

# **SIEMENS**

## **SIMATIC RTLS**

### **Localization systems**

### **SIMATIC RTLS Visualization 2D view**

Application manual

**10/2018**

C79000-G8976-C535-01

## Legal information

### Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

<b>⚠ DANGER</b>
indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.
<b>⚠ WARNING</b>
indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.
<b>⚠ CAUTION</b>
indicates that minor personal injury can result if proper precautions are not taken.
<b>NOTICE</b>
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

### Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

### Proper use of Agilion products

Note the following:

<b>⚠ WARNING</b>
Agilion products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Agilion. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

### Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

### Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Agilion GmbH  
Blankenauer Straße 74  
09113 Chemnitz  
Germany

Tel.: +49 - (0)371 - 45 00 48-0  
Fax.: +49 - (0)371 - 45 00 48-11

[www.agilion.de](http://www.agilion.de)  
[service@agilion.de](mailto:service@agilion.de)

Management:  
Andreas Werner  
Johannes Waldhör  
Sven Sieber

HR B 21249 Chemnitz  
USt.-IdNr.: DE236591552

# Table of contents

<b>1</b>	<b>Overview .....</b>	<b>6</b>
1.1	Audience and scope .....	6
1.2	Localization network .....	6
1.3	Localization .....	7
<b>2</b>	<b>Application .....</b>	<b>9</b>
2.1	Visualization .....	9
2.2	Program start-up .....	9
2.3	Drop-down menu options .....	9
2.3.1	Connect and disconnect .....	9
2.3.2	Connection settings .....	10
2.3.3	Change password .....	11
2.3.4	Language .....	11
2.3.5	Search .....	11
2.3.6	Search Options .....	12
2.3.7	Clear Log .....	12
2.4	Individual map as background image .....	12
2.5	Toolbar options .....	12
2.5.1	Rotate display .....	13
2.5.2	Reduce/enlarge display .....	13
2.5.3	Switching maps .....	13
2.5.4	Coordinate system and scale .....	13
2.5.5	Hide/show infrastructure .....	13
2.5.6	Displaying transponders .....	14
2.5.7	Select node .....	14
2.5.8	Show location area .....	14
2.5.9	Distance .....	15
2.5.10	Show results .....	16
2.5.11	Additional display options within the drop-down menu .....	17
2.5.12	Maps .....	18
2.5.13	Program update .....	18

2.5.14 Update picture automatically .....	18
2.6 Symbols in the hierarchic structure .....	18
<b>3 Error Messages on Connection .....</b>	<b>19</b>

# 1 Overview

## 1.1 Audience and scope

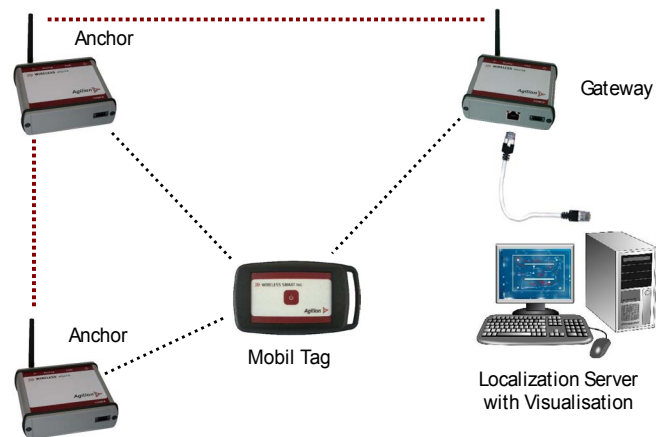
This manual outlines the operation of the visualization client of the Wireless Location System (WLS) version 2.0.1 under Windows™ 7.

The manuals assisting the installation and use of the clients “User Configuration”, “Network Configuration”, “Localization Configuration” and “System Management” as well as the “Installation guide” are situated in “Start > All programs > Agilion > WLS > Doc”.

## 1.2 Localization network

The technical capabilities of accurate positioning of moving or moved objects, especially inside buildings, develop swiftly. This opens up a plethora of new applications, e.g. in the areas of logistics as well as medical and safety technology.

Localization systems are utilized for warehousing documentation and consignment processes, automated disposal and maintenance processes within depot management systems (public transportation) as well as personnel protection in danger areas.



