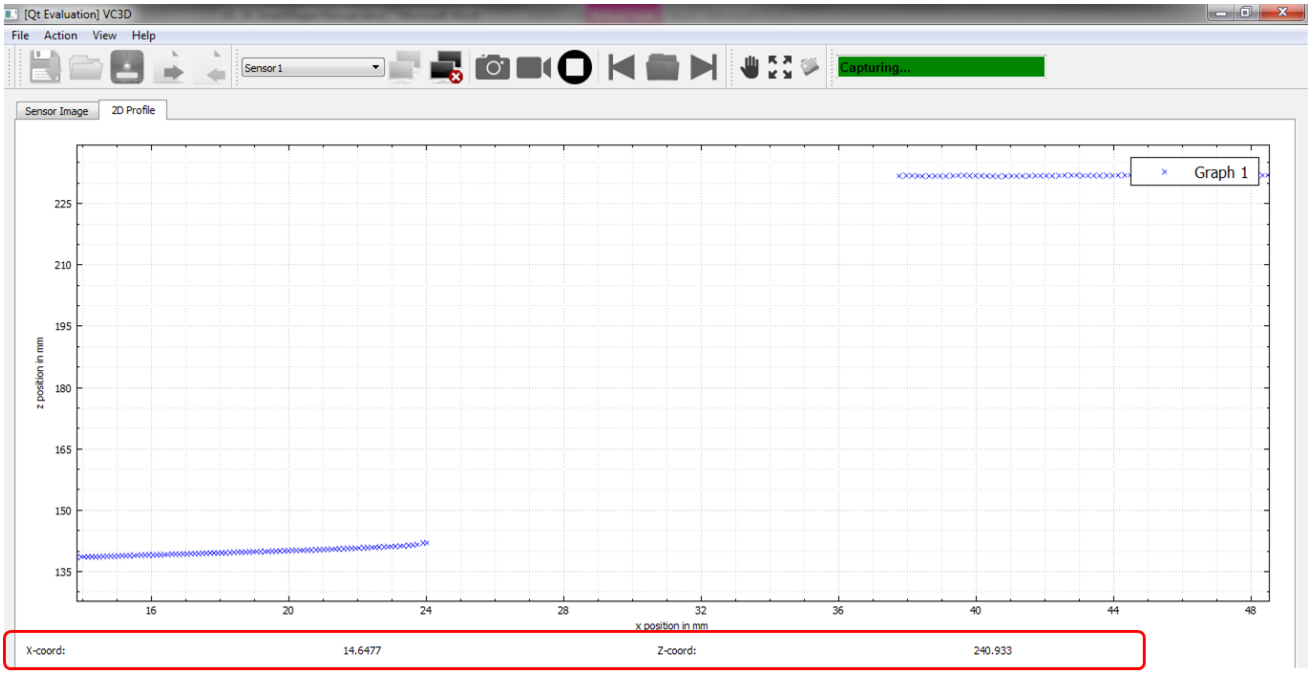
In “Sensor Image” Display Mode, place the cursor inside the transferred image in order to get additional information like position and brightness in term of grey level at this position.



In “Profile” Display Mode, place the cursor inside the profile graph in order to get additional information like x-position and z-position (attitude) at this position.



