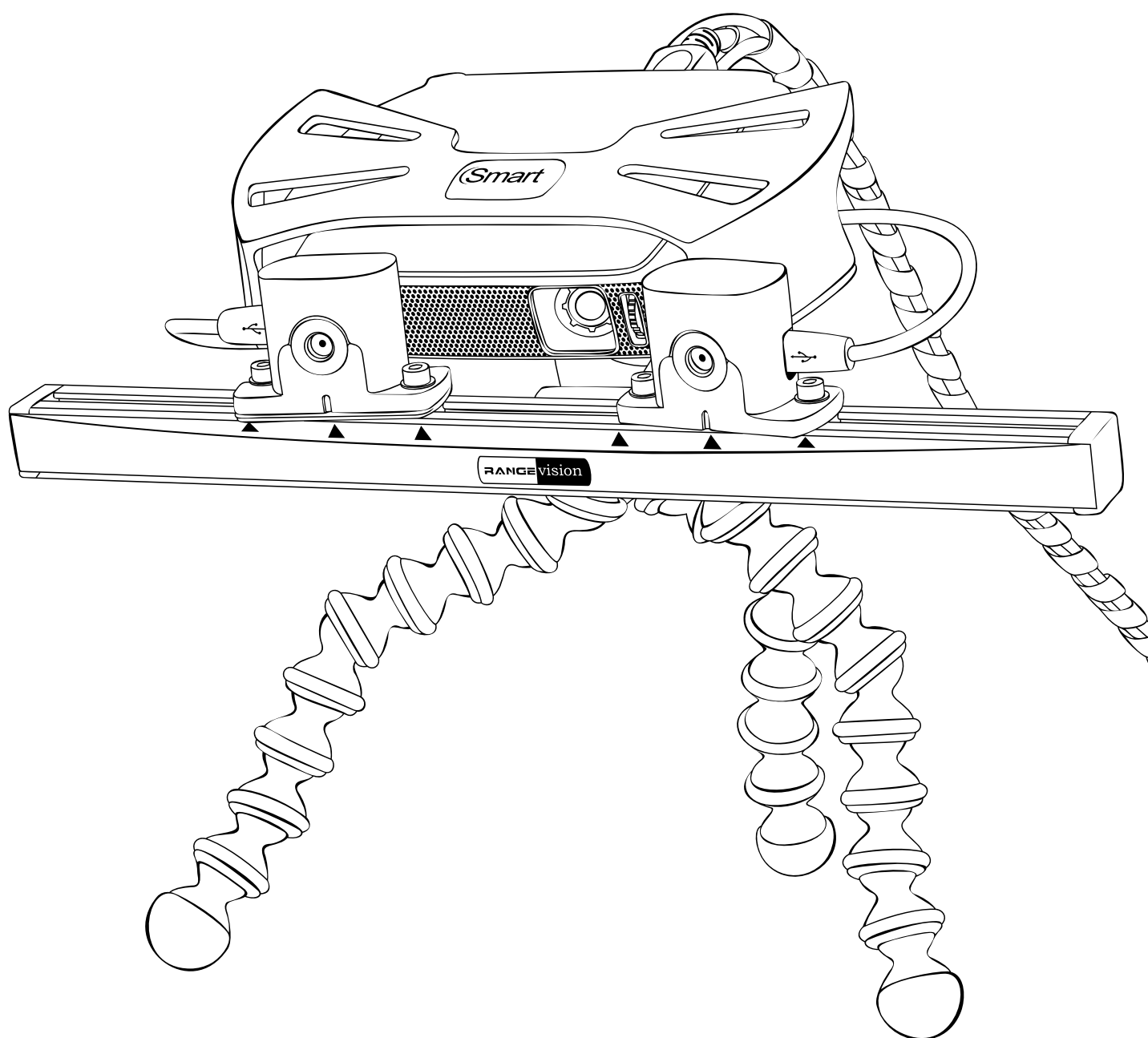


# RANGEVISION

# SMART

ScanCenter 2016.2



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# Introduction

Thank you for choosing RangeVision product. Please read the instructions for setting up and scanning before using the RangeVision Smart 3D scanner, as well as familiarize with the manual in processing the scan data in RangeVision ScanMerge. Here are described the procedures for preparing the scanner, installing the required drivers, calibration procedure, scanning procedure, and tips for acquiring high-quality three-dimensional object model.



## Warnings

- Do not expose the scanner to liquids
- Do not store or use the scanner in dusty or humid environment
- Do not expose the scanner and its components to contamination, shock or drops
- Do not connect power supply to the faulty wall outlet
- Do not aim the scanner on the people and animals in order to avoid contact with eyes of the harmful bright light projector.

# Technical specifications

| Scanning zone          | 1                                | 2           | 3           |
|------------------------|----------------------------------|-------------|-------------|
| Scanning area (mm)     | 500x375x375                      | 300x225x225 | 150x112x112 |
| 3D resolution (mm)     | 0,4                              | 0,24        | 0,12        |
| 3D point accuracy (mm) | Up to 0.1% of scanning area size |             |             |

|                               |               |
|-------------------------------|---------------|
| Resolution of cameras         | 1,3 Mpix      |
| Diagonal of the matrix        | 1/2"          |
| Scanning time                 | ~12 sec       |
| Model calculation time        | ~8 sec        |
| Dimensions (WxHxD)            | 160x55x150 mm |
| Format of 3D model            | STL           |
| Source of light               | LED           |
| Weight of the scanning module | 0,7 kg        |
| Calibration time              | ~5 min        |

## System requirements

- Operating system - Windows XP and newer versions
- Processor - not worse than Intel Core i3 1.7 GHz
- Graphics card with ability to connect projector
- RAM not less than 4Gb
- 3 USB-ports (4 if using turn table)

# Preparing to work

---

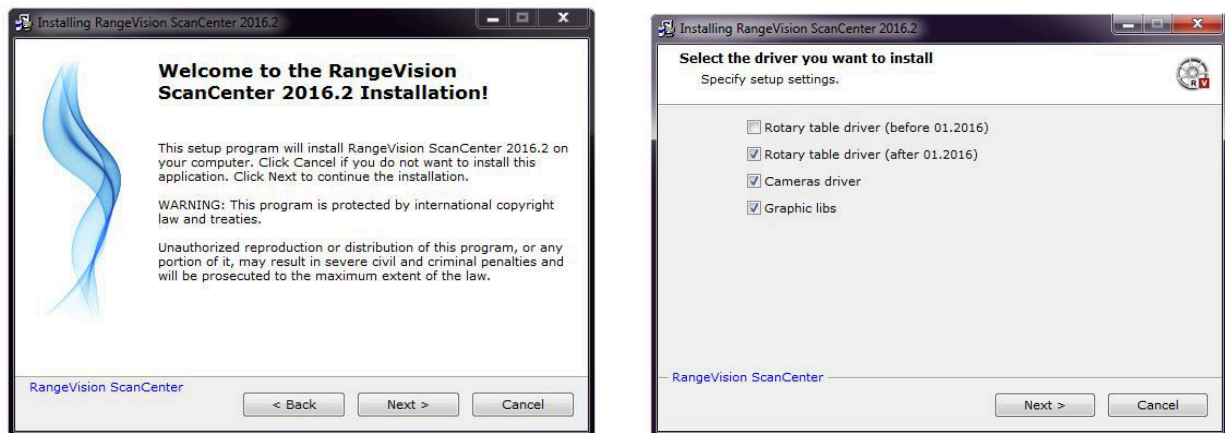
## Package contents



1. Scanning module with LED projector
2. 2 USB cameras
3. Cables (USB+HDMI)
4. USB disk with the software
5. License key
6. Desktop flexible tripod
7. Projector power supply
8. Hex key (to adjust the position of the cameras)
9. Calibration plate for scan zones №1,2
10. Calibration plate for scan zone № 3
11. Magnetic stand for calibration plates
12. Scanning markers
13. Carrying Case

# Installing software and drivers

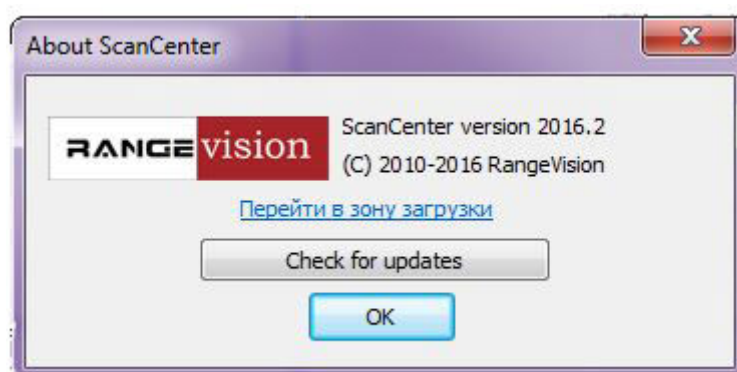
Connect USB disk with RangeVision logo to your PC and launch RangeVision ScanCenter setup



Following the tips, choose the language, type and the path of installation. After copying the files install drivers and graphic libraries, which are necessary for correct functioning of RangeVision 3D scanner.



