

TARGET VIEWER

3D-MIMO-RADAR

Devices: *iSYS-5010, iSYS-5011, iSYS-5020,*
iSYS-5021, iSYS-5110

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History

Document revision	Date	Change log	Author
1	2016-11-30	First release	VR
2	2017-01-13	Save/load parameter file description added	TP
3	2017-01-10	Support for iSYS-5110 added	TP
4	2017-03-27	document network settings for iSYS-5110	PG
5	2017-11-30	Description for change sensitivity	SW
6	2017-12-20	Support for iSYS-5020 added	CIB
7	2018-02-07	Recording and playback function for iSYS-5010 included	BG
8	2018-03-15	Added all changes coming up with V1.024	SW
9	2018-05-04	Added description for IP configuration iSYS-5020	TS
10	2018-05-07	Changed sensitivity default values for iSYS-5020	TS
11	2018-05-09	Unused functionality removed	TS
12	2018-05-18	New screenshots	SW
13	2018-11-13	Support for iSYS-5011, iSYS-5021 and new tracker library added	CN

1. Target-Viewer description

The Target-Viewer can be used to configure and display the target list of an iSYS-5XXX RADAR sensor. It displays a 2-D (x-y) map of the observed scene with the targets positioned in range and azimuth. The velocity information and moving direction are indicated by the color of the target and the RCS value is indicated as value. A background image (google maps, etc.) can be imported to perfectly visualize your observed scene.



2. Connection of the RADAR sensor to a PC

2.1. iSYS-5XXX connections

The Target-Viewer has to be connected by two ways:

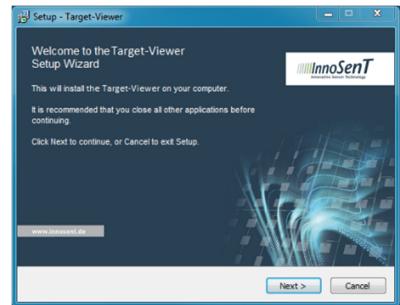
- SPI (totalphase beagle SPI protocol analyzer)
or ETHERNET to receive the target list
- UART or RS485 (UART/RS485 to USB
converter) to read and write parameter from
or to the iSYS-5XXX

Sensor	Target List Interface	Configuration Interface
iSYS-5010	SPI	UART (UART-USB converter)
iSYS-5011	SPI	UART (UART-USB converter)
iSYS-5020	SPI or ETHERNET	UART (UART-USB converter)
iSYS-5021	SPI or ETHERNET	UART (UART-USB converter)

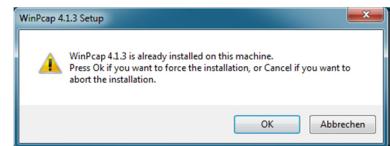
3. Target-Viewer installation

The setup files for the Target-Viewer can be found in the device software package. Please ask InnoSenT for the software package. For series products the packages can be downloaded on the homepage: www.innosent.de.

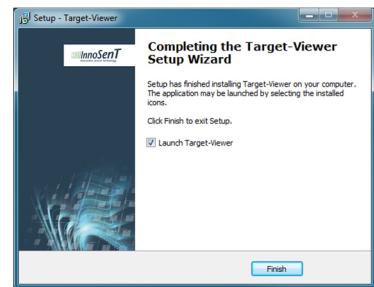
- Download Software Package Target-Viewer
- Double click on “Target-Viewer_Vx.xxx.exe”
- Follow the instructions



- If WinPcap is already installed proceed with Cancel – otherwise install WinPcap