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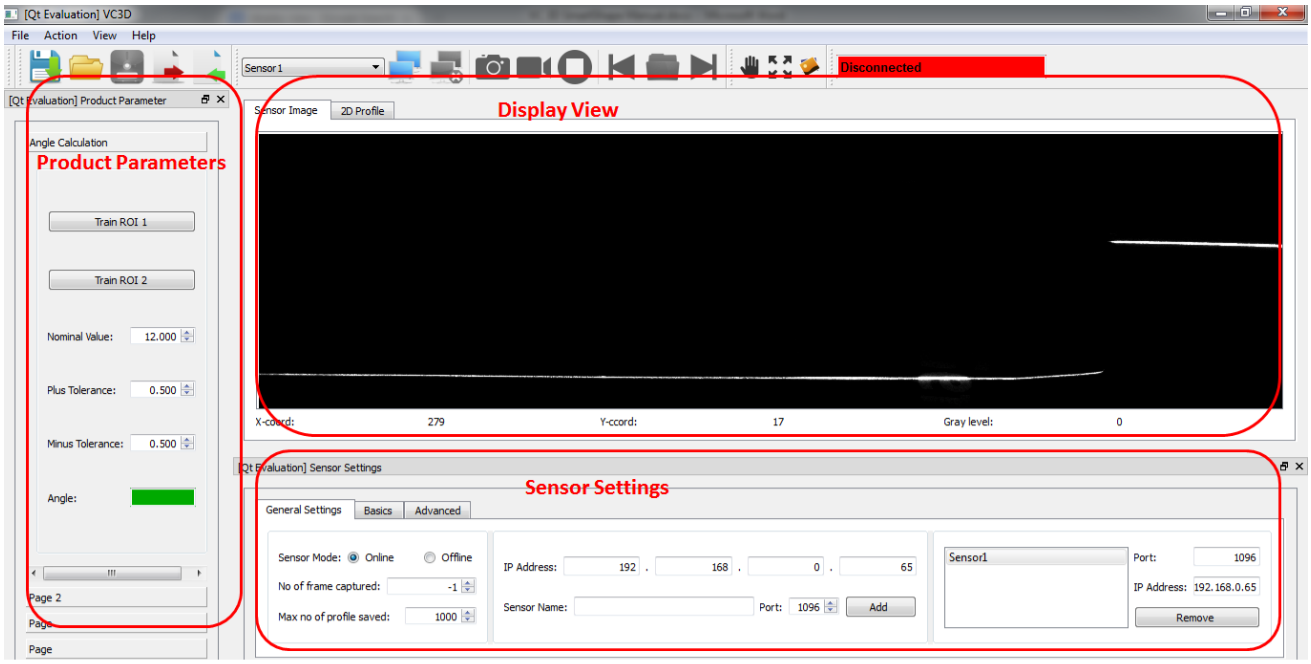
2 User Interface

After you have started the "3DSmartShape.exe", several user interfaces will be displayed. Each user interface serves different purpose. You can explore the functionality of each user interface in this chapter.

2.1 Overview

There are three main user interface elements in this software:

1.) Display View
2.) Sensor Settings
3.) Product Parameters



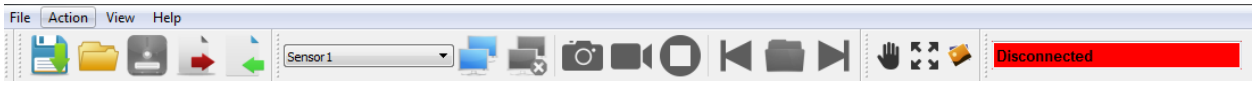
You can switch the Display View between "Sensor Image" and "2D Profile" depending on which Display Mode you choose.

In the "General Settings" tab of the "Sensor Settings" docked window, you can switch between "Online" mode and "Offline" mode. You can only connect to the sensor when you select "Online" mode. In "Offline" mode you can load and view the profile data that has been previously saved. Here you can also add a new sensor setting with your preferred name e.g. "My Sensor". You can change any sensor parameter in the "Basics" and "Advanced" tab after you stop the capture mode or record mode.

In the “Product Parameters” docked window, there will be several measurement functions that help the user to analyse the profile data e.g. angle measurement, gap measurement, radius, centre point calculation and so on. These features are still under development.

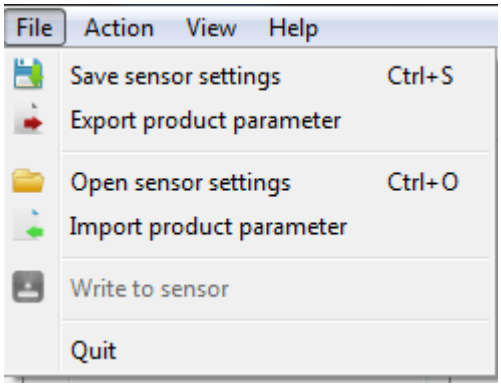
2.2 Main Menu

The user has the possibility to control all the actions of the software through different options of the main menu.



2.3 File

All operations for saving and loading sensor settings and product parameters are executed via “File” menu.

