

SIEMENS

SIMATIC RTLS

Localization systems

SIMATIC RTLS Data Export Service

Application manual

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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.

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1 General

1.1 Audience and scope

This user guide outlines the installation, configuration and available data outputs of the “Data Export Service” version 2.4 of the Wireless Location System (WLS) on a Windows™ 7 computer.

The “Data Export Service” is required, insofar as the localization data computed by the WLS are not or not only visualized and managed using the clients.

2 Application

2.1 Data Export Service

The “Data Export Service” enables to transfer the mobile transponders positional data computed by the WLS and, depending on the configuration, customer specific data to the host system for processing and analyzing. For that purpose, the “Data Export Service” provides three export processes as output options which can be run simultaneously:

- Database export
- Export via socket connection (TCP/IP)
- Export via socket connection based on ISO/IEC 27730-1 2014

The “Data Export Service” can be configured using the file “AgilionDataExport.ini”. This configuration file is stored in the Windows™ folder. Configuration has to be carried out before starting the “Data Export Service”.

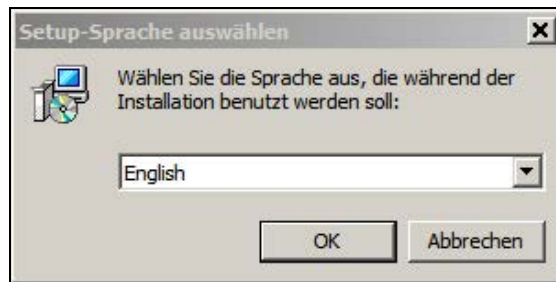
Computed localization data of transponders within a localization area are transmitted to the host system via the “Data Export Service”. The frequency of transmission differs depending on the localization area type and transponder configuration.

Enter the name of the computer containing the “Data Export Service” (host) into the configuration file insofar as the service is not installed onto the computer hosting the WLS server.

3 Installation

Installation of the “Data Export Service” is prompted by executing (usually by double-clicking the file) the executable file “WIRELESS LOCATION SYSTEM DataExportService Setup.exe”.

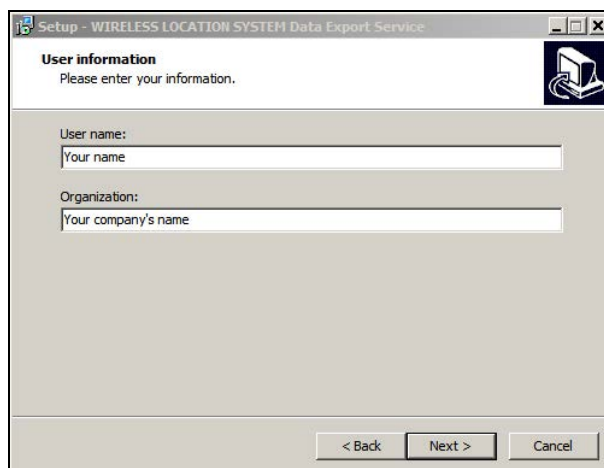
Initially the language of the set-up assistant has to be selected. Confirm the selection made by pressing the button “OK” in order to continue the set-up process.



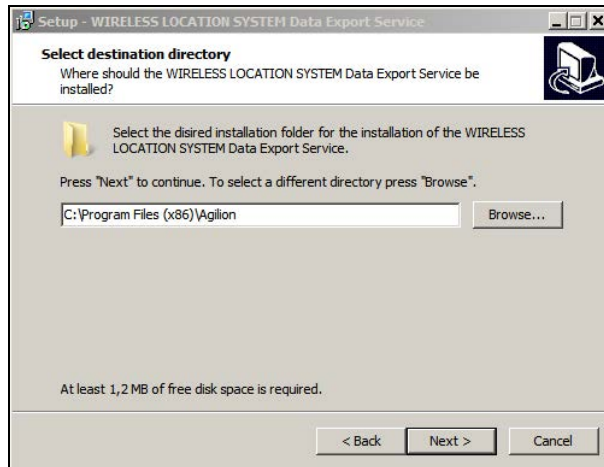
If possible close all other applications as instructed on the set-up assistant’s welcome screen and press the button “Next” in order to continue the set-up process.