After the setup on the desktop should appear RangeVision programs: ScanCenter, ScanMerge and IDS Camera Manager. If you have access to the Internet RangeVision ScanCenter will automatically notify you when updates are available. You can check for updates manually by clicking **About → Check for Updates**



# Scanner connection

## Scanner assembly

Remove the scanner from the case, install the scanner unit on the flexible tripod. If necessary, you can use any other tripod for photo and video equipment with a max load of 1 kg and mount 1/4 ".

The cameras are connected via MiniUSB connector, the projector is connected via HDMI.



Do not connect the scanner to the computer before installing the drivers and software

Turn on the power supply into a working electrical outlet and connect to the projector. There is LED signaling projector battery charge on the back of the projector. The projector can use the mains or the battery.

## Connecting projector

After connection the projector will be displayed in the system.

If the computer has several video output you should define the needed one.

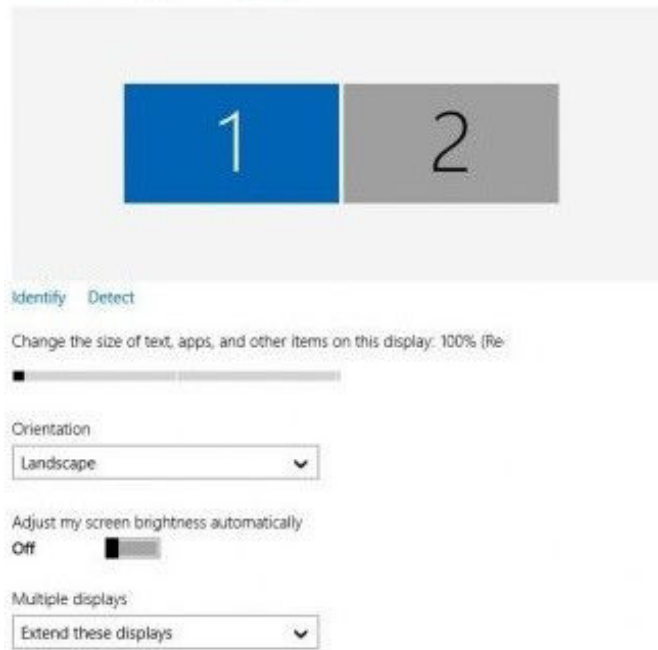


If the second monitor (projector) wasn't recognized by the system – check cable connection and restart the computer. You can also connect the cable to computer with switched on projector if it was off.

- After clicking by the right button on the desktop, choose screen resolution
- Choose in the list – Screen , or by clicking number 2, 2nd monitor.
- Choose Extend these screens choose in the popup Several screens.



## Customize your display

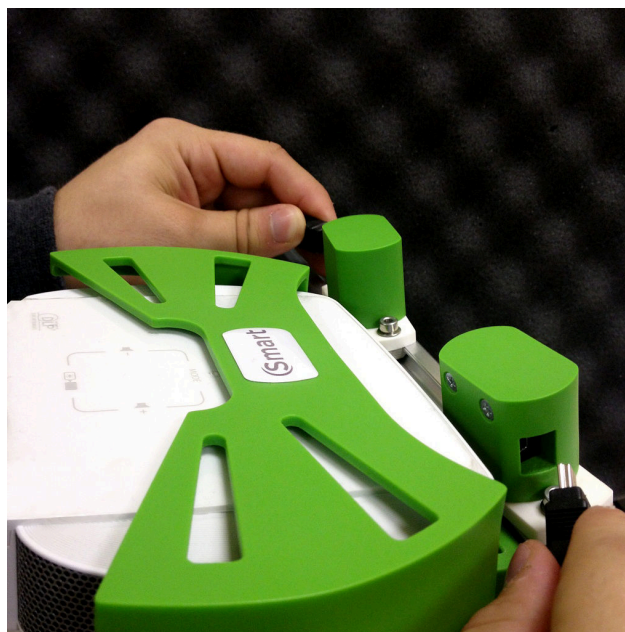


## Cameras connection

Connect cameras to USB ports of your computer. Make sure that USB ports work correctly.



It's forbidden to use USB hub and connect cameras to one port!  
The scanner can't send data correctly with only one USB!





## Connecting the turn table

Before scanning on turn table it's necessary to install table driver, to plug it in and to connect the table with the computer via USB-cable.

Scanner may be equipped with different types of turn tables, with additional power supply or without it, and depending on the controller, the name of the connected device can be different, for example **Silicon Labs**, **Arduino Uno**, **Rangevision Table** and so on.



For checking efficiency of the table, turn it for a little angle. On the menu choose **Adjustment** → **Table calibration**. Enter the angle number and press **Turn**. The table must rotate clockwise, viewed from above. If the table rotates in another direction, change the parameter - **Change the direction** in configuration settings.

Apart from other modes, before using turn table for scanning it's necessary to evaluate its axis (to perform table calibration). It's done in order that the scanner could acquire positioning of table axis for automatical fragment registration. Additional calibration of table is necessary, if during scanning the reciprocal positioning of the table and the scanner changed.

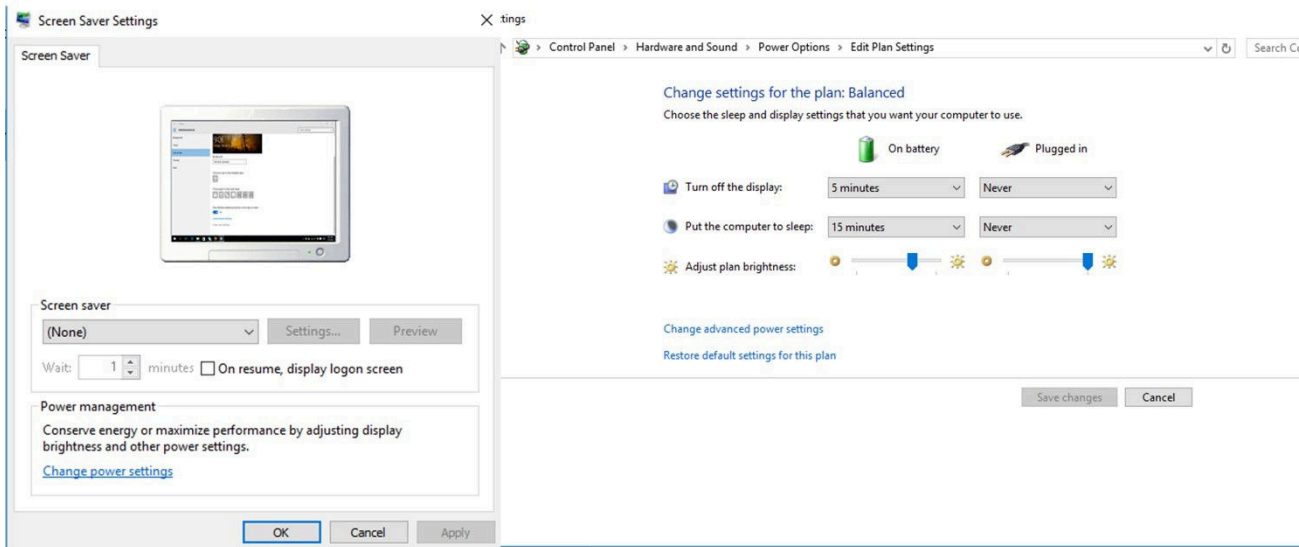
## Setting up your computer for the work with the scanner

For the correct operation of Rangevision 3D scanner you will need to setup your computer. This procedure is performed once before the first use of the scanner.

### Configuring computer parameters

In order to avoid problems with scanner functioning it's necessary to switch off screensaver and sleeping mode.

Click by the right mouse button on the desktop choose **Personalization** → **Screensaver**, switch off the screensaver and transition of the computer to sleeping mode.

