Leica GMX900 Series
Getting Started Guide

Version 1.3
English

- when it has to be **right**

Leica
Geosystems

Introduction

☞   To use the products in a permitted manner, please refer to the detailed safety instructions in the GMX901 User Manual and GMX902 GG/GMX902 GNSS User Manual.

Purpose of this manual

This Getting Started Guide is intended as a quick reference manual to use the Leica GNSS Spider software to configure the GMX901, GMX902 GG and GMX902 GNSS instruments and compute positions of monitored points.

myworld
@Leica Geosystems

myWorld@Leica Geosystems (**https://myworld.leica-geosystems.com**) offers a wide range of services, information and training material.
With direct access to myWorld, you are able to access all relevant services whenever it is convenient for you, 24 hours a day, 7 days per week. This increases your efficiency and keeps you and your equipment instantly updated with the latest information from Leica Geosystems.

Service	Description
myProducts	Simply add all Leica Geosystems products that you and your company own. View detailed information on your products, buy additional options or Customer Care Packages (CCPs), update your products with the latest software and keep up-to-date with the latest documentation.
myService	View the service history of your products in Leica Geosystems Service Centers and detailed information on the services performed on your products. For your products that are currently in Leica Geosystems Service Centers view the current service status and the expected end date of service.
mySupport	Create new support requests for your products that will be answered by your local Leica Geosystems Support Team. View the complete history of your Support and view detailed information on each request in case you want to refer to previous support requests.
myTraining	Enhance your product knowledge with the Leica Geosystems Campus - Information, Knowledge, Training. Study the latest online training material or download training material on your products. Keep up-to-date with the latest News on your products and register for Seminars or Courses in your country.

Validity of this manual

This manual applies to the GMX901, GMX902 GG and GMX902 GNSS.

Available documentation

Name	Description/Format	🗎	📄
Leica GMX900 Series Getting Started Guide	Included are detailed descriptions of the necessary steps to configure GMX901/GMX902 GG/GMX902 GNSS with Leica GNSS Spider.		✓
Leica GMX901 User Manual	All instructions required in order to operate the product to a basic level are contained in the User Manual. Provides an overview of the product together with technical data and safety directions.	✓	✓
Leica GMX902 GG/ GMX902 GNSS User Manual	All instructions required in order to operate the product to a basic level are contained in the User Manual. Provides an overview of the product together with technical data and safety directions.	✓	✓
Structural Monitoring Equipment List	Describes items and setup of monitoring systems.		✓
GNSS Networks and Reference Stations Equipment List	Describes items and setup of permanent GNSS reference stations.		✓
Leica GNSS Spider Online Help	Comprehensive guide to the GNSS Spider software. Included are context-sensitive descriptions of GNSS Spider software settings and functions.		✓
Installation Guide - Leica GNSS Spider Reference Station	Detailed installation instructions for the installation of Leica GNSS Spider		✓

Refer to the following resources for all GMX900 Series documentation/software:
• the Leica GMX900 CD
• https://myworld.leica-geosystems.com

Table of Contents

1 GNSS Spider Configuration & Settings

1.1 Overview

Description
GMX901, GMX902 GG and GMX902 GNSS instruments are delivered with default settings which cover the needs of the typical user. The settings can be adjusted according to the customer needs and applications.

Requirements
GMX901:   Leica GNSS Spider v2.3.1 or later must have been installed.
GMX902 GG: Leica GNSS Spider v2.3.2 or later must have been installed.
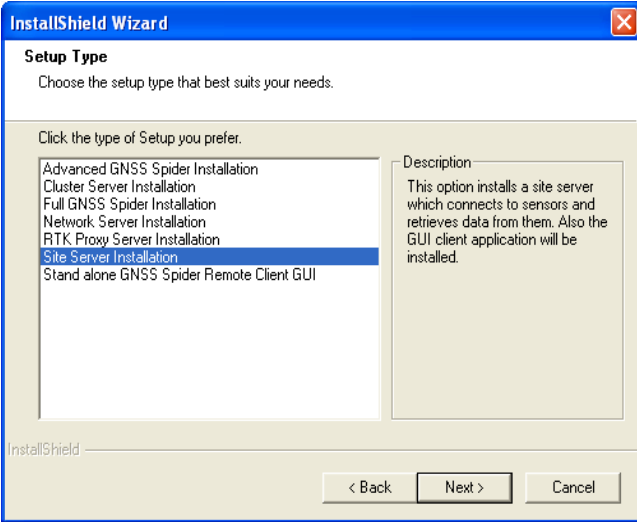GMX902 GNSS: Leica GNSS Spider v3.3 or later must have been installed.

Refer to "1.1.1 Installation"for information on how to start Leica GNSS Spider at a basic level or refer to "Leica GNSS Spider Reference Station Installation Guide" for advanced information.

1.1.1 Installation

Site Server installation
Use **Site Server Installation** option to install all GNSS Spider Site Server related components including the local SQL database which, when populated, contains all the information required to manage one or mulitple GNSS instruments. This installation type installs all modules required for instrument control, raw data archiving and position computation.

Site Server installation step-by-step
The Installation Guide Wizard is a tool that guides you through the GNSS Spider installation routine.

Step	Description
1.	Start the GNSS Spider setup program.
2.	The InstallShield Wizard welcome dialog appears. You can use **Next >** and **< Back** to navigate through the Wizard steps.

Step	Description
3.	
	The Setup Type dialog appears. Select **Site Server Installation**. This option installs a Spider site server. The site server is the component that connects to instruments, controls and retrieves data from them. Also the GUI client application will be installed. The GUI is the graphical user interface for the Spider server. For typical monitoring applications, the other servers listed in here are not required.
4.	Depending on what is already installed on your computer, the installation wizard can ask you for a path to the Dongle driver and SQL Server 2005 Express database installation files. These files are included on your GMX900 CD.
5.	Click **Next >** to proceed.
6.	The Password dialog appears. Enter and confirm a unique password that will be required by clients to access your Site Server.
☞	We recommend that the Site Server password is different from your user account and SQL system administrator passwords.
7.	Click **Next >** and proceed until the InstallShield Wizard is completed.

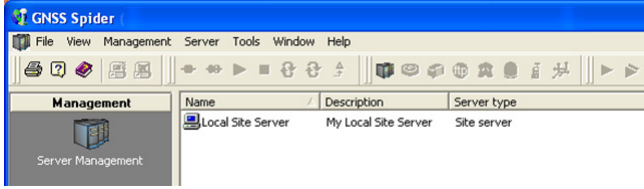| Step	Description
8.	
	Select the check box to start the GNSS Spider client user interface once installation is complete.

☞ Refer to the Installation Guide - Leica GNSS Spider Reference Station for detailed information on the individual settings.

1.1.2 Site Server

Site Server installation step-by-step

The Installation Guide Wizard is a tool that guides you through the GNSS Spider installation routine.

Step	Description
1.	Connect the instrument to the computer.
2.	Start the GNSS Spider Client GUI.
3.	Click the **Server Management** icon in the **List Bar**.
4.	This screen appears:
5.	Highlight the desired server in the server management window. Typically select the Local Site Server.
6.	Right click the desired server in the report view window and select **Open**.
☞	- Indicates an active or open server connection.

