



# **Planning**

**Visual Analysis of Visibility  
for GPS, GLONASS and Geostationary Satellites**

**Planning - User's Manual**

**HyperPage - User's Manual**

Report generator and charting tool



**Visual Analysis of Visibility  
for GPS, GLONASS and Geostationary Satellites**

# **Planning**

## **User's Manual**



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# 1. Planning - General Functions

**Planning** is a powerful stand-alone software tool supporting any form of analysis of visibility for GPS, GLONASS, IGSO and geostationary satellites.

Only a few years ago, when satellite constellation was very poor (due to a limited number of satellites visible in orbit) such a planning tool was indispensable in order to make a field campaign a success. The availability of satellite signals was restricted to only a couple of hours a day and in order to use these time spans efficiently careful planning was necessary.

Now, that the space segments of GPS or GLONASS are complete, **Planning** is still of great importance to monitor a survey campaign. It answers questions like these:

- When are the PDOPs for a station better than  $x$  and when are more than  $y$  satellites visible?
- I want to survey  $x$  stations simultaneously. When do I have the best conditions for all of them?
- I want to survey during a given time span. How many satellites will be visible?
- My survey location is partially obstructed by buildings or trees. Can I nevertheless expect considerably good results?
- Recently, I'm creating a visibility report for each day of the year manually. Can I automate this task?

## ***What does Planning do?***

**Planning** answers complex combinations of those questions, but is most comfortable to use! A lot of features are available by just a mouse-click.

Using the preprogrammed features, all you need is an almanac file containing a valid set of data. **Planning** helps you to create stations or multistations, which assemble station information like latitude, longitude, obstructions, cutoff elevation angle and maximum time span. Based on this data, you receive comprehensive answers to your questions in form of clear, multicolored graphs or tables.

**Planning** is clearly structured in sub-menus. Therefore, a look at the menu bar allows us to understand the main features very quickly.

The following sub-menus are available:



File Almanac Satellites Graphs Lists Options Windows Help

**Figure 1-1: Planning Pull-down Menus**

**File** allows you to create and manipulate stations or multistations. Station data includes the position on earth, possible obstructions, general cutoff elevation angle and a maximum time span. For simultaneous observation of at least two stations you may create or manipulate a multistation network. You may also print the graphs or terminate **Planning** from here.

- Almanac allows you to choose and load almanac data from different receiver types, to inspect its values and to save or delete it.
- Satellites Individual satellites may be enabled or disabled. Detailed information for all tracked satellites is available.
- Graphs lets you create one of the already available, preprogrammed graphs.
- Lists Shows results in form of printable lists.
- Options Lets you toggle the legend/agenda and lets you determine which satellite systems are available. These include GPS, GLONASS, IGSO and geostationary satellites.
- Windows offers the typical MS Windows options regarding window handling and allows you to toggle the toolbar.
- Help provides information on the current version and offers help.

The Menus and all standard functionality will be completely described in chapter 2.

A toolbar offers quick and intuitive access to most of **Planning's** options.



**Figure 1-2: Planning Toolbar**

The Appendix in chapter 3 offers additional information on how to add cities to **Planning** and the description of the standard almanac file.

## 2. Basic Functionality

**Planning** is structured very clearly. This allows us to follow the sub-menus to get accustomed to **Planning**'s features.

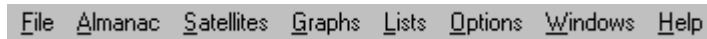


Figure 2-1: Pull-down Menus Follow Functionality

### 2.1 File Sub-Menu

**Planning** stores station-related parameters and uses them to calculate the graphs and lists. You may create new stations, select and edit existing entries, and save them. You may compose multistations. For printing you may set-up a printer and print the graphs. Last, you may terminate **Planning** using the `Exit` command.

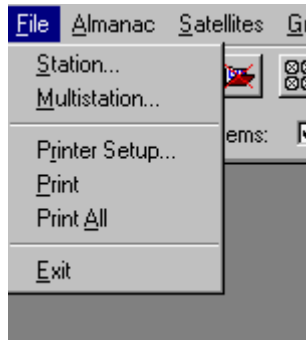


Figure 2-2: Sub-Menu File

### 2.1.1 Edit Station

The *Station...* option is a very powerful part of **Planning**. It opens the *Station Editor*, which allows you to choose the station from a list for analysis of visibility. You may define new stations and determine their coordinates and cutoff elevation angle. You can determine sky visibility with obstructions. At the same time, you can define the time segment for the visibility analysis.

You might use the *Station Editor*, if you are planning a new survey at a station you did not occupy previously. Or, if you want to see results previously calculated for an already stored station or want to directly compare different dates at the same station. Choose *File/Station...* or the respective toolbar button to open the *Station Editor*.



Station Editor

Station Name: Default

Position

Latitude: N 0 0 [°]

Longitude: E 0 0 [°]

Height: 0 [m]

Elevation Cutoff: 10 [°]

Time Information

Start at: 11/16/98

Start time: 00:00

Duration: 24

Interval: 10 [min]

Time Zone:

(GMT) Greenwich Mean Time: Dublin, Edinburgh, London, Lissabon

Difference GMT: 0.0 [h]

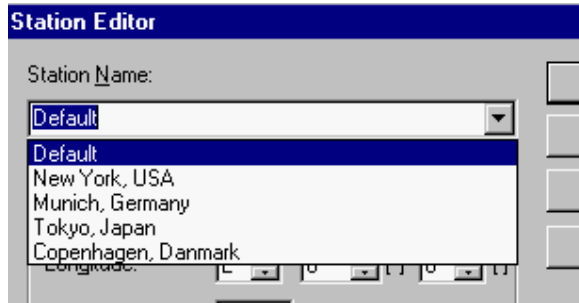
Buttons: OK, Cancel, Apply, Delete, Obstacles..., Map..., City..., Today, Time Zone...

Figure 2-3: Station Editor



It shows the current station and all related parameters. You may enter values using the keyboard or the arrow up and down buttons. Lists or graphs will be changed, as soon as you accept changes with the **Apply** or **OK** buttons.

The first entry shows the station name. When you first use **Planning**, this will be the default station `Default`, following it will be the last used station. An arrow button allows you to open a list of all previously defined stations.



**Figure 2-4: Built-in Stations**

At any time you can add further stations or delete obsolete stations. If you, e.g., want to compare certain observation intervals, you may include two stations with the same coordinates, but different time spans.

To add a new station, just type in its name, set parameters and press **OK** or **Apply**. This will add the new station to the internal list. **OK** additionally closes the dialog.

A lot of stations are available if you click on the button **City...** The dialog *Select City* will pop up. It displays the name and coordinates of

the currently selected station. You may select a station from the combo box.

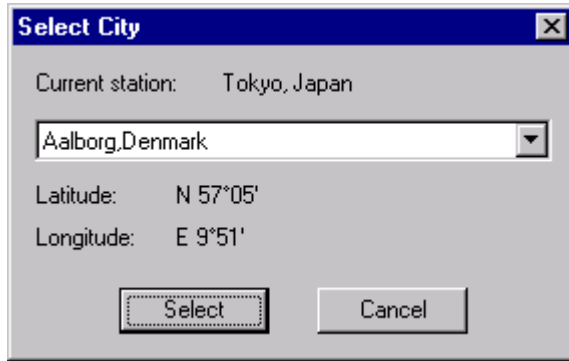


Figure 2-5: Select City

When you activate a new city name, the corresponding coordinates will be displayed. Click **Select** to select the city and its horizontal coordinates, click **Cancel** to leave the dialog without any changes to the *Station Editor*.

To delete a station from the list activate it and click the button **Delete**. The name and the corresponding parameters of this station will be deleted from the list.

The *Position* block below the station name defines the **station position** in longitude, latitude and height. You may enter a cutoff elevation. **Planning** considers no satellites with an elevation below this angle. The value is specified in degree, typical values are 10° or 15°.

The box *Time Information* allows you to enter the **start date and time**. The button **Today** allows fast entry of today's date. Define the dura-

tion of analysis (*Duration*) and choose the time interval for calculation (*Interval*). You may select the date format via the browser button ... .

It is good practice, to have an interval of about 10 min to inspect a whole day and then to set the interval to 1 to 2 minutes when it comes to precise analysis of an hour or two.

The box *Time Zone* displays the currently selected **time zone**, the current offset to GMT (Greenwich Mean Time) in hours (*Difference GMT*), and, if any, the Daylight Saving Time (*DST*). If you want to change the time zone (default: Default), click the button **Time Zone** to open the dialog *Time Zone Selection*.



**Figure 2-6: Time Zone Selection**

Select the time zone from the list *Time Zones*. If necessary, you may activate the checkbox *Daylight Saving Time*. Click **OK** to accept the choice, or **Cancel** to leave the dialog without changes.

If you know that **obstructions** at your station hide part of the sky and, therefore, block visibility to satellites, open the *Obstruction Editor* via the button **Obstacles...** The *Obstruction Editor* shows a “sky plot”. The numbers at the outer circle denote the azimuth; zero means North,  $90^\circ$  is East,  $180^\circ$  is South,  $270^\circ$  is West. The center of the circles is the zenith (elevation angle  $90^\circ$ ) and the outer circle shows elevation  $0^\circ$  (i.e., the horizon).

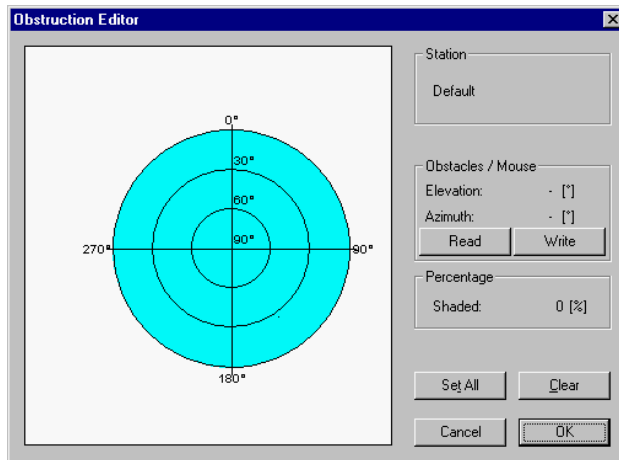


Figure 2-7: Obstruction Editor

You may create some “off-limit” areas (masks) where visibility to the satellites is blocked by just dragging the mouse over the plot while the left mouse-button is pressed. Azimuth and elevation at cursor position will be shown at the right-hand side of the plot in the box *Obstacles/Mouse*. To erase parts of the shading mask, just drag the mouse using the right mouse-button.

