

GeoMoS HiSpeed v1.0

Online Help



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Introduction to Leica GeoMoS HiSpeed

Introduction

Welcome and thank you for choosing Leica GeoMoS HiSpeed.

Leica GeoMoS HiSpeed is a software for structural monitoring that compliments Leica GNSS Spider by providing a range of analysis, messaging and reporting features and real time use of high precision inclination data from Leica Nivel200 instruments. Leica GeoMoS HiSpeed is designed to work with high rate (e.g. 20Hz) data for applications such as bridge and high rise building monitoring. It includes the following features:

- Display time-line or scatter plots of coordinate displacements from real time data streams or pre-logged files
- Formats supported include NMEA GGA, GNS, GGQ and LLQ
- Multiple real time high speed and Spider RT and PP Positioning connections
- Graphical display of longitudinal, transverse, height, easting, northing, 2D and 3D displacement time series and 2D scatter plots
- Limit checks and messaging (run application, email and SMS) are supported
- Multi-language customisable web page output of displacements calculated from real time NMEA data

For information on the software options refer to the Licensing Information.

Important Notes



In order to use the software correctly and reliably, you must follow the instructions given in the online help system. You must also adhere to the directions given in the user manual for the product with which you are using the software and the user manual of the manufacturer of the sensor and control equipment.

The rights and responsibilities accruing in respect to Leica Geosystems AG as a result of acquisition of the software are set out in the **Leica Geosystems AG Software License Agreement..**



All of the instructions and directions required for a technical specialist to use the system are included in the online help system, which are only available in English.

Trademarks

Windows is a registered trademark of Microsoft Corporation.

All other trademarks are the property of their respective owners.

System Requirements

Operating system:

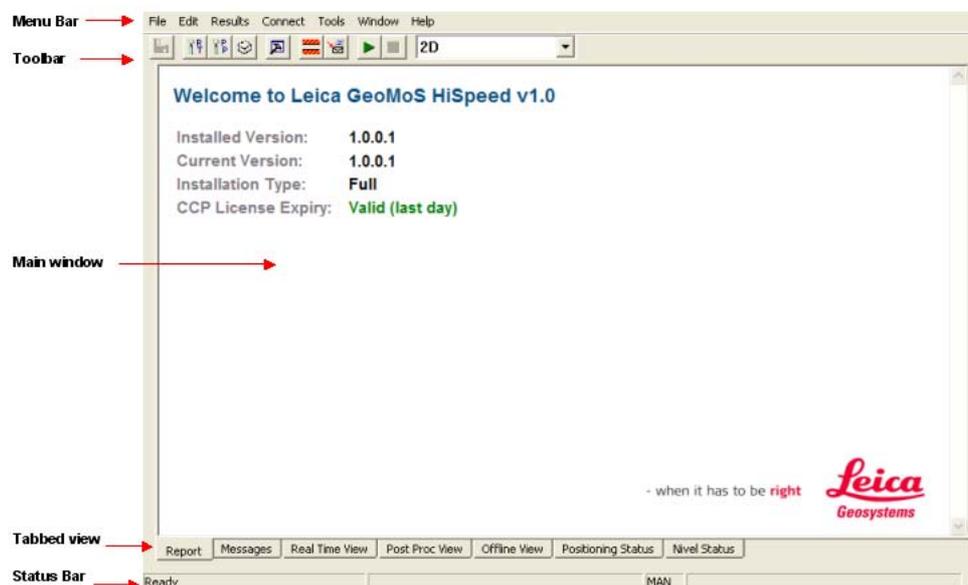
- Windows XP
- Windows Server 2003
- Windows Vista (32bit)

Minimum hardware requirements:

- Pentium II or higher
- 500 MHz
- 128 MB RAM
- 1GB hard disk
- SVGA 800x 600
- keyboard and mouse
- CD-ROM or DVD drive
- 1 parallel or USB port for software protection key (not required for License Free version)
- Ethernet connection (for receiving NMEA or configuration data from other PCs)

User Interface

The GeoMoS HiSpeed interface is characterized by a tab view, as shown below. Each tab displays a particular type of output.



Menu Bar

The Menu Bar is a special Toolbar at the top of the screen that contains menus. If a command is not applicable it is grayed out and not accessible.

The Menu Bar lists the following commands:

- File
- Edit
- Results
- Connect
- Tools
- Window
- Help

Tool Bar

Toolbars displays the commands used most often. [Click here](#) for a summary of the tool bar icons.

Tabbed-View

The main tab view is the primary component of the GeoMoS HiSpeed interface. It comprises the following tabs.

Tab	Description
Report	Displays output from processing results.
Messages	Shows a log of the most recent messages that have been generated by the software. Messages occur when ever any settings are edited and from limit checks during online coordinate analysis.
Real Time View	Displays real time displacement/deformation data derived from Leica GNSS Spider RT Positioning, NMEA or Nivel200 tilt data. Refer to Connect NMEA and Connect Nivel200 for more information.
Post Proc Plot View	Displays near real time displacement/deformation data derived from Leica GNSS Spider PP Positioning products. Refer to Connect Spider PP Positioning for more information.
Offline View	Displays code and phase residuals calculated from the loaded RINEX data. Displays displacement/deformation data from prerecorded NMEA log files or GNSS Spider PP Products database. Refer to Connect NMEA / Spider RT Positioning (Offline) and Connect Spider PP Positioning (Offline) for more information.
Positioning	Displays real time connection information such as communications

Status	status, limit check status and current displacement values for active NMEA and Spider PP Positioning connections. Refer to Connect NMEA / Spider RT Positioning and Connect Spider PP Positioning for more information.
Nivel Status	When Leica Nivel inclination sensors have been configured and activated, this tab shows the current status of the connection including the communications status and the last measurements. Refer to Connect Nivel200 for more information.

Status Bar

The status bar is used to give pertinent information on the current status of the program. It comprises five separate status windows as follows:

Tab	Description
Program Status	Displays the current activity of the program.
File Status	Displays the currently selected reference file that has been opened for analysis.
Auto Processing Status	If automatic processing has been started "AUTO" will be displayed. Otherwise "MAN" will be shown.
Progress Bar	Displays the process of the current activity.

Licensing

Background Information

There are various licensing options for Leica GeoMoS HiSpeed as listed below.

- When using the Free Version, no hardware protection key or CCP software license is required to run the software.
- To access the protected options (Main License and related options) a hardware protection key and valid Customer Care Package (CCP) software license is required. CCP licenses may be entered during the program installation or later using the **Help...CCP License Monitor** menu option.

License Free Version

The free version is available for download from <http://www.leica-geosystems.com/GeoMoSHiSpeed>. No registration or software license key is required to run the software.

Included features:

- Leica Nivel200 series inclination sensor interface and data logging

Main License

GeoMoS HiSpeed main license additionally includes the following features:

- Interface to the Leica GNSS Spider positioning products
- High frequency real time GNSS deformation analysis based on NMEA
- Post processing deformation analysis

Messaging Option

The Limit Checks and Messaging Manager allows you to define up to 3 levels of thresholds for any monitored parameter and keep you informed in real-time on critical events via email or GSM.

Getting Help

Technical Support

Background information

Technical information is available through several online services. All registered Leica Geosystems customers have access to this information. You can obtain product support in several ways:

World Wide Web

The Leica Geosystems Web Site www.leica-geosystems.com provides unlimited access to a variety of company services and product information.

The latest information and version of the software is available on the GeoMoS HiSpeed web page.

Email, Fax

Contact the Leica Geosystems Dealer/Distributor in the country where you bought your product.

Menus and Toolbars

Main Menu Bar

File

File Menu Summary

The File menu offers the following commands:

Command	Function
Save report...	Saves report in the Report Tab to a file.
Exit	Closes the program.

Edit

Edit Menu Summary

The Edit menu offers the following commands:

Command	Function
NMEA / Spider RT Positioning	Use to configure NMEA data streams for use together with Connect...NMEA / Spider RT Positioning.
Spider PP Positioning	Use to configure access to Spider PP Positioning databases for use together with Connect...Spider PP Positioning.
Nivel200	Use to configure access to Spider PP Positioning databases for use together with Connect...Nivel200.
Limit Checks	Plot multiple time series of Spider PP Positioning data configured in Edit...Spider PP Positioning.
Messaging and Events	Used to configure events such as the sending of email and running of applications when messages are generated by the system. Related options are also contained in the Messages Settings in Edit...Settings menu
Clear messages	Clears all entries in the Messages tab. The messages are not deleted, rather the "event.log" file (located in the install directory) is renamed with the current date and time and a new log file is started.
Settings	Opens a dialog to edit the program settings.

Edit... NMEA / Spider RT Positioning

The NMEA / Spider RT Positioning dialog is used to configure connections to NMEA and Spider RT Positioning data streams for online coordinate analysis. A plot of the configured connections can be made using Connect...NMEA / Spider RT Positioning.

See also Connection Settings, Edit Coordinates, Limit Checks and Messaging and Events.

NMEA Connections Settings

Field	Description
Name	The name of the connection.
Channel	The communication channel.
Format	The selected NMEA format.
Solution Type	A basic indicator of the coordinate quality. Indicates the selected solution type.
Site	The reference coordinate site.
Profile	The entered Profile direction.
LimitClass	The selected limit class that is used to perform tolerance checking of the NMEA coordinates.
Smoothing	The selected smoothing option.
Logging	Indicates if the logging option was selected.
Path	The root level folder where GeoMoS HiSpeed will create the NMEA log files if the logging option is activated.
Rollover	The selected rollover time GeoMoS HiSpeed will use for the NMEA logging.

Buttons	The five buttons along the bottom of the dialog are used to add, edit and delete the configured connections.
New	Opens the Edit Connection dialog allowing the user to enter the details of a new NMEA connection.
From Spider	Opens the Spider Database settings dialog to enable the user to connect to a Leica GNSS Spider Site Server to automatically configure the connections to all active Positioning Products with NMEA output via TCP/IP. In the Spider Database settings dialog simply enter the IP address or PC name of the Spider Site Server and enter your Spider password. <ul style="list-style-type: none"> This feature requires Leica GNSS Spider version

	2.03 or later.
Delete	Deletes the selected connection(s) from the list.
Edit	Opens the Edit Connection dialog allowing the settings of the currently selected connection to be modified.
Change Status	Toggles the status (active or inactive) of the selected connection(s).

Edit Connection Dialog

The Edit Connection dialog is used when creating or editing NMEA connections.

Setting	Description	Valid Range
Name	A unique name for the connection.	Unique string
Status	The current status of the connection. Determines whether or not it will be plotted.	Active or Inactive
Communications	The settings of the selected communication port of the NMEA data.	Valid Serial or TCP/IP port
NMEA Format	The NMEA message format of the data on the configured port.	GGA, GGQ, LLQ or LMM (Leica Proprietary)
Solution	The minimum solution type to be plotted. The solution type is a basic indicator of the coordinate quality.	Depends on the NMEA message format
Apply CQ Limit	If this option is selected the Coordinate Quality (CQ) estimate contained in GGQ or LLQ messages will be used to decide if the result will be shown. This option can be used to filter out poor quality data that occurs e.g. when the satellite geometry is bad.	Active or Inactive
CQ Limit	The maximum CQ of that result that will	0.01 to

	be displayed if the above option is activated.	0.5m
Reference Coordinate	Select the station corresponding to the configured data stream. The known station coordinates are then used as the reference for all displacement calculations. The station list is created using Tools...Edit Coordinates and selected in the General Settings of the Edit...Settings menu.	
Profile Direction	This value, a direction in degrees, indicates the expected direction of movement for the point and is used to calculate the Longitudinal and Transverse displacement. Longitudinal displacement is the displacement in the direction of the profile. Transverse displacement is at right angles to the profile. See Profiles for more information.	0 to 360 degrees
Limit Class	This is the limit class that is used to perform tolerance checking of the NMEA coordinates. The limit class must be pre-configured in Edit...Limit Checks. To configure an event, such as sending an email, if a limit check fails use Edit...Messaging and Events.	
Smoothing	This option is used to decide if GeoMoS HiSpeed is to smooth the coordinate data. If smoothing is used then the smoothed value will be shown in the plot and used for the limit checks.	None or the filter length (5s, 10s, 15s, 20s, 25s, 30s, 45s, 1min, 2min, 5min, 15min, 30min, 1hr, 2hr, 6hr, 12hr or 24hr)

Log to file	This option is used to make GeoMoS HiSpeed log the received NMEA data to log files.	Checked or Unchecked
File Path	The root level folder where GeoMoS HiSpeed will create the NMEA log files if the above option is activated.	A valid absolute directory.
File Rollover	The rollover GeoMoS HiSpeed will use for the NMEA logging. Each file name will contain the date and time and be placed in the File Path above in a subdirectory named after the connection name.	1, 2, 3, 4, 6, 12, or 24 hours.