Edit/Close a Server

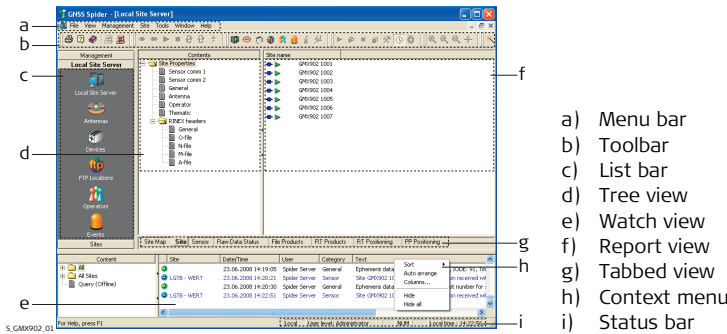Use the context menu to change server settings or to close a server.

1.1.3 Site Server View

Site Server main view

After opening the Site Server, the main view is shown. Use the Site Server to:
- define permanent GNSS sites
- configure instrument parameters at the sites
- check site status
- configure products, for example RT Positioning Products

a) Menu bar
b) Toolbar
c) List bar
d) Tree view
e) Watch view
f) Report view
g) Tabbed view
h) Context menu
i) Status bar

S_GMX902_01

Component	Description
Menu bar	The Menu bar lists all available commands. If the command is greyed out, it is not applicable. The menu item between Management and Tools is a dynamic. The menu item shown is always relevant to the view that is currently active.
Toolbar	Displays the commands used most often. Customise the toolbar by adding and removing buttons.
List bar	A navigation tool to toggle access between a Server view, management components or Site status views.
Tree View/ Report View	Select a component from the Menu Bar or List Bar to show the management view. The typical management view consists of a tree view in the left pane and a report view in the right pane. The report view displays objects corresponding to the highlighted item in the tree view.
Watch view	A list of messages of actions or events taken by the GNSS Spider server. The messages are triggered by the operator or the server itself. The messages are logged in real-time. The messages are colour coded to help distinguish critical events.
Tabbed view	Use the tabs to switch from one view to another.
Context menu	Right click an item to open a context menu. The context menu contains item-specific commands.
Status bar	The local time and your sever access level.

Site Server tabs   Use the Site Server tabs to switch from one view to another.

Site Server tab	Description
Site Map	Gives you a graphical overview of the status and configuration of all sites belonging to your server.
Site	Create, edit, view and delete such sites.
Sensor	Configure instruments settings.
Raw Data Status	View the real-time connection status of the configured sites.
File Products	Define the creation of data files, e.g. RINEX and event logs.
RT Products	Create real-time correction streams for RTK rovers.
RT Positioning	Create baselines for real-time positioning between two sites.
PP Positioning	Create baselines for post processed positioning between two sites.

Site tab

- A site is a GNSS instrument and antenna connected to a GNSS Spider server.
- The Site tab enables you to create, edit, view and delete such sites. Once you have created a site, you will be able to connect to and configure site properties. Its status can be monitored and products such as Positioning products can be defined. Additionally, the site properties report view allows you to save, print and search its contents.
- The tree view shows the different categories of site properties.
- The report view shows the instrument status using icons.

Sensor tab

- A sensor is basically the instrument situated at the site.
- The **Sensor tab** enables you to view and edit the instrument settings and upload them to the instrument. The sensor report view allows you to save, print and search its contents.
- The tree view shows the different categories of site properties.
- The report view shows the instrument status using icons. Refer to paragraph "Site Server icons".

Site Server icons

Icons	Description
	Site is disconnected from GNSS Spider server.
	Site is connected to the GNSS Spider server.
	Site is started. Only started sites are taken into account for product generation.
Site Name ... Site Code GMX902 ... 1003	Report view text in black: Current site and instrument settings have been uploaded to the instrument.
Site Name ... Site Code GMX902 ... 1003	Report view text in blue: Current site and instrument settings have not been uploaded to the instrument.

1.2 Site Configuration

Site configuration step-by-step

Step	Description
1.	Start the GNSS Spider Client GUI (**G**raphic **U**ser **I**nterface)
2.	Open a server.
3.	A GMX901, GMX902 GG and GMX902 GNSS can be installed with the Site Setup Wizard or manually. The Wizard will start automatically if you open a server that has no defined sites.

	No site configured:	**Site configured:**
	↓	↓
	Site Setup Wizard starts. Refer to"1.2.1 Automatic Site Setup".	The Site tab opens. Refer to "1.2.2 Manual Site Setup".

1.2.1 Automatic Site Setup

Description

The Site Setup Wizard is a tool that guide you through the following stages of a site configuration:
- Setting up communication to the GMX901/GMX902 GG/GMX902 GNSS
- Site location information
- Configuration of instrument operation parameters

Automatic Site Setup step-by-step

Step	Description
1.	Open a server.
2.	Select **Tools** from the **Menu Bar**.
3.	From the drop-down menu select 🪄 **Wizard...** or select the corresponding toolbar button.
4.	The Wizard **Welcome** dialog appears. Use **Next ❯** and **❮ Back** to navigate through the Wizard steps.
5.	The Sensor Communication dialog appears. Select: • **Sensor:** GMX901 or GMX902 • **Sensor connected via:** Select the type of communication from the drop-down list GMX901: The default serial port settings are 115200/None/8/1/None. GMX902 GG/GMX902 GNSS: The default serial port settings are 115200/None/8/1/None. Refer to "1.4 Instrument Settings"for how to change GMX900 Series serial port settings from within GNSS Spider.
6.	Click **Next❯** to connect the sensor and proceed.