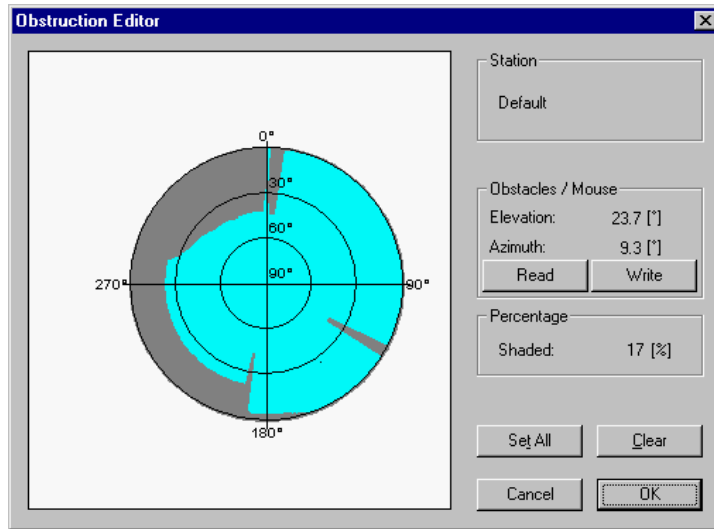


Figure 2-8: Masking

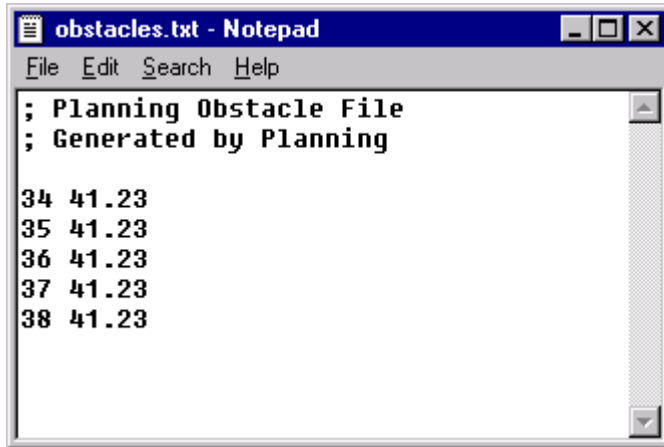
When you have finished the masking of an area you will see the percentage of shaded horizon under the title *Percentage*. Two buttons allow you to easily manage the shaded areas: **Clear** always allows you to clear the plot, which removes all shaded areas. **Set all** sets the full plot to shaded.



Clicking **OK** defines the obstructions and returns to the *Station Editor*. To discard the settings click **Cancel**.

You may also read in and write out ASCII files containing azimuth and elevation information: To import information on existing obstacles, click the button **Read** and select an ASCII \*.TXT file from a Standard file selector. The text file contains in each line first the azimuth, sepa-

rated by an empty space follows the related obstruction height (elevation). The text file only holds those azimuths for which obstruction information is available.

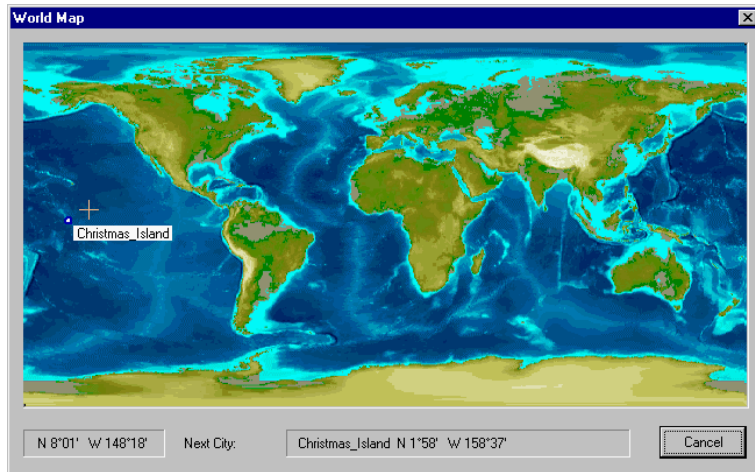


```
obstacles.txt - Notepad
File Edit Search Help
; Planning Obstacle File
; Generated by Planning
34 41.23
35 41.23
36 41.23
37 41.23
38 41.23
```

Figure 2-9: Obstacle File

The information contained in the text file will overwrite the current system information. That means: If the text file contains information for a specific azimuth, the file information prevails over the manually input information. If specific azimuths are not contained in the text file, previously input obstructions will be kept. The figure above displays only information for a few azimuth values in the northeastern sky section.

The **Map...** button of the *Station Editor* opens the dialog *World Map* that allows you to **identify a location**.



**Figure 2-10: Define Coordinates - World Map**

The cross-shaped cursor marks the position of the currently chosen station, identified by the current coordinate entries in the lower left corner. A little rectangle helps you to control the movement of the cursor. It identifies the location of the city most adjacent. A text field gives its name and country. The box *Next City* repeats the name of the most adjacent city and indicates its geographical coordinates. The Appendix shows how to add new cities to **Planning**.

To choose a new location, just move the cursor to it, check the values at the bottom of the window and then double-click with the left mouse-button. This will close the *World Map* dialog, and simultaneously, in the *Station Editor* window, this action will create a new entry in the *Station name* field and update the coordinates. If you do not want to change anything, click **Cancel**.


After all parameters are set, you may apply them without closing the *Station Editor* window (**Apply**) or close the window and apply the chosen station parameters (**OK**).



**Apply** or **OK** append any new station to the station list.  
**OK** additionally closes the *Station Editor* window.

**Cancel** leaves the *Station Editor* without changes. If you defined obstructions, these settings are kept.

### 2.1.2 Multistation Analysis

The Multistation Analysis is of great importance, if your network covers a large area. Simultaneous observation of the same satellites may be essential. The option *Multistation...* of the pull-down Menu *File* or its corresponding toolbar button open the dialog *Multistation Analysis*, which allows you to define a Multistation network. 

The Dialog *Multistation Analysis* resembles very much the dialog *Station Editor*. Therefore, this section concentrates on the new options of this dialog. For the features of the boxes *Time Definition*, *Time Zone* or the buttons **OK**, **Cancel**, **Apply**, **Delete**, **Today** and **Time Zone** please refer to section 2.1.1.



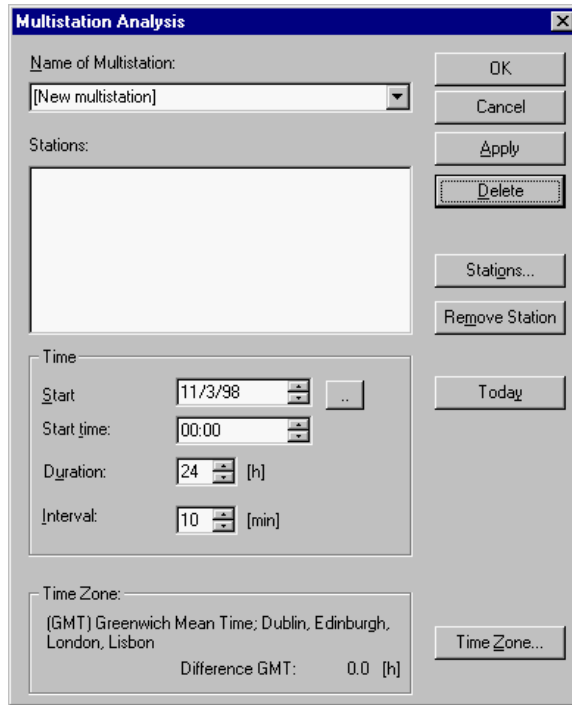




Figure 2-11: Dialog Multistation Analysis

 To edit a multistation network, you previously have to define the stations the network will be composed of. To do so, make use of the *Station Editor* (click the pull-down menu option *File/Station...* or the corresponding toolbar button) and define the location of the respective stations. Do not regard the time definition. (Refer to section 2.1.1). 

To define a multistation network, you will define its name and the stations it consists of.

Edit the **name of the multistation** network in the string field *Name of Multistation*. The default name is [New Multistation]. A new name is accepted, if you have selected at least two stations for the network.

After you have selected stations, the list box *Stations* will display the stations the network is composed of. To **remove a station** from the list box activate it and click the button **Remove Station**. The station will be immediately removed from the network, however, it will be still stored in the list of stations.

**Station selection** is very easy. Click the button **Stations...** . The dialog *Station Selection* pops up.

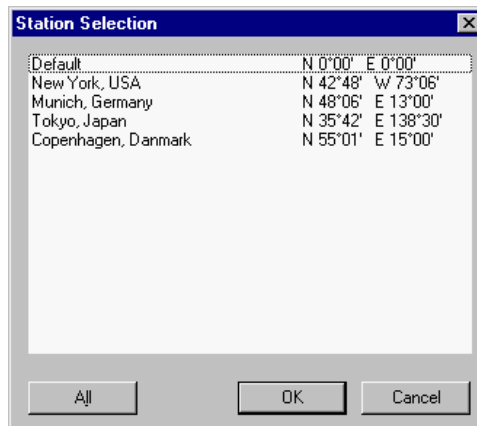


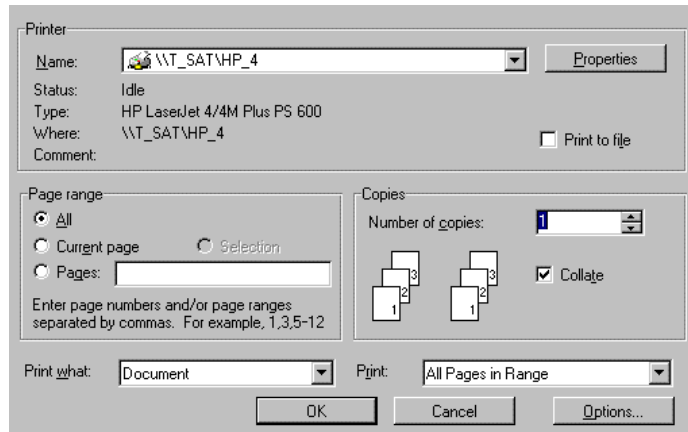
Figure 2-12: Station Selection for Multistation

The dialog *Station Selection* displays a list of all edited stations including their names and geographical coordinates. To select a station just

click it (left mouse button). To deselect a selected station click again. You may select an indefinite number of stations. To select all, click the button **All**. **OK** accepts your selection and closes the dialog, **Cancel** closes the dialog without change.

### 2.1.3 Printer Setup

If you want to print graphs you should set up the printer first. **Printer Setup** displays all the possibilities for changing printer parameters. It may look similar to this, depending on your operating system:



**Figure 2-13: Printer Setup**



**You should always set-up your printer in a way that it will print in landscape format.**

Check the printer parameters and, if satisfied, press **OK** to start printing. If you do not want to print, press **Cancel**. The **Network** button connects you to a network printer, if available.

### **2.1.4 Print**

**Planning** allows you to print out copies of the graphs. When you choose **File/Print** or the corresponding toolbar button, the printing process starts. The graph to be printed must be activated!



The option **File/Print All** allows you to print all graphs displayed in the main window.

### **2.1.5 Exit**


The menu option **File/Exit** will terminate the program at once! No further dialog is provided. Please note that all current graphs are lost!

## **2.2 Almanac Sub-Menu**

Almanac data is used to compute satellite visibility. When first starting **Planning** you have been asked for an almanac file. A default almanac file, ALMANAC.AL is part of the program package, however, you may also refer to your own almanac data file. Using the Almanac sub-menu you can check and fix the almanac later. The following options are available:

Load	loads an almanac file according to <b>Trimble Total Control</b> almanac format
Import...	imports an almanac file derived from other receiver types
Save	saves an almanac with a new name
Remove	clears the current database, but no physical file is affected
Information	gives info on the current almanac.