- Click “Finish” to close the setup and to launch the Target-Viewer



- Select your device after launching the Target-Viewer



4. Target-Viewer overview

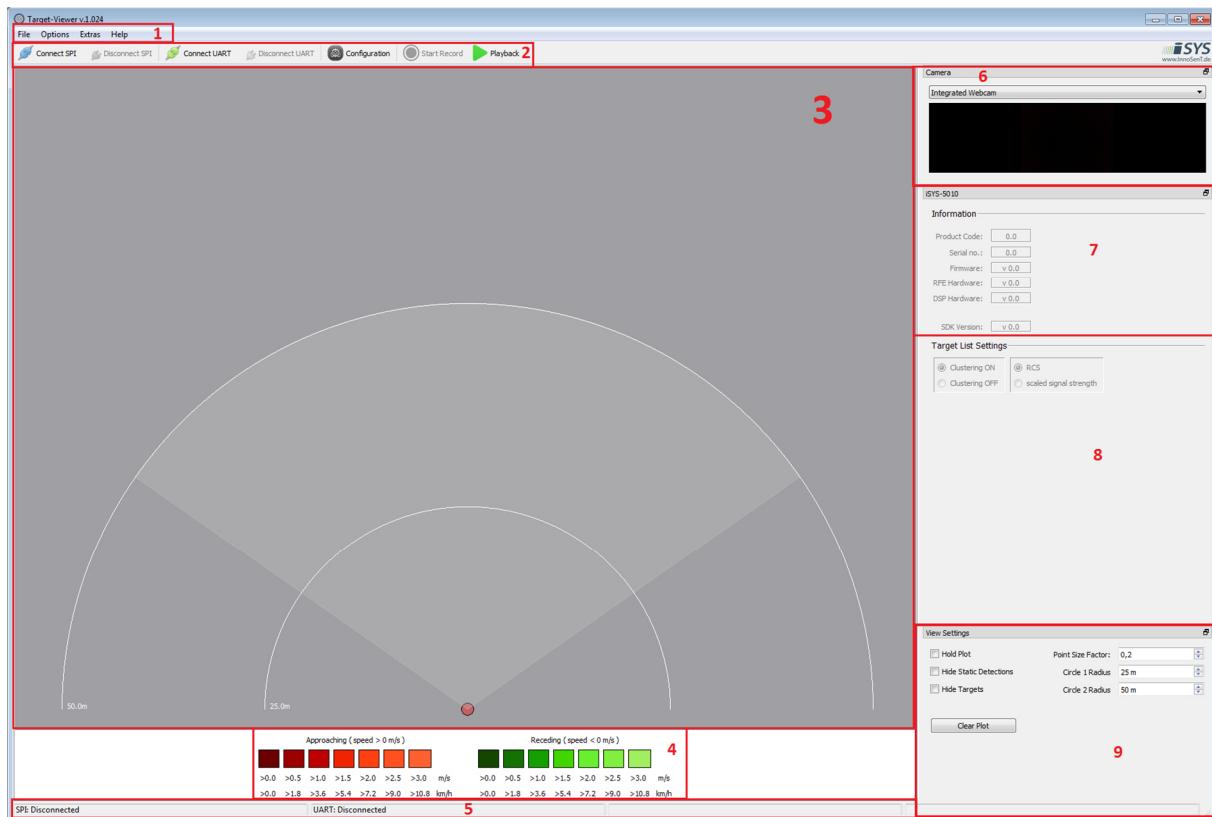
The Target-Viewer has the following elements:

1) Menus:

- File: close the Target-Viewer, save/load parameter file, save/load Target-Viewer configuration
- Options: configuration options of the RADAR sensor (Options are only available when iSYS-5XXX is connected to UART)
- Extras: update firmware
- Help: version information of the Target-Viewer and register for advanced settings

2) Sensor connection and configuration

- 3) Display the target list
- 4) Velocity information
- 5) Communication status
- 6) Camera
- 7) Radar sensor information
- 8) Target list settings
- 9) View settings options



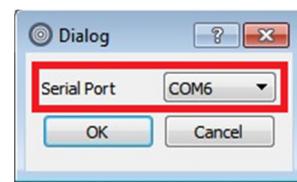
5. Connection of your RADAR sensor

Connect your device to your PC through UART and SPI or Ethernet and switch on your power supply. **The boot process of the device takes about 5 seconds.**

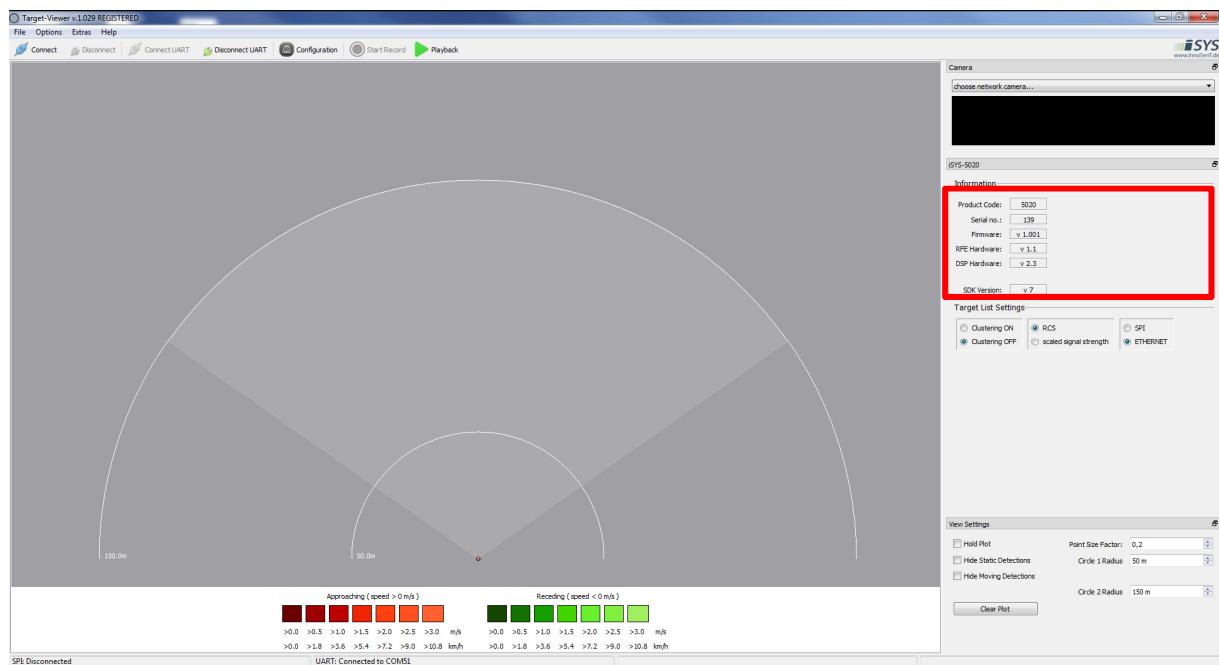
- 1) Click "Connect UART"