Step	Description
☞	If GNSS Spider fails to connect the sensor, the **Sensor Connection Failure** dialog appears.
7.	The General site parameters dialog appears. Enter the • site name • the site code, which is a unique 4 character ID • marker information. The marker information is used in the RINEX headers. Typically, it corresponds to Site name and code.
8.	Click **Next>** to proceed.
9.	The **Antenna** dialog appears. Enter the • accurate coordinates. • correct antenna type and height reading.
10.	The Receiver type dialog appears. Enter the • serial number of the instrument.
11.	Click **Next>** and proceed until the Site Setup Wizard is completed.
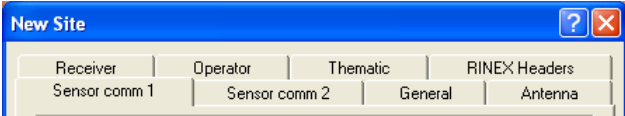
☞ If the connection to the instrument is not yet possible, the Site Setup Wizard can still be used. In that case, finish the Wizard despite the failed connection, but remember to upload the settings once the connection can be established. Refer to the GNSS Spider Online Help for detailed information on the individual settings.
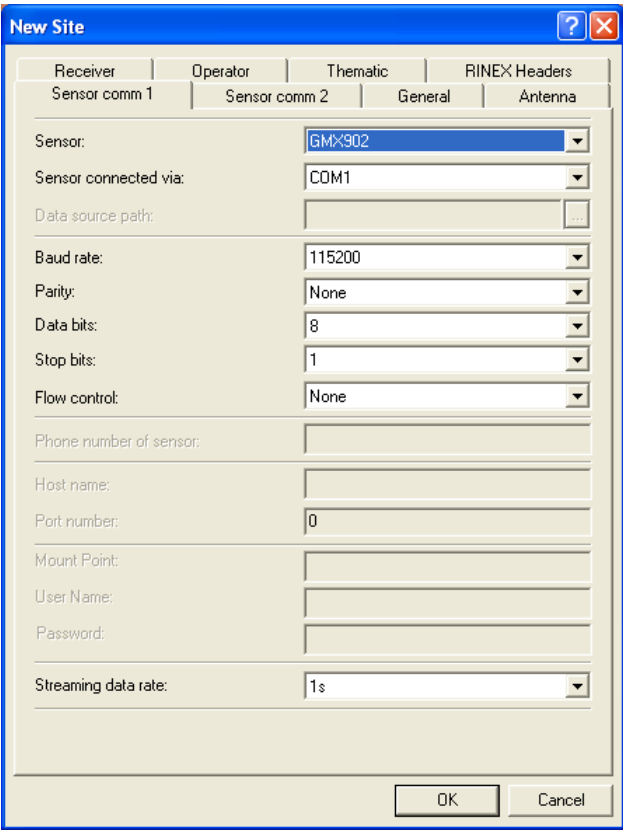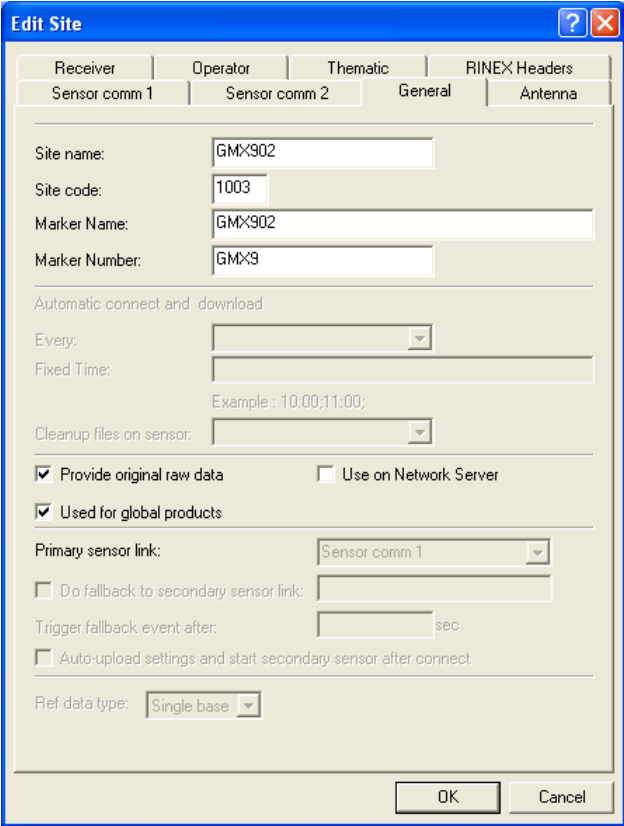
1.2.2 Manual Site Setup
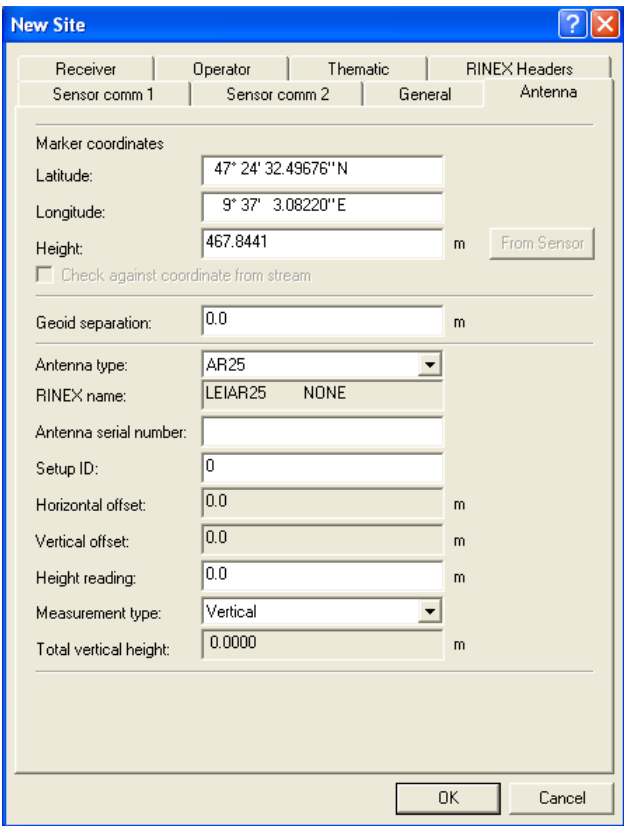
Manual Site Setup step-by-step

For standard setups, it is recommended to run through these basic configuration steps. Refer to the GNSS Spider Online Help for detailed information on the individual settings.

Step	Description
1.	Open a server.
2.	Switch with the **Tabbed view** to the **Site tab**.
3.	Right click in the report view and select **New...** from the context menu.
4.	This dialog appears:

Step	Description
5.	Select **Sensor comm 1** or **Sensor comm 2** tab: • Select the sensor type GMX901 or GMX902 and the communication parameters. • Select the streaming data rate. **New Site** Tabs: Receiver, Operator, Thematic, RINEX Headers Sensor comm 1, Sensor comm 2, General, Antenna Sensor: GMX902 Sensor connected via: COM1 Data source path: Baud rate: 115200 Parity: None Data bits: 8 Stop bits: 1 Flow control: None Phone number of sensor: Host name: Port number: 0 Mount Point: User Name: Password: Streaming data rate: 1s OK Cancel
☞	The maximum data rate for the GMX901 is 1Hz.

Step	Description
6.	Select the **General tab**:

- Enter a site name, a unique 4 character ID and marker information. Marker information is used for the RINEX header only.
- Enable **Provide original raw data** if you want to share a data stream with another GNSS Spider site server.
- Enable **Used for global products** for convenience when making products. This action allows you to define a single product that is used for all sites.

Step	Description
7.	Select the **Antenna** tab:

• Enter accurate coordinates. From the **View** menu, select **Settings** to change from cartesian to geodetic coordinates.
• The **Geoid separation** will be added to NMEA GGA strings created by positioning products. Use the default if in doubt.
• Enter the correct **Antenna type** and **Height reading**.

Step	Description
8.	Press **OK** to confirm or **Cancel** to end the function.
9.	Connect the instrument. For more details refer to "1.2.3 Connect/Disconnect Site".

1.2.3 Connect/Disconnect Site

Connect

Connect establishes a connection between the GNSS Spider server and the selected site (instrument) via the defined communication method, either serial, modem or TCP/IP connection. This command is not active in case a connection is already established. After the connection is established, you are able to upload settings.

☞ To prevent accidental change of communication settings it is not possible to edit these settings for a connected instrument.

Disconnect

Disconnect terminates the connection between the PC and the instrument. This command can be selected if the instrument is connected.

☞ For all real-time products, or for creating RINEX files from a raw data stream, the instrument must stay connected at all times.

Connect/Disconnect an instrument step-by-step

Step	Description
1.	Open a server.
2.	Switch with **Tabbed view** to either the **Site**, **Sensor** or **Raw Data Status tab**.
3.	Right-click on a site (instrument) in the Report view on the right-hand side.
4.	Select **Connect** or **Disconnect** in the **Context menu** to establish communication.
5.	GNSS Spider will indicate the successful connection or termination with a progress bar and watch view message.