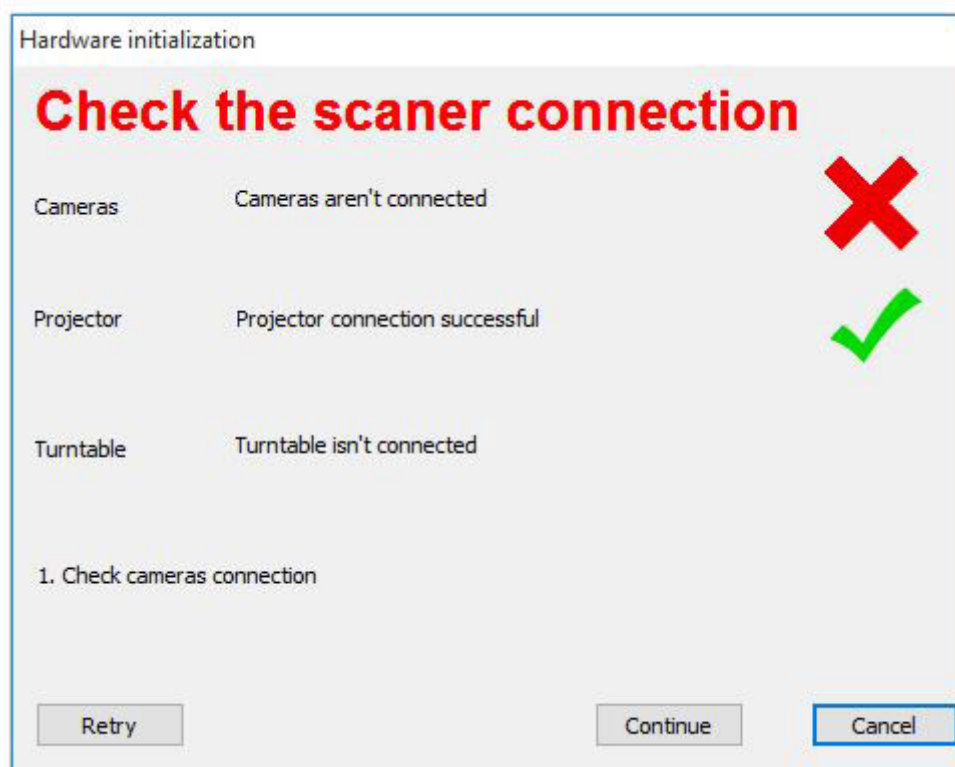


# Scanner setup

## RangeVision ScanCenter launch

Turn on the projector and connect the scanner to the computer. In IDS Camera Manager check the connection and cameras availability. Run **Rangevision ScanCenter**. In order for program to work properly you need to run it as Administrator.

If the scanner is not connected or drivers aren't installed, a warning appears, as shown below:



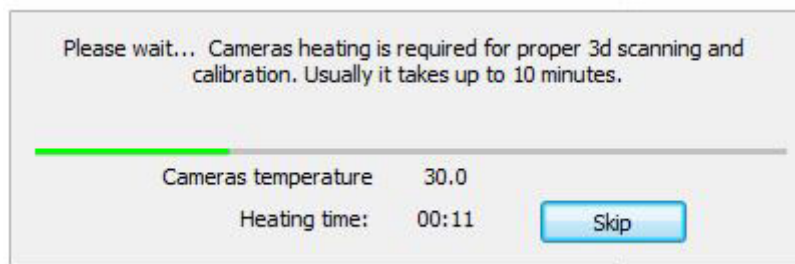
Check the connection of cables, power supply, and then click **Retry**. If you are sure that all the components of the scanner are connected correctly and the connection error persists, click **Skip** to select your scanner settings manually. If necessary, contact the technical support of your reseller. If the scanner is not connected intentionally and none of the components can be found, after clicking **Skip** ScanCenter will run immediately without manual selection of equipment. In the future, you can select hardware on **Settings → Configuration**.

In the case if all the settings are correct, after starting the program, you should see the image from the cameras in the main application window, and the projector will start projecting cross.

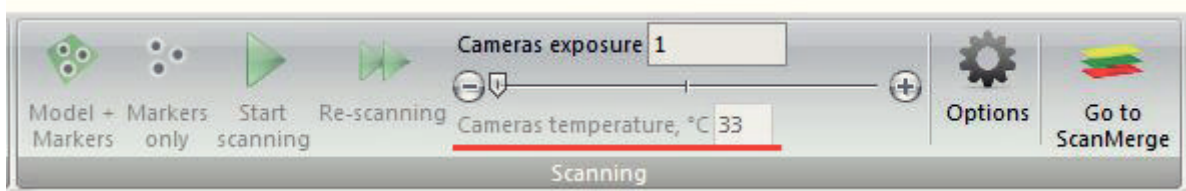


Check that the right corresponds to the right camera image, and the left camera - the left image. The right camera - one that is on your right, if you stand to face scanning object.  
If the cameras are swapped, change the state of the parameter **Swap cameras** on the **Camera** tab in the configuration dialog box

For normal operation, scanner requires warming up. If the cameras aren't warmed up enough, the program at startup will notify you about it.

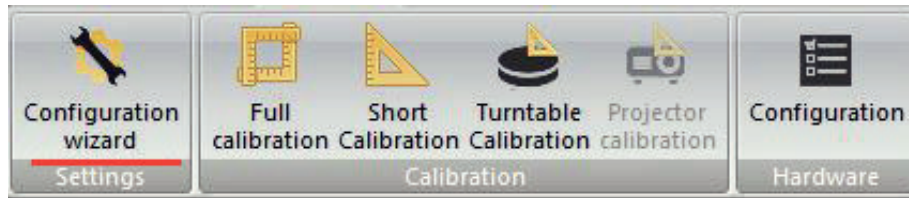


After warming up the value of the current temperature of the cameras is showing in the **Toolbar**.



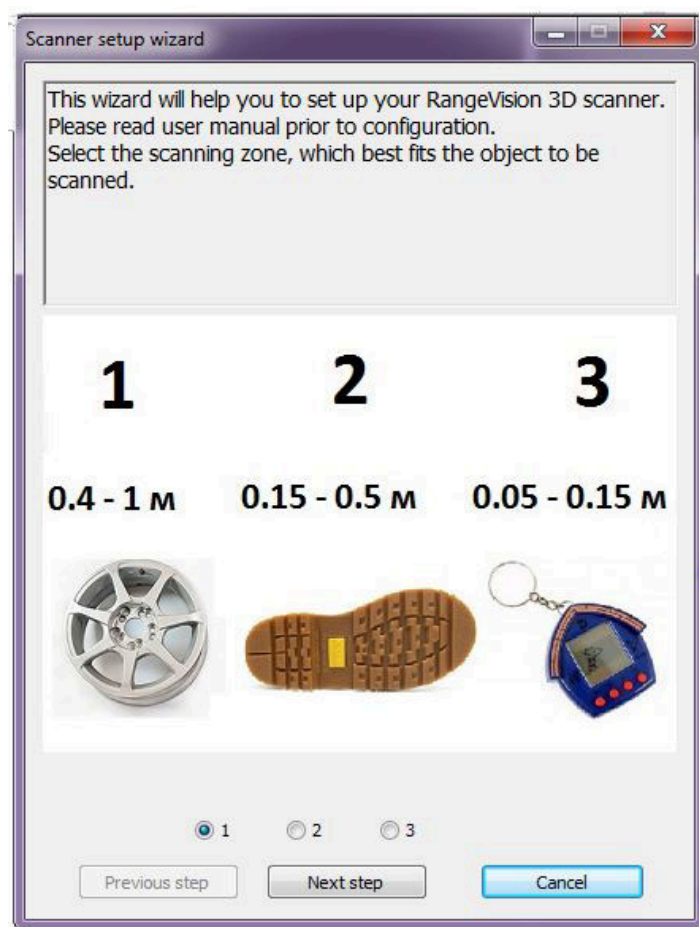
# Configuration Wizard

To configure Smart before scanning, launch **Configuration wizard**. It step by step describes all actions, necessary to configure the scanner. In addition, please carefully read this chapter.