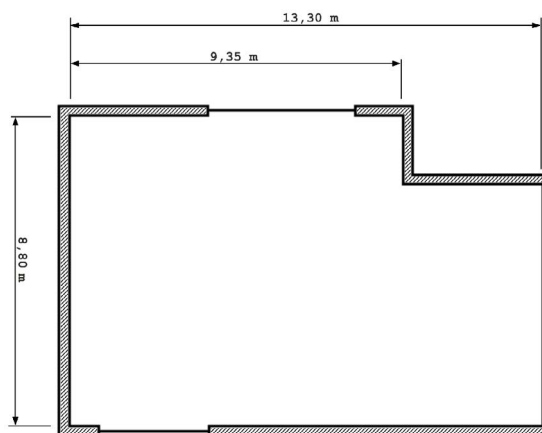
- **Mobile transponders**  
The term “mobile transponders” comprises all movable devices considered for localization within the localization network. Due to various designs, people can carry them and they are attachable to vehicles, devices, pallets or other objects. Furthermore, it is possible to transmit customer-specific data from and to mobile transponders.
- **Anchor**  
Anchors serve as reference points for the localization. Fixed at steady positions within the localization network, they enable the collection and transmission of localization data to the server via other anchors and gateways. They are part of the so-called infrastructure of the WLS.

- Gateway  
 Like anchors, gateways serve as reference points for the localization network. Additionally, they possess an interface for IT-infrastructure connection (Ethernet). The IT-infrastructure exchanges localization information and customer-specific data between the wireless localization network and the localization server. The utilization of several gateways is recommended for larger localization networks. Thus both the number of transponders that can be operated simultaneously and the availability of position information can be increased.
- Localization server  
 The localization server computes the positions of the mobile transponders. The server has interfaces to supply position information (as well as any other application-related data) for visualization, logistics applications, mission planning and further applications. The WLS supports typical database interfaces like SQL-Server, Oracle etc. as well as TCP/IP. It is possible to adjust the interfaces according to customer's specifications. Furthermore, customer-specific control information can be transmitted to the mobile transponders via the localization server (digital in- and output).
- Visualization  
 It is rather simple to visualize the WLS-computed transponder positions and customer-specific data in 2D. The visualization can be based on floor plans, terrain surveys, satellite images, 2D/3D models (CAD, VRML, etc.) or other images.

### 1.3 Localization

A 3-dimensional coordinate system is the basis of the actual localization. X and Y define the area whilst Z the height.

The floor plan of a room in which an object shall be localized is shown below for the purpose of illustration.