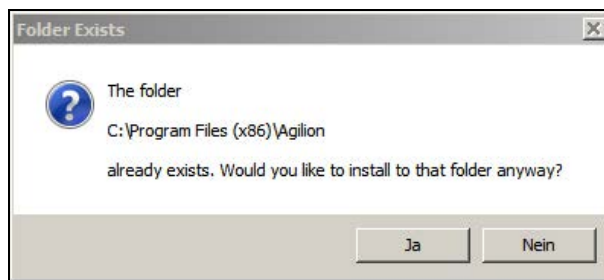
The screen “User information” allows to enter a user and a company name. Press the button “Next” in order to continue once the desired entry has been put in.



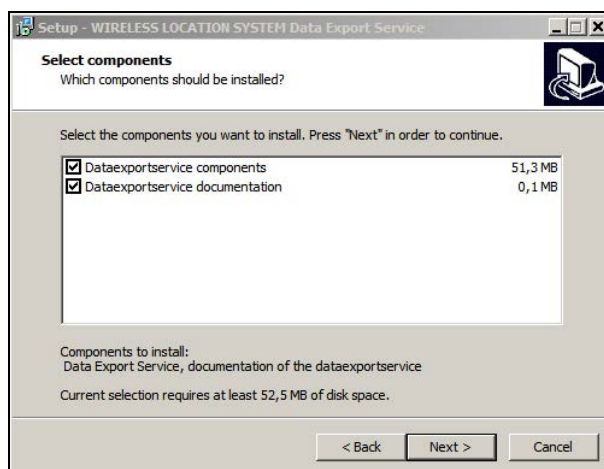
Next select the installation folder. The default installation folder is the installation folder of the WLS Server and Clients (Windows™ 7: C:\Program Files (x86)\Agilion). Change this as desired by pressing the button “Browse...”. A new subfolder for the “Data Export Service” will be created in the selected directory. Press the button “Next” in order to proceed after setting an installation directory.



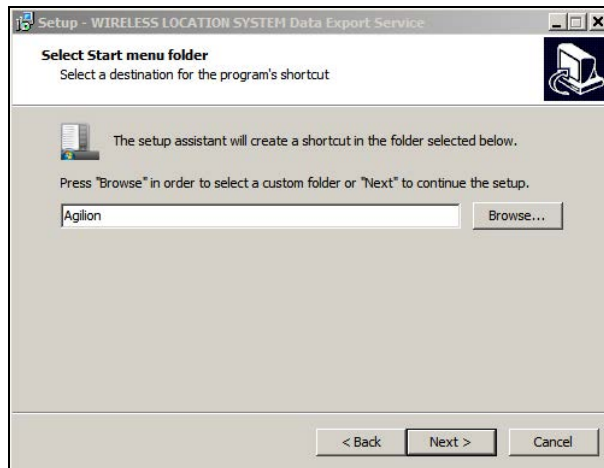
A warning message may pop up when selecting the default directory on a computer with any software already installed. This message can be skipped unhesitatingly by pressing the button “Yes”.



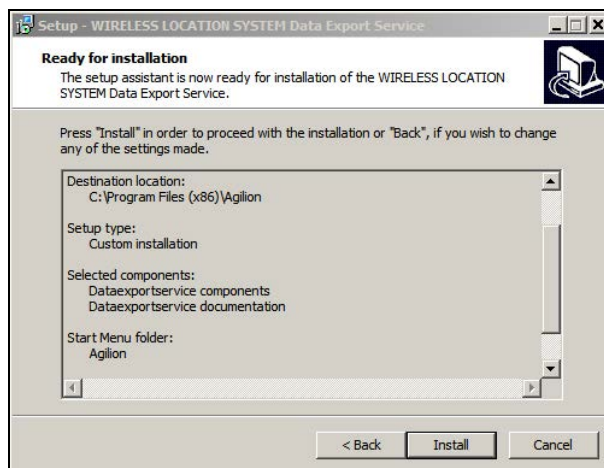
In the next window select the components for installation. These are the “Data Export Service” itself and the corresponding documentation. Proceed with the installation process by pressing the button “Next” once you have selected the desired components.