### **2.2.1 The Load and Import Options**

Both options allow you to load the contents of a new almanac file into the database used for calculation. If you have an almanac file containing almanac data in the **Trimble Total Control** almanac format and with extension \*.ALM or \*.??A (where ?? stands for the year), load it by choosing Almanac/Load or the corresponding toolbar button.  It will be used for all subsequent computations.

If you want to use almanac files created by other receivers, **Planning** allows to import this almanac data and to convert it automatically. Just activate Almanac/Import... and select the format you want to import. A dialog appears, allowing you to search for files. After you imported

foreign almanac data, a message notifies you on success or failure of import.

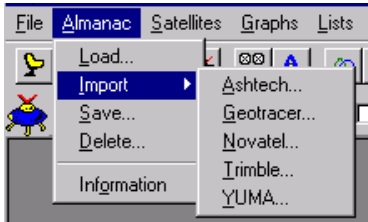



Figure 2-14: Almanac Sub-Menu Import

If you load or import **several almanacs**, **Planning** will use an intelligent algorithm for optimal results. Satellites of different PRNs will be merged in the internal database, not regarding the source of information, and will be appended to the fitting container (e.g., any GPS satellite will be found in the GPS container). If multiple almanac data is available for a satellite, **Planning** will store the almanac data with the most recent information.

### 2.2.2 Save...

If you have imported an almanac you might want to save it in the **Trimble Total Control** format via the menu option Almanac/Store or the corresponding toolbar button. A standard  file dialog opens which allows the usual options to choose drive and directory as well as input a new file name (preferably using the default extension \*.ALM).

### 2.2.3 Remove Almanac

If you choose the option *Almanac/Remove* or the corresponding toolbar button, all almanac data will be deleted from the database. You must then load or import a new almanac for further computing.



**ATTENTION:** As soon as you choose *Almanac/Remove*, data will be deleted from the database! Be sure you really want to clear the almanac before choosing this option!

### 2.2.4 Almanac Information

If you choose the option *Almanac/Information*, the *About Almanac* dialog pops up and displays the paths and file name of the current almanac together with a summary of the satellites available in it.

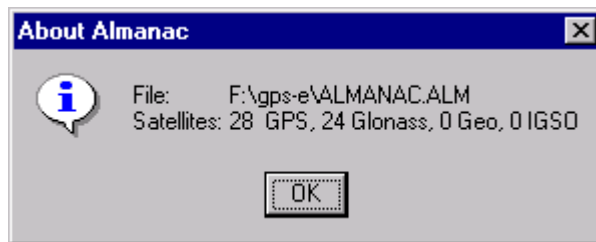


Figure 2-15: Almanac Information

## **2.3 Satellite Sub-Menu**

The pull-down menu `Satellites` covers the functions you need for satellite selection. The following options are available:

Selection	enables/disables satellite systems and/or individual satellites for the calculations
Information	provides for each single satellite the complete almanac information


### **2.3.1 Satellite Selection**

**Planning** is able to use satellites of four satellite systems for calculation of satellite visibility. These Systems are:

GPS	the U.S. NavStar Global Positioning System
GLONASS	the Russian Global Navigation Satellite System
Geo	geostationary satellites of the future, ESA-developed GNSS2 System (expected ca. 2002)
IGSO	International Geostationary Orbit - part of the future ESA-developed GNSS2 System (expected ca. 2002)

The geostationary and IGSO Satellites are part of the GNSS2 System, which is currently in the state of planning. The GNSS2 System is to be built-up by the European Space Agency ESA with the same principle and aiming as the GPS and GLONASS systems, starting with next century. Learning from the GPS and GLONASS experiences results in differences in the space and control segment in order to choose the system parameters in a way that navigation using GNSS2 will be faster, more precise and saver, allowing for airborne navigation.



You can speed up calculation or redrawing of graphs by disabling whole satellite systems or individual satellites. Just click the option *Satellite/Selection* or the corresponding toolbar button  and you will find the dialog *Satellite Selection* displayed.

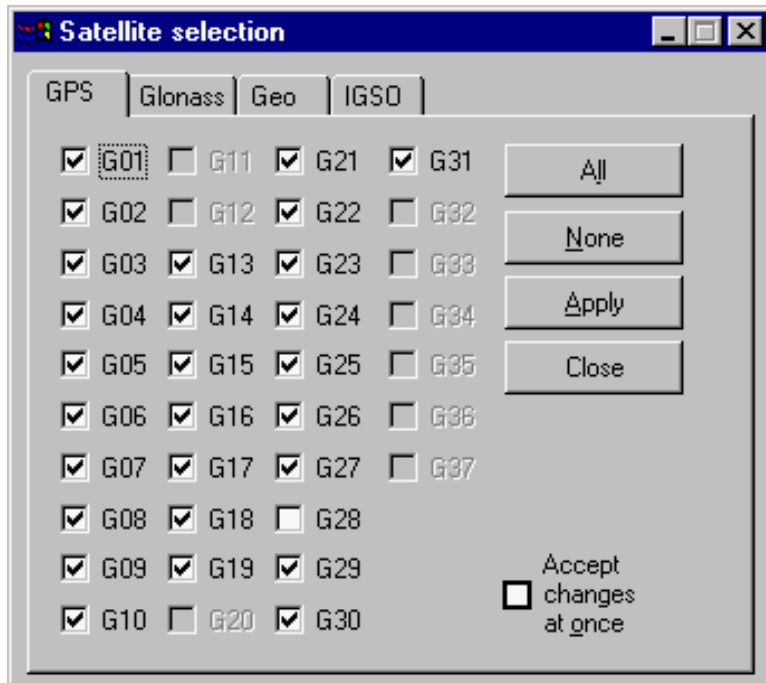


Figure 2-16: Satellite Selection

The dialog *Satellite Selection* consists of a page for each of the above listed satellite Systems. They are similarly composed. You may enable or disable each individual satellite of a system via its checkbox. By default all loaded satellites of good health (=0) are enabled. Satellites with missing satellite information are grayed out and cannot be en-

abled. Click the respective checkbox to toggle the satellite. Via the buttons **All** you can enable all satellites of the page, the buttons **None** disables all satellites of this system..

You may add the changes to the database via the button **Apply**. Satellite information for disabled satellites will not be lost, the respective satellite will just be “switched off”. In the lower right corner of the page you will find a checkbox, which by default is cleared. If you check the option *Apply changes at once*, changes in the toggling status of a satellite will be accepted at once and you do not have to click the button **Apply**. This option is advantageous, if you en/disable several times just one satellite.

The bar *Satellite Systems* allows you to select from the list of satellite systems for calculation.

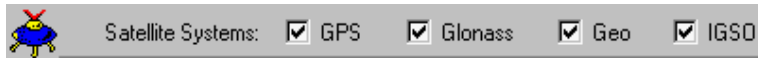


Figure 2-17: Bar Satellite Systems

The “super” switches allow you to enable or disable complete satellite systems, retaining the settings in the dialog *Satellite Selection*. If, e.g., a GPS satellite is enabled, but the GPS “super” switch on the bar is disabled, the satellite will not be used for calculations.

On the other hand, if a GLONASS satellite is disabled on its page of the dialog *Satellite Selection*, but the GLONASS “super” switch on the bar is enabled, the satellite will not be taken for calculation.



Setting a “super” switch does not affect the setting of *individual satellites* as it does using the dialog *Satellite Selection*!

### 2.3.2 Satellite Information

Choosing the option Satellite/Information or the corresponding toolbar button opens the notebook *Satellite Information*, which serves as a display of the currently available almanac data for each satellite.

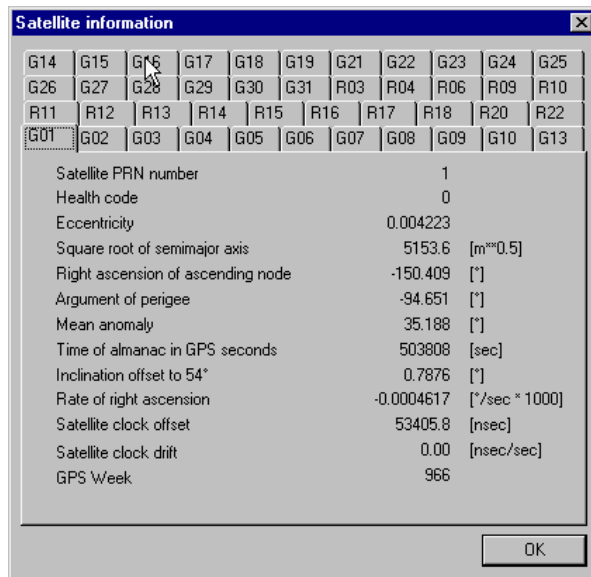


Figure 2-18: Satellite Information

For each satellite a page displays the values from its almanac. This allows you to identify bad or wrong data and to check the data age.

Please note that the GLONASS almanac information is converted to the GPS standard.

## 2.4 Graph Sub-Menu

A lot of graphs show information on satellite constellation and visibility. You may select of a set of standard graphs; however, Trimble Ter-rasat will be pleased to build-up special graphs for you.

### 2.4.1 General Rules

To create a graph you need the following items:

- a station or a multistation (refer to section 2.1).
- an almanac file according to **Trimble Total Control** standard named \* .ALM or \* .??A, where ?? stands for the year . You may import almanacs of other types and convert them (refer to section 2.2).

When **Planning** is started, a default almanac is loaded and all standard graphs are attached to items in the Graph menu. Just select one of the rich set of standard graphs.

The **bar** *Satellite Selection* allows you to select from the list of satellite systems to be considered for calculation. The “super” switches allow to enable or disable complete satellite systems.

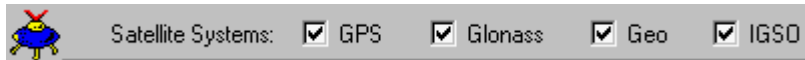


Figure 2-19: Bar Satellite Selection

You may also switch on or off satellites separately (see section 2.3.1) .



Satellite En/Disabling by the dialog *Satellite Selection* (pull-down menu option *Satellites/Selection*)

overrides the satellite system setting by the bar. E.g., if you disabled all GLONASS satellites by the dialog, the graph will not display any GLONASS satellites, even if the satellite system is enabled by the bar.

Some graphs are **functions of time** (e.g., **Elevation Display**). **Planning** makes the inspection of time sectors very simple. When you have opened a graph, the picture shows the complete time span, which you have defined via the station or multistation editor. Now drag the cursor over a time sector while holding the left mouse button. You will notice the cursor drawing a wavy rectangle. The rectangle marks the time sector. You can mark the time sector forwards and backwards.