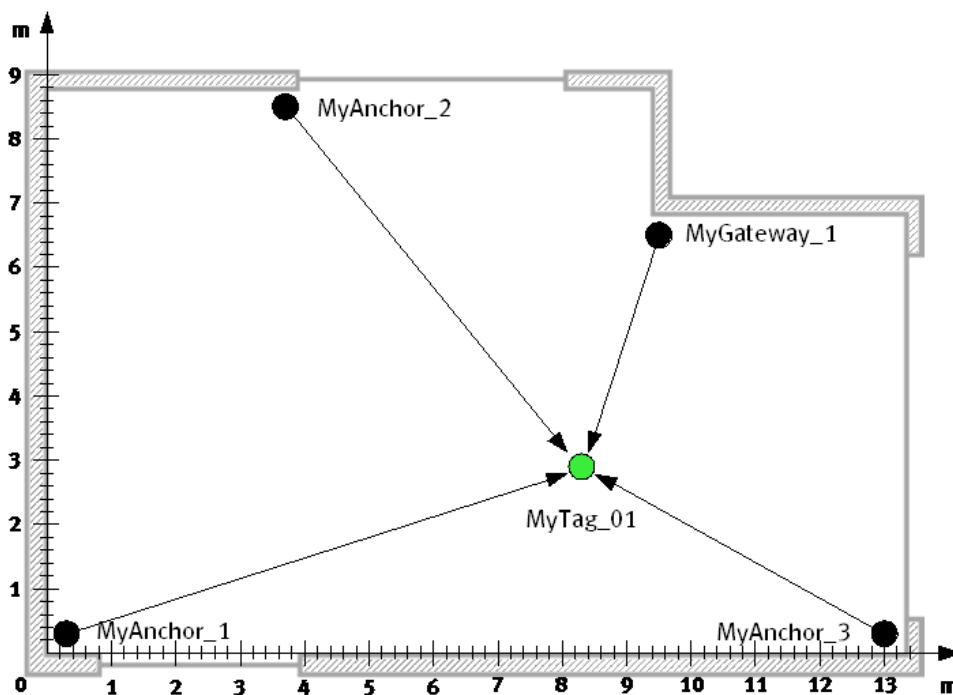


The reference points (anchors and gateways) must be arranged according to certain rules within the monitored room.

- The radio signal of at least four reference points should be reachable at each point of the monitored area. A permanent and direct line of sight between transponders and infrastructure should be targeted.
- The radio systems (anchors and gateways) must be spread evenly in the monitored area.
- Gateways and anchors should be mounted overhead (as high as possible) to guarantee an undisturbed radio transmission.
- The antennas of all radio systems must be attached upright.
- Anchors and gateways must not be mounted hidden, e.g. behind a wall.
- Anchors and gateways should not be mounted in front of electromagnetically reflective surfaces (radiator, sheet).

The coordinate origin must be set at a prominent spot, for instance one of the corners of the monitored area (as shown in the example below), though the center of the room, too, is a viable option. The latter case will result in negative values for the x and y coordinates of some devices.

Based on the coordinate origin, the measured positions of each gateway and anchor must be entered into the software.



In the example above the gateway “MyGateway\_1” has the following coordinates: X=940 cm, Y=650 cm und Z=altitude from floor.

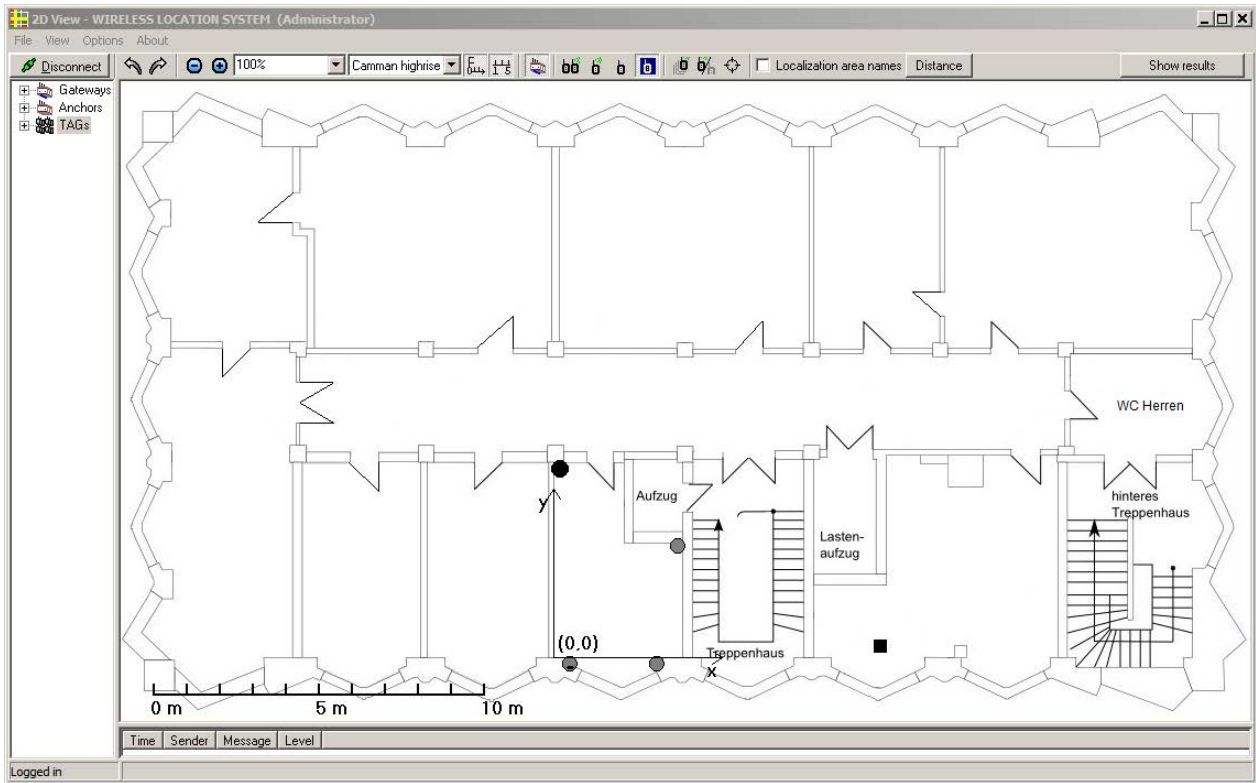
The computation of the transponder’s (MyTag\_01) position is done on basis of the distances to all four radio systems.