## Scanning zones

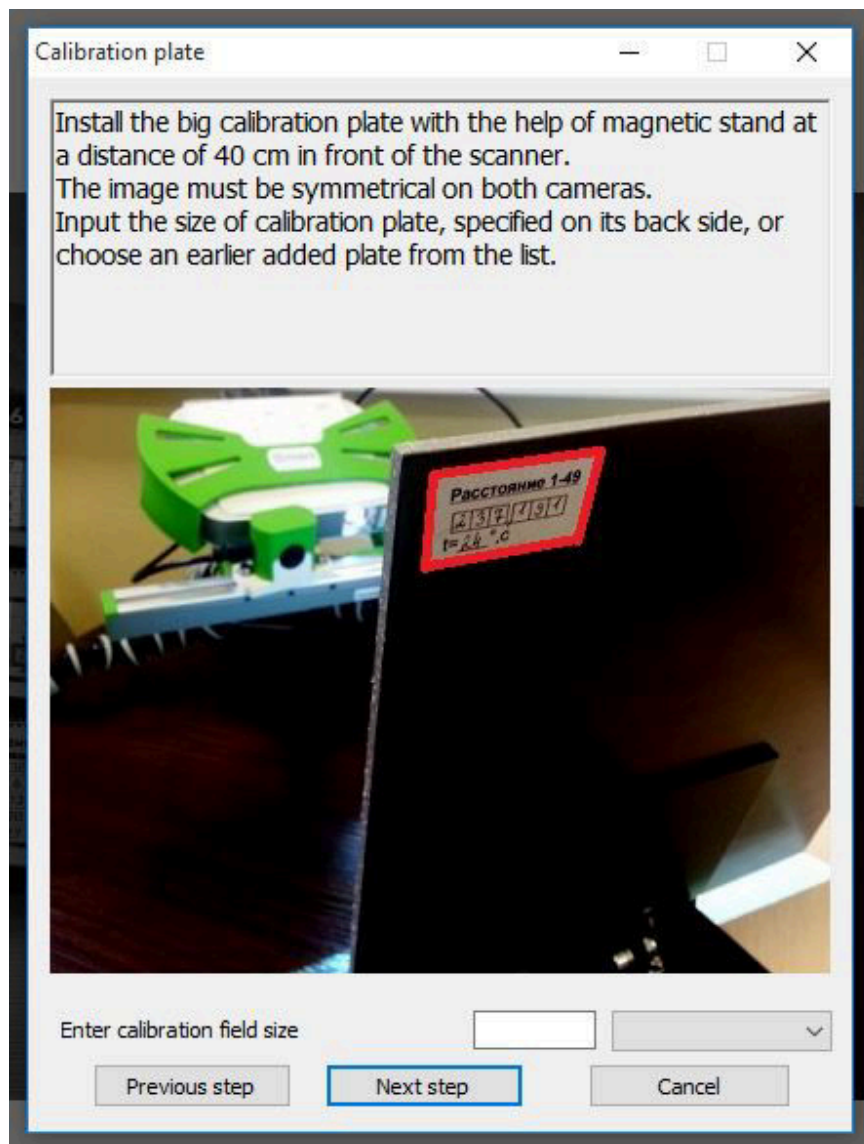
Before beginning the configuration, select the desired scan area (zone), depending on the object scanned.



RangeVision Smart scanner can be configured to 3 scanning zones. By changing the distance between the cameras and the follow-up calibration, changes the size of the scanning zone. For each scanner area a separate calibration plate is used. Scan zone № 3 has higher surface detail, but obtaining a model of a large object will require a greater number of scanned fragments. On scan zone № 1 one capture results a model of a large fragment of the object surface, but with lower detail. The optimal choice of scanning zone is when an object is placed in the scan area and is comparable in size to the calibration plate. Evaluate the size of the object and select a suitable scanning zone.

# Calibration field size

Take the necessary calibration to configure the scanner to the selected scan area. Make sure that the scan area is included in the packaging of your scanner.



The exact size is written on the label on the reverse of the calibration plate. Enter this value in the **Configuration Wizard** or select from the drop-down list of previously entered values.

# Initial setup of cameras

Disconnect USB cable from the cameras, and using a hex key loosen the screws of cameras. Move the cameras, aligning the marks on their housing with the marks on housing of the scanner. On the smallest scan zone №3 the cameras are as close as possible, on scan zone №2 they correspond to the medium position, and scan zone №1 - furthest. Please note, in order to set up the scanner to scan zone №1, first you must perform the calibration for the zone №2, therefore, the initial position cameras should be 2. After installation of cameras tighten cap screws and connect USB cables to the cameras. In the figure below the position of cameras corresponds to the scan zone №3.



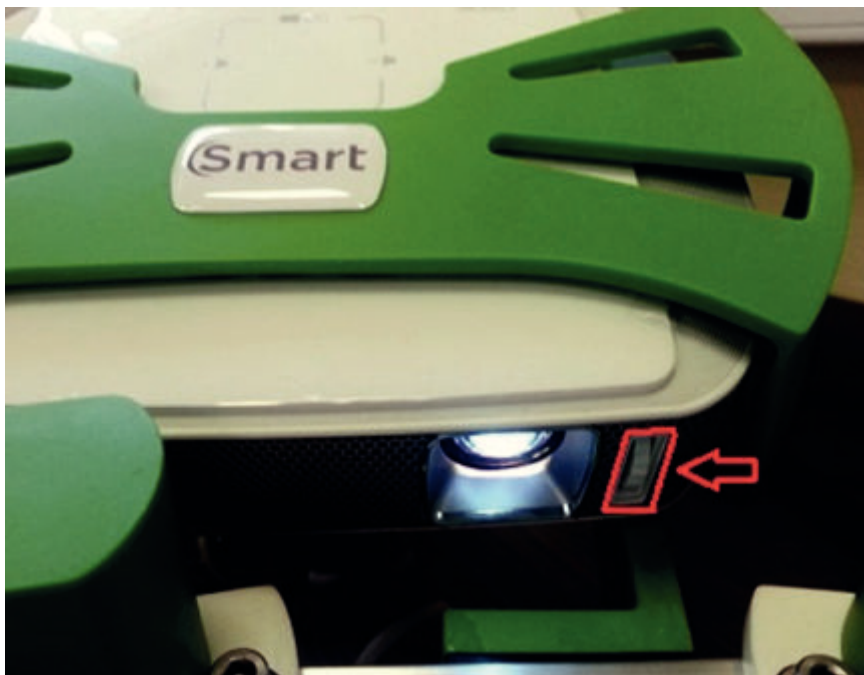


# Working distance and projector focus

Take the calibration plate in accordance with the selected scanning zone: large for scanning zones № 1,2, small for scanning zone № 3. Install the plate on the magnetic stand in front of the scanner.

| Scanning zone, № | 1     | 2     | 3     |
|------------------|-------|-------|-------|
| Distance, cm     | 65-70 | 37-40 | 15-18 |

Install the plate in such a way as to ensure that the blue markings on the view from one of the cameras has matched with furthest marks on the calibration plate, as shown in the figure below. When placing plate on the stand, pay attention that top part of the plate has black triangles. Move the plate closer to or further away from the scanner, until the image from the camera will not display that the vertical lines of grid cross the furthest marks on the plate. On the figure the working distance is determined by the right-hand camera. The distance from the scanner cameras to the plate shall be maintained in this position during calibration and scanning (hereinafter - working distance).



Move the plate or the scanner so that the view of the plate from both cameras is symmetrical, keeping the distance from the scanner to the plate unchanged. Turn on the mode **Lines and stripes** and adjust the focus of the projector, so that the lines are as sharp as possible. Set up the focus is by scrolling a wheel next to the projector lens.

As the cameras are not focused yet, the image may be blurred. Evaluate the adjusted sharpness visually by the calibration plate.



# Calibration

You need to perform **calibration** in order to ensure the work of the scanner after the adjustment of lenses. Specifically for this purpose we use the calibration plate, which pre-measured with high accuracy. Scanning software analyses the image of the plate, obtained from the cameras and compares it with the mathematical model, marked by the algorithm.

There are 3 types of calibration: **Full calibration**, **Orientation (short calibration)** and Calibration of turn table (finding the table axis).

## Full calibration is used if:

- The lenses of the cameras need to be reconfigured (for example, if you change the scanning area)
- If you suspect that scanning accuracy got worse
- After transporting the scanning complex

## Orientation is used:

- If you suspect that the camera moved due to unreliable mounting
- If you want to check the accuracy of performed calibration
- Before the work with the scanner (recommended)

## Calibration of rotary table is performed:

- In case of any change in the position of the rotary table to the scanner (when scanning on the rotary table)

Calibration of rotary table is described in the section **Scanning on rotary table**.

Run the **Full calibration** on the **Settings** tab.