Related Topics

Edit... Spider PP Positioning

Edit... Limit Checks

Edit... Messaging and Events

Edit Coordinates

Edit... Spider PP Positioning

The Spider PP Positioning dialog is used to configure connections to Spider Positioning databases for online and offline coordinate analysis. A plot of the configured connections can be made using

Connect...Spider PP Positioning

See also Connection Settings, Limit Checks and Messaging and Events.

Spider Post Processing Products Connection List Settings

Field	Description
Name	The name of the Spider PP Positioning product.
Server	The name or IP address of the PC running the Spider Site Server.
Site	The name of the monitoring site configured in GNSS Spider.
Profile	The selected profile direction in degrees.
LimitClass	The selected limit class that is used to perform tolerance checking of the received coordinates.

Smoothing	The selected smoothing option.
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Button	The four buttons along the bottom of the dialog are used to add, edit and delete the configured connections.
From Spider	Opens the Spider Database settings dialog to enable the user to connect to a Leica GNSS Spider Site Server to automatically configure the connections to all active PP Positioning Products. In the Spider Database settings dialog simply enter the IP address or PC name of the Spider Site Server and enter your Spider password.
Delete	Deletes the selected connection(s) from the list.
Edit	Opens the Edit Spider PP Positioning dialog allowing the settings of the currently selected connection to be modified.
Change Status	Toggles the status (active or inactive) of the selected connection(s).

Edit Connection Dialog

The Edit Connection dialog is used when creating or editing NMEA connections.

Setting	Description	Valid Range
Name	This is the name of the Spider PP Positioning product.	
Station	The name of the monitoring site configured in GNSS Spider.	
Server	This is the name or IP address of the PC running the Spider Site Server.	
Status	The current status of the connection. Determines whether or not it will be plotted.	Active or Inactive
Profile Direction	This value, a direction in degrees, indicates the expected direction of movement for the point and is used to calculate the Longitudinal and Transverse displacement. Longitudinal displacement is the displacement in the direction of the profile. Transverse displacement is at right angles to the profile. See Profiles for more	0 to 360 degrees

	information.	
Limit Class	This is the limit class that is used to perform tolerance checking of the received coordinates. The limit class must be pre-configured in Edit...Limit Checks. To configure an event, such as sending an email, if a limit check fails use Edit...Messaging and Events.	
Smoothing	This option is used to decide if GeoMoS HiSpeed is to smooth the coordinate data. If smoothing is used then the smoothed value will be shown in the plot and used for the limit checks.	None or the filter length in hours (1, 2, 4, 6, 8, 12, 24, 36, 48)
Update Spider coordinate using	This option allows GeoMoS HiSpeed to update the Spider site coordinate using the results of the PP Positioning products. Note: This feature is intended for use in post processing (PP Positioning) monitoring applications. This option should not be used with RT Positioning or RT Products on the Site or Network servers.	
a median calculated over	The coordinate update is made using a median calculated over a defined time period.	1 to 30 days
and a minimum of	A minimum number of results can be defined to ensure that a high quality median is calculated.	5 to 100 results

Note:

- GeoMoS HiSpeed automatically gets the reference coordinate from Leica GNSS Spider, so there is no need to create a reference coordinate list like with NMEA connections.

Related Topics

Edit... NMEA / Spider RT Positioning

Edit... Limit Checks

Edit... Messaging and Events

Edit... Nivel200

The Nivel200 dialog is used to configure connections to Nivel210 and Nivel220 inclination sensors for data logging. The connection is initiated using the Connect...Nivel200 menu.

Nivel200 Settings

Field	Description
Name	The entered name of the Nivel connection.
Channel	The selected communication port of the sensor.
Type	The selected Nivel model.
ID's	The selected IDs assigned to the connected sensor.
Observation Rate	The entered observation rate in seconds.
Logging	Indicates if the logging option was selected.
Path	The root level folder where GeoMoS HiSpeed will create the the Nivel log files if the logging option is activated.
Rollover	The selected rollover time GeoMoS HiSpeed will use for the Nivel logging.

Button	The four buttons along the bottom of the dialog are used to add, edit and delete the configured connections.
New	Opens the Edit Connection dialog allowing the user to enter the details of a new Nivel connection.
Delete	Deletes the selected connection(s) from the list.
Edit	Opens the Edit Connection dialog allowing the settings of the currently selected connection to be modified.
Change Status	Toggles the status (active or inactive) of the selected connection(s).

Edit Connection Dialog

The Edit Connection dialog is used when creating or editing Nivel connections.

Setting	Description	Valid Range
Name	A unique name for the connection.	Unique string
Status	The current status of the connection. Determines whether or not it will be plotted.	Active or Inactive
Communications	The settings of the selected communication port of the Nivel sensor(s).	Valid Serial or TCP/IP port
Nivel Type	The model of the sensor. Nivel 210 are connected individually via RS232. Nivel 220 can be connected in series with up to 32 sensors on a single RS485 bus.	Nivel210 or Nivel220
Nivel Identifiers	The IDs assigned to the connected sensors. The Add , Edit and Delete buttons open the Edit Nivel Identifier dialog.	Up to 32 identifiers
Observation Rate	The desired observation interval in seconds.	1 to 600000 seconds
Log to file	This option is used to make GeoMoS HiSpeed log the received inclination data to log files.	Checked or Unchecked
File Path	The root level folder where GeoMoS HiSpeed will create the Nivel log files if the above option is activated. A subfolder is created for each Nivel ID. A comma separated .niv file is created for each rollover.	A valid absolute directory.
File Rollover	The rollover GeoMoS HiSpeed will use for the Nivel logging. Each file name will contain the date and time and be placed in the File Path above in a subdirectory named after the connection name.	1, 2, 3, 4, 6, 12, or 24 hours.

Edit Nivel Identifier Dialog

The Edit Nivel Identifier dialog is used when creating or editing Nivel connections.

Setting	Description	Valid Range
ID	The sensor identifier configured with the NivelTool.	1...9 or A...Z
Name	The name of this sensor.	String
Null X	The X-tilt reference value.	-
Null Y	The Y-tilt reference value.	-
Read From Sensor	Press this button to read the Null X and Null Y values directly from the connected Nivel sensor.	-

Edit... Limit Checks

Limit (tolerance) checks may be defined to generate messages and events when received coordinates (either via NMEA or via Spider PP Positioning) differ by more than a certain amount from the known *a priori* (reference or null) coordinates. Absolute limit checks may be configured using the **Edit...Limit Checks** menu. Events, such as sending of an email or running of an application, may be configured to occur when a limit check is failed using Edit...Messaging and Events.

A number of Limit Classes may be created. Each Limit Class has up to eight different limit checks (see table below), each of which has three defined levels (Level 1, Level 2 and Level 3). A different message type is generated for each level and so different events may be configured for them using Edit...Messaging and Events.

The usage of the limit checks is as follows:

Limit Check Type	NMEA / Spider RT Positioning	Spider PP Positioning	Nivel200
Longitudinal	●	●	
Transverse	●	●	
Height	●	●	
2D	●	●	
3D	●	●	
X Tilt			●
Y Tilt			●

Limit Check Settings

The three buttons along the top of the dialog are used to add, edit and delete the configured limit classes.

Button	Description
New	Opens the Edit Limit Class dialog allowing the user to enter the name of the new limit class.
Rename	Opens the Edit Limit Class dialog allowing the name of the limit class to be modified.
Delete	Deletes the selected limit class from the list.
Limit Checks	<p>Activate or deactivate the absolute limit checks for each type of displacement (longitudinal, transverse, height, 2D and 3D). The displacement is calculated as the difference between the measured coordinate and the reference coordinate defined in the connection. For Nivel200 inclination data it is the difference between the measured value and the configured reference (or null) value for that sensor.</p> <p>In order to prevent overloading of the system when using high speed (20Hz) input data, the limit checks are only calculated at most every second and a new message will not be sent more than the rate defined in the Message Settings in the Edit...Settings menu.</p>

Related Topics

Edit... NMEA / Spider RT Positioning

Edit... Spider PP Positioning

Edit... Messaging and Events

Edit... Messaging and Events

Background information

Messaging and Events is used to run actions such as sending of emails when the system generates a message. Messages may be generated by the automatic RINEX processing or by coordinate analysis components of GeoMoS HiSpeed.

See also Messaging Settings and Limit Checks.

To configure messages and events

Follow this procedure to configure messages and events:

Step	Action
1	Select the menu Edit...Messages and Events .
2	The Edit Messages and Events dialog will be shown. In the list on the left-hand side of the dialog all Messages are listed which GeoMoS HiSpeed can generate. On the right-hand side you see all Actions .
3	Use the New Action button to configure an action. You will be required to enter specific information for the action based on its type (Application or Email or SMS).
4	Select the messages that you wish to trigger the action in the Message window on the left and activate the check box for the action in the Action window. You can link multiple Actions to one Message.
5	Use the Overview button to get a summary of which actions are assigned to messages.
6	Change the settings as required.
7	Click the OK button. The Edit Messages and Events dialog will be closed and the settings saved.

Messaging and Events Settings

The five buttons along the right of the dialog are used to add, edit, delete, test and overview the messages and events..

Button	Description
New Action...	<p>Press the button and a sub-menu appears where you can select the type of the new action. You can choose between Application, Email and SMS.</p> <ol style="list-style-type: none"> 1. Application define in the field command line an external application (EXE or BAT) which GeoMoS HiSpeed will run as an action. Always use the full path to the directory. The field Comment is only a remark and has no additional functionality so it works also if this field is empty. Press OK and the new action is in the right list of the Message and Events Editor. 2. Email Define the address(es) of the To and CC

	recipients. 3. SMS Define the telephone number of the recipient.
Edit	Please select a action first in the list. Press the button Edit and then it is possible the edit the selected action.
Delete	Press this button to delete a selected action.
Test	Press this button to immediately test a selected action. This function can be used for controlling all actions.
Overview	All the definitions you made between messages and actions are listed in a overview panel.

Database Settings

The Database Settings dialog is used to enable the user to connect to a Leica GNSS Spider Site Server to

- automatically configure the connections to all active Positioning Products with NMEA output via TCP/IP.
- automatically configure the connections to all active PP Positioning Products.

Field	Description
Database Name	The database name. This field cannot be changed.
Server	Enter the IP address or PC name of the Spider Site Server.
Login	The required Spider login access level. This field cannot be changed.
Password	Enter your Spider password.

Settings

Edit Settings - Overview

The Edit Settings dialog is used to modify a wide range of program settings. The settings pages can be accessed by the tree view on the left side of the settings dialog.

General Settings

Connection Settings

- NMEA / Spider RT Positioning
- Spider PP Positioning
- Nivel200

Graphing Settings

- Displacement Graph Extents
- Tilt Graph Extents

Messaging Settings

- Email Messaging
- SMS Messaging

Map Display Settings

Web Settings

- NMEA / Spider RT Positioning
- Spider PP Positioning
- Languages

General Settings

The General settings apply to the program and in general and the manual quality check.