- 2) Select your Serial Port and click "OK"



After successfully connection, the Target-Viewer will display the status "UART: Connected to COM X". The information of the RADAR sensor is now handled by the Target-Viewer and displayed in the sensor information window.



5.1. Configure the channel frequency

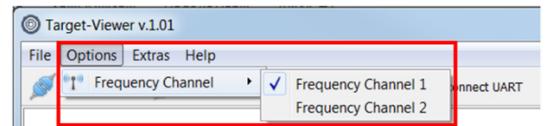
The RADAR sensor allows to choose between different frequency channels:

- Frequency Channel 1: up ramp
- Frequency Channel 2: down ramp

To choose the frequency channel:

- 1) Click “*Options*”
- 2) Click “*Frequency Channel*”
- 3) Choose the “*Frequency Channel*”
- 4) The active frequency channel is marked with the symbol “✓”.

The selected frequency channel will be saved on the RADAR sensor as default parameter

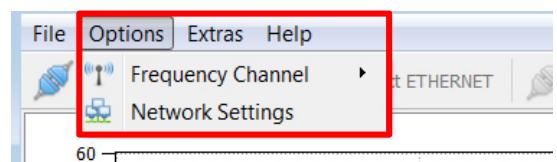


5.2. Network settings

The iSYS-5020, iSYS-5021 and iSYS-5110 RADAR sensors offer the possibility to change the network settings.

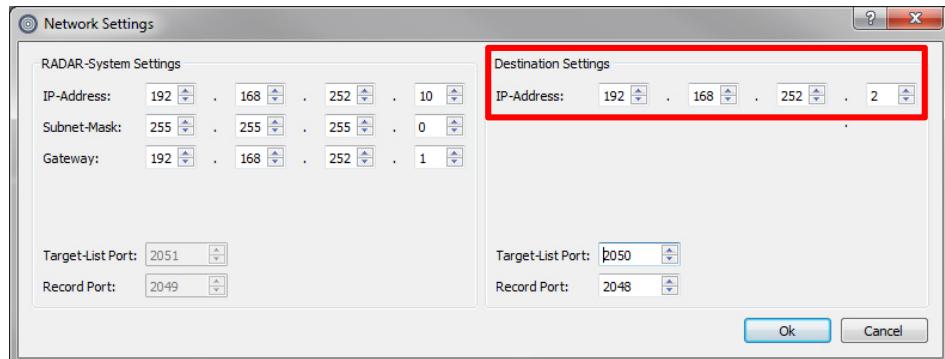
To change the network settings:

- 1) Click "Options"
- 2) Click "Network Settings"
- 3) The "Network Settings" window shows the default parameters from the following radar sensor



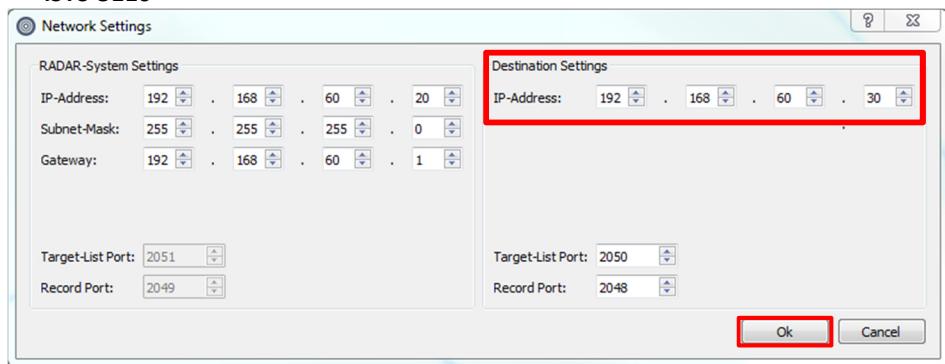
Network configuration:

iSYS-5020 & iSYS-5021



Note: For iSYS-5020 and iSYS-5021 make sure that Ethernet connection is configured. Otherwise you cannot receive the target list over Ethernet. More detailed information can be found at 6. Target list display.