## 2 Application

### 2.1 Visualization

The visualization client (2D View) plots the positions of the gateways, anchors and transponders designated for location. The transponder positions computed by the localization server are plotted in relation to the coordinate system set before on the map provided beforehand.




### 2.2 Program start-up

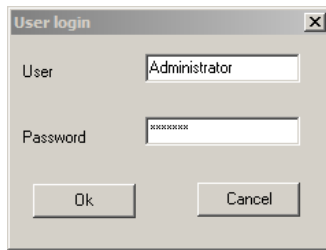
The client “2D View” (Visualization.exe) can be started under “Start > All Programs > Agilion > WLS > Clients > 2D View”.

### 2.3 Drop-down menu options

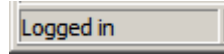
#### 2.3.1 Connect and disconnect



After starting the program, establish a connection to the WLS by pressing the  icon. All devices (gateways, anchors, transponders) set up will be displayed thereafter. Alternatively, the connection can be established via the drop-down menu (“File > Connect”).



Next to logging in as “Administrator” using the password “Agilion”, the WLS will provide all information for the entire localisation system.



The status bar at the bottom left of the GUI displays the connection status.

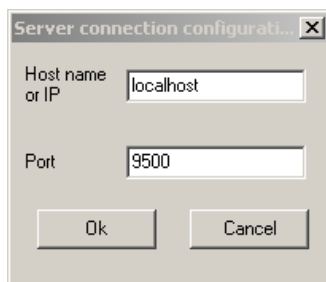


The connection icon will switch to  as soon as a connection has been established, thus confirms the connection. The red icon  signals the lack of a connection.

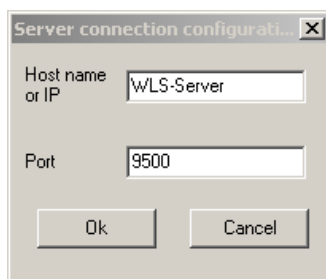
An error message will be displayed after approximately 20 seconds in case the client failed to connect to the WLS. The connection icon switches back to , the status bar will read . A list of various error messages is attached to this document (see **Fehler! Verweisquelle konnte nicht gefunden werden.**).

## 2.3.2 Connection settings

Insofar as no valid connection to the WLS has been set, enter the connection parameters accordingly. The default host name is "localhost", the default port is 9500. The host name is the name of the server within the network the WLS is installed onto. These settings can be altered within the drop-down menu under "Options > Connection" at any time.



Provided that the WLS has been installed on the same computer as the user configuration, "localhost" can be set as "Host name or IP". These are the default settings. Otherwise, enter the WLS server's network name.



---

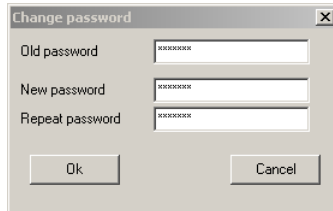
**Notice**

Make sure communication between server, infrastructure and user configuration is not blocked by a firewall or Ethernet gateway.

---

### 2.3.3 Change password

The current (logged in) user's password can be changed under "Options > Change password".



---

**Notice**

Changing the password affects all clients of the WLS.

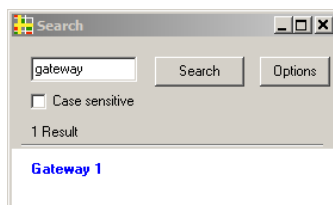
---

### 2.3.4 Language

The language settings of the GUI can be switched from German to English and vice versa under "Options > Language".