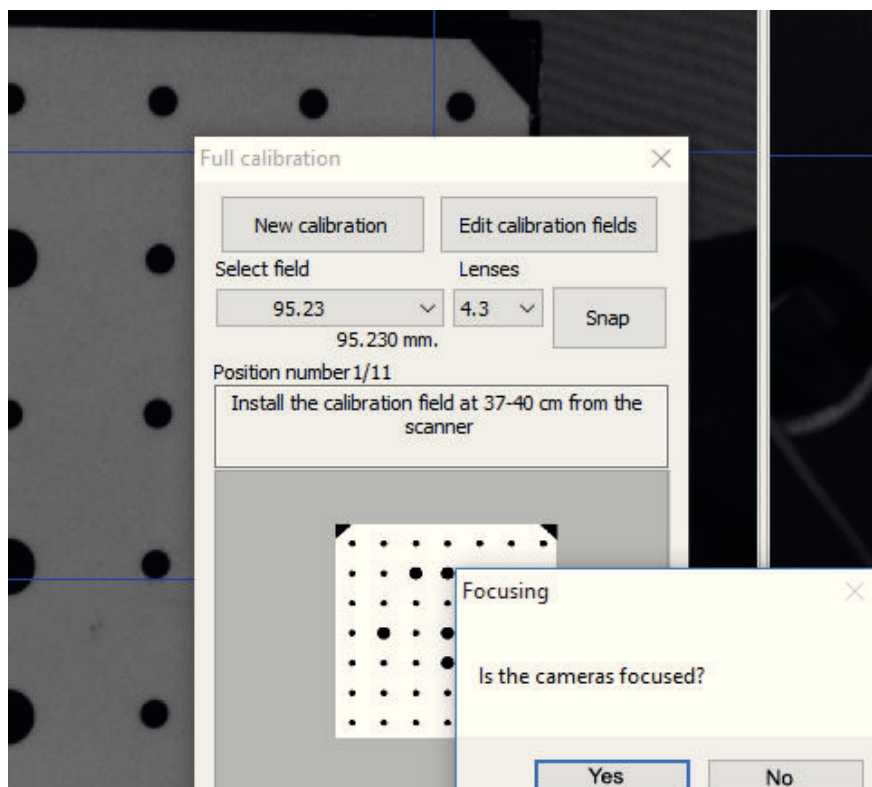
When calibrating the scanner makes snapshots of the calibration plate in 11 different positions. Calibration field is pre-measured with high accuracy. Size of calibration plate is specified in the table on the backside of each plate. This option should be specified in advance before the first calibration in **Edit plates**.

Be careful when selecting the plate, specifying its size, and during calibration! When the calibration is incorrect, there may be problems when scanning and you will receive model with distorted size.

Specify the added plate in the list **Select plate**. When making a selection, settings of Lenses will automatically be changed. RangeVision Smart always has focal length of the lenses of 4.3 mm.

Calibration is performed without illumination with natural light, when you start the calibration dialogue, the mode **"Black light"** is activated. Using the slider in the toolbar increase the value of exposure of the cameras. If the image of the plate is still dark, increase the brightness of the external lighting.

After this, click **Capture**. Camera will focus on the calibration plate. Visually inspect the sharpness of the cameras after focusing.



If the cameras are focused, you will get a snapshot of the plate in the first position. At the calibration during shooting both the scanner and the calibration plate must be fixed relative to each other! To make snapshots in other positions, set the plate according to the instructions in the program and a schematic representation. Do not change the distance to calibration field, if this is not stated in the prompt (positions 10 and 11). To set the plate to the desired position, change the position and tilt of magnetic stand, or the position of the scanner on a tripod.

After the last snapshot will be performed an analysis of the data for calibration.

```

C:\Windows\system32\cmd.exe
2 0.345459      aver_err=0.236917      max=1.81597 <cana,9,49>
3 0.345458      aver_err=0.236938      max=1.81737 <cana,9,49>
field Y
0 0.345458      aver_err=0.236938      max=1.8173 <cana,9,49>
1 0.0639882     aver_err=0.0537895     max=0.365582 <canb,8,1>
2 0.0623709     aver_err=0.0515545     max=0.379202 <canb,8,1>
3 0.0623703     aver_err=0.0515555     max=0.377586 <canb,8,1>
field Z
0 0.0623703     aver_err=0.0515549     max=0.377713 <canb,8,1>
1 0.0596538     aver_err=0.0482685     max=0.388193 <canb,8,1>
2 0.0596536     aver_err=0.048274      max=0.387272 <canb,8,1>
cameras orientation : 0=independent, 1=by first pos., 2=estimate : mode =
relative
0 0.0879476     aver_err=0.06493       max=0.562123 <canb,8,1>
1 0.0667019     aver_err=0.0554963     max=0.459063 <canb,8,1>
2 0.0667011     aver_err=0.0555018     max=0.457148 <canb,8,1>
ellipse centers correction : 0=non estimate, 1=estimate : mode =
ellipses
0 0.0714963     aver_err=0.0607184     max=0.459063 <canb,8,1>
1 0.0664411     aver_err=0.0551689     max=0.458806 <canb,8,1>
2 0.066441      aver_err=0.0551684     max=0.458242 <canb,8,1>
saving new photogr
-----
Final precision is 0.066441 pix.

```

Final precision is 0.\*\* shows the calibration accuracy. Memorize the measured value and close the calibration menu.

Short Calibration function (orientation) is used to test the accuracy of calibration. This is a simplified version of full calibration, the calculation occurs after the one capture of calibration plate in the initial position (at the working distance from the scanner). Orientation is also used to configure to the scan area № 1.

After performing the Full calibration before the scan, perform Orientation. Measured value of Final precision must be less than 0.1 pix. If the value has proved to be greater, perform calibration again, taking care of warm-up of the cameras, the position of calibration plate and the size of the plate specified in the program.

Example 1: A complete calibration result was final precision 0.095 pix, after Orienting - 0.076 pix. Scanner calibration has been performed.

Example 2: A complete calibration result was final precision 0.124 pix, after Orienting - 0.11 pix. Scanner calibration has not been performed, it is necessary to calibrate again.

To calibrate for the scanning zone №1, first you must perform calibration for scanning zone №2. Than you need to close ScanCenter, move cameras to positions for scanning zone №1 (to do this you will have to temporarily disconnect USB cables) and again launch ScanCenter.

Letting cameras to warm up, install calibration plate on the distance 65 - 70 cm from the scanner and perform Orientation. Turn on Stripes and Lines and check the projector focus.

## Some advice on calibration:

- Do not change the distance from the center of the plate to the scanner when turning the plate. The exception are only snapshots in positions 10 and 11.
- Do not rotate the plate at a very high angle. Ensure that all marks on the plate are visible from both cameras, when you turn the table.
- Be careful with calibration plates! It is not permitted to contaminate or perform any mechanical damage to the surface with the marks. After the use store the plates in designated case.
- Before the calibration procedure ensure that cameras and cables are secure in the designated position.
- After calibration the calibration plate should be put inside the carrying case in order to avoid the damage or contamination!

# Scanning

---

## Requirements for the scanned object

The scanner analyses structured light reflected from the surface of the object, therefore, scanning should be carried out in premises without direct sunlight, as well as free of dust and vibration. For the same reason scanning of the following objects is not possible or is too difficult:

- too dark and black objects
- transparent objects
- mirrors
- flecking and glossy objects
- fur

To work with such objects it is recommended to process them with special aerosol products prior scanning, which leave a very thin coat of white powder on the object after drying. HELLING Developer solution U89, Sherwin D-100.

There are also some difficulties when you are scanning objects with sharp edges, deep grooves or holes, thin wall objects. Objects that contain large contrast areas (for example, black lettering on white paper) can also cause problems. Geometrical distortion may appear in places with strong contrast.

## Scanning principle and methods

If you're shooting a single fragment (scan) - you get a three-dimensional model of the object surface. To create a full object model you need to obtain surfaces of the object, that together entirely replicate the form of the object, i.e. scan the object from different angles.