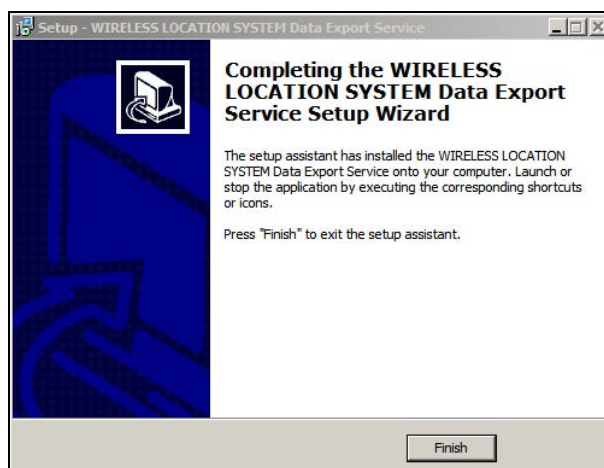
A start menu entry can be set in the following window. “Agilion” is the default setting which can be altered by pressing the button “Browse...”. The default setting will create shortcuts for starting and stopping the Data Export Service under “Start > All programs > Agilion > WLS > Server”. “Press “Next” to proceed with the set-up.



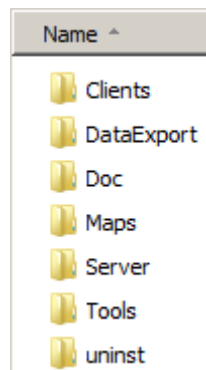
All settings and selections made will be displayed ahead of the actual installation. Insofar as you are satisfied with the settings made press the button “Install” in order to prompt the installation of the “Data Export Service”. Any setting made can be altered by pressing the button “Back”.



Press “Finish” in the final set-up window in order to complete the installation.



The “Data Export Service” has been installed into the automatically created subfolder “DataExport” in the directory containing the WLS, insofar as the default settings have been selected.



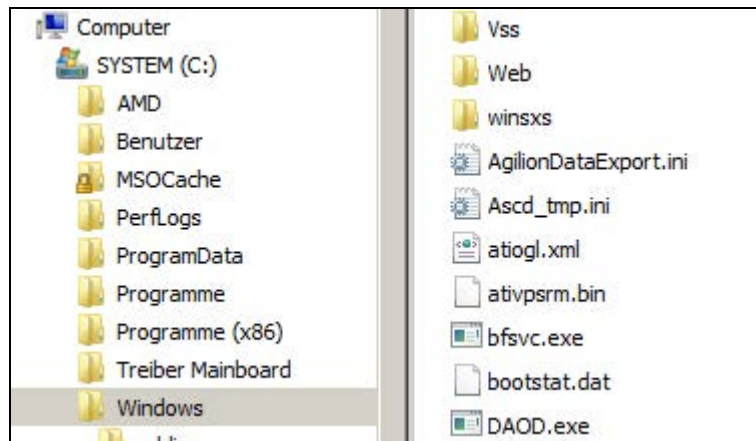
Notice

The “Data Export Service” will not start automatically with the operating system. Make the appropriate settings on your computer, if you want to utilize the “Data Export Service”.

4 Configuration

4.1 General

The “Data Export Service” has to be configured before it is started. The configuration is carried out in the configuration file “AgilionDataExport.ini”, which is by default situated in the directory C:\Windows.



Open that file in a text editor by double-clicking on it. Any changes made in this file have to be saved before the editor is closed for them to take effect (“File > Save” or “Ctrl+S”). A restart of the “Data Export Service” is also required in order for the changes to be applied.

```
[LocSystem]
Host=localhost
Port=9500
;ReconnectInterval=1000
;The active user may be altered here. This has to be done as a Windows administrator.
;login=DataExport
;pwd=DA2

[ExportDataBase]
dbtype=
user=
password=
server=localhost
database=SQLEXPRESS
Active=0

[ExportTCPIP]
Host=localhost
Port=800
Active=0
FixedLineLength=0

[ExportSTDIP]
Host=localhost
Port=800
Active=0

[ExportSLMP]
Active=0
Port=4000
RemoteFraming=LineFeedFraming
KeepAliveMsgActive=0
KeepAliveMsgTime=5
WelcomeField=
```

Notice

When using the Windows text editor please make sure that whoever revises the .ini-file is logged in to Windows as an administrator. Otherwise there might be complications when it comes to allocating the file to the client. We suggest the use of Notepad++ (<https://notepad-plus-plus.org>) in order to circumvent this difficulty.