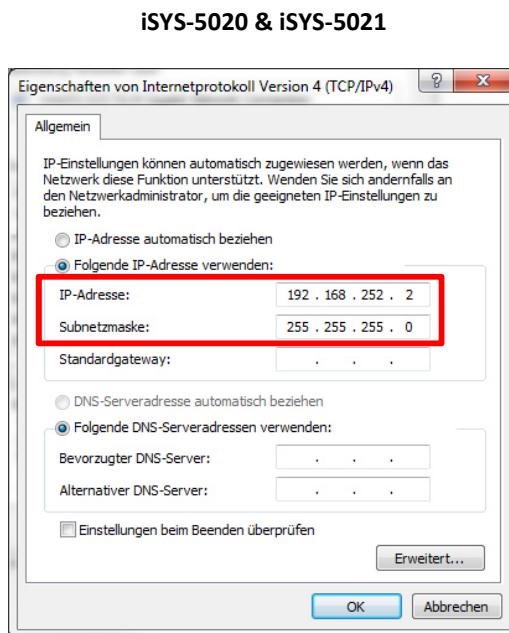
iSYS-5110



- 4) Click "Ok" to save the settings

5) Check network settings of your Ethernet adapter

Configure the IP address of your Ethernet adapter to the same settings as the “Destination Settings” from Step 3). The RADAR sensor does not support DHCP and is set to static.



6) Reconnect your Ethernet connection

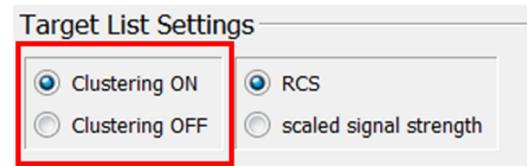
5.3. Configure target clustering

The iSYS-5010 and iSYS-5020 RADAR sensors offer the possibility to display the target list with or without a clustering. Clustering regroups the multiple response of the observed targets in the target list and display the mean position of the clustered.

To enable or disable the clustering option:

- In the “*Target List Settings*”:
 - Click “*Clustering ON*” to enable it
 - Click “*Clustering OFF*” to disable it

The choice of having the clustering on or off is then saved on the radar sensor as default parameter.



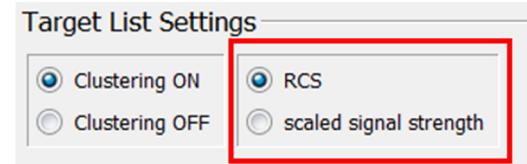
5.4. Configure RCS calculation

The iSYS-5010 and iSYS-5020 RADAR sensors offer the possibility to recover either the scaled signal strength or the RCS value of a target.

To enable the RCS calculation and receive the RCS values:

- In the “*Target List Settings*”:
 - Click “*RCS*” to choose the RCS value
 - Click “*scaled signal strength*” to have the scaled signal strength

The choice of having the RCS or the scaled signal strength is then saved on the radar sensor as default parameter.



6. Target list display

The Target-Viewer offers the possibility to display the target list

- For iSYS-5020 and iSYS-5021 it is possible to change the target list output. The target list can be received over Ethernet or SPI. The configuration can be changed at "Target List Settings".



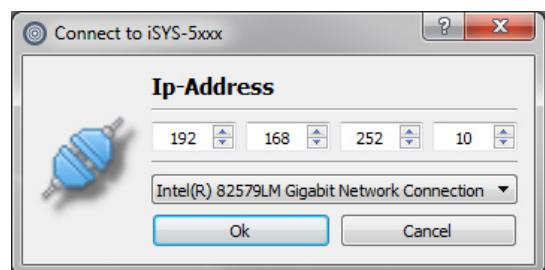
Note: The target list output can only be changed when UART is connected. For receiving the target list over SPI you need a totalphase SPI Beagle adapter.

- For SPI connection click "Connect SPI" (available for iSYS-5010 and iSYS-5011 and for iSYS-5020 and iSYS-5021 when the target list output is configured as SPI)
- for Ethernet connection click "Connect" (available for iSYS-5110 and for iSYS-5020, iSYS-5021 when the target list output is configured as Ethernet)