☞ For further information on troubleshooting communication problems refer to the GNSS Spider Online Help.
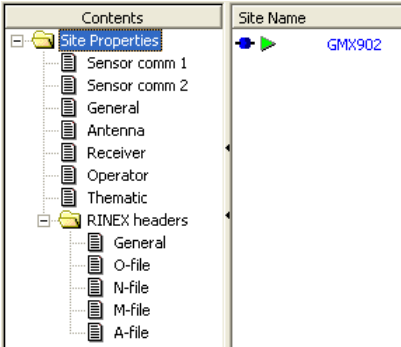
1.3 Site Settings

Description

Several site settings can be adjusted according to your needs. The most important are:
- Site name
- Coordinates
- Antenna settings
- Communication parameters

Edit a site step-by-step

Step	Description
1.	Open a server.
2.	Switch with **Tabbed view** to either the **Site**, **Sensor** or **Raw Data Status tab**.
3.	Double-click a site or right-click and select **Properties...** in the Report view. Contents / Site Name Site Properties 　Sensor comm 1 　Sensor comm 2 　General 　Antenna 　Receiver 　Operator 　Thematic 　RINEX headers 　　General 　　O-file 　　N-file 　　M-file 　　A-file GMX902
4.	Make your changes.
5.	Press **OK** to confirm or **Cancel** to end the function.
6.	Right-click on the site and select **Upload settings** from the **Context menu**.
☞	The **Site name** will change from blue to black when the settings are uploaded.

☞ The GNSS **Sensor comm** settings of a connected site cannot be edited.

1.4 Instrument Settings

Description

The following instrument settings can be adjusted according to your needs with GNSS Spider:
- Elevation mask
- Raw data (GMX902 GG/GMX902 GNSS only)
- Pulse Per Second (PPS) (GMX902 GG/GMX902 GNSS only)

Modify instrument settings step-by-step

Step	Description
1.	Open a server.
2.	Switch with the **Tabbed view** to the **Sensor tab**.
3.	On the right-hand side the **Sensor Properties** view is shown. The current instrument settings are displayed.
4.	In the tree view, select the category you want to edit (e.g. General).
5.	Right-click on a site in the report view and select **Properties** from the **Context menu**.
6.	Make your changes: • Settings relating to the elevation mask. Refer to "1.4.1 Elevation Mask". • Settings relating to the raw data. Refer to "1.4.2 Raw data (GMX902 GG/GMX902 GNSS Only)". • Settings relating to the PPS. Refer to "1.4.3 PPS (GMX902 GG/GMX902 GNSS Only)".
7.	Press **OK** to confirm or **Cancel** to end the function.
8.	Right-click on the site and select **Upload settings** from the Context menu.
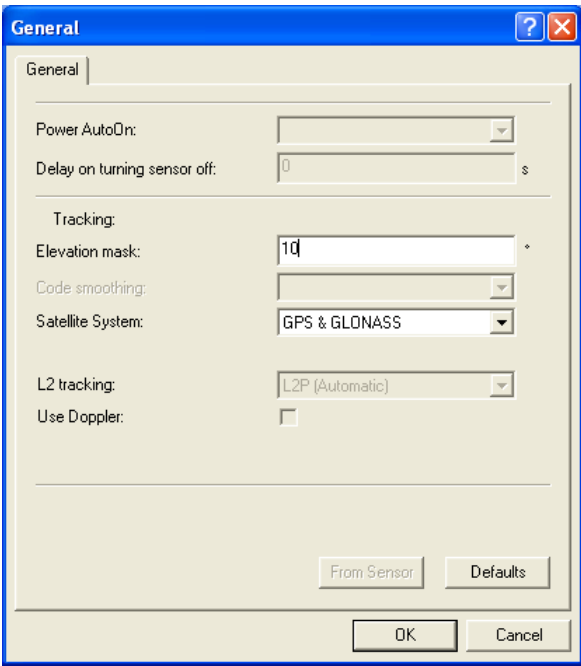
1.4.1 Elevation Mask

Description

The elevation mask is the elevation below which satellite data will not be recorded. Satellites below this elevation will not be tracked.

Edit elevation mask step-by-step

Step	Description
1.	Open a server.
2.	Switch with **Tabbed view** to the **Sensor tab**.
3.	In the tree view, select the **General** category.
4.	Right-click on a site in the report view and select **Properties** from the **Context menu**.

Step	Description
5.	Edit the **Elevation mask**.

General

General

Power AutoOn:

Delay on turning sensor off: 0   s

Tracking:

Elevation mask: 10   °

Code smoothing:

Satellite System: GPS & GLONASS

L2 tracking: L2P (Automatic)

Use Doppler:

From Sensor   Defaults

OK   Cancel

☞ Low satellites are important for a good geometry, but they also have a noisier signal. If in doubt use the default setting 10°.
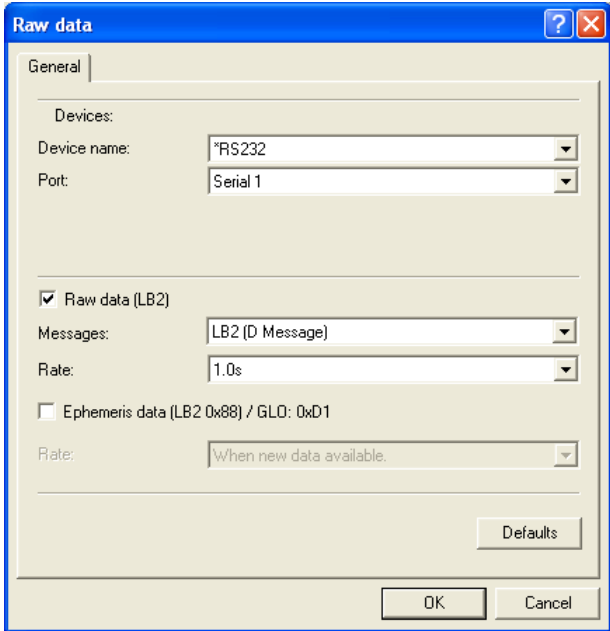
1.4.2   Raw data (GMX902 GG/GMX902 GNSS Only)

Description   The raw data interface allows you to configure a raw data output over port P2 for the GMX902 GG/GMX902 GNSS. Use this functionality when you want to provide raw data to another application, such as a second GNSS Spider site server.

Edit raw data settings step-by-step

Step	Description
1.	Open a server.
2.	Switch with **Tabbed view** to the **Sensor tab**.
3.	In the tree view, select the **Raw data** category.
4.	Right-click on a site in the report view and select **Properties** from the **Context menu**.
5.	Edit the **Raw data (LB2)** settings.