Program Settings (Main Page)

Setting	Description	Valid Range
General		
Coordinate File	<p>The Bernese format coordinate file that contains the reference coordinates for NMEA coordinate plots.</p> <ul style="list-style-type: none"> • You can create or edit Bernese coordinate files using Edit Coordinates in the Tools menu. 	
UTM Projection		
False	The false easting used when projecting	

Easting	coordinates to UTM easting and northing.	
False Northing	The false northing used when projecting coordinates to UTM easting and northing.	Checked or Unchecked
Display		
Local Time	Show times in local time. If not selected the UT (GMT) times will be used. Note: It may be necessary to close and then re-open the user interface for all of the dates in the Messages tab to be updated to the new format.	Checked or Unchecked

Related Topics

- General Settings
- Connection Settings
- Graphic Settings
- Messaging Settings
- Map Display Settings
- Web Settings

Connection Settings

Background information

These settings apply to the various connection options, such as NMEA / Spider RT Positioning, GNSS Spider PP Positioning and Nivel200, that can be configured using the Edit menu and activated via the Connect menu.

There are three sub pages, NMEA / Spider RT Positioning, Spider PP Positioning and Nivel200 in the Connections setting page. There is no Connection settings main page. Each page can be accessed by the tree view on the left side of the settings dialog.

NMEA / Spider RT Positioning

These settings apply to the Connect... NMEA / Spider RT Positioning menu option.

Setting	Description	Valid Range
<i>General Options</i>		
Update plot periodically and not when new data is received	This option is used to decrease the CPU usage when plotting data from a data stream. Rather than updating the plot every time new data is received, the plot will be updated not more than the specified number of seconds.	Active or Inactive, a time between 1 and 5000 seconds
Create web page output every	Creates a web page with the displacement plots selected in the Web Settings.	Active or Inactive, a time between 1 and 60 minutes
Automatically reconnect when the program is loaded	When the program is started (the first instance only) the NMEA connections will be re-established and the graphs (and optionally the web page) updated.	
<i>Time Period</i>		
Period to store in memory	This option specifies how much data the plot will store in memory when plotting data from a data stream. The value is set in minutes or hours from the current time. Data older than this amount will be discarded and hence this value sets the maximum time range for the data that can be shown in the plot.	A time between 1 minute and 24 hours
Period to display in the plot	This option specifies the maximum age of the data to be displayed in the plot.	A time between 1 minute and 24 hours
<i>Plot Options</i>		
Plot title	The title shown in the displacement graphs in	

	the user interface. No title is given in the plots on the web page, instead a text description is given for each plot type.	
Automatically scale the plot to fit the data	If this option is checked then the minimum and maximum values of the plot axes will automatically scale to match in the data. Otherwise the values used in the Displacement Graph Extents settings will be used.	

Spider PP Positioning

These settings apply to the Connect...Spider PP Positioning menu option.

Setting	Description	Valid Range
General Options		
Update plot periodically and not when new data is received	This option is used to decrease the CPU usage when plotting data from a data stream. Rather than updating the plot every time new data is received, the plot will be updated not more than the specified number of seconds.	Active or Inactive, a time between 1 and 5000 seconds
Create web page output	Creates a web page with the displacement plots selected in the Web Settings.	Active or Inactive, a time between 1 and 60 minutes
Automatically reconnect when the program is loaded	When the program is started (the first instance only) the Spider PP Positioning connections will be re-established and the graphs (and optionally the web page) updated.	
Time Period		

Period to store in memory	This option specifies how much data the plot will store in memory when plotting data from a data stream. The value is set in minutes or hours from the current time. Data older than this amount will be discarded and hence this value sets the maximum time range for the data that can be shown in the plot.	A time between 1 minute and 60 years
Period to display as default	This option specifies the maximum age of the data to be displayed in the plot.	A time between 1 minute and 60 years
<i>Plot Options</i>		
Plot title	The title shown in the displacement graphs in the user interface. No title is given in the plots on the web page, instead a text description is given for each plot type.	
Automatically scale the plot to fit the data	If this option is checked then the minimum and maximum values of the plot axes will automatically scale to match in the data. Otherwise the values used in the Displacement Graph Extents settings will be used.	

Nivel200

These settings apply to the **Connect...Nivel200** menu option.

Setting	Description	Valid Range
<i>General Options</i>		
Update plot periodically and not when new data is received	This option is used to decrease the CPU usage when plotting data from a data stream. Rather than updating the plot every time new data is received, the plot will be updated not more than the specified number of seconds.	Active or Inactive, a time between 1 and 5000 seconds

Create web page output	Creates a web page with the tilt and temperature plots selected in the Web Settings.	Active or Inactive, a time between 1 and 60 minutes
Automatically reconnect when the program is loaded	When the program is started (the first instance only) the Nivel connections will be re-established and the graphs (and optionally the web page) updated.	
<i>Time Period</i>		
Period to store in memory	This option specifies how much data the plot will store in memory when plotting data from a data stream. The value is set in minutes or hours from the current time. Data older than this amount will be discarded and hence this value sets the maximum time range for the data that can be shown in the plot.	A time between 1 minute and 24 hours
Period to display as default	This option specifies the maximum age of the data to be displayed in the plot.	A time between 1 minute and 24 hours
<i>Plot Options</i>		
Plot title	The title shown in the tilt graphs in the user interface. No title is given in the plots on the web page, instead a text description is given for each plot type.	
Automatically scale the plot to fit the data	If this option is checked then the minimum and maximum values of the plot axes will automatically scale to match in the data. Otherwise the values used in the Tilt Graph Extents settings will be used.	

Related Topics

- General Settings
- Connection Settings
- Graphic Settings
- Messaging Settings
- Map Display Settings
- Web Settings

Graphing Settings

Background information

The main graph settings page contains settings that govern the format of the graphs that are generated using GeoMoS HiSpeed.

There is a Graphing settings main page and two sub pages, Displacement Graph Extents and Tilt Graph Extents. Each page can be accessed by the tree view on the left side of the settings dialog.

The settings are divided into the following categories, with each category on a separate page of the settings dialog:

Graph Settings (Main Page)

General graph format settings.

Setting	Description	Valid Range
Plot Size (Graphs)	The Base Width and Base Height are used to define the default size in pixels of timeline and similar graphs saved to file when using the File...Quality Check (Graphs) menu and when creating web pages.	320 to 2000 pixels
Plot Size (Maps)	The Base Width and Base Height are used to define the default size in pixels of maps saved to file when using the File...Quality Check (Graphs) menu and when creating web pages.	320 to 2000 pixels
Plot Size (Screen)	The size of the graphs that are created using the Results ... Plot Graph menu or by the automatic quality check. A size suitable for your monitor's display settings should be used. Default 100.	100, 90, 80, 75, 60 or 50%
Plot Size (Web)	The size of the graphs that are contained in the web page generated automatically or by using the	100, 90, 80, 75, 60 or

	Results ... Create Web Page menu. A small graph size than normal may be preferable to decrease download time for users.	50%
Line Graph Options		
Show Points	Markers will be shown on the graph indicating where the data points are.	
Show precisions (when available)	Bars will be drawn to indicated the precision (2 sigma) of the data. This is only supported with SINEX data which contains precision information.	
Vector Plot and Map Options		
Show Point Markers	Markers will be shown to indicate the position of the site.	
Show Point Labels	Labels will be shown to indicate the name of the site.	
Show Gridlines	A grid of latitude and longitude will be shown to indicate the scale of the map	
General Colours	The Background, Plot, Plot Area, Text, Borders and Threshold colours to be used in the graphs.	Depends on video display settings

Displacement Graph Extents

Used to set the display settings for each of the graphs used to display displacement calculated from NMEA or Spider PP Positioning data.

In this dialog the minimum and maximum y-value and the spacing between tick marks may be specified for all graphs that are available to display output from automatic quality checking. The graph extents are listed for each graph type, not each individual graph. A complete lists of the graph types is shown below with the graph type.

Plot	Description	Type
2D / Coordinate Quality	A time series plot of the plan displacement.	2D / Coordinate Quality
3D	A time series plot of the absolute displacement.	3D
Longitudinal	A time series plot of the longitudinal displacement.	Longitudinal
Transverse	A time series plot of the transverse	Transverse

	displacement.	
Easting/Northing	A time series plot of the displacement in easting and northing.	Easting/Northing
Height	A time series plot of the displacement in height.	Height
2D Scatter	A scatter plot of the plan displacement.	2D Scatter
HDOP	A time series of the Horizontal Dilution of Precision.	HDOP
Satellites Used	A time series of the number of satellites used in the position solution.	Satellites Used
Age of Data	A time series of the age of the reference data (GNSS differential corrections).	Age of Data
Vectors		
Scale Factor	Enter a scale factor. A scale factor of 1 will display the vector displacement at actual size. ie. 1cm displacement will be 1cm long on the screen.	0.01 to 1000

Tilt Graph Extents

Used to set the display settings for each of the graphs used to display tilt and temperature data measured with Nivel200 inclination sensors.

In this dialog the minimum and maximum y-value and the spacing between tick marks may be specified for all graphs that are available to display output from automatic quality checking. The graph extents are listed for each graph type, not each individual graph. A complete lists of the graph types is shown below with the graph type.

Setting	Description
Tilt	Time series of inclination (tilt) in x and y directions.
Temperature	A time series of the internal temperature of the inclination device.

Related Topics

[General Settings](#)
[Connection Settings](#)
[Graphic Settings](#)
[Messaging Settings](#)
[Map Display Settings](#)
[Web Settings](#)

Messaging

Background information

The Messaging settings page contains settings that enable the generation of messages and events by the system. Actual configuration of messages and events is done in the [using the Edit...Messages and Events](#) menu.

There is a Messaging main page and two sub pages, Email messaging settings and SMS settings . Each page can be accessed by the tree view on the left side of the settings dialog.

The settings are divided into the following categories, with each category on a separate page of the settings dialog:

Messaging (Main Page)

General parameters that govern automatic processing.

Setting	Description	Valid Range
Minimum time between messages	This setting is used to prevent the system from becoming overloaded with messages when performing limit checks and other messages related to high-speed (e.g. 20Hz) coordinate data.	A time between 1 and 3600 seconds
Minimum disk space	This is the minimum amount of disk space on any of the drives used by automatic processing. If the disk space drops below this value GeoMoS HiSpeed will generate a message.	A value between 10 and 100,000 MB

Note:

- Events such as the sending of email or running of external applications can be attached to messages using the [Edit...Messages and Events](#) menu.

Email messaging settings

The Email Settings give GeoMoS HiSpeed the necessary information to communicate with the mail server and send the email error messages specified in the [Edit...Messages and Events](#) section. Details of email messages that failed to send are recorded in the Messages tab.

Setting	Description	Valid Range
From Name	The name assigned to the valid e-mail address.	-
From Address	The mail address assigned to the valid e-mail address.	Valid e-mail address
To Address	The e-mail address of the primary recipient of the error messages. E.g. the GPS network manager. Multiple To addresses may be specified (delimited by semi-colons).	Valid e-mail address(es)
CC Address	(Optional) The e-mail address of a secondary recipient of the error messages. Multiple To addresses may be specified (delimited by semi-colons)	Valid e-mail address(es) or blank
Domain	The domain name for the e-mail service.	Valid domain name
Server	The full address of the local e-mail server.	Valid server address
Port	The port number of the local e-mail server.	Integer, default 25

SMS Settings

The SMS Settings give GeoMoS HiSpeed the necessary information to communicate with a GSM modem to send SMS messages specified in the [Edit...Messages and Events](#) section. Details of SMS messages that failed to send are recorded in the Messages tab.

Setting	Description	Valid Range
COM Port Settings		
COM Port	The serial port to which the GSM modem is attached.	Valid COM port

Baud Rate	The baud rate used by the GSM modem.	Valid baud rate
GSM Settings		
Check that modem responds with OK	If this is activated GeoMoS HiSpeed will give a failure message if the SMS modem does not respond with "OK" when a SMS message is sent.	Checked or Unchecked
Send PIN Code	Specified if GeoMoS HiSpeed needs to send a PIN code to access the modem.	Checked or Unchecked
PIN Code	The PIN code needed for GeoMoS HiSpeed to access the GSM modem.	The PIN code set on the GSM modem

Note: GeoMoS HiSpeed supports the GSM 07.05 specification used by the Leica MC45 GSM modem. Only modems that support this protocol may be used with GeoMoS HiSpeed.