### 2.3.5 Search

It is possible to search for devices by means of text patterns using the drop-down menu option "Options > Search".

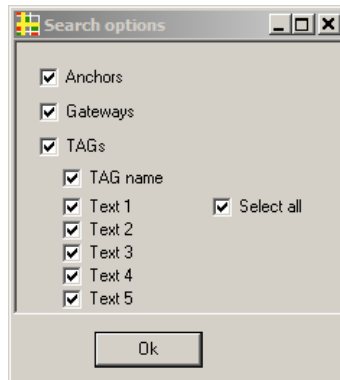


In case of distinct search results, the found device will be highlighted in the main window (hierarchical structure) immediately. Should there be more than one search result, the result marked in the search result window will be highlighted in the main window.

## 2.3.6 Search Options

The query can be narrowed down to particular node types, transponders or certain text fields via “Options > Search options”. The selectable text fields concerning the transponders are individually allocable using the client “System Management”.

The window “Search options” can also be prompted by pressing the icon “Options” within the search window (2.3.5).



## 2.3.7 Clear Log

Messages in the log window (bottom right of the GUI) can be deleted by pressing “Options > Clear log”. New messages will be displayed instantaneously thereafter.

## 2.4 Individual map as background image

The manual covering the localization client describes how to import a user-defined map.

A blank, white map with raster elements is displayed by default upon the first launch of the client. It can be replaced with any digital image (\*.jpg, \*.bmp, \*.emf, \*.wmf) depicting the area of localization, such as a floor plan or an aerial image.

## 2.5 Toolbar options


You may adjust the map display individually using the toolbar.



Furthermore, it is possible to display or hide certain devices of the WLS.





## 2.5.1 Rotate display

The entire image can be rotated by 90° using the arrow buttons . The map and positional data of the infrastructure devices have to be aligned similarly. Use an appropriate image editing programme in order to rotate the map only.

Alternatively, image rotation can be proceeded via the drop-down menu under “View > Rotate display”.

## 2.5.2 Reduce/enlarge display


The display size of the map can be changed using the icons  and . Alternatively, a predefined or desired display size may be set within the toolbar.

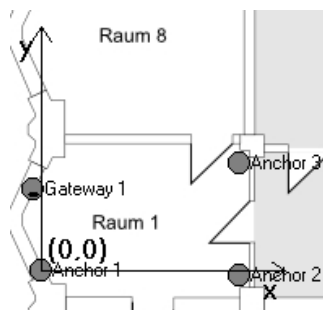
The display size can also be altered via the drop-down menu under “View -> Zoom + or Zoom - “. Furthermore, the hierarchic structure, log window and toolbar can be hidden or displayed via the drop-down menu under “View > Presentation mode”.

## 2.5.3 Switching maps

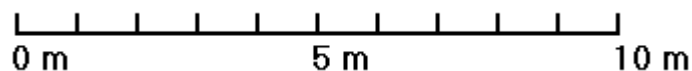
Insofar as more than one map has been imported, it is possible to switch between those maps using the respective drop-down menu within the toolbar or alternatively “Options > Maps”.

## 2.5.4 Coordinate system and scale


The coordinate system can be displayed at its origin or hidden entirely by pressing the icon .



Analogously, the scale can be displayed or hidden by pressing the icon .




## 2.5.5 Hide/show infrastructure


The infrastructure devices (anchors and gateways) will be displayed or hidden on the map and within the hierarchic structure by pressing the icon .



Selecting “View > Show infrastructure” from the drop-down menu has the same effect.

## 2.5.6 Displaying transponders


Activating the icon  initiates the display of all transponders in the map.

Activating the icon  initiates the display of all active transponders in the map.


Activating the icon  initiates the display of all inactive transponders in the map.

Activating the icon  initiates the display of the transponder selected in the hierarchic structure in the map. The icon  can only be activated, if the previous icon (Show selected transponder) is already activated. Activation of this icon initiates the tracking of the selected transponder.

Alternatively, all these commands are executable via the drop-down menu. In order to activate the tracking of a transponder using this route, select a transponder in the hierarchic structure first. Subsequently activate “Selected” and “Tracking” in the drop-down menu.