☞

• If you want to configure a site in GNSS Spider receiving such a raw data stream, set **Passive LB2** as sensor type.
• The raw data interface is typically not required to stream raw data to GNSS Spider over the main sensor communication line. See setting of **Streaming data rate** in the **Sensor Comm settings** for that.
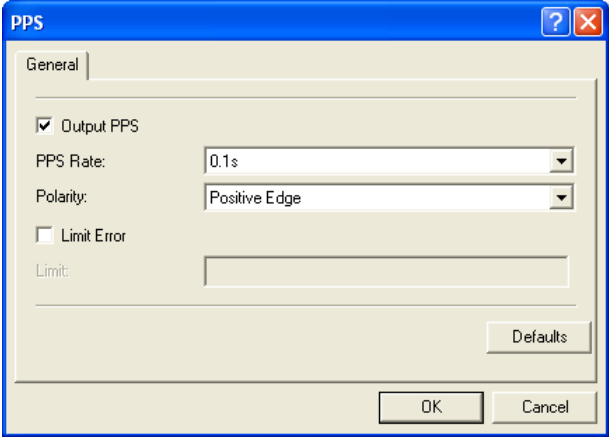
1.4.3   PPS (GMX902 GG/GMX902 GNSS Only)

Description

PPS stands for **P**ulse **P**er **S**econd. It is a pulse that is output at a specified interval time over the **PPS port** of the GMX902 GG/GMX902 GNSS. Use this functionality to activate or synchronise another device, such as accelerometers.

Edit PPS settings step-by-step

Step	Description
1.	Open a server.
2.	Switch with **Tabbed view** to the **Sensor tab**.
3.	In the tree view, select the **PPS** category.
4.	Right-click on a site in the report view and select **Properties** from the **Context menu**.
5.	Edit the **PPS** settings.

☞

- Both the raw data and the PPS interface will not be immediately active on pressing OK. Select **Upload settings** from the **Context menu** to activate the interface.
- The sensor properties, **Logging**, **Real-time 1**, **Real-time 2** and **External sensors** are not supported by the GMX902 GG/GMX902 GNSS.

1.5   Instrument Commands

Description
The instrument commands are available in a context menu. Select a site on the **Site** or **Sensor tab** and right-click. A menu with all available commands will pop up.

Context menu

Connect/Disconnect
After the connection is established, you are able to upload settings or start logging. For additional information refer to "1.2.3 Connect/Disconnect Site"

☞ To prevent the accidental change of communication settings, you are not able to edit the settings for a connected instrument!

Upload
The upload saves configuration data to the instrument and stops current product creation.

☞ The Upload settings command can only be selected if the instrument is connected. If Upload settings is sent to a instrument that is started, product creation will be stopped.

Start
For GMX901, GMX902 GG and GMX902 GNSS instruments, **Start** tells GNSS Spider to begin with product creation for this site. For GRX1200+ Series instruments, **Start** can trigger more advanced functions. See the GNSS Spider Online Help fordetails.

☞ The **Start** command can only be selected if the instrument is connected but not started.

Remote port settings

Allows you to change the parameters of the GMX901, GMX902 GG and GMX902 GNSS serial port to which you are currently connected remotely. For serial channels, it also automatically adjusts the GNSS Spider server's serial port to match the new setting. Use with care when connected over TCP/IP and a Serial-to-IP converter. For this case, you will also need to change the serial port settings of the converter manually.

1.6 RT Positioning Products

Description

Positions are the most important output of a monitoring system. In the GNSS Spider site server, it is possible to compute and distribute real-time position data streams for attached sites. One such data stream is called an RT Positioning Product. The positions are calculated as baselines using one site as a reference and another site as the rover. The output can be in NMEA GGA, GGQ and LLQ format (intended to be used by other software applications, such as Leica GNSS QC) or directly to Leica GeoMoS monitoring software.
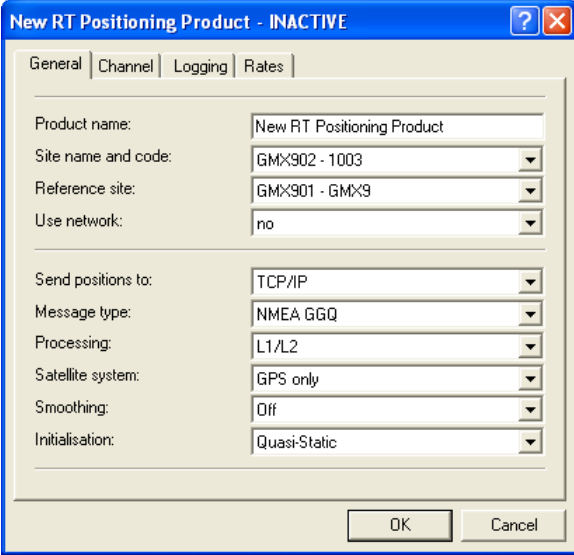
☞ Whilst high accuracy positions can be computed in real-time with single frequency data, the reliability is much lower than with dual frequency data. For this reason, it is recommended to use the GMX902 GG or GMX902 GNSS rather than the GMX901 for real-time monitoring applications.
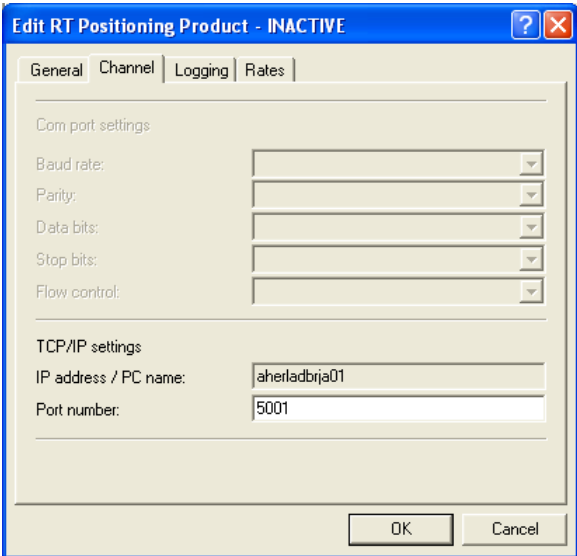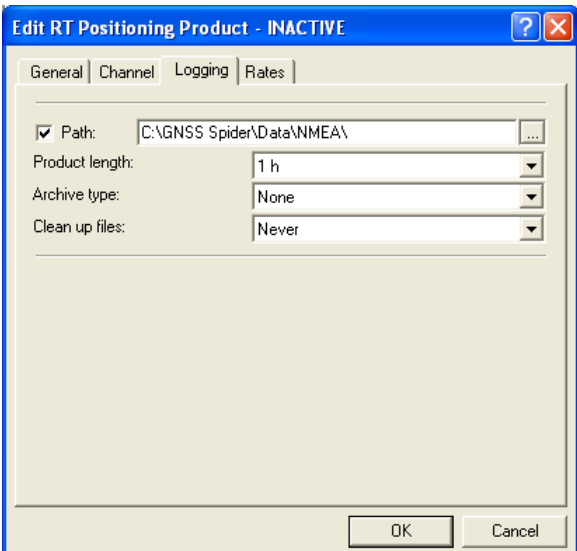
1.6.1 Create/Edit RT Positioning Products

Create an RT Positioning Product step-by-step
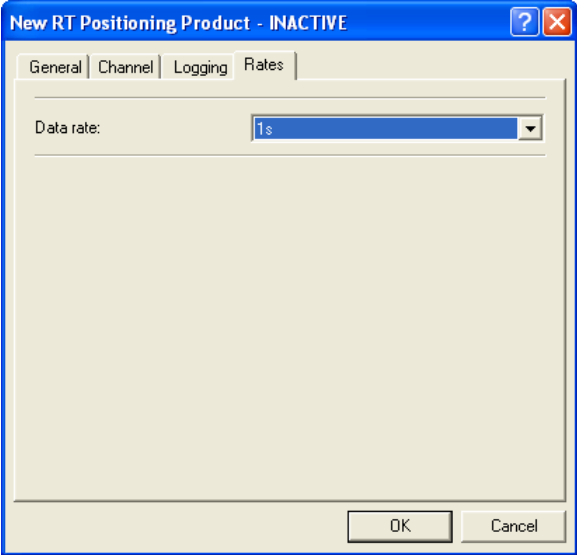
Step	Description
1.	Open a server.
2.	Switch with the **Tabbed** view to the **RT Positioning** tab.
3.	Right-click in the **RT Positioning** report view and select **New...** from the context menu.