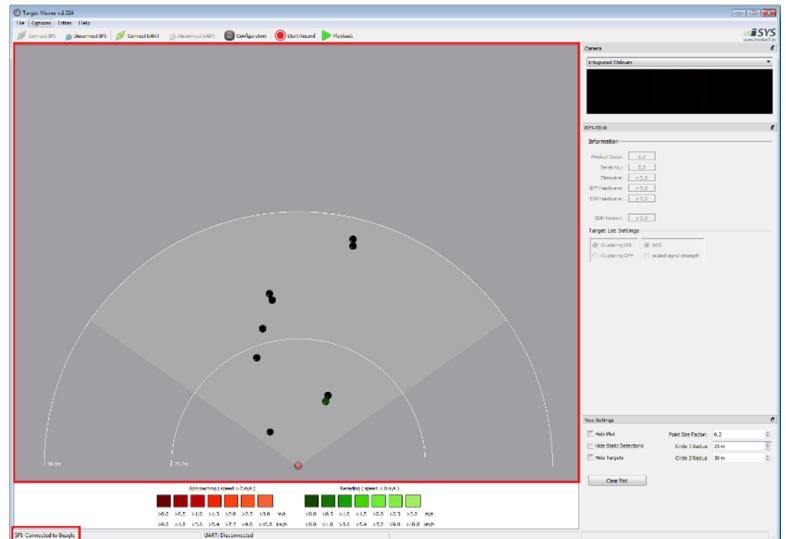


Sensor	Default IP address
iSYS-5020	192.168.252.10
iSYS-5021	192.168.252.10

If UART is connected, the sensor's IP address is automatically set. The default network settings can be changed, which is described in chapter 5. Choose the Ethernet adapter where the device is connected and click "Ok".

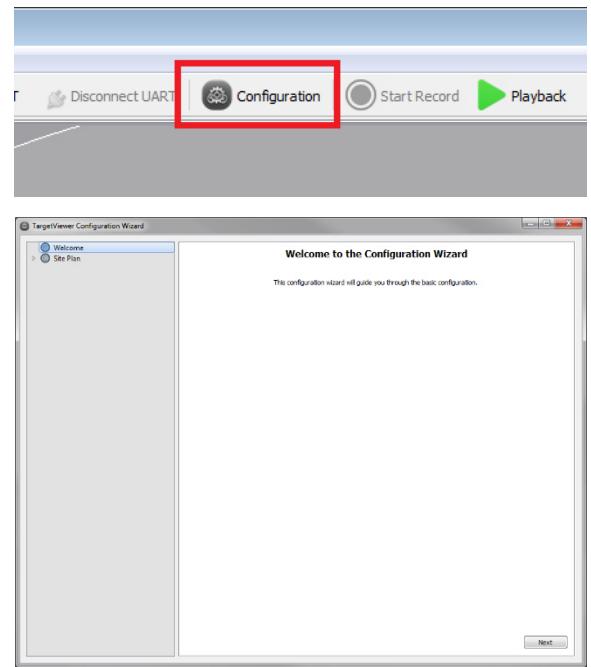


- The connection information of the interface is shown at the bottom of the Target-Viewer. The target list is displayed on the 2D map.



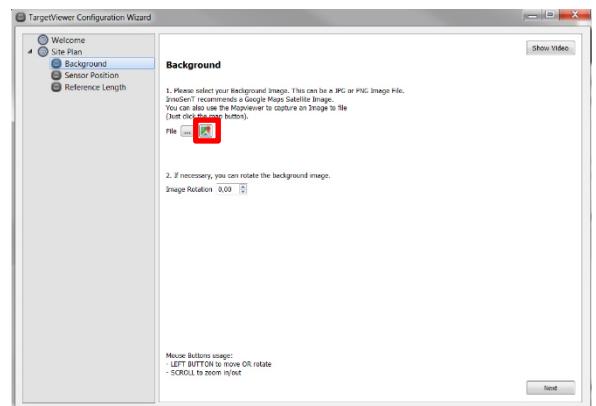
7. Configuration Wizard

The Configuration Wizard will guide you through the Target-Viewer configuration. With this wizard, you are able to set a background image for better visualization of the measurement scene.



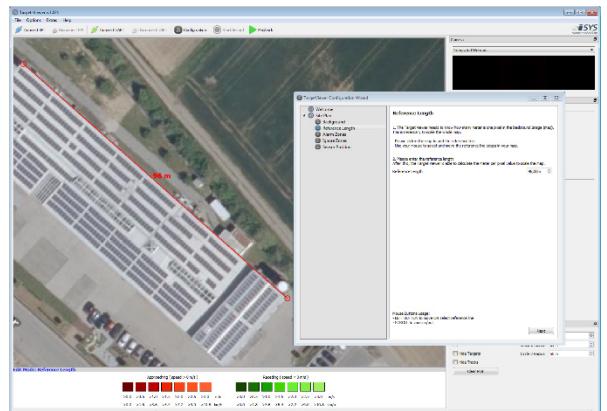
7.1. Background image

The Background Tab allows you to set a background image for your observed scene. This can be a JPG or PNG image file. InnoSenT recommends a Google Maps satellite image. You can also use the Mapviewer to capture a background image (Just click the map button).