Related Topics

General Settings

Connection Settings

Graphic Settings

Messaging Settings

Map Display Settings

Web Settings

Map Display Settings

The Map Display Settings govern the appearance of the View/Edit tab.

Map Display Settings

Setting	Description	Valid Range
Plot Coastline	If this option is selected the associated file will be loaded and used to display a coastline in the maps shown in the Network View tab.	Checked or Unchecked
Coast line file	The name of the file containing the coast line data.	Valid file path and

		name
Plot background image	If this option is activated the selected raster image will be loaded in displayed in the maps shown in the Network View tab.	Checked or Unchecked
Alpha value	The alpha value is used to control the intensity of the background image. If the alpha value is low the picture will have a low intensity (and will be less distracting). If the alpha value is high the intensity will be like (like if you view the image normally in a viewer).	0 to 255
Background image file	The raster image file to be displayed. The following file types are supported: JPEG (JPG), Window Bitmap (BMP), Device Independent Bitmap (DIB), Portable Network Graphics (PNG) and Tagged Image File Format (TIF).	Valid file path and name
Georeferencing	For the background image to be properly georeferenced you must enter the latitude and longitude of the upper-left and lower-right corners of the image.	
Specify map boundaries	This option allows the user to specify the latitude and longitude boundaries of the map shown in the Map View tab. If unchecked then the display area will be calculated automatically.	Checked or Unchecked

Related Topics

General Settings

Connection Settings

Graphic Settings

Messaging Settings

Map Display Settings

Web Settings

Web Settings

Background information

The main web settings page contains settings that govern the content and appearance of the web page used to communicate the results of automatic quality checking.

There is a main web settings page and three sub pages, NMEA / Spider RT Positioning Graphs, Spider PP Positioning Graphs and Lanuages. Each page can be accessed by the tree view on the left side of the settings dialog.

- The languages that the web pages are shown in are controlled by XML files located in the install folder. To add or remove languages refer to the section Lanuages.
- To change the format of the web page, including e.g. colours, fonts, table design etc. refer to the section Formatting of Web Pages.

The settings are divided into the following categories, with each category on a separate page of the settings dialog:

Web Settings (Main Page)

General web page settings.

Setting	Description	Valid Range
Web Path	The path to the folder where the web page is to be created.	Valid Path
Force use of asp.net directed links (for use together with GeoMoS Web)	Use this option when the web page output is to be displayed in Leica GeoMoS Web.	Checked or Unchecked

NMEA / Spider RT Positioning Graphs

Settings to define what graphs should be shown on the Connect... NMEA / Spider RT Positioning web page.

Setting	Description	Valid Range
Check Box Graph Selection	Up to six graphs may be selected to be shown on the Real Time Coordinate Analysis web page (created using Connect...NMEA / Spider RT Positioning).	

Include connection status information	A table will be included in the web page that provides the same information that is available in the Positioning Status tab. Specifically, the following information is listed: Status (icon), Name, Communications status, Time of last change, Longitudinal displacement [m], Transverse displacement [m] and Height displacement [m]	Checked or Unchecked
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Spider PP Positioning Graphs

Settings to define what graphs should be shown on the Connect... Spider PP Positioning web page.

Setting	Description	Valid Range
Check Box Graph Selection	Up to six graphs may be selected to be shown on the Post Processed Coordinate Analysis web page (created using Connect... Spider PP Positioning).	
Include connection status information	A table will be included in the web page that provides the same information that is available in the Positioning Status tab. Specifically, the following information is listed: Status (icon), Name, Communications status, Time of last change, Longitudinal displacement [m], Transverse displacement [m] and Height displacement [m]	Checked or Unchecked

Languages

Select the language files to be included in the web page output.

Multi-language Web Pages

The language(s) of the web pages created by Leica GeoMoS HiSpeed can be configured by the user. This is done simply by adding or removing XML (.xml) files from the Languages folder in the install directory (by default C:\Program Files\Leica Geosystems\Leica GeoMoS HiSpeed\Language\).

Four languages are included in the install: Chinese, English, French and German. At least one language file must be in the folder for Leica GeoMoS HiSpeed to create the web page.

To add a new language

1. Copy an existing XML language file and save it with the name '??GQCLanguage.xml' where '??' is a two character abbreviation of the language name (e.g. EN for English, DE for German).
2. Translate the content of the file.

The next time Leica GeoMoS HiSpeed creates the web page, a web page in the new language will also be created.

Note:

- **Do not** modify any of the XML tags. The tags are contained within angled brackets <> and are needed by the program to find the relevant text.
- **Do not** change the order of and %d, %s or %lf characters within the text or the web page will not be created correctly and the program could become unstable.

To remove a language

1. Move or delete the XML language file from the Language folder.
2. (Optional) Manually delete any files for the language that have been created by GeoMoS HiSpeed.

Leica GeoMoS HiSpeed will no longer create a web page in this language. Any existing web page files will not be deleted.

Formatting of Web Pages

The formatting of the web pages is contained in a Cascading Style Sheet (CSS) file with the name "style_win_ie.css". The CSS file is stored in the install folder of GeoMoS HiSpeed and is copied to the web page folder each time the web page is updated.

The CSS file can be used to change formatting such as colours, fonts, table design etc.

Note:

- The CSS file will be overwritten if you re-install GeoMoS HiSpeed. Please take care to back up the CSS file should you modify it.
- If you have modified the CSS file please check when you install a new version of GeoMoS HiSpeed to see if new classes have been added to the CSS file.

Related Topics

General Settings
 Connection Settings
 Graphic Settings
 Messaging Settings
 Map Display Settings
 Web Settings

Results

Results Menu Summary

The Results menu offers the following commands:

Command	Description
Create Web Page	Create a summary web page based on automatic RINEX quality check results. See Web Page Settings for more information.
View Web Page...	Loads the web page in the default web browser.

View Web Page

The View Web Page dialog is accessed via the **Results...View Web Page menu** and is used to load the various web pages that can be created by Leica GeoMoS HiSpeed.

Setting	Description
Web Page	Select either the web page from the following: Real Time Coordinate Analysis: Web page created using Connect...NMEA / Spider RT Positioning. Post Processed Coordinate Analysis: Web page created using Connect...Spider PP Positioning
Language	Select from the available languages.

Related Topics

Web Settings
 Connect... NMEA / Spider RT Positioning

Connect**Connect Menu Summary**

The Connect menu offers the following commands:

Command	Description
NMEA / Spider RT Positioning	Real time plotting of multiple time series of NMEA data configured in Edit...NMEA / Spider RT Positioning .
NMEA / Spider RT Positioning (Offline)	Offline plotting of multiple time series of NMEA data configured in Edit...NMEA / Spider RT Positioning.
Disconnect NMEA / Spider RT Positioning	Disconnects all active NMEA data streams.
Spider PP Positioning	Near real time plotting of multiple time series of Spider PP Positioning data configured in Edit...Spider PP Positioning.
Spider PP Positioning (Offline)	Offline plotting of multiple time series of Spider PP Positioning data configured in Edit...Spider PP Positioning.
Disconnect Spider PP Positioning	Disconnects all active Spider PP Positioning database connections.
Nivel200	Connect and log data from multiple Nivel210/220 inclination sensors configured in Edit...Nivel200.
Disconnect Nivel200	Disconnects all active Nivel210/220 sensors.
Connect (All)	Connect all active NMEA / Spider RT Positioning, Spider PP Positioning and Nivel connections.
Disconnect (All)	Disconnects all active NMEA / Spider RT Positioning, Spider PP Positioning and Nivel connections.
Reconnect	Reconnects all previously active NMEA / Spider RT Positioning, Spider PP Positioning and Nivel connections.

Connect... NMEA / Spider RT Positioning**Background Information**

This feature is accessed via the **NMEA / Spider RT Positioning** menu and is used to plot NMEA coordinate data in the form of **displacements** (difference from a reference coordinate) from a number of TCP/IP or RS232 data streams in real time. Configuration of the data streams must be done before

hand using **Edit...NMEA Connections**. Limit checks and messaging and events can be configured using **Edit...Limit Checks** and **Edit...Messaging and Events** respectively. Various options can be found in **Edit...Settings** under the topic **Connections Settings**.

To configure NMEA / Spider RT Positioning coordinate plots

Follow this procedure to configure NMEA coordinate plots.

Step	Action
1	(If not connecting to Leica GNSS Spider) Create a list of reference coordinates for the stations using Tools...Edit Coordinates . Select the reference coordinate list in the General Settings page of the Edit...Settings menu. If you are using Leica GeoMoS HiSpeed together with Leica GNSS Spider, then the reference coordinates will be read from Spider.
2	Select the menu Edit...NMEA Connections . The Edit NMEA Connections dialog will be shown. Use either the From Spider or Add button to create connections to NMEA GGQ, GGQ, LLQ or Leica Proprietary (LMM) data streams. Exit the dialog with OK once you have finished creating the connections.
3	(Optional) Select the menu Edit...Settings . The Edit Settings dialog will be shown. Modify the NMEA Connection settings. Exit the dialog with OK.
4	(Optional) Select the menu Edit...Limit Checks . The Edit Limit Checks dialog will be shown. Modify the default limit class or create a new limit class. Exit the dialog with OK. If you have created a new limit class use Edit...NMEA Connections again to assign the limit class to individual connections as desired.
5	(Optional) Select the menu Edit...Messages and Events . The Edit Messages and Events dialog will be shown. Create actions (such as emails or running of external applications) that are to be triggered when a particular message (such as limit check exceeded) is generated. Assign to each message the appropriate actions. Exit the dialog with OK.
6	Select the menu Connect...NMEA . GeoMoS HiSpeed will then try to connect to each configured stream. The Positioning Status tab will then be shown. The Real Time Plot tab , the Positioning Status tab and the Messages tab will be updated when new data or messages are received. If a web page output has been selected in the NMEA / Spider RT Positioning connection settings, use the Results...View Web Page menu to open the web page in your default browser.
7	Disconnect the data streams using Connect...Disconnect NMEA . The connections will be closed and the graph will no longer update.

Note:

- To disconnect from the NMEA data streams use the **Connect...Disconnect NMEA** or **Connect...Disconnect (All)** menu
- To reconnect to the NMEA data streams use the **Connect...NMEA** or **Connect...Reconnect** menu
- GeoMoS HiSpeed will automatically try to reconnect to a TCP/IP connection if the connection is lost.

Related Topics

Edit... NMEA / Spider RT Positioning

Edit... Spider PP Positioning

Connect... NMEA / Spider RT Positioning (Offline)

Edit... Limit Checks

Edit... Messaging and Events

Edit Coordinates

Connect... NMEA / Spider RT Positioning (Offline)**Background Information**

The NMEA / Spider RT Positioning (Offline) dialog is accessed via the **Connect...NMEA / Spider RT Positioning (Offline)** menu and is used to plot coordinate data in the form of **displacements** (difference from a reference coordinate) from pre-recorded NMEA data. Configuration of the connections can be done before hand using **Edit...NMEA / Spider RT Positioning**. Otherwise the configuration can be entered manually each time.

Offline analysis of NMEA data comprises four steps:

1. Entering general information such as the time period and plot settings using the **Plot Offline NMEA Options** dialog.
2. Entering the data source specific data such as the name, format, reference coordinate etc. using the **Plot Offline NMEA Data Series** dialog.
3. Selected the NMEA files for the source configured in step 2.
4. Repeat of steps 2 and 3 until all data is added to the plot.

The graphs are then displayed in the **Offline View tab** and controlled via the combo box on the tool bar.