Step	Description
4.	Select the **General** tab:
	• Each RT Positioning product must have a unique name.
	• The rover site and reference site must be different sites. Zero baselines based on identical data streams are not permitted.
	• The rover site and reference site must be off the same type (real or simulated).
	• Select the real-time output settings.
	• GMX901: Only L1 processing is possible. GPS only is supported. GMX902 GG/GMX902 GNSS: L1/L2 processing is recommended. GPS & GLONASS are supported.

New RT Positioning Product - INACTIVE

General | Channel | Logging | Rates

Product name: New RT Positioning Product
Site name and code: GMX902 - 1003
Reference site: GMX901 - GMX9
Use network: no

Send positions to: TCP/IP
Message type: NMEA GGQ
Processing: L1/L2
Satellite system: GPS only
Smoothing: Off
Initialisation: Quasi-Static

OK   Cancel

Step	Description
5.	Select the **Channel** tab: • Enter the settings for the configured real-time output. **Edit RT Positioning Product - INACTIVE** General / Channel / Logging / Rates Com port settings Baud rate: Parity: Data bits: Stop bits: Flow control: TCP/IP settings IP address / PC name: aherladbrja01 Port number: 5001 OK Cancel
6.	Select the **Logging** tab: • Choose a path to the log the real-time output files (if desired). **Edit RT Positioning Product - INACTIVE** General / Channel / Logging / Rates ☑ Path: C:\GNSS Spider\Data\NMEA\ ... Product length: 1 h Archive type: None Clean up files: Never OK Cancel
☞	It is the user responsibility to ensure that the hard disk does not fill.

Step	Description
7.	Select the **Rates** tab: • Enter the position output rate. If the output rate is slower than the input rate, the position calculation is done at either 1 Hz or the input rate (whichever is faster) and sampled. • The raw data input rate must be at least as fast as the position output rate. New RT Positioning Product - INACTIVE General | Channel | Logging | Rates Data rate: 1s OK Cancel
8.	For more detailed information on RT Positioning products refer to the GNSS Spider online help or press F1 to open context-sensitive help for each dialog.
9.	Press **OK** to confirm or **Cancel** to end the function.
10.	The RT Positioning Products will immediately become active after they have been created, as long as the configured sites are **connected** and **started**.

Active and Inactive products

The status of the product is shown by an icon:

• Active products 🛰 are created as long as the configured sites are connected and started.

• Inactive products ✖ are not created, but are available for later activation.

Change the status of a product by checking or unchecking **Active** in the product's context menu.

Edit RT Positioning Products

To edit a RT Positioning Product it is necessary to deactivate it first.

1.6.2 Tips & Tricks

Important notes

- For a Positioning Product to function, both sites must be **connected** and **started**.
- Check the Raw Data Status to make sure that the status is **Receiving data**.
- If no data is received from the rover station, no position will be calculated. A null NMEA string will be output.
- If no reference data is available, a navigated position will be calculated .
- **Relative latency** will affect the accuracy of the results. The latency is shown in the Raw Data Status tab.
- If a single frequency site (GMX901) is selected for the processing and the processing is set to "L1/L2" then no position will be calculated.

Positions with sites from multiple site servers

- Create an **Original Raw Data** RT Positioning product for the site on the remote site server. Enable **Provide original raw data** in the site properties.
- Create a Passive (LB2) site on the local site server.

RT Positioning products are just like RTK on the rover

- Reliability of ambiguity resolution will decrease with the baseline length. The product can take a long time to fix, it cannot fix at all or it can incorrectly fix for long baselines.
- Accuracy will also decrease with the baseline length.
- User will be warned when creating a baseline longer than 30 km but there is no limit on the baseline length.
- The Leica RTK kernel is tuned for Leica data and best results will be obtained when using Leica instruments.

Ambiguity resolution techniques

- Three ambiguity resolution options are available:
    - **On Known Point** (default)
    - **While Moving** (also known as OTF or on-the-fly)
    - **Quasi Static**
- The **Moving ambiguity** resolution technique is suitable for instruments with high dynamics. Use for sites that are expected to move rapidly or far from their initial position. The reliability is not as high as with the other approaches.
- **On Known Point** ambiguity resolution, is more reliable but requires that the reference station and rover station have highly accurate coordinates. If the sites are moving then the coordinates must be updated in the site configuration because inaccurate coordinates will prevent GNSS Spider from resolving the ambiguities.
- **Quasi Static** is a combination of the **While Moving** and **On Known Point** approaches. The site coordinates are used to aid the ambiguity resolution. They do not need to be accurately known (a few decimetres or a metre is sufficient). Use for sites that are expected to move but not far or fast.
- Wrong fixes are more likely with **While Moving** initialisation, especially for long baselines. A wrong ambiguity fix will be seen as a jump in the coordinates.

Elevation Mask

- All data from the data streams are used by the RT Positioning products.
- Using data below 10° can cause lower accuracy positions.
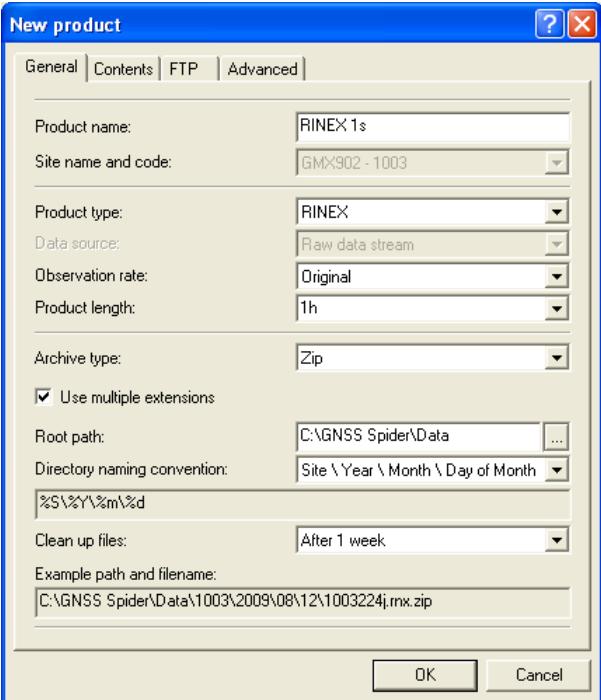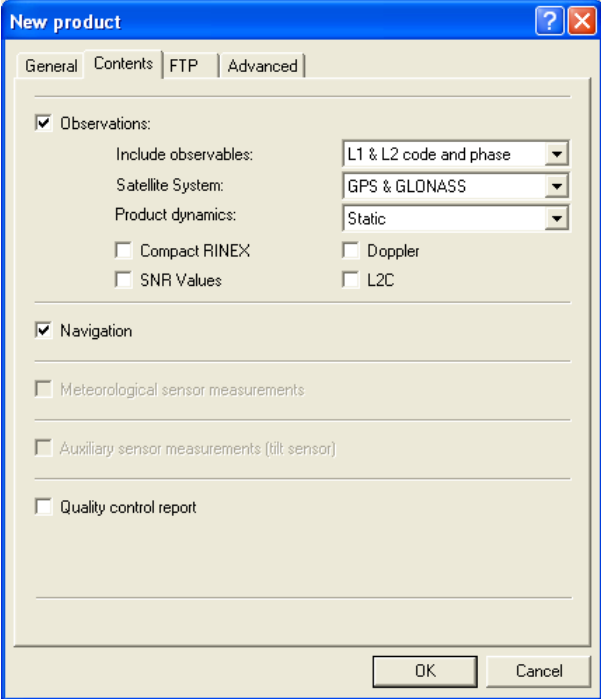
1.7 File Products