7.2. Reference length

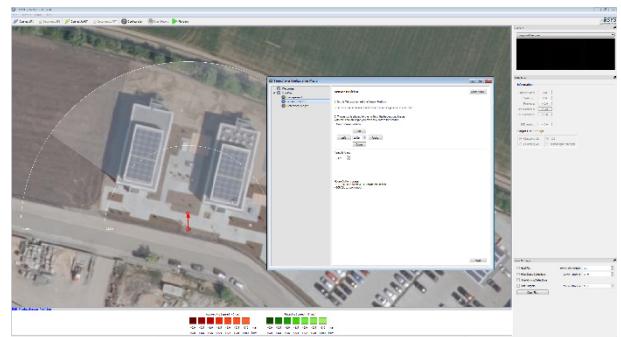
The Target-Viewer needs to know how many meter is one pixel in the background image (map). This is necessary to scale the whole map. Please *click* in the map to add the reference line. Use your mouse to select and move the reference line edges in your map. After this, please enter the reference length in meter. The Target-Viewer is now able to calculate the meter per pixel value to scale the map.



7.3. Sensor position

In this tab you can set the sensor position. Use your mouse to select and move the sensor position in your map.

The sensor is aligned to the north of the background image. With the Azimuth Angle you can easily rotate the sensor.



8. Connection of an network or USB camera

The Target-Viewer can show a live stream of a connected Network or USB camera.

8.1. USB camera

Connect the USB camera before starting the Target-Viewer. The Target-Viewer will recognize automatically the USB camera and start the live stream. By default, the Target-Viewer use the camera of the laptop if one is present.



8.2. Network camera

A network camera can be selected with the IP address, the username and the password of the camera.

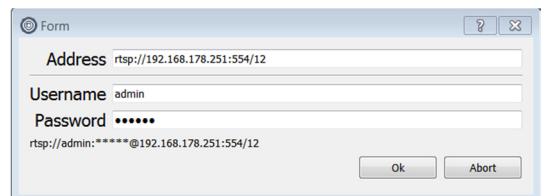
- 1) Click "*choose network camera*"



- 2) Enter the IP address of the camera, username and password if necessary.

After entering the camera information, the network URL will be displayed.

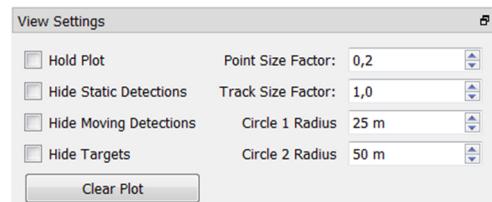
If all entered information are correct the target viewer shows the network camera live stream.



9. Configure the view settings options

The view settings configuration allows to adjust the display of the target list:

- *Hold Plot*: allows to keep displaying the target list of the passed frames
- *Hide Static Detections*: displays only the moving targets of the observed scene
- *Hide Moving Detections*: displays only the static targets of the observed scene
- *Hide Targets*: allows to hide the target list in plot
- *Point Size Factor*: allows to scale the point size of the displayed targets
- *Circle 1/2 Radius*: displays two circles with the specified distances
- *Clear Plot*: discards all the previous target list displayed



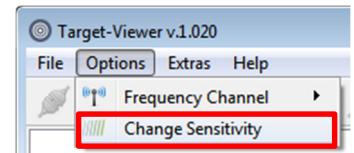
10. Detection sensitivity

The detection sensitivity can be used to adapt the device due rain interference. The iSYS-5010 and iSYS-5020 allow to customize the detection sensitivity for three ranges. These parameters determine how sensitive the sensor is for detections in a specific radial range area. A lower value means that the threshold is more sensitive in this range area (more targets) and a higher values sets a lower sensitivity (fewer targets) for the detection of moving targets. The default values and applicable range areas for these parameters are shown below in table. The values in the table are recommended. Higher or lower values are also supported by the iSYS-5XXX RADAR sensor, but they will generate too much noise targets or no targets in the target list.

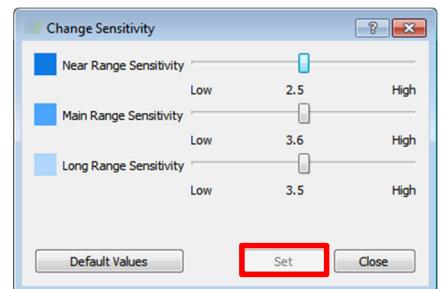
10.1. iSYS-5010

Parameter	Radial Range area	Default value	Recommended value
Near range sensitivity	Up to 2.7m	2.5dB	0.5dB to 4.5dB
Main range sensitivity	2.7m to 40.7m	3.6dB	1.6dB to 5.6dB
Long range sensitivity	Above 40.7m	3.5dB	1.5dB to 5.5dB

- 1) Click "Options" and "Change Sensitivity"