Connect NMEA / Spider RT Positioning (Offline) - General Options settings

Setting	Description	Valid Range
<i>Time Period</i>		
Start Date	The date of the earliest result to plot.	A valid date
Duration	The time period from the specified end date to plot.	A time between 1 and 1000 days
End Date	The date of the most recent result to plot.	A valid date
End date is always the current date	Use this option to fix the end date to the current date.	Checked or unchecked
<i>Plot Options</i>		
Plot title	The title shown in the displacement graphs in the user interface. No title is given in the plots on the web page, instead a text description is given for each plot type.	
Automatically scale the plot to fit the data	If this option is checked then the minimum and maximum values of the plot axes will automatically scale to match in the data. Otherwise the values used in the Displacement Graph Extents settings will be used.	Checked or unchecked
Data rate	Select Original to use all data in the NMEA log files, to reduce the amount of data select the desired data rate for the plots. Use this option to look at long periods of high rate data so that less computer memory is required.	Original, 1s - 1hr

Note:

- The selected date will not apply for sites using the NMEA GGA data format because GGA does not include date, only time.

Connect NMEA (Offline) - Data Series settings

Setting	Description	Valid Range
Choose the NMEA connection:		
Connection	Select a real time connection that was configured using Edit...NMEA Connections to set the appropriate site and data options. Othwerwise select **Custom** and enter the details manually.	
Choose the connection settings:		
Name	The name of the time series that will be shown in the graphs.	A time between 1 and 1000 days
Reference Coordinate	Select the station corresponding to the configured data stream. The known station coordinates are then uses as the reference for all displacement calculations. The station list is created using Coordinates...Edit Coordinates and selected in the Program Settings of the Edit...Settings menu.	
Profile Direction	This value, a direction in degrees, indicates the expected direction of movement for the point and is used to calculate the Longitudinal and Transverse displacement. Longitudinal displacement is the displacement in the direction of the profile. Transverse displacement is at right angles to the profile. See Profiles for more information.	0 to 360 degrees
Smoothing	This option is used to decide if GeoMoS HiSpeed is to smooth the coordinate data. If smoothing is used then the smoothed value will be shown in the plot and used for the limit checks.	None or the filter length (5s, 10s, 15s, 20s, 25s, 30s, 45s, 1min, 2min, 5min, 15min, 30min, 1hr,

		2hr, 6hr, 12hr or 24hr)
Format and Quality		
NMEA Format	The NMEA message format of the data.	GGA, GGQ, LLQ or LMM (Leica Proprietary)
Solution Type	The minimum solution type to be plotted. The solution type is a basic indicator of the coordinate quality.	Depends on the NMEA message format
Apply CQ Limit	If this option is selected the Coordinate Quality (CQ) estimate contained in GGQ or LLQ messages will be used to decide if the result will be shown. This option can be used to filter out poor quality data that occurs e.g. when the satellite geometry is bad.	Active or inactive
CQ Limit	The maximum CQ of that result that will be displayed if the above option is activated.	0.01 to 0.5m

Related Topics

[Edit... NMEA / Spider RT Positioning](#)

[Connect... Spider PP Positioning](#)

[Connect... Spider PP Positioning \(Offline\)](#)

[Connect... NMEA / Spider RT Positioning](#)

[Connect... Limit Checks](#)

[Connect... Messaging and Events](#)

[Edit Coordinates](#)

Connect... Spider PP Positioning

Background Information

The **Connect...Spider PP Positioning** menu is used to plot coordinate data in the form of **displacements** (difference from a reference coordinate) from a SpiderPositioning SQL database that is created when using **Leica GNSS Spider PP Positioning Products**. Configuration of the database connections must be done before hand using **Edit...Spider PP Positioning** The graph will automatically updated when new data becomes available. Limit checks and messaging and events can be configured using **Edit...Limit Checks** and **Edit...Messaging and Events** respectively. Various options can be found in **Edit...Settings** under the topic **Connections**.

Configure Spider PP Positioning coordinate plots

Follow these steps to configure Spider PP Positioning coordinate plots.

Step	Action
1	Select the menu Edit...Spider PP Positioning . The Edit Spider PP Positioning Connections dialog will be shown. Use the From Spider button to create connections to SpiderPositioning SQL database(s). Exit the dialog with OK once you have finished creating the connections. The reference coordinates for the displacement graphs will be taken directly from Spider.
2	(Optional) Select the menu Edit...Settings . The Edit Settings dialog will be shown. Modify the Spider PP Positioning connection settings. Exit the dialog with OK.
3	(Optional) Select the menu Edit...Limit Checks . The Edit Limit Checks dialog will be shown. Modify the default limit class or create a new limit class. Exit the dialog with OK. If you have created a new limit class use Edit...Spider PP Positioning again to assign the limit class to individual connections as desired.
4	(Optional) Select the menu Edit...Messages and Events . The Edit Messages and Events dialog will be shown. Create actions (such as emails or running of external applications) that are to be triggered when a particular message (such as limit check exceeded) is generated. Assign to each message the appropriate actions. Exit the dialog with OK.
5	Select the menu Connect...Spider PP Positioning GeoMoS HiSpeed will then try to connect to each configured stream. The Positioning Status tab will then be shown. The Post Proc Plot tab , the Positioning Status tab and the Messages tab will be updated when new data or messages are received. If a web page output has been selected in the Spider PP Positioning connection settings, use the Results...View Web Page menu to open the web page in your

	default browser.
6	Disconnect the data streams using Connect...Disconnect Spider PP Positioning . The connections will be closed and the graph will no longer update.

Note:

- To discontinue online operation use the **Connect...Disconnect Spider PP Positioning** or **Connect...Disconnect (All)** menu
- To recommence online operation use the **Connect...Spider PP Positioning** or **Connect...Reconnect** menu

Related Topics

- [Edit... NMEA / Spider RT Positioning](#)
- [Connect... Spider PP Positioning \(Offline\)](#)
- [Connect... NMEA / Spider RT Positioning](#)
- [Connect... NMEA / Spider RT Positioning \(Offline\)](#)
- [Connect... Limit Checks](#)
- [Connect... Messaging and Events](#)
- [Edit Coordinates](#)

Leica SpiderQC

Connect... Spider PP Positioning (Offline)

Background Information

The Spider PP Positioning (Offline) dialog is accessed via the **Connect...Spider PP Positioning (Offline)** menu and is used to plot coordinate data in the form of **displacements** (difference from a reference coordinate) from a SpiderPositioning SQL database that is created when using **Leica GNSS Spider PP Positioning Products**. Configuration of the database connections must be done before hand using **Edit...Spider PP Positioning**

Offline Plot Settings

Setting	Description	Valid Range
Start Date	The date of the earliest result to plot.	A valid date
Duration	The time period from the specified end date to plot.	A time between

		1 and 1000 days
End Date	The date of the most recent result to plot.	-
End date is always the current date	Use this option to fix the end date to the current date.	-
Plot title	The title shown in the displacement graphs in the user interface. No title is given in the plots on the web page, instead a text description is given for each plot type.	-
Automatically scale the plot to fit the data	If this option is checked then the minimum and maximum values of the plot axes will automatically scale to match in the data. Otherwise the values used in the Displacement Graph Extents settings will be used.	-

To configure Spider PP Positioning offline coordinate plots

1. Select the menu **Edit...Spider PP Positioning**. The **Edit Spider PP Positioning Connections dialog** will be shown. Use the **From Spider** button to create connections to SpiderPositioning SQL database(s). Exit the dialog with OK once you have finished creating the connections. The reference coordinates for the displacement graphs will be taken directly from Spider.
2. Select the menu **Connect...Spider PP Positioning (Offline)**. The Spider PP Positioning Process (Offline) dialog will be shown. Enter the time period of data to show. Exit the dialog with Continue. GeoMoS HiSpeed will then try to connect to each configured stream and will give a message indicating the result. The **Offline View** tab will then be shown.

Related Topics

[Edit... NMEA / Spider RT Positioning](#)

[Connect... Spider PP Positioning](#)

[Connect... NMEA / Spider RT Positioning](#)

[Connect... NMEA / Spider RT Positioning \(Offline\)](#)

[Edit... Limit Checks](#)

[Edit... Messaging and Events](#)

[Edit Coordinates](#)

Connect... Nivel200

Background Information

This feature is accessed via **Connect...Nivel200 menu** and initiates the connections to the Nivel inclination sensors connected in Edit...Nivel200. This menu option is used to connect to Nivel200 inclination sensors, read and record the measured data and display it in a real time plot. Various options can be found in **Edit...Settings** under the topic **Connections**.

Configure and record data from multiple Nivel200 sensors

Follow these steps to configure and record data from multiple Nivel200 sensors.

Step	Action
1	Select the menu Edit...Nivel200. The Edit Nivel Connections dialog will be shown. Use either the Add button to create connections to Leica Nivel210 or Nivel220 sensors. Exit the dialog with OK once you have finished creating the connections.
2	(Optional) Select the menu Edit...Settings . The Edit Settings dialog will be shown. Modify the Nivel Connection settings. Exit the dialog with OK.
3	Select the menu Connect...Nivel200 . GeoMoS HiSpeed will try to connect to each configured sensor. The Nivel Status tab will then be shown where the connection status is listed. The Real Time Plot tab, the Nivel Status tab and the Messages tab will be updated when new data or messages are received.
4	Disconnect the data streams using Connect...Nivel200 . The connections will be closed and the graph will no longer update.

Related Topics

[Edit... Nivel200](#)

Tools

Tools Menu Summary

The Tools menu offers the following commands:

Command	Description
Edit Coordinates...	Runs a tool to extract and display coordinates.
Plot Coordinate Time	Plot a time series or scatter plot of

Series...	coordinates from a file or real time data stream.
Plot Inclination Time Series...	Plot a time series or scatter plot of coordinates from a file or real time data stream.

Edit Coordinates

Background information

The Edit Coordinates dialog is accessed via the **Tools, Edit Coordinates...** menu and is used to run a tool to extract and display coordinates.

Note:

- To plot displacements from NMEA data using Plot Coordinate Time Series or Plot NMEA Time Series data it is necessary to create a coordinate file containing the null or reference coordinates for the displacement calculation.
- The reference coordinate file must be set in the Program Operation settings.

Edit Coordinates List Settings

Icon	Function	Description
	Open	Open an existing Bernese format (*.CRD) or CSV coordinate file.
	Save As...	Save the points as a Bernese format (*.CRD) coordinate file.
	Extract Coords from SINEX file...	Extract coordinates from a SINEX file.
	Extract Coords from RINEX file...	Extract coordinates from one or more RINEX observation files.
	Extract Coords from GNSS Spider	Extract coordinates from a Leica GNSS Spider site server.
	New...	Manually add a new coordinate.
	Edit...	Edit the selected coordinate.
	Delete...	Delete the selected coordinates.
-	Delete All	Clears the coordinate list.

Settings	Description
Coordinates	
Description	The File description.
Reference Frame	The coordinate reference frame.
Epoch	The coordinate epoch.
Coordinate System	
Cartesian	Displays the coordinates as Cartesian X, Y and Z.
Geographic	Displays the coordinates as latitude, longitude and height.
UTM	<p>Displays the coordinates as easting, northing, height and zone in the UTM (Universal Transverse Mercator) projection.</p> <p>Note: The false easting and false northing of the UTM projection are setting in the General Settings part of the Edit Settings menu option in the Edit menu.</p>

Related Topics

Edit... NMEA / Spider RT Positioning

Plot Coordinate Time Series

Program Operation Settings

Plot Coordinate Time Series

Background information

The Plot Coordinate Time Series dialog is accessed via the **Tools , Plot Coordinate Time Series** menu and is used to plot a time series or scatter plot of coordinates from a file or real time data stream.

Note:

A multiple baseline plot option is available using **Connect...NMEA / Spider RT Positioning** and **Connect...Spider PP Positioning**. These are options, which also allow for limit checks and messaging, must be purchased as an option and are dongle protected.

Plot Coordinate Time Series Settings

- If plotting from a file the plot will be shown in a new window.
- If plotting from a data stream the plot will be shown in the Plot View Tab.
- To disconnect from a data stream use the **Coordinates...Disconnect Data Stream** menu
- To reconnect from a data stream use the **Coordinates...Reconnect Data Stream** menu

- GeoMoS HiSpeed will automatically try to reconnect to a TCP/IP connection if the connection is lost.