Description

In GNSS Spider, the template that describes how the RINEX data downloaded from the instrument can be handled, is called a **File Product**.

A **Global File product** is referred to as a single file product configuration that is used for multiple sites. A Global File product allows a single configuration for a RINEX product which can be used for all sites connected to the site server. The Global File product ensures that the files for all sites are created based on the same configuration.

1.7.1 Create File Products

Create a File Product step-by-step

Step	Description
1.	Open a server.
2.	Switch with the **Tabbed** view to the **File Product** tab.
3.	Right-click in the **File Product** report view and select **New...** from the context menu.
4.	Select the **General** tab: • Enter a unique **Product name**. • Select the **Site name and code** for which you want to generate a product. • Select the **Product type**, RINEX. **New product** General | Contents | FTP | Advanced Product name: RINEX 1s Site name and code: GMX902 - 1003 Product type: RINEX Data source: Raw data stream Observation rate: Original Product length: 1h Archive type: Zip ☑ Use multiple extensions Root path: C:\GNSS Spider\Data Directory naming convention: Site \ Year \ Month \ Day of Month %S\%Y\%m\%d Clean up files: After 1 week Example path and filename: C:\GNSS Spider\Data\1003\2009\08\12\1003224j.rnx.zip OK Cancel

Step	Description
5.	Select the **Contents** tab: • Specify the contents of the RINEX files. • Set **Product dynamics** to **Static**.
6.	Select the **FTP** tab to specify an FTP push and its target location. The FTP push will include all files that are defined for this product.
7.	Select the Advanced tab to enter and run a command-line operation after product creation.
8.	Press **OK** to confirm or **Cancel** to end the function.
9.	The File Product will immediately become active after its creation, as long as the configured sites are **connected** and **started**.

1.7.2 Tips & Tricks

Important notes
- All sites that will use a Global File product, must have the **Use for Global File products** check box checked.
- When activating a File product make sure that the site is started.
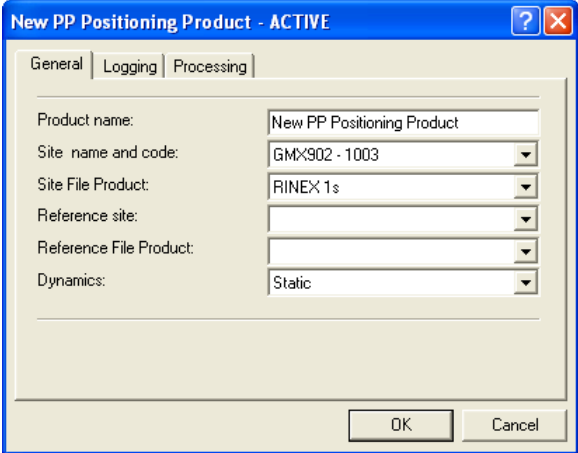
1.8 PP Positioning Products
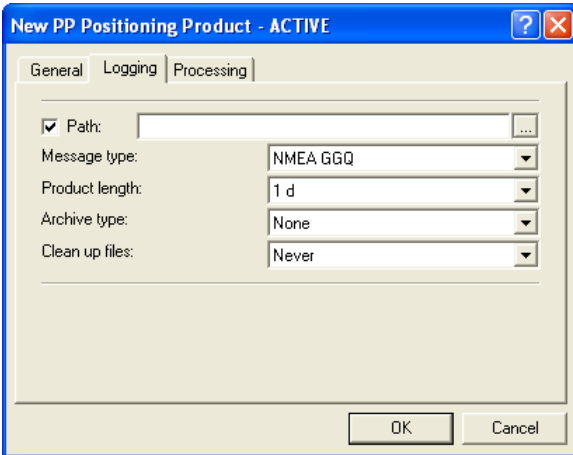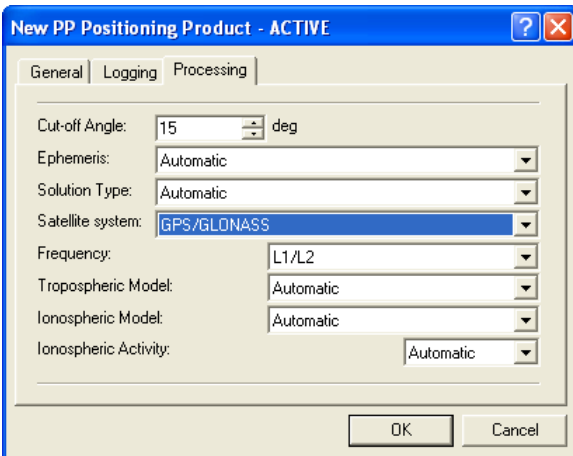
Description

PP Positioning products are GNSS baselines that are computed using logged RINEX file products. PP Positioning products enable accurate position computation also in difficult GNSS environments. Difficult environments can be caused for example by severe obstructions, where real-time processing can fail or gives unsatisfying results.

1.8.1 Create PP Positioning Products

Create a File Product step-by-step

Step	Description
1.	Open a server.
2.	Switch with the **Tabbed** view to the **PP Positioning** tab.
3.	Right-click in the **PP Positioning** report view and select **New...** from the context menu.
4.	Select the **General** tab: • Enter a unique **Product name**. • **Site name and code:** Select the name of the monitoring site. • **Site File Product:** Select the RINEX File Product that is activated for the monitoring site. • **Reference site:** Select the name of the reference site. The monitoring and reference site must be different sites (zero baselines are not permitted). The monitoring and reference site must be of the same type (real or simulated). • **Reference File Product:** Select the RINEX File Product that it activated for the reference site. The monitoring and reference site **File Product** must be of the same length. • If the **Dynamics** is set as **Kinematic**, a position will be computed for every epoch and output to the log file. Only an average value will be stored in the database. If the **Dynamics** is set as **Static**, a single position will be computed for the whole session.