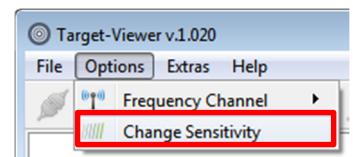
- 2) Change the Sensitivity and click "Set"



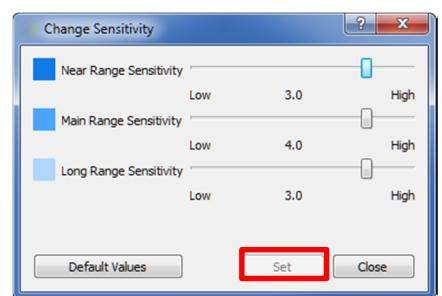
10.2. iSYS-5020

Parameter	Radial Range area	Default value	Recommended value
Near range sensitivity	Up to 2.5m	6.0dB	2.0dB to 9.0dB
Main range sensitivity	2.5m to 54.0m	2.9dB	1.0dB to 8.0dB
Long range sensitivity	Above 54.0m	2.4dB	1.0dB to 8.0dB

- 3) Click “Options” and “Change Sensitivity”



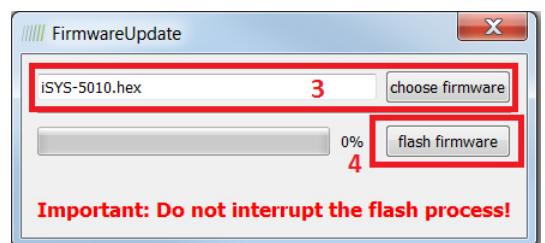
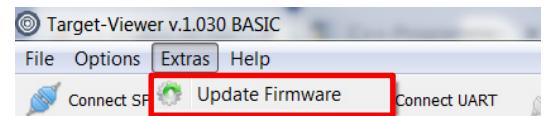
- 4) Change the Sensitivity and click “Set”



11. Firmware update

The firmware update of the RADAR sensor is done through the Target-Viewer.

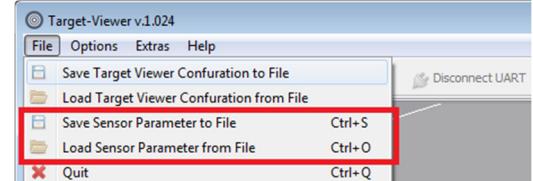
- 1) Click "Extras"
- 2) Choose "Update Firmware"
- 3) Select your "Serial Port" and click "OK"
- 4) Click "choose firmware" and select the firmware to update
- 5) Click "flash firmware"



Note: The firmware update files are delivered within the Software-Packages. Please load also new parameter files after firmware update from the same Software-Package to avoid malfunction.

12. Parameter files

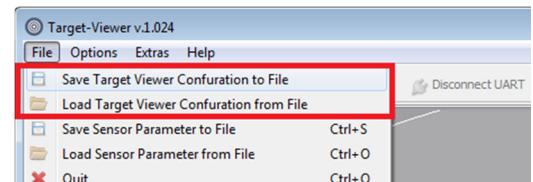
The Load and Save parameter file functionality is done through the Target-Viewer menu "File".



Parameter files will be available for new firmware updates, if necessary. It could also be possible to have different parameter files for special applications.

13. Target-Viewer configuration files

The whole Target-Viewer configuration (including background image, etc.) can be saved and loaded over the menu "File".



14. Smart Tracker

The iSYS-5011 and iSYS-5021 support the InnoSenT Smart Tracker. For further information check the *Smart Tracker User Manual*.