4.2 Export into a database

4.2.1 Settings

The database type, user name and password, data base server and database have to be stated in the configuration file in order to put out the positional data computed by the WLS into a database. Furthermore, the value "Active" has to be changed from "0" to "1" to activate export via the data base interface.

```
[ExportDataBase]
dbtype=sqlserver_2014
user=sa
password=Agilion2011
server=localhost
database=SQLEXPRESS
Active=1
```

4.2.2 Output file

The database table “locsystrack” will be created as soon as the “Data Export Service” runs and the WLS is started. For every transponder an entry containing all significant information will be written into this table. This information will be updated cyclically. The current transponder positions can be read from this transfer database at any time.

The database table contains following arrays:

Array	Type	Unique	Content
tag_addr	char[17]	yes	Node (radio) address; format xx:xx:xx:xx:xx:xx
tag_desc	string	no	Description of the transponder
pos_x	int	no	X-position in cm
pos_y	int	no	Y-position in cm
pos_z	int	no	Z-position in cm
instime	datetime	no	Time of database entry
instime_ms	int	no	Milliseconds of the time above

4.3 Export via Socket connection (TCP/IP)

Using this setting the “Data Export Service” serves as a communication client initiating the connection establishment. The connection gets established with the start of the export service. In case of an interruption of the connection, connection establishment is retried cyclically until it is established.

The single data components of a data package are sent concatenated to a string. The packages are tabular and, analogous to a CSV file, divided by semicolons. The string, too, ends with a semicolon.

The data may be transmitted via two different data packet protocols. Choose the type according to your demands. The required settings and resulting output values for both types (ExportTCPIP and ExportSTDIP) are described below.

4.3.1 Settings ExportTCPIP

Host and port have to be stated in the configuration file in order to export the positional data computed by the WLS via a socket connection type 1 (TCP/IP). Furthermore, the value “Active” has to be changed from “0” to “1” to activate socket connection export. The “FixedLineLength” is of relevance, if the readout of the distance data always has to be the same character length. In case the corresponding value is set at “0”, the readouts for, e.g. 8 and 12 meters will be of different length. Setting the value at “1” results in 00000008 and 00000012 respectively (eight characters each with leading zeroes).

```
[ExportTCPIP]
Host=localhost
Port=800
Active=1
FixedLineLength=0
```

4.3.1.1 Output data ExportTCPIP

The data packet of the export protocol type 1 consists of the eight arrays described in the table below. The output format is stated in the corresponding description:

Array	Name	Description
1	Date	Date; format yyyyymmdd
2	Time	Time; format hhmmss
3	Milliseconds	Milliseconds; format 0 ... 999
4	TAG address	String containing the transponder's WLS address; format xx:xx:xx:xx:xx:xx
5	x-coordinate	X-coordinate in meters and centimeters; format 0.00 ... 99999.99 Separator is a decimal point „.“
6	y-coordinate	Y-coordinate; format as x-coordinate
7	z-coordinate	Z-coordinate; format as x-coordinate
8	Line break	0x0A; end of string suffix

Exemplary string: „20140512;150257;27;3c:4b:89:12:77:6f;83.67;10.67;2.50;\n“

4.3.2 Settings ExportSTDIP

Host and port have to be stated in the configuration file in order to export the positional data computed by the WLS via a socket connection type 2 (TCP/IP). Furthermore, the value “Active” has to be changed from “0” to “1” to activate socket connection export.

```
[ExportSTDIP]
Host=localhost
Port=800
Active=1
```

4.3.2.1 Output data ExportSTDIP

The data packet of the export protocol type 2 consists of the arrays described in the table below. Unlike export via ExportTCPIP the output can be adjusted flexibly and also transmit I/O data, thus read inputs or set outputs. To this end various telegram types (commands) are used in array 4 prompting different outputs in array 6 (data). The telegram types are described below.