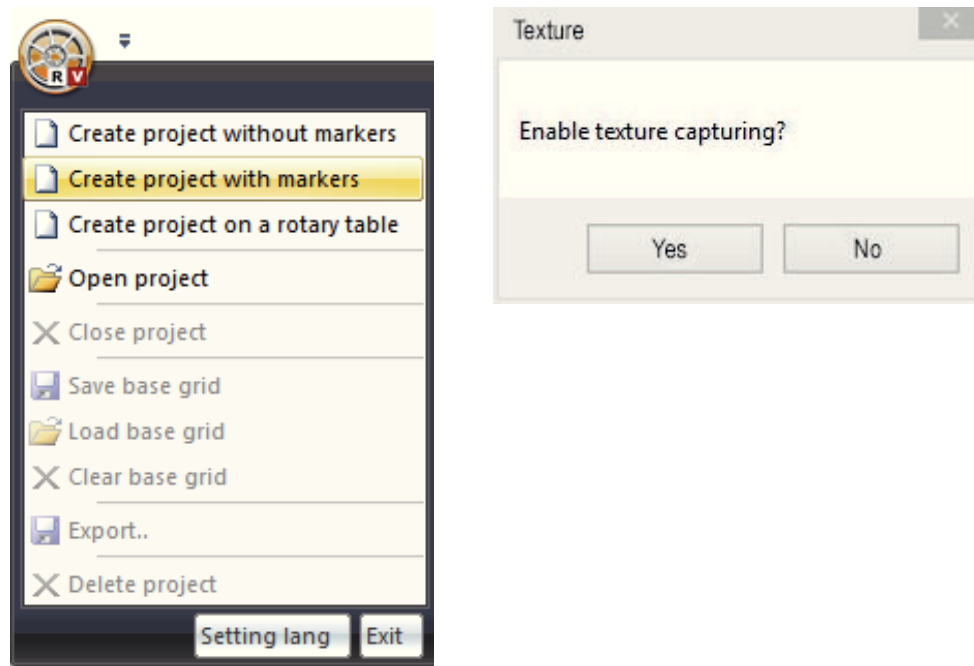
Obtained fragments are combined in the special software by the surface geometry, hence there is another requirement - the object must be rigid and do not change its shape during the entire scanning procedure. Otherwise, the geometry of the same area of the object surface of different scans may be different, and it will be impossible to unite the pieces into a coherent whole.

In RangeVision 3D scanner there are 3 scan options available, which are different, in the first place, by the fragment alignment method:

- Scanning without markers
- Scanning with markers (marks)
- Scanning on the turn table (optional, not included in the standard kit)

# Creating a new project

To start scanning create a new project in accordance with the selected scan method.



Specify the location where you want to save the project and scan data. When you choose the path where you want to save the project, consider a large volume of scan data. Scan data are saved in a folder «Project name\_folder».

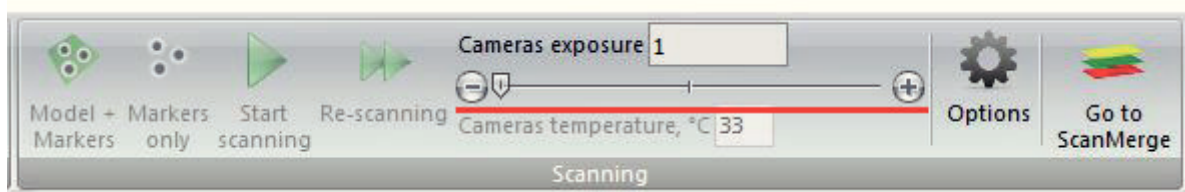
After creating a project you must select the scan mode – with texture or without.

## Placing an object

After you create a project, place an object in front of the scanner at the working distance from the cameras. The approximate distance to the surface of the object is specified in the table in Calibrations section. The object must be mounted securely to avoid vibration and change of the position during the scan process. If the object does not fit entirely into the scan area, you should not move the scanner further to "increase" the scanning area. This will lead to the decreased quality of the model. Scan the object in a few positions, for example, the top and the bottom parts separately, and then unite these parts. Using the auxiliary materials for securing an object, take into account the possibility of their removal from the 3D model.

# Adjusting the exposure and brightness

After you place an object at the needed distance, switch the projector to the **Lines and Stripes** lighting mode. Adjusting exposure of the cameras (the slider in the toolbar), get maximum exposure value, which does not cause red dots to appear on the lines. Areas of the image, not relating to the scanned object, don't matter. Red color mark the areas of the excess lighting. The scanner doesn't digitize such areas.

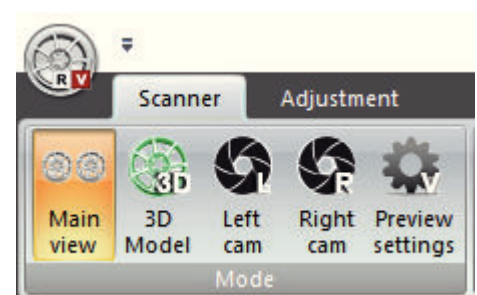


When working on battery, the brightness of illumination is lowered. Projector with fully charged battery may work about an hour without being connected to a power supply.

Due to close distance to an object, it may be necessary to lower the brightness of lines and stripes in the menu **Brightness settings**. Set the brightness of lines at approximately 2 times greater than the one of the stripes. Visually lines and stripes must be the same brightness. Also you may lower the brightness of the projector itself.

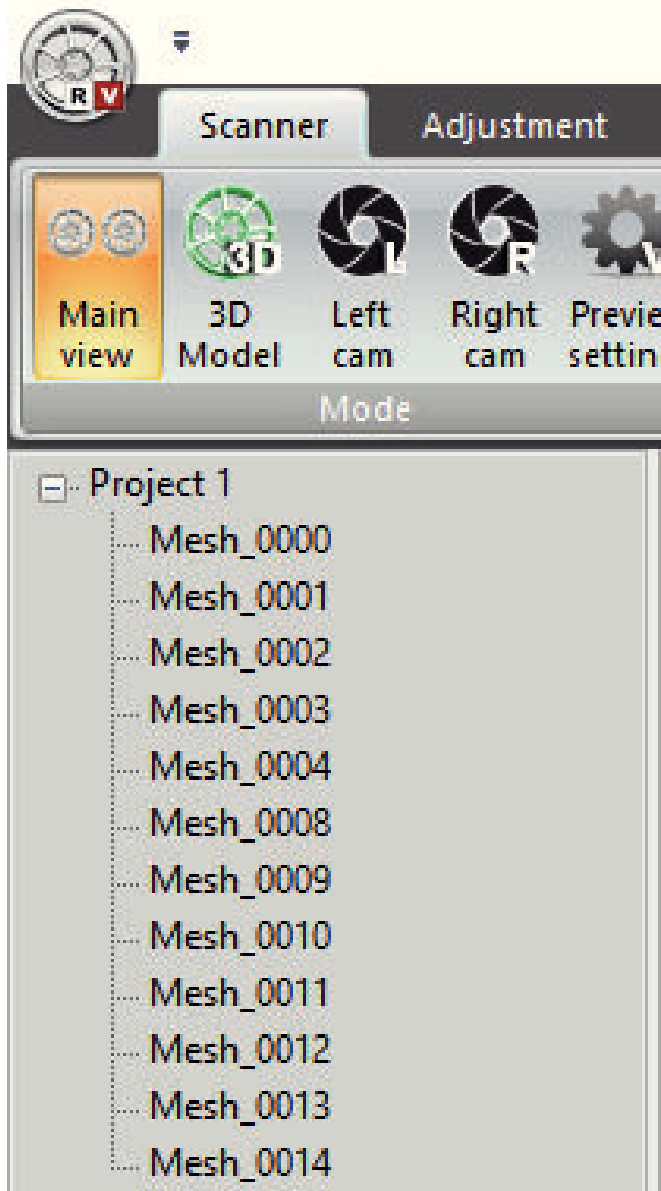
## Viewing the model

To see the whole preview model you can rotate, zoom and pan the 3D view. For the convenience of scanning, you can switch the display mode: only images from the cameras, only 3D model or an image and model together.





| Action   | Tool                                       |
|--|--|
| Rotation of the model                            | Left mouse button                          |
| Rotation of the model in the plane of the screen | Left mouse button on the edges of the view |
| Zooming/Deleting                                 | Middle mouse button (press mouse wheel)    |
| Dragging the model in the plane of the screen    | Right mouse button                         |



You can simplify preview for decreasing time of redraw model. You can do this in the **Preview options** menu. For this drag the slide control change the degree of model simplification from 0 to 10: 0 not a simplified model, 10 the most simplified model

The left side of the main software window contains **project tree**, which specifies all scans contained in the project. When you select a project - the field of viewing 3D model displays all scans, when you select an individual scan - it will be the only one displayed. To delete bad fragment just select it in the tree and press **Delete**. For convenience, each fragment has its own color.