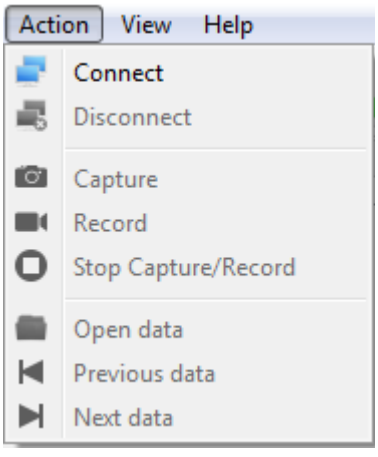


Function	Icon	Description
Save sensor settings		This menu item saves the current sensor settings. The user has to enter a name for the sensor settings file. The saved file can be found at the "Devices" directory.
Load sensor settings		When you click on this menu item, a window opens (pop-up). The opened window shows a current directory, where all the sensor settings files (VC3DPar.txt) are previously saved. You can choose the file you want to open.
Save product parameters		This menu item exports the current product parameters. The user has to enter a name for the product parameters file. The saved file can be found at the "Devices" directory.
Load product parameters		When you click on this menu item, a window opens (pop-up). The opened window shows a current directory, where all the product parameters files (ProdPar.txt) are previously exported. You can choose the file you want to import.
Write product and sensor settings to nano 3D flash		This menu item allows you to write the current product and sensor settings into the sensor flash. The sensor will start with these settings. This menu item is only available when the sensor is in standby mode.

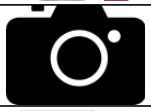
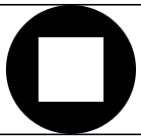
You can transfer the setting files (VC3DPar.txt and ProdPar.txt) via ftp directly to the sensor.

2.4 Action

The "Action" menu allows user to control the sensor and view the offline data.

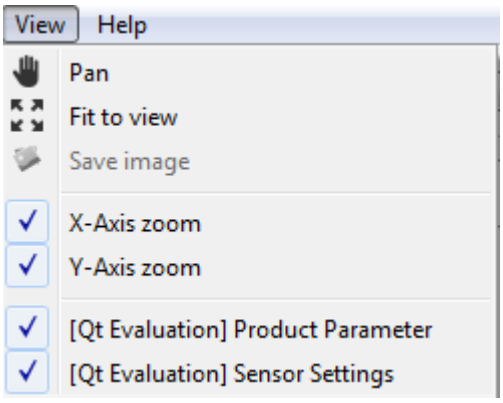


Function	Icon	Description

Connect		This menu item establishes a connection to the sensor.
Disconnect		This menu item terminates the connection to the sensor.
Capture		When you click on this menu item, the sensor will start the image acquisition.
Record		When you click on this menu item, the sensor will start the image acquisition and record the profile data in the local directory "Data".
Stop Capture/Record		This menu item allows you to stop the image acquisition or data recording.
Open data		When you click on this menu item, a window opens (pop-up). The opened window shows a current directory, where all the profile data files (*txt) are previously recorded. You can choose the offline profile data you want to view.
Previous data		This menu item allows you to view the next profile frame.
Next data		This menu item allows you to view the previous profile frame.

2.5 View

This menu contains all features to manipulate the display view e.g. zooming and panning.



Function	Icon	Description
Pan		When this menu item is checked, you can drag the view to your desired image location. At the same time, the zooming feature is disabled. This feature is only applicable at "Sensor Image" display.
Fit to view		This menu resets the view scale so that the whole image or all profile points are visible.
Save image		When you click on this menu item, the current image on the "Sensor Image" display will be saved in the local directory "Data".
X-Axis zoom		When this menu item is checked, the size of range in horizontal direction can be changed by using the mouse wheel. You can scroll the mouse wheel forwards to decreases the range (zooms in) and scroll backwards to increases it (zooms out). Optional you can click on the axis in order to change the zoom via wheel mouse.
Y-Axis zoom		When this menu item is checked, the size of range in vertical direction can be changed by using the mouse wheel. You can scroll the mouse wheel forwards to decreases the range (zooms in) and scroll backwards to increases it (zooms out). Optional you can click on the axis in order to change the zoom via wheel mouse.
Product Parameters		You can check this menu item to show the "Product Parameters" docked window or uncheck it to close the window.
Sensor Settings		You can check this menu item to show the "Sensor Settings" docked window or uncheck it to close the window.

2.6 Help

Here you have the possibility to retrieve the information about your software version.