Setting	Description
<p>Choose the type of plot</p>	<p>Time Series (E,N,H): Plot a line graph with residual easting, northing and height on the y-axis and time on the x-axis.</p> <p>Time Series (2D,3D,H): Plot a line graph with residual 2D (planar), 3D and height on the y-axis and time on the x-axis.</p> <p>Scatter Plot (E,N): Plot a scatter plot with northing on the y-axis and easting on the x-axis.</p>
<p>Choose the data source</p>	<p>Source: The data may be taken from either a file or from a real time data stream.</p> <p>Format: Select the format of the data to be read. Options include NMEA GGA, NMEA GGQ, NMEA LLQ, NMEA LMM (Leica Proprietary message in Leica GNSS Spider Positioning Products). For files the options CSV XYZ is also available (a comma separated file containing Cartesian coordinates).</p> <p>Comms Settings: Opens the Communication Settings dialog. Only available if the data source is "data stream".</p> <p>Store up to *** hours of data in memory: This option specifies how much data the plot will store in memory when plotting data from a data stream. The value is set in hours from the current time. Data older than this amount will be discarded.</p> <p>Update plot periodically and not when new data is received: This option is used to decrease the CPU usage when plotting</p>

	data from a data stream. Rather than updating the plot every time new data is received, the plot will be updated not more than every 2 seconds.
Choose the plot settings	
Output coordinates	Lists the coordinates and a summary of the file contents in a report shown in the Output Tab. Only available when plotting from a file.
Plot coordinates of at least type	Only plot coordinates that have a coordinate quality flag of the specified quality or higher. Only available for NMEA formats.
Plot only coordinates with CQ less than **	Do not plot the coordinates unless the CQ (coordinate quality) estimate is less than the specified amount. This option is only available with NMEA GGQ and NMEA LLQ formats.
Smooth data using a filter length of **	Apply a weighted moving average filter using the specified length to smooth the coordinate data.
Plot relative to pre-defined coordinates:	<p>Plot the coordinates relative to a known value.</p> <ul style="list-style-type: none"> • For this option to be available a reference coordinate file must be set in the General Settings part of the Edit Settings menu option in the Edit menu. • If this option is not selected then the coordinates will be plotted relative to the first coordinate received.
Set the y-axis minimum and maximum	If selected, the scale of the y-axis will be fixed to the specified minimum and maximum value. Otherwise the scale of the y-axis will be set automatically to fit the data.
Log data to a file	If selected, all data received from the communication plot will be logged to the specified file. Only available when plotting from a data stream.

Edit Communication Settings

This dialog is used to enter the communication settings for the real time coordinate plot.

Setting	Description
Serial	<p>Connect to the specified serial port.</p> <p>COM Port: The serial port.</p> <p>Baud Rate: The baud rate.</p>
TCP/IP	<p>Connect to the following TCP/IP port.</p> <p>IP Address: The IP address or computer name of the computer or device transmitting the data.</p> <p>Set Local Host: Sets the IP address to that of the local host.</p> <p>Port: The IP port.</p>

Plot Inclination Time Series

Background information

The Plot Inclination Time Series dialog is accessed via the **Tools, Plot Inclination Time Series** menu and is used to plot a time series or scatter plot of tilt data collected from Nivel200 inclination sensors.

Note: Nivel sensors can be configured using [Edit...Nivel200](#) and logged using [Connect...Nivel200](#).

Plot Inclination Time Series Settings

Setting	Description
Choose the type of plot	<p>Time Series (X,Y): Plot a line graph with x and y tilt versus time.</p> <p>Scatter Plot (X,Y): Plot a scatter plot with y tilt on the y-axis and x</p>

	tilt on the x-axis.
Choose the plot settings	
Plot relative to pre-defined reference value:	If a null measurement (calibration) is known for this sensor it may be entered here. These reference x and y tilt values will be differenced from the measurements.
Set the y-axis minimum and maximum:	If selected, the scale of the y-axis will be fixed to the specified minimum and maximum value. Otherwise the scale of the y-axis will be set automatically to fit the data.

Window Menu

Window Menu Summary

The Window menu offers the following command:

Command	Description
Hide	Hides the main window of the program and places an icon in the system tray of the Microsoft Windows Task Bar that can be used to restore the window. The window may be restored by left-clicking on the icon in the system tray.

Help Menu

Help Menu Summary

The Help menu offers the following commands:

Command	Description
Help Topics	Loads this help.
Purchased Options	Displays a list of the detected dongle options.
CCP License Monitor	Opens the CCP License Monitor which can be used to register and view available Customer Care Package (CCP) software keys.

Check for Updates	Connects to the Leica Geosystems web site to determine if a new version of Leica GeoMoS HiSpeed is available for download.
About...	Displays a dialog with information about the version of the software.

Purchased Options

Displays a list of the detected software options.

Field	Description
Entitlement Number	Displays the entitlement number of the software license. This number should be reported, whenever you make an inquiry for product support.
License Expiry	The license expiry date (if applicable).
CCP License Expiry	The date when the CCP (Customer Care Package) license expires.
Release Date	The release date of the software. A CCP license key must be valid at least one day beyond this date.

Demo (includes all options)	Activated when the available dongle has been issued for demonstration purposes only. This dongle must not be used for any other purposes than product demonstration and evaluation.
Leica GeoMoS HiSpeed	Activated when GeoMoS HiSpeed main license has been acquired and properly enabled.
Limit Checks and Messaging	Activated when GeoMoS HiSpeed messaging (Option 1) license has been acquired and properly enabled.

Tool Bar

Tool Bar Overview

The main GeoMoS HiSpeed tool bar contains the following items.

Icon	Function and Description:
------	---------------------------

	<p>Save Output Saves output in the Output Tab or Station Report tab to a file.</p>
	<p>Edit the NMEA / Spider RT Positioning connections Opens a NMEA / Spider RT Positioning data stream for online coordinate analysis.</p>
	<p>Edit the Spider PP Positioning connections Opens a Spider PP Positioning data stream for online coordinate analysis.</p>
	<p>Edit the Nivel200 connections Opens a Nivel200 data stream for online coordinate analysis.</p>
	<p>Edit the program settings Opens a dialog to edit the program settings.</p>
	<p>Edit the limit checks</p>
	<p>Edit the messages and events</p>
	<p>Connect all Connect all configured data streams.</p>
	<p>Stop all Stop all configured data streams.</p>
	<p>Graph Type List Box Changes the graph type shown in the Real Time View and Post Proc View tabs</p>

Tabbed-View

Leica GeoMoS HiSpeed

Tabbed View - Summary

The main tab view is the primary component of the GeoMoS HiSpeed interface. It comprises the following tabs.

Tab	Description
Report	Displays output from file processing results.
Messages	Shows a log of the most recent messages that have been generated by the software. Messages occur when ever any settings are edited and from limit checks during online coordinate analysis.
Real Time View	Displays real time displacement/deformation data derived from Leica GNSS Spider RT Positioning, NMEA or Nivel200 tilt data. Refer to Connect NMEA / Spider RT Positioning and Connect Nivel200 for more information.
Post Proc View	Displays near real time displacement/deformation data derived from Leica GNSS Spider PP Positioning products and SINEX data. Refer to Connect Spider PP Positioning for more information.
Offline View	Displays code and phase residuals calculated from the loaded RINEX data. Displays displacement/deformation data from prerecorded NMEA log files or GNSS Spider PP Products database. Refer to Connect NMEA / Spider RT Positioning (Offline) and Connect Spider PP Positioning (Offline) for more information.
Positioning Status	Displays real time connection information such as communications status, limit check status and current displacement values for active NMEA and Spider PP Positioning connections. Refer to Connect NMEA / Spider RT Positioning and Connect Spider PP Processing for more information.
Nivel Status	When Leica Nivel inclination sensors have been configured and activated, this tab shows the current status of the connection including the communications status and the last measurements. Refer to Connect Nivel200 for more information.

Report tab

Displays output from file processing results.

Related Topics

Tabbed View Summary

Messages tab

Shows a log of the most recent messages that have been generated by the software. Messages occur when ever any settings are edited, from limit checks during online coordinate analysis and during automatic processing.

Field	Description														
Icons	<table border="1"> <thead> <tr> <th>Icon</th> <th>Priority</th> </tr> </thead> <tbody> <tr> <td></td> <td>Limit check level 1 failed</td> </tr> <tr> <td></td> <td>Limit check level 2 failed</td> </tr> <tr> <td></td> <td>Limit check level 3 failed</td> </tr> <tr> <td></td> <td>Notice</td> </tr> <tr> <td></td> <td>Warning</td> </tr> <tr> <td></td> <td>Error</td> </tr> </tbody> </table>	Icon	Priority		Limit check level 1 failed		Limit check level 2 failed		Limit check level 3 failed		Notice		Warning		Error
Icon	Priority														
	Limit check level 1 failed														
	Limit check level 2 failed														
	Limit check level 3 failed														
	Notice														
	Warning														
	Error														
Date	Date and time that the message was generated.														
Source	<p>The source of the message.</p> <table border="1"> <tbody> <tr> <td>Messaging</td> <td>An event triggered by a limit or threshold check.</td> </tr> <tr> <td>System</td> <td>An event triggered by the application as part of either normal or abnormal behavior.</td> </tr> <tr> <td>User</td> <td>An event triggered by the operator. E.g. Edited settings.</td> </tr> </tbody> </table>	Messaging	An event triggered by a limit or threshold check.	System	An event triggered by the application as part of either normal or abnormal behavior.	User	An event triggered by the operator. E.g. Edited settings.								
Messaging	An event triggered by a limit or threshold check.														
System	An event triggered by the application as part of either normal or abnormal behavior.														
User	An event triggered by the operator. E.g. Edited settings.														
Message	The message. Click here for a detailed description of the Messages.														

Further Information

Messages

Tabbed View Summary

Leica GeoMoS HiSpeed

Real Time View Tab

Displays real time displacement/deformation data derived from Leica GNSS Spider RT Positioning, NMEA or Nivel200 tilt data. Refer to Connect NMEA / Spider RT Positioning and Connect Nivel200 for more information.

Related Topics

Tabbed View Summary

Graph Context menu

Leica GeoMoS HiSpeed

Post Proc View tab

Displays near real time displacement/deformation data derived from Leica GNSS Spider PP Positioning products and SINEX data. Refer to Connect Spider PP Positioning for more information.

Related Topics

Tabbed View Summary

Graph Context menu

Leica GeoMoS HiSpeed

Offline View

Displays code and phase residuals calculated from the loaded RINEX data. Displays displacement/deformation data from prerecorded NMEA log files or GNSS Spider PP Products database.

Refer to Connect NMEA / Spider RT Positioning (Offline) and Connect Spider PP Positioning (Offline) for more information.

Related Topics

Tabbed View Summary

Graph Context menu

Positioning Status tab

Displays real time connection information such as communications status, limit check status and current displacement values for active NMEA and Spider PP Positioning connections.

Refer to Connect NMEA / Spider RT Positioning and Connect Spider PP Positioning for more information.

Top section - Real time connections

Field	Description
NMEA Connection	The name of the NMEA connection configured in Edit...NMEA / Spider RT Positioning.
Comms	The communications status: <ul style="list-style-type: none"> • No response: No data is being received. • Receiving status: Data of a lower quality than specified is being received. • Receiving data: Valid data of the required quality is being received.
Last Change	The date and time of the last change in the status.
Sats	The number of satellites being used in the position solution.
Longitudinal	The difference to the reference coordinate in the profile direction.
Traverse	The difference to the reference coordinate at 90 degrees to the profile direction.
Height	The difference to the height coordinate in height.
Av. Longitudinal	The average difference in longitudinal displacement over the last hour.
Av.	The average difference in transverse displacement

Transverse	over the last hour.
Av. Height	The average difference in height displacement over the last hour.
Valid Pos.	The number of valid (within tolerance) positions received. Only shown if Apply Statistics is activated in NMEA / Spider RT Positioning Connections .
Av. Sats	The average number of satellites used in the solution. Only shown if Apply Statistics is activated in NMEA / Spider RT Positioning Connections .
Prec. 2D	The average 1 sigma precision in 2D (plan). Only shown if Apply Statistics is activated in NMEA / Spider RT Positioning Connections .
Prec. Height	The average 1 sigma precision in height. Only shown if Apply Statistics is activated in NMEA / Spider RT Positioning Connections .
Accu. 2D	The average 1 sigma accuracy in 2D (plan). Only shown if Apply Statistics is activated in NMEA / Spider RT Positioning Connections .
Accu. Height	The average 1 sigma accuracy in height. Only shown if Apply Statistics is activated in NMEA / Spider RT Positioning Connections .