14.1. How to activate the Smart Tracker?

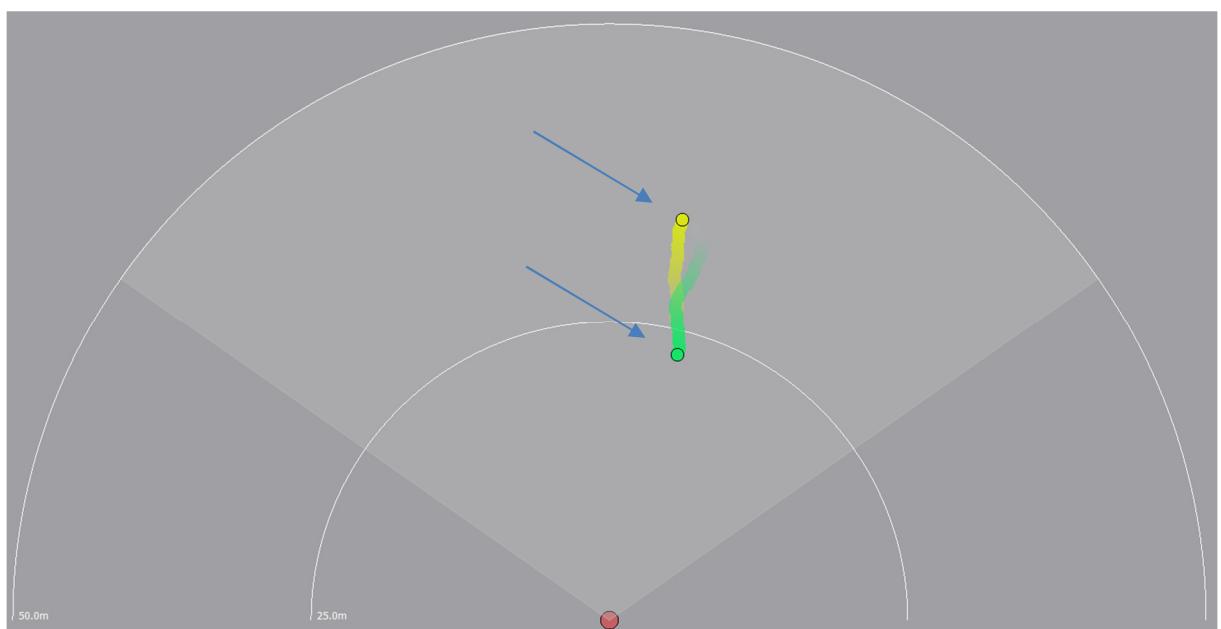
The Smart Tracker is a software module, delivered as a library. It is loaded by placing it into the application directory where the Target Viewer is located.

Tracking is activated by connecting to a supported sensor system or by replaying a target list recording.

14.2. What do you see?

The tracks are displayed in the main window graph.

Each track owns a unique color and their history is visible by a tail.



15. Record & Playback

The Record & Playback functionality supports a target list recording.

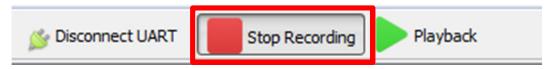
15.1. Recording

Connect your camera first, if you want to save both sensor data and video stream.

- 1) Click “Start Record” button to begin the recording.



- 2) Click “Stop Recording” button to finish the recording.

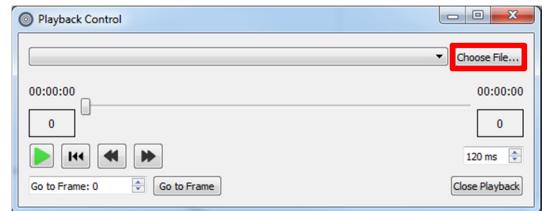


- 3) Choose file name and location for recording data.

15.2. Playback

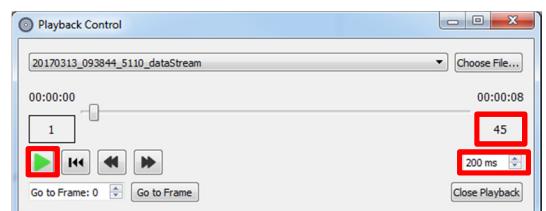
- 1) Click “Playback” button

- 2) Select playback file with “Choose File”



- 3) The number of frames and cycle time will be set after the file is loaded.

- 4) Click “Start playback” (green arrow) and watch the targets in the 2D map.



16. FAQ

16.1. How to correct the check sum error

The Target-Viewer checks the transmission of the data from the iSYS-50XX radar sensor before displaying it. The iSYS-5XXX calculates a check sum and transmits the data to the Target-Viewer. The Target-Viewer recalculates and compares the result with the one from the radar sensor. If the two numbers are not identical, a check sum error message is displayed at the bottom of the Target-Viewer window.

To correct this error, please comply with these indications:

- Always use cables with a high quality
- Avoid USB-hubs
- Perform communication test from different host PCs

Otherwise please contact InnoSenT GmbH for additional help.

16.2. Failed UART connection

Please verify the following points:

- The iSYS-5XXX is powered and connected to the PC
- The Serial Port Number is correct
- Perform communication test from different host PCs

Otherwise please contact InnoSenT GmbH for additional help.

16.3. Failed SPI connection

Please verify the following points:

- The iSYS-5XXX is powered and connected to totalphase SPI Beagle adapter
- The totalphase SPI Beagle adapter is connected to the PC
- Verify that the driver of the totalphase SPI Beagle adapter is correctly installed
- Perform communication test from different host PCs

Otherwise please contact InnoSenT GmbH for additional help.

16.4. Failed firmware update

Please verify the following points:

- The iSYS-5XXX is powered and connected to UART
- The Serial Port Number is correct
- Perform communication test from different host PCs

Otherwise please contact InnoSenT GmbH for additional help.

16.5. How to identify the serial port

How to identify the “Serial Port”:

- Open control panel
- Click “*Device manager*”
- Open “*Ports (COM & LPT)*”
- Find which COM port is “Silicon Labs CP210x USB to UART Bridge (COM X)”

Otherwise please contact InnoSenT GmbH for additional help.

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