Step	Description
5.	Select the **Logging** tab: • If desired, choose a path is log the files *New PP Positioning Product - ACTIVE* Tabs: General	Logging	Processing ☑ Path: [ ] [...] Message type: NMEA GGQ Product length: 1 d Archive type: None Clean up files: Never [OK] [Cancel]
6.	Select the **Processing** tab: • Select the **Satellite system**. The GMX901 is a GPS only instrument, so the satellite system GPS only can be selected. For GMX902 GG/GMX902 GNSS, select GPS/GLONASS. • Frequency: Select the frequency of the data to be processed. If L1/L2 is selected and the RINEX files contain L1 only data, no position will be calculated. • The same processing parameters are used as the defaults in LEICA Geo Office. *New PP Positioning Product - ACTIVE* Tabs: General	Logging	Processing Cut-off Angle: 15 deg Ephemeris: Automatic Solution Type: Automatic Satellite system: GPS/GLONASS Frequency: L1/L2 Tropospheric Model: Automatic Ionospheric Model: Automatic Ionospheric Activity: Automatic [OK] [Cancel]
7.	For more detailed information on PP Positioning products refer to the GNSS Spider online help or press F1 to open context-sensitive help for each dialog.
8.	Press **OK** to confirm or **Cancel** to end the function.

| Step	Description
9.	The PP Positioning product will immediately become active after it's created.

1.8.2　　Tips & Tricks

Important notes
- For a PP Positioning product to function, both sites must be **connected** and **started** and the File Products must be **activated**.
- File Products of at least 10 minutes must be used if processing L1 only data.
- If the File Products are split (because a site is disconnected and reconnected) then only the first one will be processed.
- Post Processing will potentially use a large amount of CPU and hard disk. Therefore. the Post Processing is done sequentially (one at a time) and only once creation of all file products has finished.
- Currently only uncompressed file products and file products compressed by Zip and GZip are supported.

2 GNSS Spider Status Information

2.1 Site Map

Description   The site map gives you a graphical overview of the status and configuration of all the sites from your server.
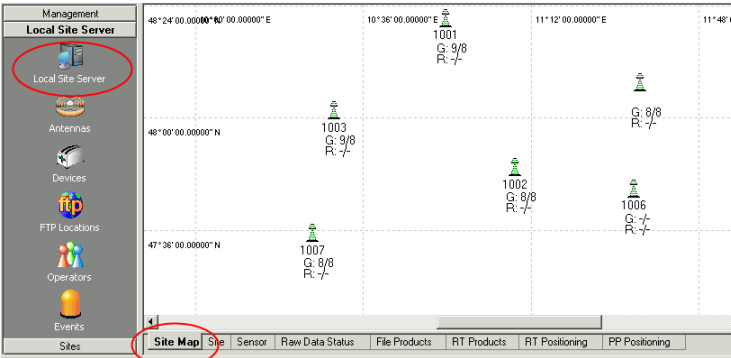
Graphical Settings Right-click in the background and you can open the **Graphical settings...** dialog, or alternatively select **Graphical Settings...** from the **Site Map** menu. This dialog explains all symbols and allows you to switch them on or off.

Zoom   The Site Map menu allows you also to access the **Zoom In**, **Zoom Out** and **Zoom 100%** functions.

2.2　　　　　Site Status

Description　　The Site status views are used to check the logging and tracking status of each site or instrument. The List bars lists all sites configured sites on the Site Server. Use the site icons to switch between sites.

The report view consists of two tabs:

- **Sensor:** Displays information for site, instrument and satellites.
- **Tracking:** displays status information about currently tracked satellites.

The status icons are only updated while the Site Server is connected to the instrument.

2.2.1　　　　Sensor Tab

Description　　Select the **Sensor tab** to view instrument status information updates.

2.2.2　　　　　　Tracking Tab

Description　　　　Select the **Tracking tab** to view information on satellites currently tracked along with a sky plot.
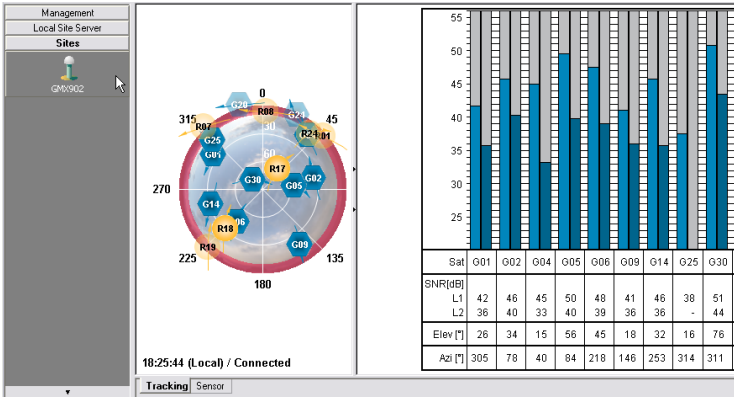
☞　　　　For further information on the Tracking tab refer to the GNSS Spider Online Help.

2.3 Raw Data Status

Description

Raw Data Status tab report view displays real-time information on the current data stream and an overview of the communication activity.

Site name			Site code	Comm activity	Data received [%]	GLONASS tracked	First epoch	Data rate
		GMX902 1001	1001	no response	0.0	No	-	0.000 sec
		GMX902 1002	1002	no response	0.0	No	-	0.000 sec
		GMX902 1003	1003	no response	0.0	No	-	0.000 sec
		GMX902 1004	1004	receive data	100.0	No	13.02.20…	1.000 sec
		GMX902 1005	1005	receive data	100.0	No	13.02.20…	1.000 sec
		GMX902 1006	1006	receive data	100.0	No	13.02.20…	1.000 sec
		GMX902 1007	1007	receive data	98.6	No	13.02.20…	1.000 sec

Site Server icons

The icons are updated once a minute and every time you connect to, upload to or start the instrument. The master time site is highlighted in yellow.

Icons	Description
	GNSS Spider server is disconnected from the instrument.
	GNSS Spider server is connected to the instrument.
	Logging is active on the instrument.

Communication Activity

The **Comm Activity** (Communication activity) field in the report view list the current communication status between the instrument and GNSS Spider. Colour coding of the text is used to enable quick analysis of the communication status.

Status	Description
disconnected	Site is not connected (colour grey).
receiver status	Data is streamed but not enough data has been received for the site to be usable (colour orange).
receive data	Site is connected and data stream is received (colour black).
downloading	Shown during automatic file download (colour black). For Leica GPS1200 instruments only.
uploading	Shown during firmware file upload or settings upload (colour black).
connecting	The site is currently trying to connect to the data stream but is not able to establish a connection. Check your communication line or your communication settings (colour red).
no response	The site is connected but no response is received at all within standard time outs (colour red).

Master Time Site

- Too accurately compute the data latency it is necessary to align the computer clock closely with GPS time. To help this one site must be defined as the Master site.
- Chose the site with the most reliable communication link as the Master site. Active connections to Leica instruments are preferable over other instrument types. In the Raw Data Status view, the line of the master time site is highlighted in yellow.

Total Quality Management: Our commitment to total customer satisfaction.

TQM
ISO 9001 / ISO 14001

Leica Geosystems AG, Heerbrugg, Switzerland, has been certified as being equipped with a quality system which meets the International Standards of Quality Management and Quality Systems (ISO standard 9001) and Environmental Management Systems (ISO standard 14001).

Ask your local Leica Geosystems dealer for more information about our TQM program.

Leica Geosystems AG
Heinrich-Wild-Strasse
CH-9435 Heerbrugg
Switzerland
Phone +41 71 727 31 31
www.leica-geosystems.com

- when it has to be **right**

Leica
Geosystems