By activating the icon  the last known positions of the transponders will be displayed, insofar as no current position is available. Make sure appropriate preselections have been made. If, for instance, the display of active transponders only is activated, the last known positions of inactive transponders will not be displayed.


## 2.5.7 Select node

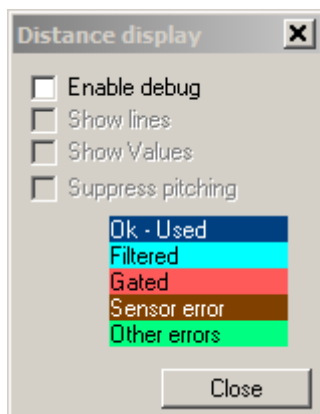
Activating the icon  allows the selection of any node on the map by means of the cursor. The selected node will then be highlighted within the hierarchic structure automatically.

## 2.5.8 Show location area

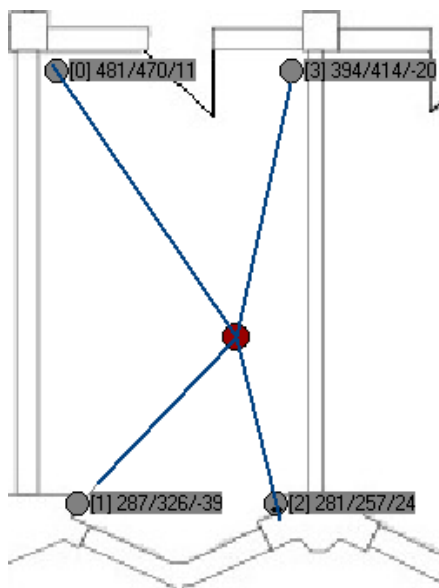
Activating the icon  Localization area names initiates the display of the respective location area names next to the transponders on the map.

## 2.5.9 Distance


Pressing the icon  prompts the appearance of the selection window “Distance display”. Further information concerning the distance measurements of the transponder highlighted in the hierarchic structure can be displayed by utilizing these settings.

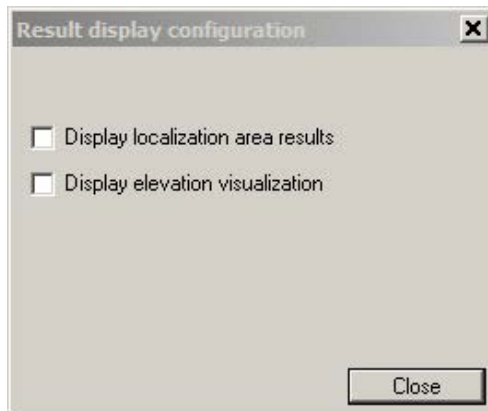


Enabling debug in that window enables all other options for selection. Activating “Show lines” initiates the display of all measurements made by any node concerning the selected transponder as lines in the predefined color. The calculated distances will be displayed next to the respective node, if “Show values” is additionally selected. Activating “Suppress pitching” initiates the suppression of position pitching.

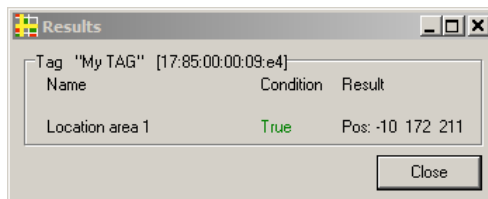


## 2.5.10 Show results

Pressing the icon  prompts the appearance of a selection screen enabling to chose whether the localization results, the elevation results or both shall be displayed for the transponder selected in the hierarchic structure.



The localization result output window displays the conditions “True” or “False” indicating whether a transponder is located within a particular location area or not. Furthermore, the result shows the transponder’s position (Pos:) as x-, y-, z-coordinates. Other possible results are “Few” and “None” in case the transponder is located by too few or no nodes at all respectively.



The localized elevation of the transponder will be displayed within the boundaries set under “Views” in the client “Localization Configuration”.