The transmission of I/O data is only available, insofar as the feature has been licensed with the WLS package.

The data packet type 2 is structured as follows:

Array	Name	Description
1	Date	Date; format yyyyymmdd
2	Time	Time; format hhmmss
3	Milliseconds	Milliseconds; format 0 ... 999
4	Telegram type (command)	Defines the content of the following data
5	TAG address	String containing the transponder's WLS address; format xx:xx:xx:xx:xx:xx
6	Data	Data determined by the telegram type
7	Line-break	0x0A, end of string suffix

4.3.2.1.1 Telegram type 1 (data)

Telegram type 1 transmits, usually cyclic, the positional data of the transponder in three arrays:

Array	Name	Description
6a	x-coordinate	X-coordinate in meters and centimeters; format 0.00 ... 99999.99 Separator is a decimal point „.“
6b	y-coordinate	Y-coordinate
6c	z-coordinate	Z-coordinate

4.3.2.1.2 Telegram type 10 (command)

The command transmitted switches on the transmission of I/O data. It is necessary to send this telegram once in order to enable telegram type 11.

Array	Name	Description
6	IOTransmissionActive	The array is one byte long and represents a Boolean value. Possible values: <ul style="list-style-type: none">• 0 = disable IO transmission• 1 = enable IO transmission for all transponders and send current values

4.3.2.1.3 Telegram type 11 (data)

This telegram type sends a state message (I/O data) concerning a change of a transponder's digital or virtual input. This data packet is sent asynchronously, thus whenever an event has occurred.

Array	Name	Description
6	Inputs	State of input pins 1-8 (one Byte as a Bit field)
7	Virtual Inputs	State of virtual input pins 1-8 (one Byte as a Bit field)

The telegram is transmitted by the WLS:

- On enabling the transmission see Telegram type 10
- On changes of the values of the inputs

The digital inputs may indicate, for example, the opening or closing of a bus door, the filling level of the sanding system, the tire pressure or other electronically connected sensors.

The virtual inputs pass on already processed sensor data, for instance the result of the analysis of a transponder's acceleration sensor.

Whether Inputs or VirtualInputs are available, depends on the built and software status of the devices. Relevant information is provided in the data sheets of the specific device.

The meaning of Inputs and VirtualInputs differs according to intended purpose and configuration.

Notice

Without Input reading license, this message does not get send.

4.3.2.1.4 Telegram type 12 (data)

The data transmitted by this telegram type depends on the technical system generating the outputs. The data can be defined customer-specific. Exemplarily this might be the connection of a tramway's heating control system in order to enable remote powering up of the wagon-heating.

Currently two bits (thus two outputs) of the output array are supported, enabling following switching and output options:

Array	Name	Description
6	Outputs	<p>The array is one byte long, 2 bits of which are supported.</p> <p>Possible outputs (each customer-specific interpretable according to allocation):</p> <ul style="list-style-type: none">• 0 = both outputs „0“• 1 = output 1 „1“, output 2 „0“• 2 = output 1 „0“, output 2 „1“• 3 = both outputs „1“

4.3.2.1.5 Telegram type 13 (data)

Confirms the reception, procession and execution of the telegram type 12 command.

4.3.2.1.6 Telegram type 100 (error message)

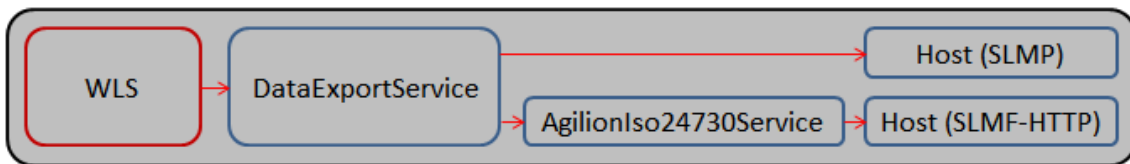
This telegram type is the error message for telegram type 12, thus informs about a command not being executed.