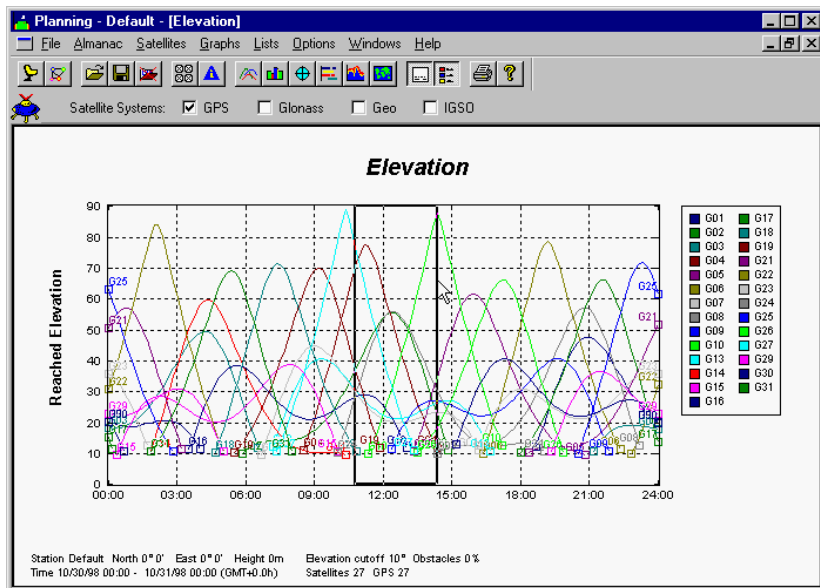


Figure 2-20: Example Display (Elevation)

When you release the left mouse-button the graph will be redrawn, showing the results magnified for just the chosen time sector.

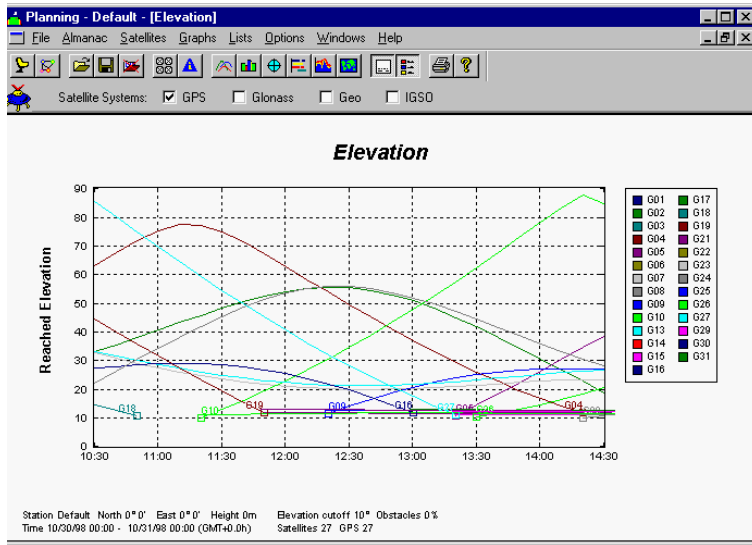


Figure 2-21: Magnified Display

You may continue to magnify up to one epoch for the whole figure.

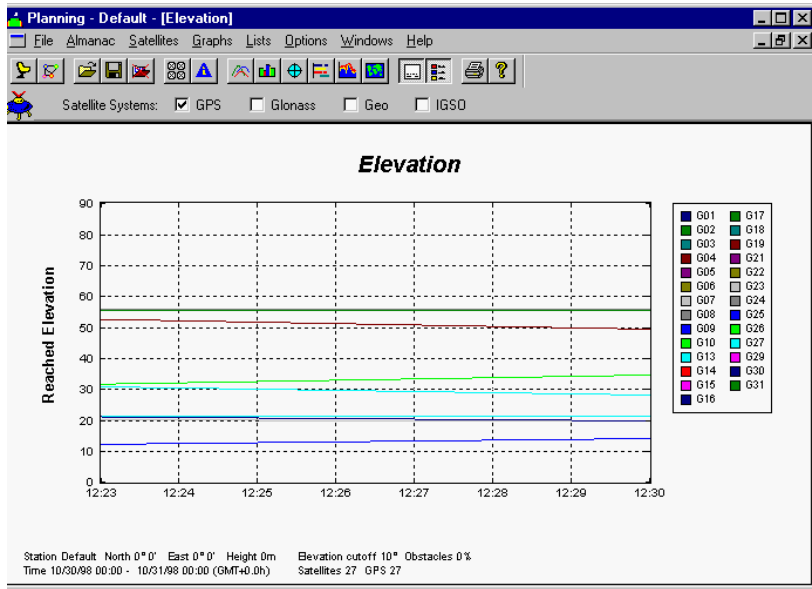


Figure 2-22: Maximum Magnification

To zoom back to the previous time span click with the right mouse-button anywhere on the graph. Double-clicking with the right mouse button maximizes the display to the original time span.

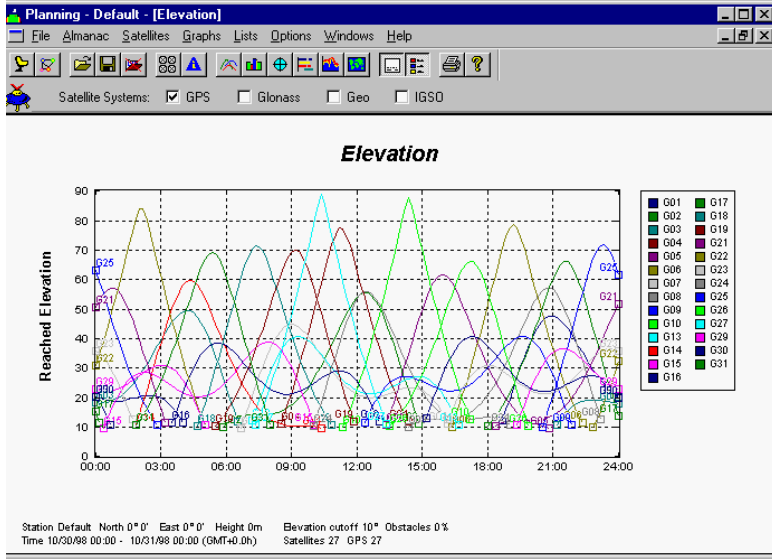
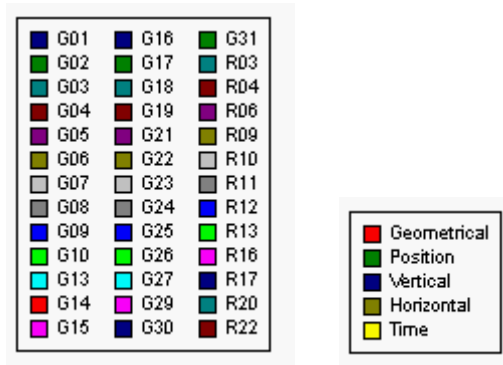


Figure 2-23: Redisplay Total Time Span



Each graph may have a legend and an agenda.

The legend lists the objects used for calculation of the graph. You may enable/disable the display of the legend via the pull-down menu option Windows/Legend. The legend may be a satellite legend, assigning colors to each satellite. For the graphs of combined DOP values the legend assigns colors to the DOP types.



**Figure 2-24: Satellite Legend and DOP Legend**

The bottom of each graph display is occupied by a summary of the current station's parameters, the agenda. You may enable/disable the display of the legend via the pull-down menu option Windows/Agenda.

Station Default	North 0° 0'	East 0° 0'	Height 0m	Elevation cutoff 10°	Obstacles 0%
Time 16.11.98 00:00 - 17.11.98 00:00 (GMT+0.0h)	Satellites 39		GPS 27	Glonass 12	

**Figure 2-25: Agenda**

The first line is the station name and position. The next line gives the maximum time span and time difference to GMT (daylight saving time considered). The following lines give the cutoff elevation angle and the shading via obstacles in percent of the sky, followed by the numbers of satellites considered. You can see how many satellites of each satellite system are currently enabled, no matter, whether enabled individually or by the satellite system selection.

### 2.4.2 Elevation Display

The graph *Elevation* is accessible via the menu function Graph/Elevation or the corresponding toolbar button.

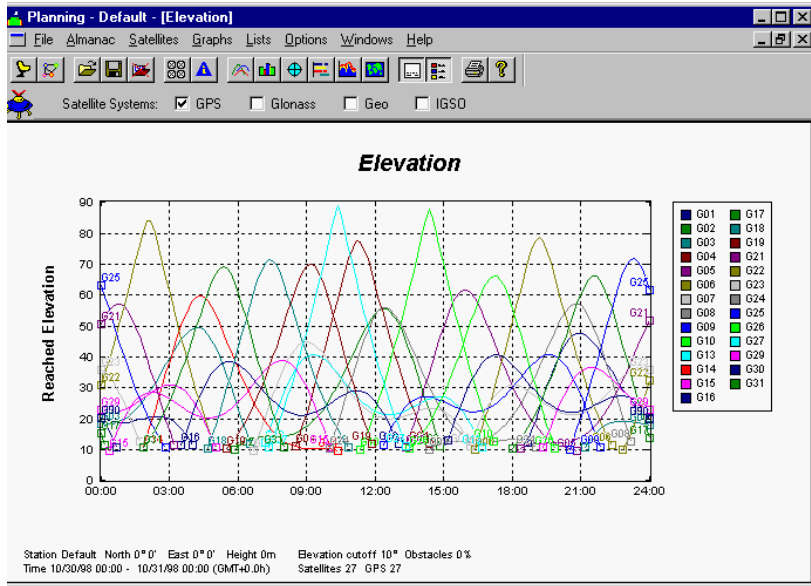


Figure 2-26: Elevation Display

For geometrical considerations and because of the distortion of satellite signals through the atmosphere at low elevations it is useful to know satellite elevation angle.  $0^\circ$  corresponds to the horizon,  $90^\circ$  corresponds to the zenith. Satellites at very low elevation (below  $10^\circ$ , say) do not contribute very much to the calculation of a position because of errors in propagating signals through the atmosphere. Usually a minimum elevation mask is introduced in order to avoid these distortions. Below this limit satellites are generally not accepted for surveying and are not shown in the *Elevation* Display. If a satellite is hidden by obstacles, it will not be shown as well.

You will find the satellite number near start and end point of the elevation curve.

Please note, that geostationary satellites are always at constant elevations.

### 2.4.3 Number of Satellites

The graph *Visibility* is accessible via the menu function Graph/Number of Satellites or the corresponding toolbar button.