# Scanning without markers

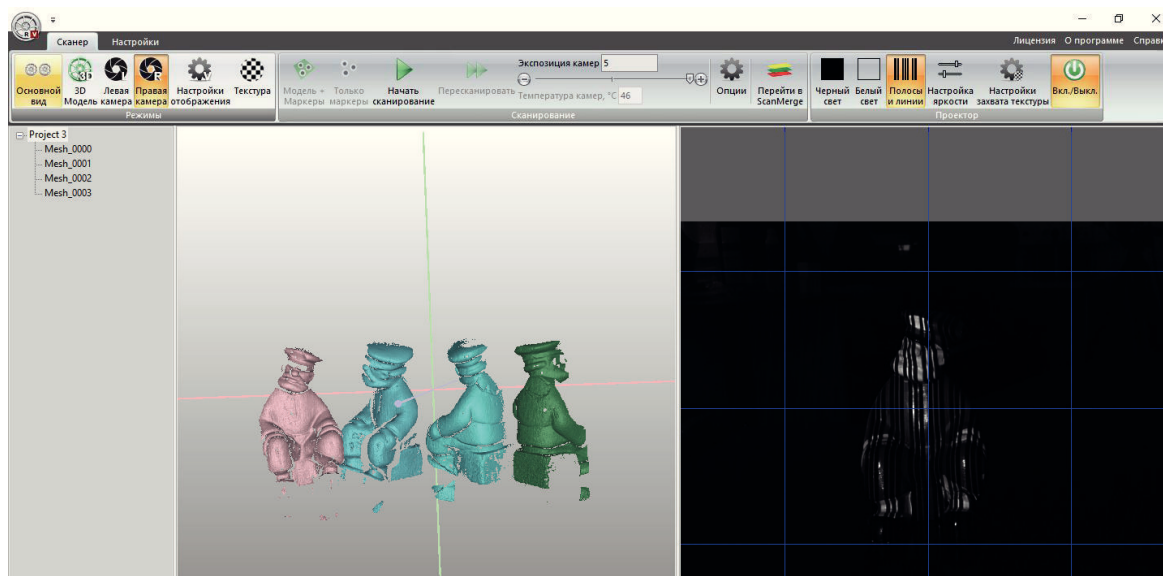
When scanning without markers, the fragments of the model surface may not be oriented in relation to each other, which decreases the scanning speed and the process of gaining a 3D-model.

This scanning method may be used if the surface of the object has expressed assymetrical relief, which will later serve as basis for fragments registering.

## Sequence of actions when scanning without markers:

- Prepare the surface of the object to be scanned (if needed)
- Create new project without markers or open an existing one
- Perform Orientation to check calibration of the scanner
- Install object in front of the scanner at a working distance
- Turn on Stripes and lines mode, check the sharpness of the projector and with the help of the slider adjust the exposure of cameras
- Start scanning with the corresponding button
- Aim the scanner at the object at a different angle to obtain the next segment
- Scan the object from desired sides, controlling the quality of obtained scans in the 3D model viewing area.
- After the end of scanning Go to ScanMerge for processing of obtained data

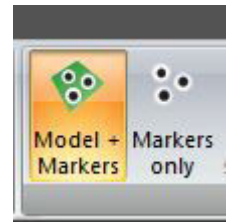
## The example of obtained data when scanning without markers:



# Scanning with markers

This scanning method is more convenient than scanning without markers. In addition to construction of the object surface, in this mode the scanner finds marks and calculates their coordinates. If each of the following scans has enough related marks from previous ones, new fragment automatically will be placed in the desired position. In this way, all the pieces will automatically form a three-dimensional object model, making it easier for further processing of the scan data.

Found markers form a **reference grid**. You can create a reference grid in advance, and then scan the object. Thus each scan will be connected to the reference grid, and not to the previous scan, without the need for overlap between them. Thus, you can stick fewer markers to an object. Switching between creating a reference grid and scanning is done in the control panel.



Reference grid can be used repeatedly, if you're using auxiliary object for your scanning process (surface with markers). Reference grid can be uploaded in different formats: **basegrid**, **obc**, **txt** from third-party sources, for example, from photogrammetric system, that allows you to scan large objects without significant loss in accuracy. If you want to create the reference grid press the **File** **Save** reference grid.

When sticking markers to an object it is desirable to choose flat areas. In this case, on obtained model you can cut the section with the mark, and **cover** the blank space without significant losses in a result.

For scanning it is convenient to use additional dark rotating platform with in advance placed markers. Using a dark surface, which is "invisible" for the scanner, simplifies removing extra areas when processing the model.



If a project can not cover all necessary areas to scan without moving the object relative to the surface with markers, you need to create multiple projects (by number of positions of the object relative to the markers) and then during the processing load them together to combine.

Markers should be attached as chaotic as possible. Avoid expressed patterns or curves, as this may provoke incorrect detection of markers. If the new fragment is not correctly oriented in relation to the model, delete it to create a next scan. When using auxiliary surface, object should not move in relation to the markers during the scan!

If there are not enough markers on the new scan (less than three) or the software is unable to joint scan to already existing ones, an error message is sent and the scan is considered to be unsuccessful. Also, an error may occur if the scanner was decalibrated and can not properly assess the size of the markers.

Brightness of the projector light when identifying markers can be changed. Turn on the illumination mode **Markers** and open the **Brightness settings**. Specify the brightness value, at which the markers can be clearly seen on the output from the cameras.

When creating project with markers, it is necessary to specify the type and size of used markers. Scanner kit includes black markers with radius of 2.5 mm.

Sequence of actions when scanning with markers:

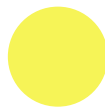
- Stick markers on the object or auxiliary surface
- Prepare the surface of the object to be scanned (if needed)
- Create new project with markers or open an existing one
- Perform **Orienting** to check calibration of the scanner
- If the reference grid of 3D-marks is already created - load it through **File→Load reference grid**

- Set the object at a working distance from the scanner
- Turn on **Stripes and lines** mode, check the sharpness of the projector and with the help of the slider adjust the exposure of cameras
- Start **scanning** with the corresponding button
- Scan the object in the next position, visually observing the correctness of fragments stitching in the 3D model viewing area. If the scan during stitching is in obviously incorrect position, it is clear that such scan should be deleted - select it in the tree and press **Delete**.
- Go to ScanMerge for further processing or create a new project to scan the object from the other side.

Identified markers may appear in the following colors:



Marker found on several scans  
(reliable)



Marker found only once  
(not reliable)

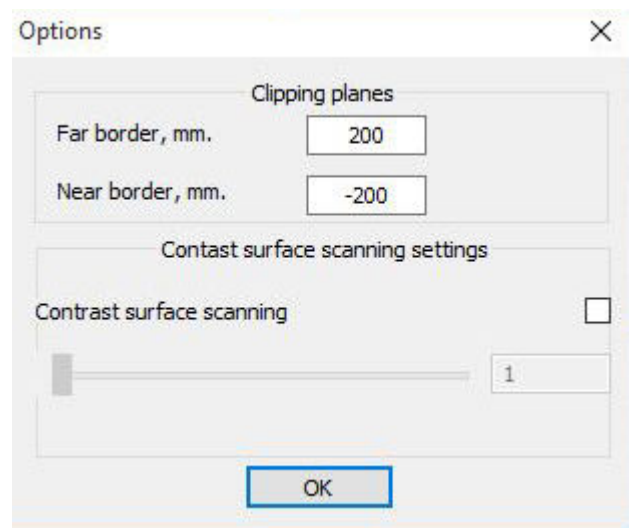
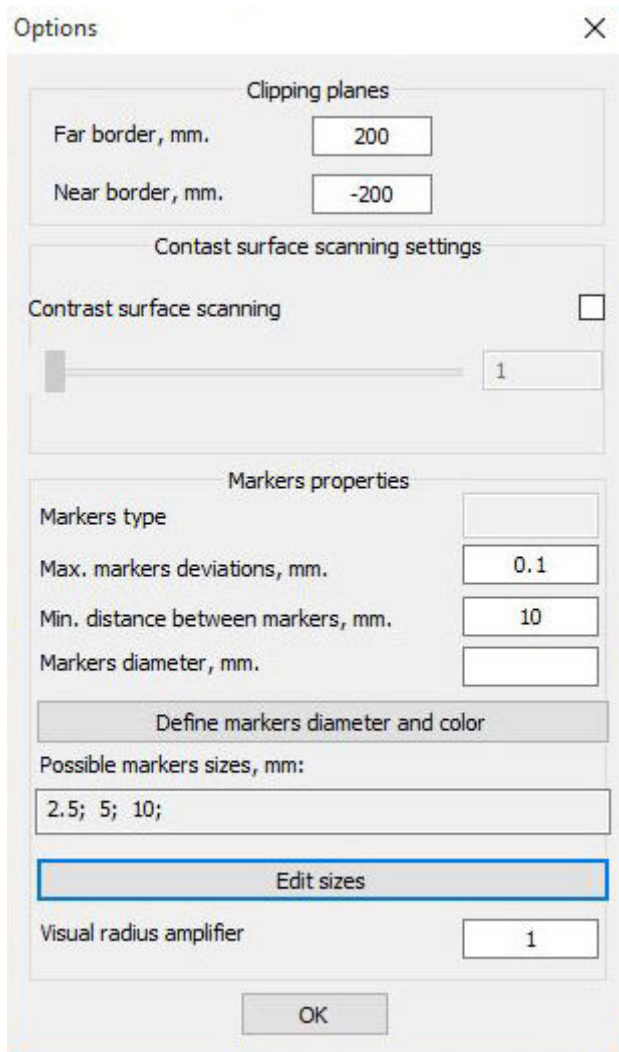