4.4 Export via socket connection based on ISO/IEC 24730-1 2014

In this case the customer's application connects to the WLS via TCP/IP. The WLS answers with a message flow that does not end until the connection to the customer's application is closed. The WLS sends 'keep alive' messages insofar as no messages are sent for a prolonged period in order to signal the continuity of the connection to the customer's application. The corresponding cycle time is controlled via the configuration file of the "Data Export Service".

The customer's application should periodically initiate the retrieval of a connection lost.

The telegram transmission via SLMP and SLMF, respectively, takes place as shown in the following schematic illustration:



4.4.1 SLMP via Socket (TCP/IP)

The "Data Export Service" supports the SLMP (Simple Location Message Protocol) messages structured according to ISO/IEC 24730-1:2014 and transmitted via TCP/IP.

This functionality has to be activated in the Data Export Service's configuration file as described in paragraph 4.1.

```
[ExportSLMP]
Active=1
Port=4000
RemoteFraming=LineFeedFraming
KeepAliveMsgActive=1
KeepAliveMsgTime=30
;at least 5 seconds
WelcomeField=Welcome
;or any alternative welcome message
```

The WLS uses the message specification according to the ISO/IEC 24730-1:2014. Please refer to this norm.

4.4.1.1 Connection establishment, data and telegram definition

Below you will find examples for the telegrams transmitted on the establishment of the connection, which are 'Welcome', 'Field definitions' and the 'Telegram definition'. <CR><LF> acts as the telegram end identification:

Welcome telegram, version (here: 1.0), interface, text:

```
WLS,SLMF,1.0,0.0.0,Welcome<CR><LF>
```

The following field definitions are being sent:

```
FieldDefinition,Source,String<CR><LF>
FieldDefinition,Format,String<CR><LF>
FieldDefinition,Tag_ID_Format,HexBinary<CR><LF>
FieldDefinition,Tag_ID,HexBinary<CR><LF>
FieldDefinition,X,Double<CR><LF>
FieldDefinition,Y,Double<CR><LF>
FieldDefinition,Z,Double<CR><LF>
FieldDefinition,Battery,HexBinary<CR><LF>
FieldDefinition,Timestamp,DateTime<CR><LF>
FieldDefinition,Algorithm,String<CR><LF>
FieldDefinition,A,Double<CR><LF>
```

The telegram definition may look as follows:

```
LocateMessageDefinition,WLS,DFT,Tag_ID_Format,Tag_ID,X,Y,Z,Battery,Timestamp<CR><LF>
oder
LocateMessageDefinition,WLS,O1D,Tag_ID_Format,Tag_ID,X,Y,Z,Battery,Timestamp,Algorithm,A<CR><LF>
```

4.4.1.2 Keep-alive telegram

The keep-alive telegram looks as follows:

```
KeepAlive,30<CR><LF>
```

4.4.1.3 Position transmission telegram

Analogous to the telegram definition

```
LocateMessageDefinition,WLS,DFT,Tag_ID_Format,Tag_ID,X,Y,Z,Battery,Timestamp<CR><LF>
```

the telegram transmitting the position looks as follows:

```
WLS,DFT,02,17850000193f,-31.38,8.94,2.80,3,2016-09-13T11:38:23+02:00<CR><LF>
```

4.4.2 SLMF via http

Optionally, SLMF-HTTP (SLMF = Simple Location Message Format) may be utilized as interface, although not directly via the “Data Export Service”. A separate web-based service (AgilionIso24730Service) is available to this end. Regarding the message structure and the configuration we would, here, too, like to refer to the ISO/IEC 24730-1:2014.

The “Data Export Service” transmits positions from the WLS via its SLMP-module (Port 4000) to the AgilionIso24730Service. This service acts as the interface to the customer’s web application. For this purpose port 12346 is destined for this by default. The service can be configured using the configuration file “rtlsconfig.html”. Here you can set the maximum number of positions to be saved and the maximum period of time positions should be recorded. Furthermore, the port on which the AgilionIso24730Service provides a web-socket for the communication with the customer’s web application can be set in the configuration file “confXSD.html”