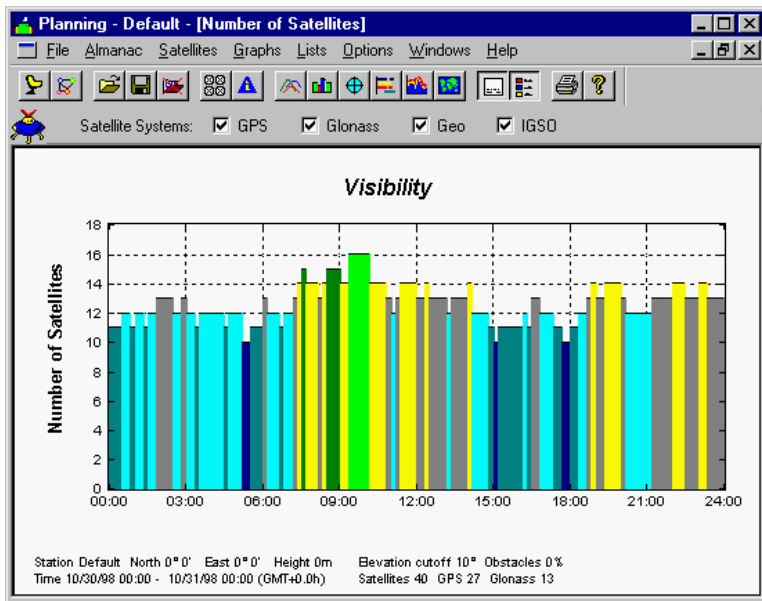


Figure 2-27: Satellite Visibility

The total number of satellites that are simultaneously visible are plotted as a graph **Best Visibility**.

A minimum of 4 satellites is required to determine a three-dimensional position in space with GPS. A minimum of 6 (4 GPS + 2 GLONASS) satellites is required to determine a combined GPS +

GLONASS solution. The presence of obstructions significantly reduces visibility.

The following color scheme is used:

0 satellites	nothing
1 satellite	blue
2 satellites	magenta
3 satellites	brown
4 satellites	light red
5 satellites	red
6 satellites	yellow
7 satellites	green
8 satellites	light green
9 satellites	light blue
10 satellites	blue
11 satellites	cyan
12 satellites	lightcyan
13 satellites	darkgray
14 satellites	yellow
15 satellites	green
16 satellites	light green
17 satellites	light blue
18 satellites	blue
19 satellites	cyan
20 satellites	dark gray
or more	

### 2.4.4 Polar Plot

The graph *Sky Plot* is accessible via the menu function Graph/Sky Plot or the corresponding toolbar button.

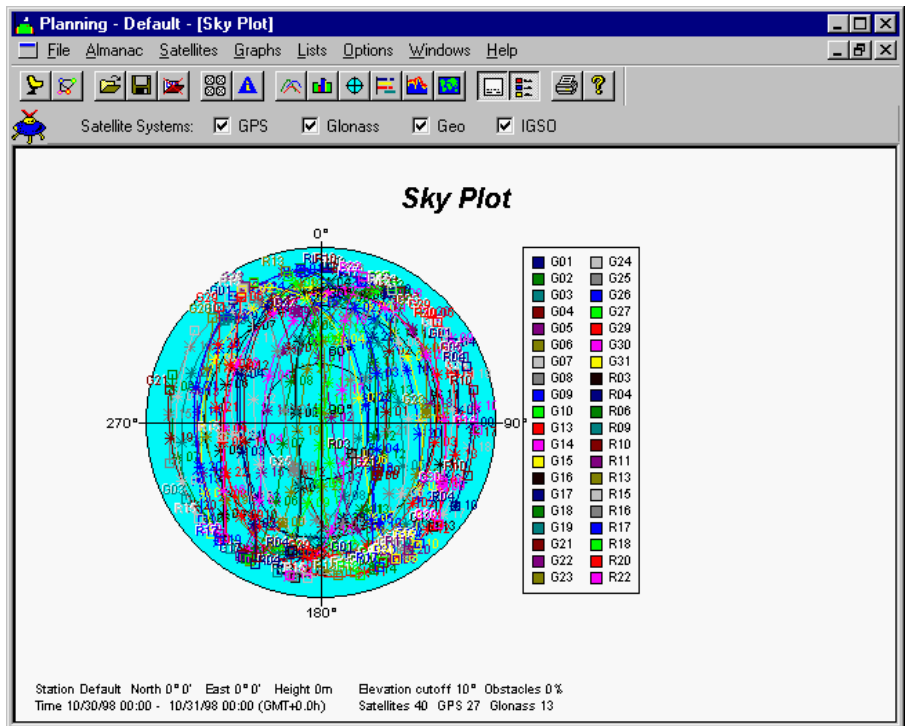


Figure 2-28: Sky Plot

The numbers at the outer circle denote the azimuth; zero means North,  $90^\circ$  is East,  $180^\circ$  is South,  $270^\circ$  is West. Center of the circles is the zenith (elevation angle  $90^\circ$ ) and the outer circle shows elevation  $0^\circ$  (i.e., the horizon). The tracks of all selected visible satellites for the given time span are projected onto this map. You will see the position of each satellite at full hours marked with the respective numbers (e.g., 3= 3:00 am, 15= 3:00 pm).

You may want to reduce the time span or the number of satellites to make the plot more readable.

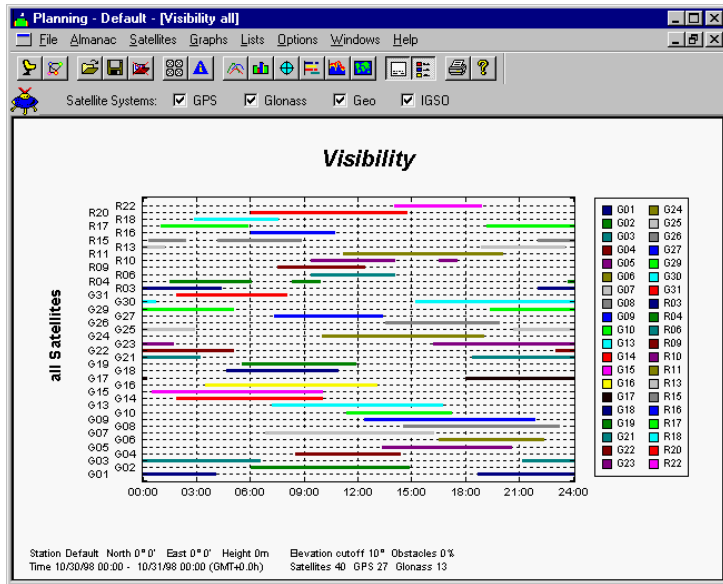
Please note, that geostationary satellites are located at always the same elevation and azimuth.

Analogous to the dialog *Obstacles*, shaded areas are drawn in the background to indicate where obstacles are located. Satellite tracks hidden by obstacles are **not displayed**.



### 2.4.5 Visible Satellites

Via the menu option Graphs/Visibility **Planning** offers you several of graphs to display the visibility of satellites as a function of time. You may choose by menu, whether you want to see satellites of one system only or of all systems simultaneously.



**Figure 2-29: General Visibility**

**Planning** offers these graphs:

- Visibility of GPS (sub-menu option GPS),
- Visibility of GLONASS (sub-menu option Glonass),

- Visibility of Geostationary Satellites (sub-menu option Geo)
- Visibility of IGSO Satellites (sub-menu option IGSO), or
- General Visibility, i.e. a combination of the former systems (sub-menu option General Visibility or the respective toolbar button).



Additionally, the settings made via the menu option *Satellites/Selection* resp. the bar *Satellite Systems* will influence the number of satellites displayed (refer to section *Satellite Selection*).

All graphs show the visible satellites as a function of time. A color bar shows the time span(s) in which the specific satellite is above the elevation cutoff ("visible", although being approximately 20 000 km aloft). Zooming in with help of the left mouse-button helps to determine the times when a satellite will ascend above or descend below cutoff elevation angle. Please note, how the presence of obstructions significantly reduces visibility.

### 2.4.6 Dilution of Precision

Via the menu option Graphs / DOP 's **Planning** offers you several of graphs to display several DOP values. The plots may display the DOPS types separately or in combination.

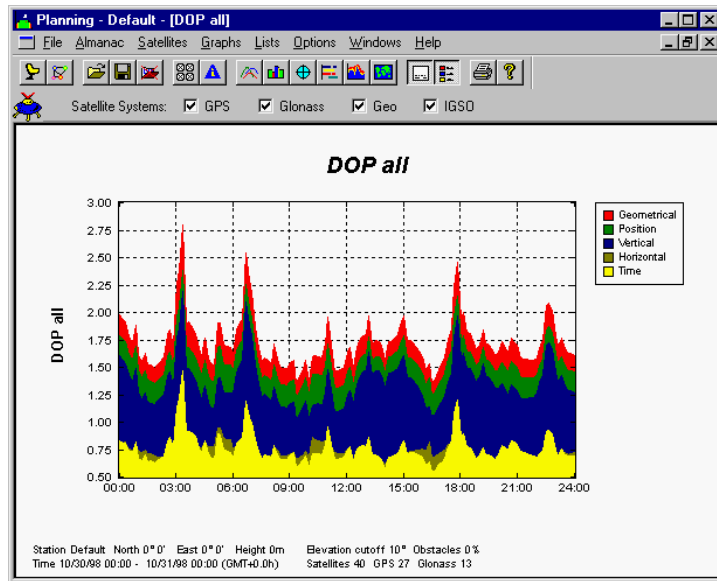



Figure 2-30: DOP - All

An important factor in assessing the accuracy of a GPS survey is the geometrical constellation of the satellites that are used during the processing measurement. The Dilution of Precision - or DOP - values are calculated and displayed as functions of time.

The DOP types available are:

GDOP:        geometrical DOP  
PDOP:        position DOP  
VDOP:        vertical DOP  
HDOP:        horizontal DOP  
TDOP:        temporal DOP

You may choose each of the DOP types separately. If you choose the option `All together` or the respective toolbar  button, all results will be shown in one single graph, printed one above the other. Typically, the values follow the following rule:

$$\text{GDOP} > \text{PDOP} > (\text{VDOP} , \text{HDOP}) > \text{TDOP}$$

and, therefore, GDOP values are printed in the background, while TDOP values are shown in front.

An alternative option is to choose `All together (Lines)`, which shows the DOP values as lines instead of colored areas.

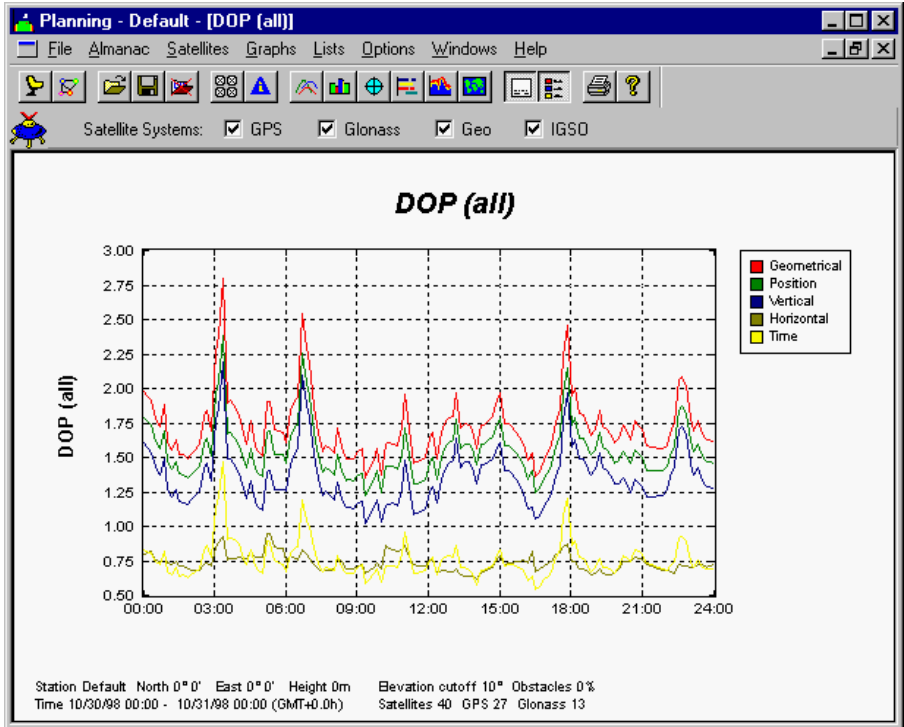


Figure 2-31: DOP - all, Lines

If you choose the option *Open 5 DOPs*, the plots of the 5 single DOP types will be opened in descending order. You may arrange them on your desktop to compare the values.