Bottom section - Post processing connections

Field	Description
Post Processing Connection	The name of the Spider Post Processing or SINEX Connection configured in Edit...Spider PP Positioning.
Comms	The communications status: <ul style="list-style-type: none"> • No response: No data is being received. • Receiving status: Data of a lower quality than specified is being received. • Receiving data: Valid data of the required quality is being received.
Last Change	The date and time of the last change in the status.
Sats	The number of satellites being used in the position solution.
Longitudinal	The difference to the reference coordinate in the

	profile direction.
Traverse	The difference to the reference coordinate at 90 degrees to the profile direction.
Height	The difference to the height coordinate in height.
Av. Longitudinal	The average difference in longitudinal displacement over the last hour.
Av. Transverse	The average difference in transverse displacement over the last hour.
Av. Height	The average difference in height displacement over the last hour.

Related Topics

Tabbed View Summary

Leica GeoMoS HiSpeed

Nivel Status tab

When Leica Nivel inclination sensors have been configured and activated, this tab shows the current status of the connection including the communications status and the last measurements. Refer to Connect Nivel200 for more information.

Field	Description
Name	The name and ID of the Nivel configured in Edit...Nivel200.
Comms	The configured communication port of the Nivel sensor.
Last Change	The date and time of the last change in the status.
X Tilt	The last measured tilt in the X direction in milli radians.
Y Tilt	The last measured tilt in the Y direction in milli radians.
Temperature	The last measured internal temperature of the sensor in degrees Celsius.

Related topics

Connect Nivel200

[Edit Nivel Connections](#)

Tabbed View Summary

Graph Context menu

Leica GeoMoS HiSpeed

Graph Context Menu - Summary

The context menu is available in all graphical views.

The context menu offers the following commands:

Command	Function
Zoom In	Select to zoom in. Available in Network View tab only.
Zoom Out	Select to zoom out. Available in Network View tab only.
Reset	Select to reset the view. Available in Network View tab only.
Measure	Select to measure between two sites. Select a site, left click, hold and drag to measure. Available in Network View tab only.
Properties...	Select to configure the Axes, Labels, Format and Colour properties.
Series...	Select to open a dialog to turn on/off the various data series in the plot.
Show Comments	Select to show/hide comments.
Increase font size	Select to increase the font size.
Decrease font size	Select to decrease the font size.
Draw Points	When checked the point markers are displayed at each data point.
Label Points	When checked the point labels are displayed at each data point (only for map views).
Show Background Image	Check to display a background image (only for map views). A background image file has to be loaded and georeferenced before it can be shown in the Network View. Go to Edit / Settings / Map Display to load and georeference a background image.
X Grid Lines	Check to display X grid lines.
Y Grid Lines	Check to display Y grid lines.
Save as...	Select to save the graph as a bitmap, jpeg, png, csv or Google kml (only for map views) file.

Properties

The Plot Properties dialog is available in all graphical views.

Axes:

Field	Description
X Axis	Activate automatic scaling of the x-axis of the graph or enter the minimum and maximum values manually. For time series graphs the values are in Modified Julian Data format (see Tools..Date and Time Conversion). For real time graphs only the time range of the graph can be changed, not the minimum and maximum value.
Y Axis	Activate automatic scaling of the y-axis of the graph or enter the minimum and maximum values manually.
Secondary Y Axis	Activate automatic scaling of the secondary (right hand side) y-axis of the graph or enter the minimum and maximum values manually. Not all graphs display the secondary Y axis.
Z Axis	Activate automatic scaling of the z-axis of the graph or enter the minimum and maximum values manually. Not all graphs display use the Z axis.
Vectors	Enter the scale factor and length of the reference vector. For vector plots only.

Labels:

Field	Description
Title	The title of the graph.
X Axis	The x-axis label.
Y Axis	The y-axis label.
Secondary Y Axis	The secondary (right hand side) y-axis label.
Legend	Select the location of the legend: <ul style="list-style-type: none"> • None, Bottom or Right

Format:

Field	Description
General	
Draw Points	When checked the point markers are displayed at each data point.
Draw Lines	When checked lines will be drawn between sequential data points.
Fill Points	When checked the point markers will be solid. Otherwise only the outline will be drawn.
Width	The size of the point markers.
Use Transparency	When checked the data will be drawn using transparency. Use to see data series that are underneath other data series.
Alpha value	The amount of transparency to be used. The lower the alpha value the more transparent the graph will be.
Show secondary Y Axis	When checked the secondary y-axis will be shown. Only some data series will be shown on the secondary axis.
Connect Series with Large Gaps	When checked a dotted line will be drawn between points with a large data gap. Otherwise no line is drawn.

Maps	
Show TIN	When checked a triangulated irregular network (TIN) will be drawn between all the points.
Show Markers	When checked point markers will be shown.
Annotation	When checked the x and y labels and scales will be shown.
Show Distances	When checked the distances between each point will be shown together with the TIN above.
Show Labels	When checked the point name will be shown next to each point in the map.

Real Time Updates	
Update Style	Select the style of the update for real time time

	<p>series graphs:</p> <ul style="list-style-type: none"> • Continuous: The graph is shifted to the left as each new data is received. • Shifting: The graph grows toward the right. When the right hand edge is reached the graph shifts back to the middle.
Update On	<p>Select the way real time graphs are updated:</p> <ul style="list-style-type: none"> • Data Only: Only when new data is received. The graph will not indicate if a communication problem has occurred. • Data and Time: When new data is received and at specific time intervals. • Time Only. Only updated at a defined interval. Can significantly reduce CPU usage when viewing high rate data.
Update Timer	<p>The interval between the timed updated used by Update On above.</p>

X Axis, Y Axis	
Auto Grid	<p>When selected the spacing of the grid lines will be determined automatically.</p>
Interval	<p>The interval between the grid lines.</p>
Grid Lines	<p>The grid lines to be displayed:</p> <ul style="list-style-type: none"> • None: No grid lines will be displayed. • Major only: Fewer grid lines will be displayed than normal. • Normal: Grid lines will be displayed.

Colours:

Field	Description
Series	<p>Select a data series and assign a colour to it.</p>

Plot Specific	
Special	<p>This colour is used for showing thresholds in time series and bar graphs</p>
SV Track	<p>This colour is used for showing satellite tracks in sky plots</p>
Vector	<p>This colour is used for showing vectors in vector</p>

(Normal)	maps
Vector (+)	This colour is used for showing positive displacement vectors in height vector maps
TIN	This colour is used for showing a Triangulated Irregular Network of lines between sites in a map. The lines connect the sites nearest to each other
Elevation Mask	This colour is used for showing the area below the defined elevation mask in sky plots
Vector Base	This colour is used for showing the origin of vectors in vector maps
Vector (-)	This colour is used for showing negative displacement vectors in height vector maps

General	
Label Text	Select the colour to be used for the title and axis labels
Primary Plot Text	Select the colour to be used for point labels
Secondary Plot Text	Select the colour to be used for other textual information in the plot, such as the distances between sites in a site map
Background	Select the colour to be used for the background of the plot (outside the plot region)
Plot Area	Select the colour to be used for the background of the plot (inside the plot region)
Borders	Select the colour to be used for the border of the plot region
Grid Lines	Select the colour to be used for the grid lines

Series / Comments

The Series and Comments dialog is available in all graphical views.

Field	Description
All	Activate all series. All active series will be shown in the plot.
None	De-activate all series.
Toggle	Toggle the active and inactive series.

Quick Start Tutorials

Quick Start Tutorials - Overview

These tutorials shall guide the novice user through the basic set up and configuration procedures of Leica GeoMoS HiSpeed.

Quick Tour: Deformation Monitoring with Spider Real Time (RT) Positioning Products

Quick Tour: Deformation Monitoring with Spider PP Positioning Products

Quick Tour: Deformation Monitoring with Spider Real Time RT Positioning Products

GeoMoS HiSpeed can be used for real time displacement or deformation analysis when combined with the Leica GNSS Spider RT Positioning products. The Spider Positioning Products compute baselines between selected stations providing RTK position estimates in real time. The NMEA output of Spider can be read by GeoMoS HiSpeed and used to calculate and display displacements/deformations.

To Configure GeoMoS HiSpeed for Deformation Monitoring with Spider RT Positioning Products

Follow these steps to configure GeoMoS HiSpeed for Deformation Monitoring with Spider RT Positioning Products.

Part	Action
1	Configure the RT Positioning Products in Leica GNSS Spider
2	Configure the Connections to the Positioning Products
3	Configure the Limit Checks
4	Configure the Messaging Options
5	Set the Display and Web Page Output Options
6	Connect to the Data Stream

Part 1: Configure the RT Positioning Products in Leica GNSS Spider

Follow these steps to configure the RT Positioning Products in Leica GNSS Spider.

Step	Action
1	Create the sites in the Spider Site Server.
2	Connect the sites and check that the data communications are working.
3	Create the RT Positioning products. Send the results to TPC/IP.

Part 2: Configure the Connections to the Positioning Products

Follow these steps to configure the connections to the Positioning Products.

Step	Action
1	Open the Edit...NMEA / Spider RT Positioning menu.
2	Use the From Spider button to connect to the Spider Site Server. Enter the IP address or computer name for the PC running the Spider Site Server. If Spider is installed on the same PC running GeoMoS HiSpeed enter 'localhost'. Enter the Site Server password (the password you entered when installing Spider). Exit the dialog with OK.
3	GeoMoS HiSpeed will connect to the Spider Site Server database and readout the information of all RT Positioning products with Send To = TCP/IP. All of the important communications and format settings will be read from the database. The user defined site coordinates will be used as the reference coordinates for calculating the displacements. The reference coordinates are stored in a text file defined in the Edit...Settings... menu under the section General Settings / Program Settings . Exit the dialog with OK.

Part 3: Configure the Limit Checks

Follow these steps to configure the limit checks.

Step	Action
1	Open the Edit...Limit Checks... menu. The Limit Checks dialog is shown.
2	Activate and edit the relevant limit checks for the Default limit class or create one or more new limit classes using Add. Exit the dialog with OK.

- Each NMEA connection can be assigned a different limit check.
- All NMEA connections by default use the Default limit class.
- Only the active limit check types for each class will be used to generate out of limit messages.

- To change the limit class configured for a connection use **Edit...NMEA / Spider RT Positioning** and edit the connection.

Part 4: Configure the Messaging Options

Follow these steps to configure the messaging options.

Step	Action
1	Open the Edit...Settings... menu. The Edit Settings dialog will be shown.
2	In the tree on the left select Edit... Messaging Settings . Select the output path for the optional web page.
3	(For Email Messaging) Expand the Web Settings node to show the item Email Settings . When this node is selected, in the right hand window will be a list of mail server settings that are required to send email messages. Enter the settings appropriate for your main server.
4	Select the item Email Settings in the tree view on the left. The right hand window will be a list of GSM modem settings that are required to send SMS messages. Enter the settings appropriate for your GSM modem.
5	Exit the dialog with OK.
6	Open the Edit...Messaging and Events... menu. The Edit Messaging and Event dialog will be shown.
7	Add actions such as emails, SMS and command line events.
8	Link to each message the relevant action by selecting the message in the left window and activating the check box for the action in the right window.
9	Use the Overview button to check that the configured messages/events are correct.
10	Exit the dialog with OK.