Marker of the  
reference grid

## Options

**Options** menu displays the properties of the project. Depending on the type of the project, the number of options may vary.

When **scanning without markers** in **Settings** you may change the parameters for interception of the model by planes. The scanner is building a 3D model only of those parts of the object, which fall into the area, limited by near-end and far-end clipping border. For example, if far-end and near-end borders are 200 and -200mm respectively, and the scanner is configured to the scan zone 2 with working distance of about 40cm, the model would be constructed only in the area of 20 - 60 cm from the scanner.



When **scanning with markers** besides the above mentioned parameters in **Settings** you may also specify marker properties. When using customized markers, specified their radius in the corresponding field.

## Scanning with a turntable

Scanning at turn table is executed without markers. The object of scanning is placed at the table platform and is scanned from several angles.

### Order of scanning at turn table:

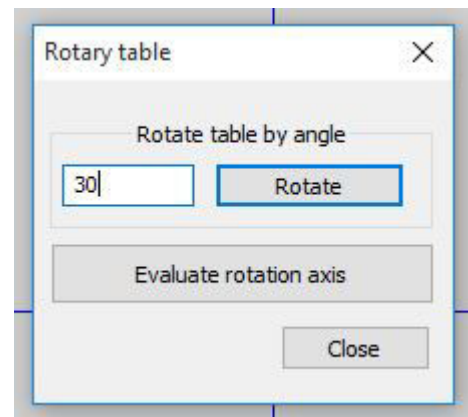
- To create new **project at turn table** or to open an existing one
- To place the object at the center of table platform
- To place the object in the way that it's at the optimal distance from the scanner and the turn table
- To adjust camera shutter speed, brightness of lines and stripes, projector sharpness
- Go to **Options**, set the deletion in scanning fragment in the field **Cut by cylinder**, considering the size of scanned object
- To set the number of scanned images to the full rotation of the table in the field **Positions**, or to set the number of angle rotation in degrees in the field **Angles**





Optimal number of table positions 8-12. By increasing the number of positions an excessive number of object fragments may be created, which will cause longer processing

- To remove the object from table platform and replace it by calibration field
- To measure the distance from central mark of the field to table surface, to put this number into the field **Highness of central mark in Options**
- To press the button **Define the axe of turn table** in the menu **Table calibration**
- To carefully replace the field with the object at the table, without changing scanner positioning relatively to the table
- **Start scanning**
- After finishing scanning **pass to ScanMerge** for processing

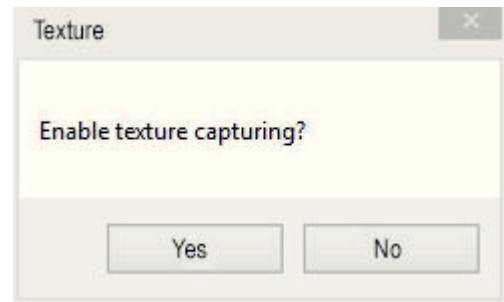
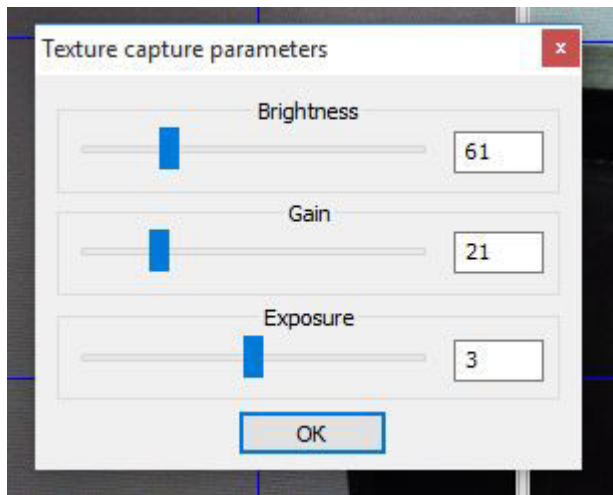


## Scanning with texture

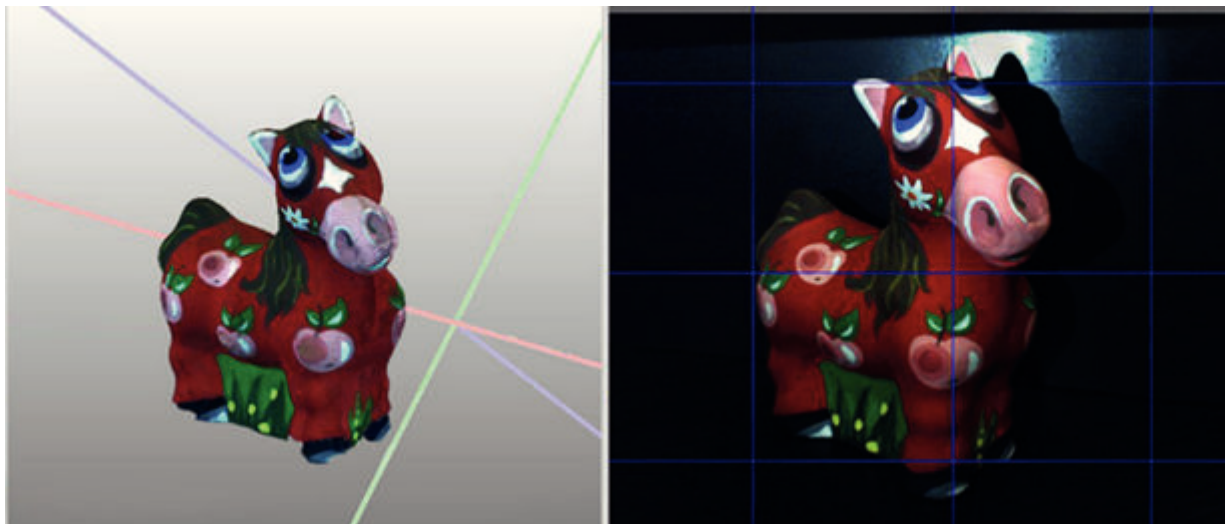
3D scanner RangeVision Smart has a feature of colored scanning. Obtaining a 3D model with texture can be achieved both through scanning with or without markers. Choice of scan mode is performed when you create a project:

Setting parameters of color scanning is performed in the **Settings for texture capturing**. When opening the menu the image from cameras gets colored.





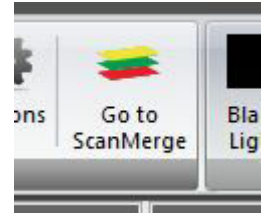
Before the scan, placing an object in front of the scanner at the working distance, adjust the **illumination brightness**, **amplification** and **exposure**. Set such values of the parameters at which the colors on the image from the cameras will be the most accurately matching the actual object colors.



Model with texture can be exported only in the OBJ format. Detailed information on export of models is contained in the manual on ScanMerge.

# Processing of the data

When scanning is finished, transfer results in ScanMerge program for processing.



To do this, click **Go in ScanMerge**. The project, which is opened in ScanCenter, will be transferred to ScanMerge.

RangeVision ScanCenter will continue to work in the background to maintain the operating temperature of the cameras. The projector can be turned off at this time.