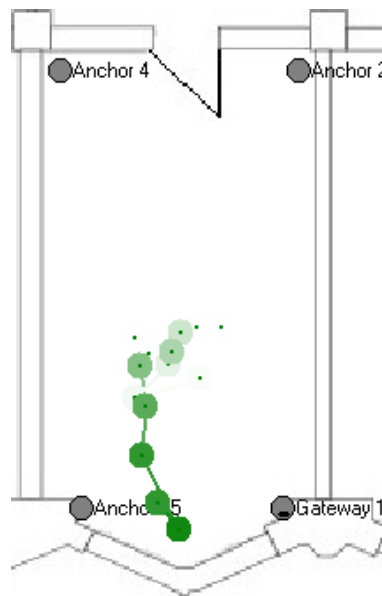


## 2.5.11 Additional display options within the drop-down menu

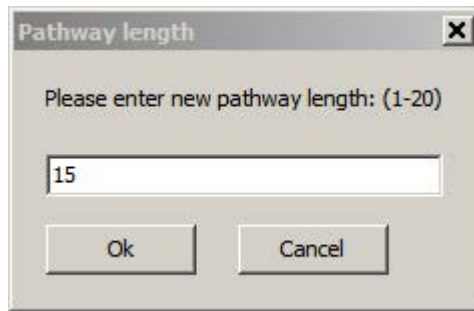
Further settings concerning the display are selectable from the drop-down menu (“View”).

These are in particular:

- Show nodes at the edges  
Activating this option initiates the display of nodes located outside the displayed area at the edge of the map.
- Show node names  
Activating this option initiates the display of the node’s names next to the devices in the map.
- Show transponder names  
Activating this option initiates the display of the transponder’s names next to the devices in the map.
- Show hints in map  
Activating this option initiates the appearance of balloon tips displaying the device type, network address and the name of a device once the cursor is placed on a device in the map.
- Show names and addresses  
Activating this option initiates the appearance of the names and network addresses of the devices next to the devices in the map.
- Show pathway  
Activating this option leads to a display of the selected transponder’s past positions in addition to its current location.



- Pathway length  
The number of past positions can be set here in case “Show pathway” was activated.



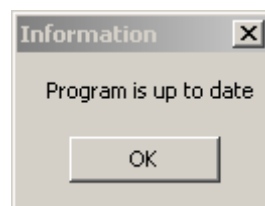
## 2.5.12 Maps

The maps of respective localization areas can be selected via “Options > Maps”.



## 2.5.13 Program update

The up-to-datedness of the program can be examined via “Options > Check for update”. Make sure all changes made have been saved before executing a program update.



## 2.5.14 Update picture automatically

Insofar as a more recent map has been stored in the appropriate folder within the software directory, it will be installed to the program automatically as far as the respective option has been activated under “Options > Update picture automatically”.

## 2.6 Symbols in the hierarchic structure

The states of devices can be read from the symbols in the hierarchic structure. These symbols are the same in all clients displaying anchors, gateways and transponders.

Anchor	Gateway	Transponder	Description
			Device is offline, sends no life-sign
			Device is online and operational
			Device is online and operational, but signaling undervoltage (check power supply).

### 3 Error Messages on Connection

Error number	Text	Possible Reason
10050	Network is down	Dead network for a socket operation has occurred. This could be the result of a network system failure, network interface failure or an error concerning Windows™ protocol stacks.
10051	Network unreachable	Network was unreachable for a socket operation. Usually the reason for this error is that the local software does not know the route to the remote host.
10052	Network dropped connection on reset	Connection was disconnected during operation, because of an erroneous life-sign signal.
10053	Software caused connection abort	The host computer's software cut an established connection. Probable reasons for this error are time-out in data transmission and protocol errors.
10054	Connection reset by peer	Server cut existing connection. This is usually caused by the server (software) being closed (program quit, computer shut down or rebooted).
10055	No buffer space available	Could not perform a socket operation due to insufficient system buffer space or a busy computer.
10056	Socket is already connected	A connect request was made to an already connected socket.
10060	Connection timed out	Attempt to establish a connection or an already established connection failed, because host or peer did not respond in time or at all.
10061	Connection refused	The targeted computer rebutted an attempt to establish a connection. Reasons for this behavior include a firewall denying access and the server not running.
10064	Host is down	Reasons for this error could be that the targeted computer is switched off, does not send a reply or failure/malfunction of a Windows™ network driver.
10065	No route to host	A socket operation could not reach the predefined host. The likely reason for this error is that the server connection setting is incorrect.