Part 5: Set the Display and Web Page Output Options

Follow these steps to set the display and web page output options.

Step	Action
1	Open the Edit...Settings... menu. The Edit Settings dialog will be shown.
2	In the tree on the left select Connection, NMEA / Spider RT Positioning .
3	Select the period of data to store in memory. This is the maximum amount of data that can be shown in the plot. To set the period to be shown in the web page and that will be initially shown in the plots within GeoMoS HiSpeed set the display period. Optionally select the web page output, automatic or fixed scaling and the plot title.

4	In the tree on the left select Web Settings . Select the output path for the optional web page.
5	Expand the Web Settings node to show the item Displacement Graphs . When this node is selected, in the right hand window will be a list of up to 6 graphs to be included in the optional web page output. Select the plot types to be shown in the web page.
6	In the tree on the left select Graph Settings . Expand the node to show the item Displacement Graph Extents . When this node is selected, in the right hand window will be a list of graphs types and their minimum, maximum and tick values. These settings will be used of a fixed scale is later chosen for the NMEA time series plots. Enter the desired plot settings. Exit the dialog with OK.

Part 6: Connect to the Data Stream

Follow these steps to connect to the data stream.

Step	Action
1	Open the Connect...NMEA / Spider RT Positioning menu.
2	GeoMoS HiSpeed will establish connections to the configured NMEA data streams. The online plots will be shown in the Real Time Plot tab and the connection status will be shown in the Positioning Status tab. Use the combo box on the toolbar to change the plot type. The web page will be output at the specified interval. Use the Results...View Web Page... menu to launch the web output in the system default web browser.

Quick Tour: Deformation Monitoring with Spider PP Positioning Products

GeoMoS HiSpeed can be used for near real time displacement or deformation analysis when combined with the Leica GNSS Spider PP Positioning Products. The Spider PP Positioning products compute baselines between selected stations providing average position estimates based on logged GPS data over a defined period. The post processing results of Spider are stored in a SQL database that can be read by GeoMoS HiSpeed and used to calculate and display displacements/deformations.

To Configure GeoMoS HiSpeed for Deformation Monitoring with Spider PP Positioning Products

Follow these steps to configure GeoMoS HiSpeed for Deformation Monitoring with Spider PP Positioning Products.

Part	Action
1	Configure the PP Positioning Products in Leica GNSS Spider
2	Configure the Connections to the PP Positioning Products
3	Configure the Limit Checks
4	Configure the Messaging Options
5	Connect to the Data Stream

Part 1: Configure the PP Positioning Products in Leica GNSS Spider

Follow these steps to configure the PP Positioning Products in Leica GNSS Spider.

Step	Action
1	Create the sites in the Spider Site Server.
2	Connect the sites and check that the data communications are working.
3	Create RINEX file products for each site.
4	Create the PP Positioning products. The results are automatically stored to a SQL database that can be read by GeoMoS HiSpeed.

Part 2: Configure the Connections to the PP Positioning Products

Follow these steps to configure the connections to the PP Positioning Products.

Step	Action
1	Open the Edit...Spider PP Positioning menu.
2	Use the From Spider button to connect to the Spider Site Server. Enter the IP address or computer name for the PC running the Spider Site Server. If Spider is installed on the same PC running GeoMoS HiSpeed enter 'localhost'. Enter the Site Server password (the password you entered when installing Spider). Exit the dialog with OK.
3	GeoMoS HiSpeed will connect to the Spider Site Server database and readout the information of all PP Positioning products. The user defined site coordinates will be used as the reference coordinates for calculating the displacements. Exit the dialog with OK.

Part 3: Configure the Limit Checks

Follow these steps to configure the limit checks.

Step	Action
1	Open the Edit...Limit Checks... menu. The Limit Checks dialog is shown.
2	Activate and edit the relevant limit checks for the Default limit class or create one or more new limit classes using Add. Exit the dialog with OK.

- Each Spider PP Positioning connection can be assigned a different limit check.
- All Spider PP Positioning connections by default use the Default limit class.
- Only the active limit check types for each class will be used to generate out of limit messages.
- To change the limit class configured for a connection use **Edit...Spider PP Positioning** and edit the connection.

Part 4: Configure the Messaging Options

Follow these steps to configure the messaging options.

Step	Action
1	Open the Edit...Settings... menu. The Edit Settings dialog will be shown.
2	In the tree on the left select Messaging Settings. Select the output path for the optional web page.
3	(For Email Messaging) Expand the Web Settings node to show the item Email Settings . When this node is selected, in the right hand window will be a list of mail server settings that are required to send email messages. Enter the settings appropriate for your main server.
4	Select the item Email Settings in the tree view on the left. The right hand window will be a list of GSM modem settings that are required to send SMS messages. Enter the settings appropriate for your GSM modem.
5	Exit the dialog with OK.
6	Open the Edit...Messaging and Events... menu. The Edit Messaging and Event dialog will be shown.
7	Add actions such as emails, SMS and command line events.
8	Link to each message the relevant action by selecting the message in the left window and activating the check box for the action in the right window.
9	Use the Overview button to check that the configured messages/events are correct.
10	Exit the dialog with OK.

Part 5: Connect to the Data Stream

Follow these steps to connect to the data stream.

Step	Action
1	Open the Connect...Spider PP Positioning menu.
2	Select the period of data to plot. The plot can be an offline view of historical data only or an online plot that automatically updates by continuously checking for new results.
3	Exit the dialog with Continue. GeoMoS HiSpeed will read out the results from the database(s) for the active Spider PP Positioning connections and draw the plot. The plots will be shown in the Plot View tab. Use the combo box on the toolbar to change the plot type.

Information

Messages

The list of registered messages available in the system is shown in the table below. Some other messages can be produced by the software which are not registered and are not shown in this list or in the Messages and Events dialog. Such messages include those relating to the changing of setting by the user and those generated if sending of a email or other system operation fails.

Each message has a certain level of priority indicated by its icon and the colour used to display it in the Messages tab. The levels are:

Message Priority

Icon	Priority
	Limit check level 1 failed
	Limit check level 2 failed
	Limit check level 3 failed
	Notice
	Warning
	Error

Messages

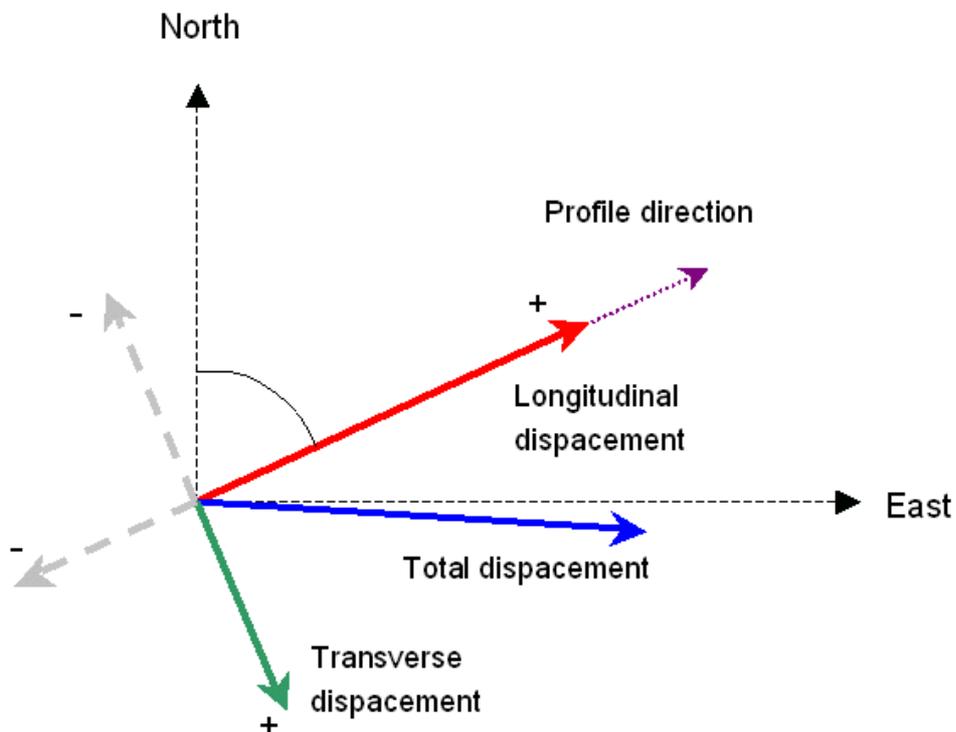
Icon	Message	Description
	Absolute limit check level 1 exceeded	Absolute limit check 1 failed because the difference between the received coordinate (from NMEA or Spider Post Processing) and the reference value was greater than the configured limit.
	Absolute limit check level 2 exceeded	As above except level 2 failed.
	Absolute limit check level 3 exceeded	As above except level 3 failed.
	Invalid limit check	The limit class assigned to the NMEA or Spider PP Positioning connection no longer exists and therefore cannot be computed.
	No entitlement found	A valid entitlement has not been found. All options will be disabled.
	Connection lost	A TCP/IP connection to an NMEA data stream was lost. Check that the data provider (e.g. Leica GNSS Spider RT Positioning Product) is activated and working correctly. GeoMoS HiSpeed will auto reconnect when the server is working correctly.
	Language file(s) missing	No valid XML language files required by GeoMoS HiSpeed to create the web page were found. These files must be in the Language sub folder within the install folder. To restore the default languages you can reinstall the software.
	Customer Care Package (CCP) will expire soon	Your Customer Care Package (CCP) will expire in a few days. Without a valid CCP you will not be able to access the protected functionality of new versions of GeoMoS HiSpeed. To renew your CCP and obtain a new license key please contact your local Leica Geosystems representative. The new license key can be activated using Help...License Monitor .
	Customer Care Package (CCP) has expired	Your Customer Care Package (CCP) is no longer valid. Without a valid CCP you will not be able to access the protected functionality of new versions of GeoMoS HiSpeed. To renew your CCP and obtain a new license key please contact your local Leica Geosystems representative. The new license key can be activated using Help...License Monitor .
	Connection to SQL database failed	GeoMoS HiSpeed could not open a connection to an SQL database (e.g. Spider database, SpiderPositioning database or SpiderWeb database). Check that the LAN or internet

		connection is working and that the SQL port 1433 is open in the firewall.
!	Communication re-established	The communication to one of the measurement sources has been re-established.
!	System OK	Confirmation message that the application is running without disruptions.
!	Web page updated	The web page has been created and successfully updated

Profiles

A profile defines the direction (i.e. azimuth) in which the longitudinal displacement will be computed. Every NMEA and Spider RT and PP Positioning connection can be assigned a profile which is used during the calculation of the displacements. The calculation of the displacement along the profile, perpendicular to the profile and in the vertical direction is dependent on the type of Limit Class assigned to the point.

Definition



Supported CSV Formats For Coordinate Files

The supported CSV formats are:

CSV Format	Description
SiteName,X,Y,Z	Site name, XYZ coordinates
SiteName,D/M/Y H:M:S,X,Y,Z	Site name, the epoch (day, month, year, hours, minutes, seconds), XYZ coordinates
SiteName,NotUsed,D/M/Y H:M:S,X,Y,Z,	Site name, not used, the epoch (day, month, year, hours, minutes, seconds), XYZ coordinates
PointID,D/M/Y H:M:S,StoredStatus,AmbiguityStatus,SolutionType,Frequency,X,Y,Z,PosQuality,HeightQuality,Pos+HeightQuality	Leica Geo Office (LGO) format
PointID,D/M/Y H:M:S,StoredStatus,AmbiguityStatus,GNSSType,SolutionType,Frequency,X,Y,Z,PosQuality,HeightQuality,Pos+HeightQuality	Leica Geo Office (LGO) format

Also tab delimited files with the following format are supported: M/D/Y H:M:S,

Latitude,Longitude,Height

where the latitude and longitude have the format, deg - minutes - seconds - sign. e.g. 53 0 9.962364

N

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