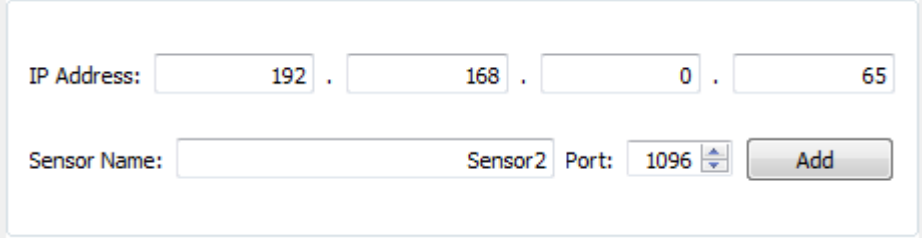
Function	Icon	Description
About		A window is opened with the number of your software version.

3 Standard Operation

The following chapter contains a detailed description of all standard procedures to use the software.

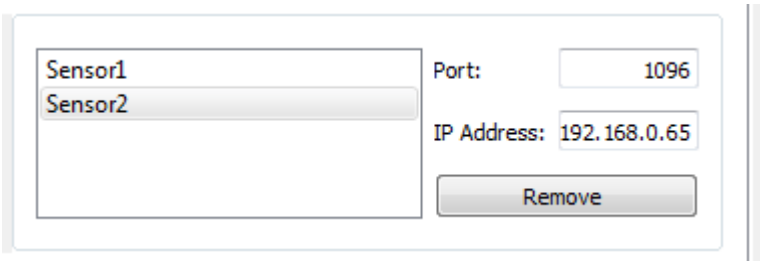
3.1 To Add A New Sensor

At the “General Settings” tab of the “Sensor Settings” docked window, you can key in the name for your new sensor. You need to enter IP Address and Port number as well. Then press the “Add” button. Right now your new sensor is available in the Sensor List for you to connect.



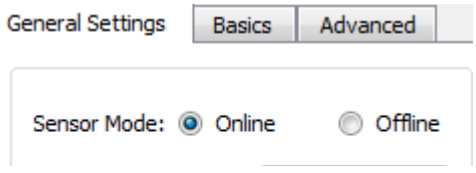
3.2 To Remove the Sensor

All the newly added sensors will appear in the list below. You can select any sensor you want to delete and press the “Remove” button. The sensor you have removed will not available anymore in the Sensor List.



3.3 Online Mode

The software starts with “Online” mode by default. You can switch to “Offline” mode under “General Settings” -> Sensor Mode when you are not connecting to the sensor.



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In “Online” Mode, you can connect to the sensor.  Once the connection is successfully established, you can either capture image  or record the profile data.  You are not allowed to change the sensor settings when the sensor is still in capture or record mode. If you want to adjust the sensor parameter, stop the image acquisition first. 

You can also load the previously saved sensor settings by pressing “Open sensor settings” button  when the sensor is in standby mode.

3.4 Offline Mode

In “Offline” Mode, you can load the previously recorded profile data for viewing. Press the “Open data” button  to load the data on “2D Profile” display. You are able to choose to view the previous or the next profile frame by pressing the “Previous data” button  or “Next data” button. 