The presence of obstructions significantly reduces visibility and, therefore, increases the DOP values.

### 2.4.7 World Projection

The graph *World Projection* is accessible via the menu function Graph/World Projection or the corresponding toolbar button.

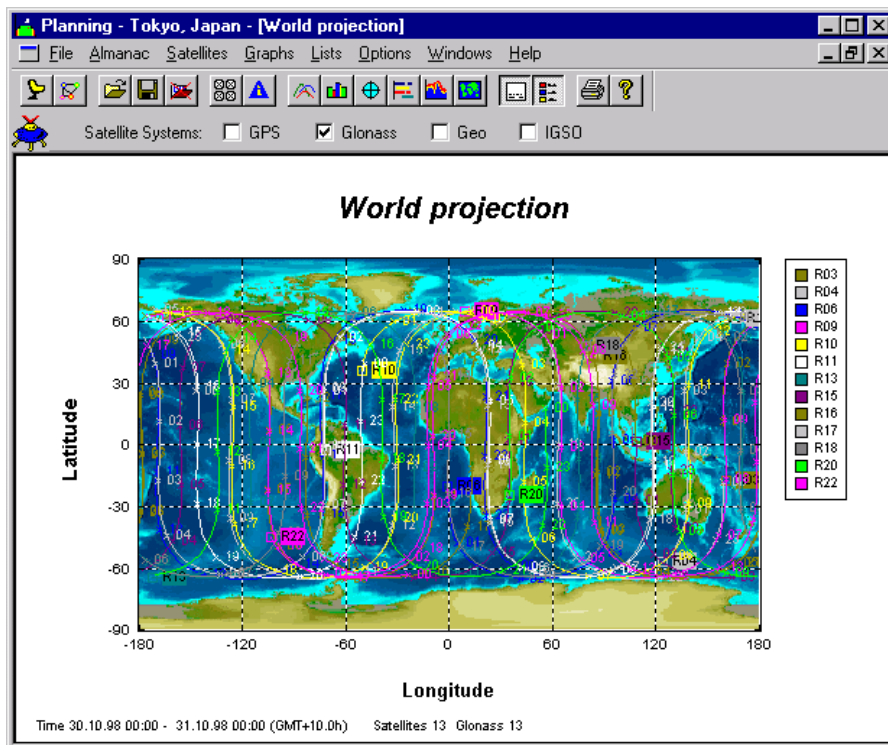


Figure 2-32: World Projection

This graph presents a colored map of the world and projections from the satellite paths on the earth's surface. Geostationary satellites are located right above the horizon, with constant latitude. The Satellite IDs are printed next to the projection using the satellite identification color. The position of each satellite is given for each full hour in hours (01, 02, ...).

This graph does not display obstructions.

You may reduce the time span or the number of satellites to ensure that the plot is readable.

## **2.5 Lists Sub-Menu**

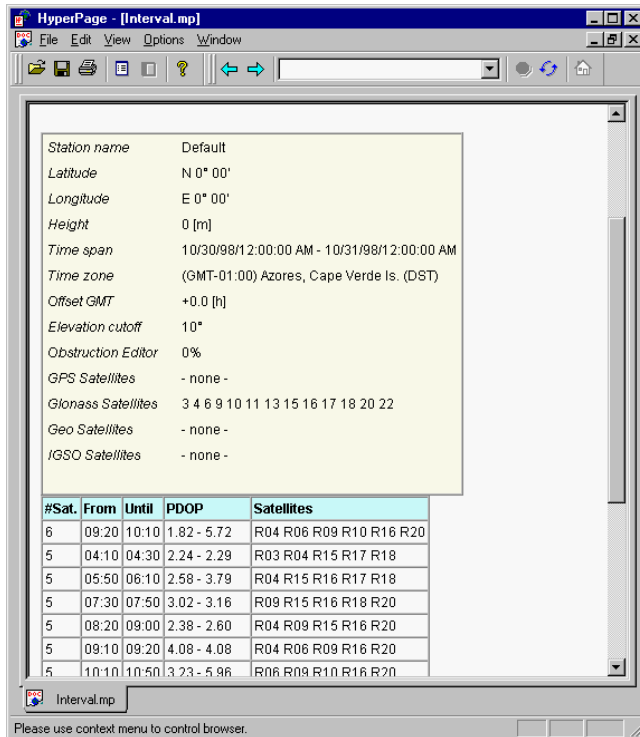
In connection with the Trimble Terrasat product **HyperPage** you may create printable lists of your planning results. For more information on **HyperPage** please refer to the ***HyperPage User's Manual***. If the **HyperPage** Option View/Tabs is active, you may combine all lists referring to a station/multistation analysis in a single **HyperPage** window. The name of the tab is the name of the data file containing the results,

The individual style of your **HyperPage** window depends very much on the Web browser installed. The following figures, therefore, can only act as examples.



### 2.5.1 Intervals

If you select the option Lists/Intervals, you will receive a **List of Intervals**:



**Figure 2-33: List Intervals**

A summary of the station/multistation parameters follows the header containing the list name. As result you will find a list of all continuous

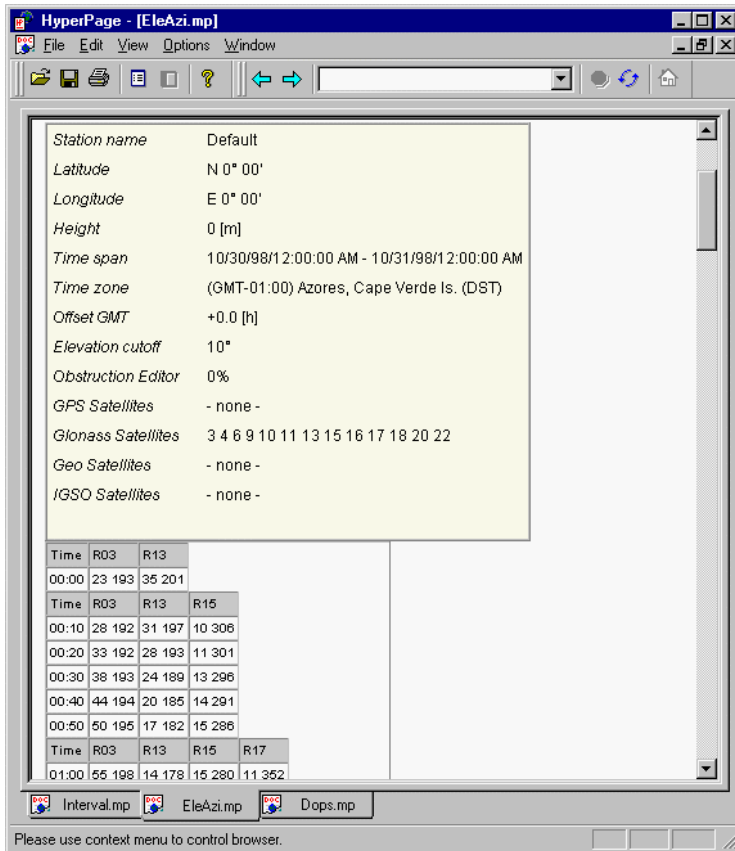
intervals without change in number of satellite or satellite constellation during the chosen time span. The list will start with the highest number of satellites visible (here: 6) and show start (`From`) and end time (`Until`) of each time span, where satellite constellation remains unchanged. You will see the range of PDOP during this time span and then the PRN-numbers of the satellites visible.

As soon as the satellite constellation changes due to one satellite (its elevation is higher or lower than the limit set by the elevation cutoff), a new line starts displaying the current values and satellites.

Since visible geostationary satellites are always visible, they are not included into the list, but just mentioned in the summary section of this document.

### 2.5.2 Elevation, Azimuth

If you select the option Lists/Elevation and Azimuth, you will receive the list **Elevation and Azimuth**:



**Figure 2-34: List Elevation and Azimuth**

This list contains the elevation and azimuth of each satellite at any single epoch.

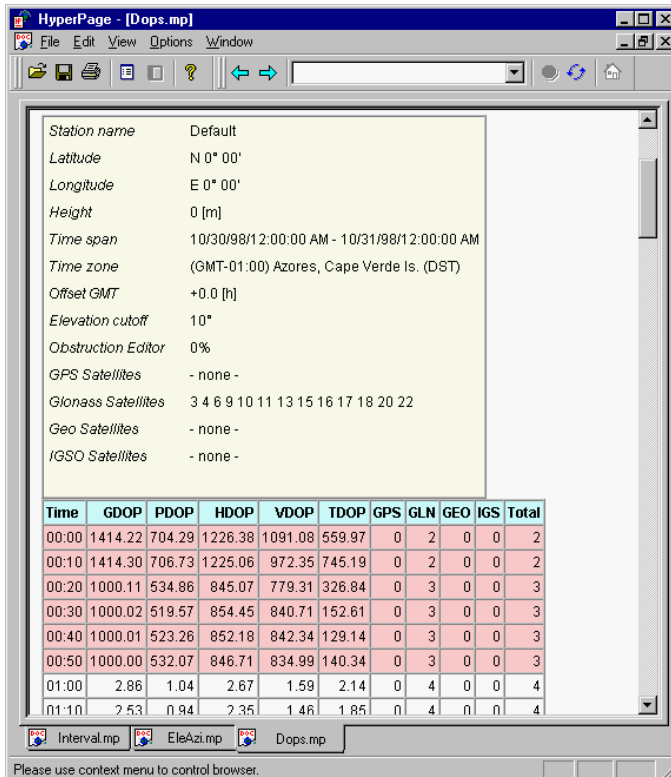
A summary of the station/multistation parameters follows the header containing the list name. In temporal order, the following data are listed in blocks of the same satellite configuration. Each block shows in order of time (column `Time`) for each satellite (columns `Satellite-IDs`) first its elevation, then its azimuth angle (integer values).

Whenever the configuration changes, this is indicated by a new block with a grayed title line, showing the new configuration.

For obvious reasons, geostationary satellites are not included in the list, but just mentioned in the summary section of this document.