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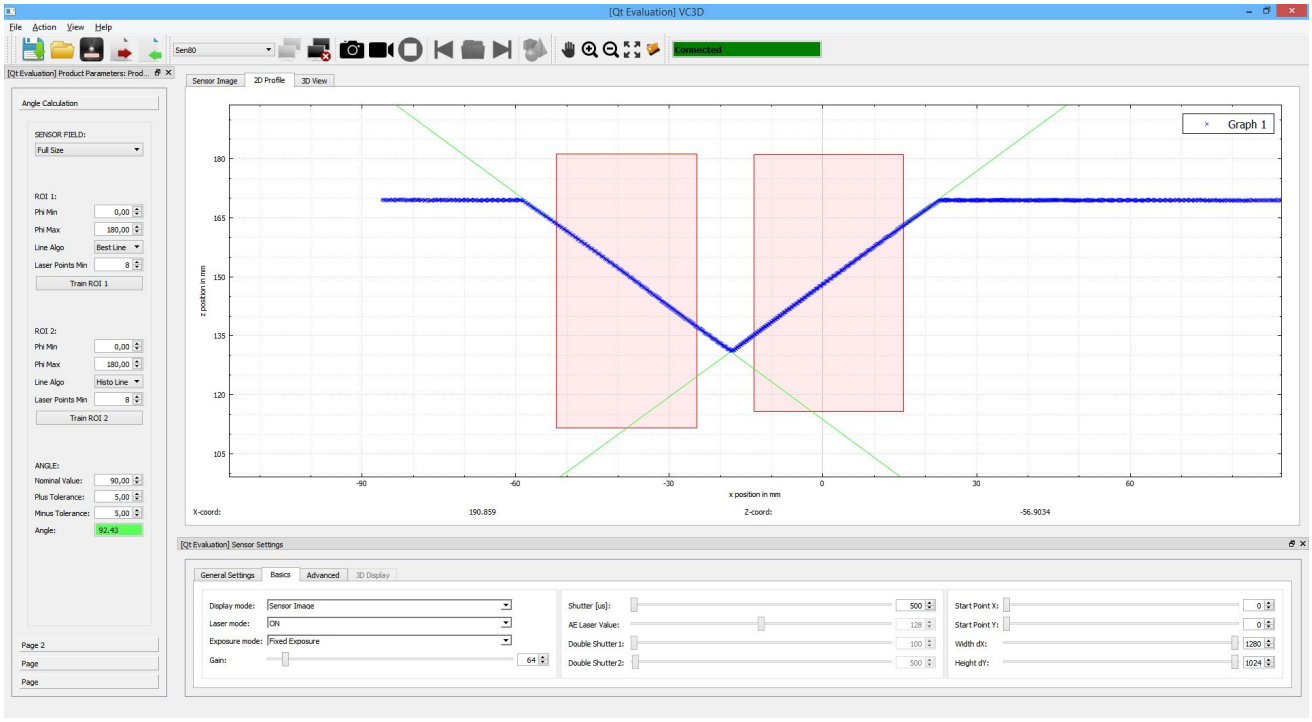
4 Product Settings

Some sensors are prepared to work as a product sensor for different tasks.

4.1 Angle Calculation



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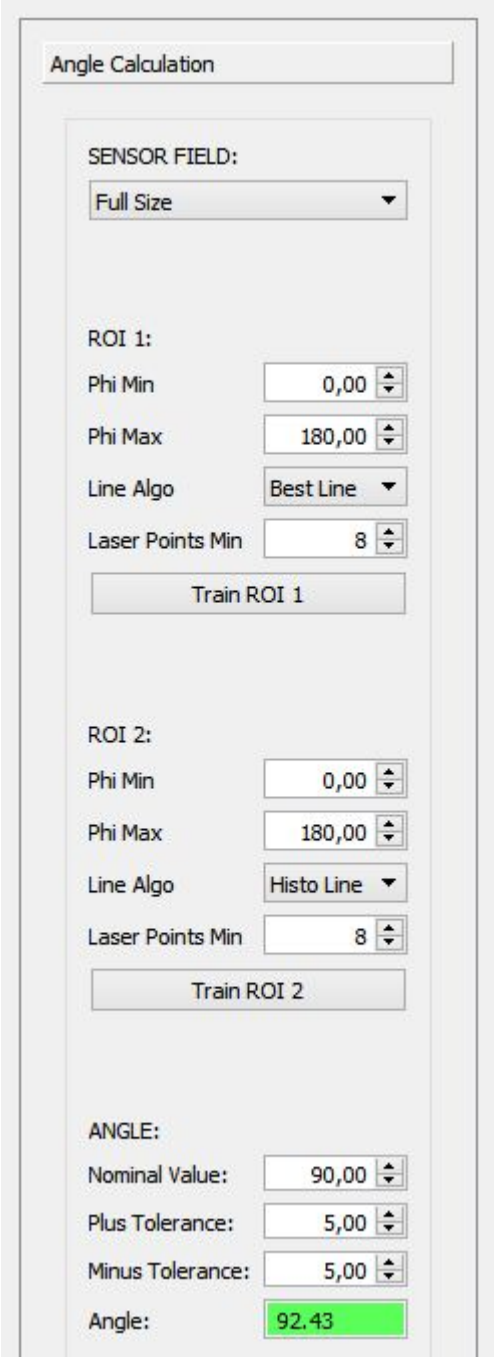
4.2 Angle Calculation Parameters



Here you can select the image acquisition are: full, bounding box for all ROIs or just the setting from the Sensor Parameter area.

For each ROI you can define the angle range, the line detection method and the min. number of valid laser detection points for building a line. The train ROI button adjusts the ROI.

The results of the product calculation is displayed here. It shows the calculated angle which will be compared with the nominal value and its tolerances.