### 2.5.3 DOP Values

If you select the option Lists/DOP values, you will receive a **List of DOP values**:



**Figure 2-35: List DOP Values**

A summary of the station/multistation parameters follows the header containing the list name. This list informs for each epoch (Time) of the selected time span on the values of each DOP type and the number of satellites visible in each system. It also displays the total number of satellites (Total).

Epochs, where GDOP reaches values higher than a given critical limit, are indicated by a red background. By default, the critical value is 3.000. However, you may edit the limit value: Click the **HyperPage** menu item Options/ Report Settings...

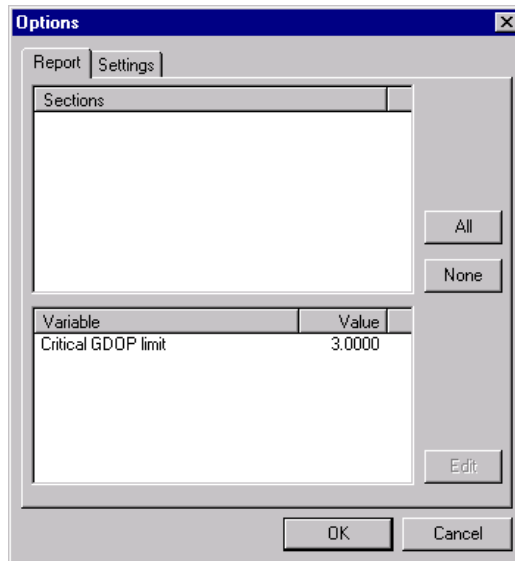
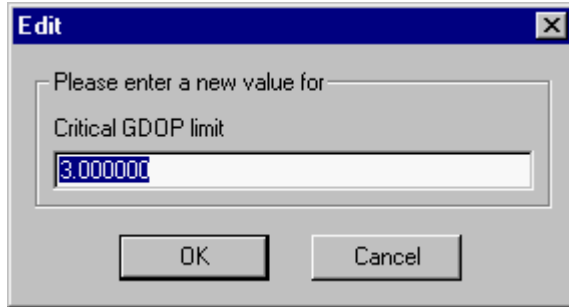


Figure 2-36: Report Settings

Activate the variable Critical GDOP Limit and click the button **Edit**.





**Figure 2-37: Edit Variable**

The dialog *Edit* allows you to enter a new value for the variable Critical GDOP Limit.

## **2.6 Options Sub-Menu**

The following menu items of the pull-down menu `Options` or the corresponding toolbar buttons allow you to activate/deactivate the display of the following items:

- Agenda 
- Legend 
- The Toolbar
- The bar Satellite Systems

Additionally, you may activate any graph from the list of open graphs.



## **2.7 Help Sub-Menu**

An About-box informs you about the current version of **Planning**, about copy-rights, about how to contact Trimble Terrasat directly or about your local vendor.

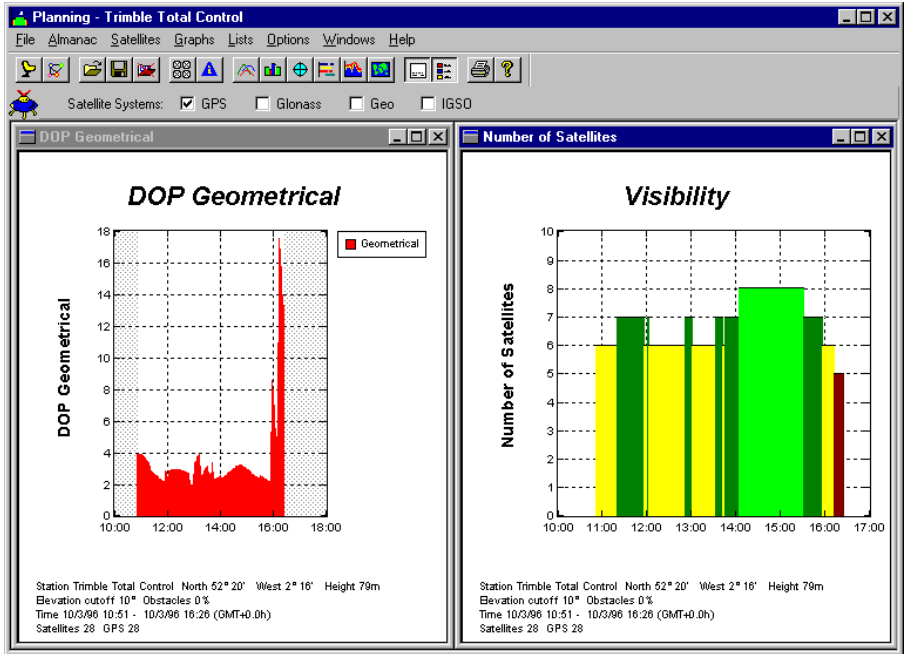
In case of questions or suggestions, please do not hesitate to contact us immediately!

Detailed help is available via the menu option `Help`.

## **2.8 Interaction with Trimble Total Control Data Processing**

**Trimble Total Control** allows you to analyze satellite visibility from within the Project Manager. Once a project is loaded or defined, the planning module **Planning** may be started from the **Tools** menu. Use the entry **Planning** from the pull-down list to call **Planning** with the current project parameters, i.e., position, date and time, time zone.

**Planning** then creates a new station under the name of the calling program (**Trimble Total Control**). The parameters of the new station are the position of the first station of the project, its cutoff elevation angle and the time span the project covers. **Planning** then calculates visibility for the transferred date and displays the *Number of Satellites* and *GDOP* graphs on the screen.



**Figure 2-38: Display of GDOP and Visibility**

Based on this initial view you may use all functions of **Planning** as described in this manual.

On exiting the program you are transferred back to the **Trimble Total Control** Project Manager.

## 3. Appendix

### 3.1 How to Add Cities to Planning

**Planning** takes city information from a file named `CITIES.DAT`. This file contains lines like these

```
Aalborg,Denmark 57.097000 9.850000  
Abbotsford,BC 49.030000 -122.320000  
Aberdeen_Priv_Gnd,MD 39.235000 -76.174900
```

The first entry contains the city name. There must not be any space character in the name. Space characters are denoted by an underscore '`_`'. This underscore is converted to a space character inside of **Planning**.

The second entry contains the latitude of the city in degree. North pole is denoted as  $+90^\circ$ , south pole is  $-90^\circ$ .

The third entry contains the longitude of the city in degree. Its range is from  $-180^\circ$  to  $+180^\circ$ , where  $0^\circ$  is the meridian going through *Greenwich*.

## **3.2 The File ALMANAC.ALM**

**Planning** uses the **Trimble Total Control** standard almanac format.

The almanac file contains the following information (see following pages):

The parameters in each column are:

PRN	Satellite PRN number
health	Health code (hexadecimal values, 0 = OK, 1..255 = BAD)
e	Eccentricity
$\sqrt{a}$	Square root of semimajor axis [ $\sqrt{m}$ ]
$\Omega$	Right ascension of ascending node [ $^{\circ}$ ]
$\omega$	Argument of perigee [ $^{\circ}$ ]
M	Mean anomaly [ $^{\circ}$ ]
toa	Time of almanac in GPS seconds [sec]
i	Inclination offset to $54^{\circ}$ [ $^{\circ}$ ]
$d\Omega/dt$	Rate of right ascension [ $^{\circ}/sec*1000$ ]
$a_0$	Satellite clock offset [nsec]
$a_1$	Satellite clock drift[nsec/s]
week	GPS week

1	2	4	5	6	7	PRN
0	0	0	0	0	0	health
0.003548	0.014520	0.003486	0.001820	0.006310	0.007247	e
5153.6	5153.6	5153.5	5153.5	5153.7	5153.6	$\sqrt{a}$
-117.290	6.714	129.089	7.560	69.937	67.910	$\Omega$
-77.040	-145.682	-63.782	-116.621	-164.554	-146.580	$\omega$
-24.986	124.258	-101.331	-6.981	-56.168	59.551	M
32768	552960	552960	552960	552960	552960	toa
0.6612	0.4343	1.4540	0.5830	1.0622	1.2336	i
-0.0004558	-0.0004636	-0.0004446	-0.0004623	-0.0004636	-0.0004617	d $\Omega$ /dt
304222.1	-176429.7	30517.6	114440.9	-7629.4	701904.3	$a_0$
0.05	0.00	0.00	0.00	0.00	0.00	$a_1$
811	810	810	810	810	810	week
9	12	14	15	16	17	PRN
0	0	0	0	0	0	health
0.003817	0.015578	0.002429	0.006959	0.001259	0.008258	e
5153.6	5153.4	5153.7	5153.7	5153.6	5153.6	$\sqrt{a}$
-51.455	-35.106	-176.439	124.121	-175.902	126.151	$\Omega$
-14.659	-5.086	178.724	99.057	-57.632	121.849	$\omega$
-48.554	-51.370	34.946	-174.743	140.444	-72.580	M
552960	32768	32768	32768	32768	32768	toa
0.3049	8.1536	1.2243	1.7245	1.0331	1.7884	i
-0.0004512	-0.0003654	-0.0004446	-0.0004407	-0.0004453	-0.0004381	d $\Omega$ /dt
-7629.4	591278.1	7629.4	206947.3	-100135.8	-91552.7	$a_0$
0.00	-0.04	0.00	0.00	0.00	0.00	$a_1$
810	811	811	811	811	811	week
18	19	20	21	22	23	PRN
0	0	0	0	0	0	health
0.005873	0.001265	0.004972	0.011899	0.008072	0.009689	e
5153.5	5153.7	5153.6	5153.6	5153.5	5153.5	$\sqrt{a}$
-120.025	-60.201	0.408	-171.355	7.569	-169.367	$\Omega$
82.622	-171.733	79.977	172.943	-4.880	-130.380	$\omega$
44.325	-131.063	107.528	155.538	114.701	128.722	M
32768	32768	32768	552960	552960	552960	toa
0.0051	21.8539	0.7848	0.8655	0.4412	1.0646	i
-0.0004643	-0.0004584	-0.0004564	-0.0004505	-0.0004643	-0.0004499	d $\Omega$ /dt
-7629.4	323295.6	236511.2	-22888.2	229835.5	7629.4	$a_0$
0.00	-0.02	0.00	0.00	0.00	0.00	$a_1$
811	811	811	810	810	810	week

24	25	26	27	28	29	PRN
0	0	0	0	0	0	health
0.006256	0.005953	0.008824	0.011299	0.003915	0.005107	e
5153.6	5153.5	5153.6	5153.6	5153.6	5153.6	$\sqrt{a}$
128.764	-53.026	-111.540	-52.233	68.512	-112.843	$\Omega$
-118.620	-177.235	-45.019	151.921	171.219	-106.051	$\omega$
-74.237	9.035	58.657	-107.828	-126.515	-92.837	M
552960	552960	552960	552960	552960	552960	toa
2.0194	22.4042	0.8312	0.1318	1.6981	0.6097	i
-0.0004381	-0.0004545	-0.0004525	-0.0004505	-0.0004577	-0.0004551	$d\Omega/dt$
81062.3	0.0	-953.7	38147.0	23841.9	7629.4	$a_0$
0.05	0.00	0.00	0.00	0.00	0.00	$a_1$
810	810	810	810	810	810	week
31						health
0						PRN
0.005872						e
5153.5						$\sqrt{a}$
68.064						$\Omega$
38.911						$\omega$
-30.110						M
552960						toa
1.1996						i
-0.0004630						$d\Omega/dt$
341415.4						$a_0$
0.05						$a_1$
810						week

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**REPORT GENERATOR AND CHARTING TOOL**

# **HyperPage**

**User's Manual**



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# 1. Introduction

## 1.1 General Information

**HyperPage** is a powerful tool for generating reports, charts or any other form of printable output. It is used by a lot of Trimble Terrasat's applications to create in HTML and then to present numerical reports, lists, tables and pictures.

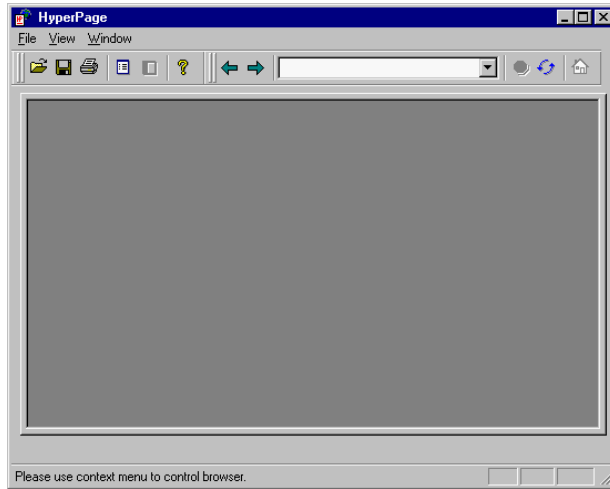
**HyperPage** is a HTML generator. That means that you have the possibility of creating complex HTML files automatically, using a macro programming language. Using HTML offers you a lot of advantages:

- Reports and lists created by **HyperPage** can be visualized on various platforms.
- The reports and lists can be distributed easily via the Internet.
- You do not necessarily need **HyperPage** to open the reports or lists. A simple Internet Browser is sufficient.
- You can increase the information enormously when you add links to relevant topics or some help files to the text.
- The reports and lists can be easily exported. Copying them into the temporary storage will have no effects on the formats or tables.

**HyperPage** uses macros like `/title` or `/tabular`. You can edit them to optimize the layout of the texts. The default macros are available in separate files. **HyperPage** documents are therefore relatively small, even though they include complex formatting commands.

This document concentrates on the functionality of **HyperPage Viewer**, as it appears on your screen.

**HyperPage**'s main window looks like this:



**Figure 1-1: HyperPage Main Window**

The **HyperPage Viewer** offers a menu, a toolbar below, a status bar at its bottom and a huge client area for the presentation of documents.

In the following you will find

- a description of how to handle and manipulate documents (Chap. .2),
- a description of how to handle files (Chap. 3),
- a short description of the layout (Chap. 4),
- a detailed description of how to adapt the settings (Chap. 5),

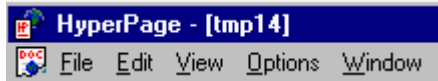
- tips on how to use **HyperPage** as an Internet browser (Chap. 6).

An *About* notebook (choose the item About **HyperPage** of the pull-down menu View) allows you to get information on the current version of **HyperPage**. It helps you to contact Trimble Terrasat in cases of problems or if you have suggestions or remarks.



## **1.2 Main Menu**

**HyperPage**'s main menu includes the following menu items:



**Figure 1-2: HyperPage Main Menu**

The **HyperPage** menu includes the following pull-down menus.


File	handle files (load, print and export) and terminates <b>HyperPage</b> ,
Edit	select contents; copy it to the clipboard
View	toggle the view of tool bars, tabs and the output window, choose the MacroStudio
Options	choose and adjust settings for reports and contents
Window	arrange the document area, for further information

## 2. File Management

All file-handling options are summarized in the sub-menu `File`.

Open	Load a *.M, *.MP document and generate an HTML file, or load an *.HTM file.
Close	Close the current document
Save as...	Save the generated document.
Reload	Re-interpret a *.M, *.MP file
Print	Printing options and printing the current HTML document.
Print Setup	Setup the printer, independent of printing.
Page Setup	Settings of the page, including the header and the footer setting.
<filename>	Quick selection of one of the four last-used files.
Exit	Leave the dialog without further questions.

## **2.1 Open a File**

To have a look at the content of a file or the edit it, open the file, using the menu item File/Open or the respective toolbar button. A standard dialog offers you the possibility of searching for a file and to open it. By default a **HyperPage** file has the extension  `*. M` or `*. MP`. **HyperPage** creates an HTML file and visualizes it. You will also have the opportunity of opening an already existing `*.HTML` file.

**HyperPage** opens several documents at the same time, the program itself, however, may only once be activated. Opening a new file leads to a child window (or page) displaying the new file.


By default, all windows are visible as tabs, listed at the bottom of the screen. This view can be switched off (View/Tab View) and the tabs can be arranged as usual with Windows applications, using the pull-down menu Window. To activate the tab view again,

- click the menu item View / Tab View
- make sure that a document is opened in the normal view.

## **2.2 Close a File**

Every document can be closed separately in the **HyperPage** program. Choose the menu option **File/Close**. Changes will not be saved.

## **2.3 Save as HTML File**

If you want to save the current file as a \* .HTM file, choose the menu option **File/Save as...** or the respective toolbar button. A  Standard file dialog offers you the opportunity to save the file and to determine the path to the directory. The default extension shown in the respective box is \* .HTM. This action stores all files into the target directory that are necessary to display the HTML file properly.

## **2.4 Reload a File**

In case you have edited a file in the MacroStudio (refer to ch. 4.2.1) it is recommended to reload the file to activate the changes. Choose the menu item **File/Reload**.

## **2.5 Printing Options**

Three are available to print the document and to edit the necessary options.

File/Print or the respective toolbar button opens a Windows standard printing dialog. All default options are offered. Additionally, an HTML related option is offered, which allows you to choose the frames that should be printed .



To determine the settings for the printer use the option File/Print Setup... .



**The standard orientation for the documents is the portrait format. However, it can easily be changed to the landscape orientation.**

The option File/Page Setup allows you to edit the header and the footer of your document and to change the orientation, margins and the size.

## **2.6 Exit**

The menu item File/Exit closes the current file and shuts down HyperPage.

## 3. Edit the Report

The pull-down menu `Edit` offers you options to edit the reports.

<code>Select All</code>	highlight and select the whole text.
<code>Copy</code>	copy the selected objects in HTML format to the clipboard.

With **HyperPage**, you can copy tables and documents via the clipboard to any available editor. If the chosen editor is capable for HTML format, the tables will be still presented as formatted tables..

The following figures shows a table for the Double Difference Float solution derived from a static processing report. You can mark areas of the report (drag of the cursor over the area that is to be selected). To mark the whole report, choose the option `Edit/Select All`.



**Please note that the above mentioned option only selects the report sections that are displayed. You can select report sections for display via the option `Options/Report Settings`.**



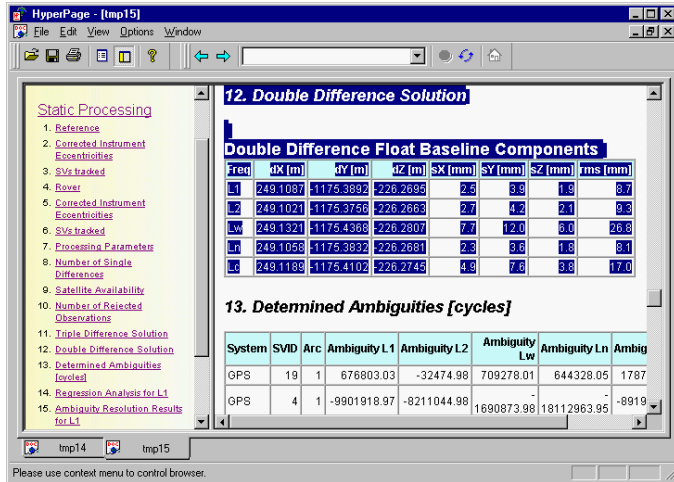


Figure 3-1: Selected Section

The marked section has been copied (via Edit/ Copy) into the clipboard and then pasted into this text (with only slight modification to the give page layout).

## 12. Double Difference Solution

### Double Difference Float Baseline Components

Freq	dX [m]	dY [m]	dZ [m]	sX [mm]	sY [mm]	sZ [mm]	rms [mm]
L1	249.1087	-1175.3892	-226.2696	2.5	3.9	1.9	8.7
L2	249.1021	-1175.3756	-226.2664	2.7	4.2	2.1	9.3
Lw	249.1321	-1175.4368	-226.2807	7.7	12.0	6.0	26.8
Ln	249.1058	-1175.3832	-226.2681	2.3	3.6	1.8	8.1
Lc	249.1189	-1175.4102	-226.2745	4.9	7.6	3.8	17.0

Figure 3-2: Auto-Formatted Copy of the Selected Section

## 4. Layout and Extras

The pull-down menu **View** offers you the options of toggling certain parts of the program. You can customize **HyperPage** completely to your own requirements.

Toolbar	Toggle the view of the toolbar
Browser Bar	Toggle the view of the Browser Bar
Status Bar	Toggle the view of the Status Bar
Tab View	Toggle the view of the tabs

Further, on you can open two extra tools via this menu:

Macro Studio opens the tool MacroStudio

Output Window View of a failure output window

### 4.1 Layout

By default all layout options are activated for **HyperPage**.

- The toolbar for file can be toggled using the menu option **View/Toolbars**. This toolbar offers all icons for opening, saving and printing a document, for report settings, contents and **HyperPage** information.

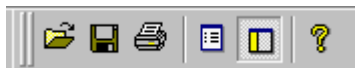
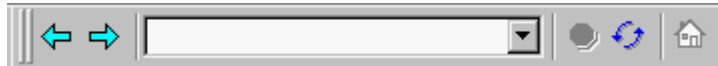


Figure 4-1: Toolbar File

- You can toggle the toolbar for Internet-usage via the respective menu option `View/Browser Bar`. It includes all icons for the usage of the Web-Browser.



**Figure 4-2: Browser Bar**

- You can toggle the Status bar via the menu option `View/Status Bar`. It offers you information on the current status of your system.
- By default the documents are listed as tabs on the bottom of your screen. When you switch off this option they are visualized as child windows in the normal view. You can enable/disable the tab view via the menu option `View/Tab View`.

## **4.2 Extras**

There are two options that will help you to create reports or to modify them. They will also help you to find errors.

### **4.2.1 Programming Environment**

One of the major advantages of **HyperPage** is its ability to adapt itself to all your needs. To create customized and printable reports and tables use the built-in and easy-to-learn macro-language. (Information for programmers: The macro-language is based on Tcl/Tk).

The extra tool MacroStudio offers you the environment for programming. It corresponds to a standard-programming-

environment with breakpoints and single step execution. To start MacroStudio choose the menu option View/Macro Studio.

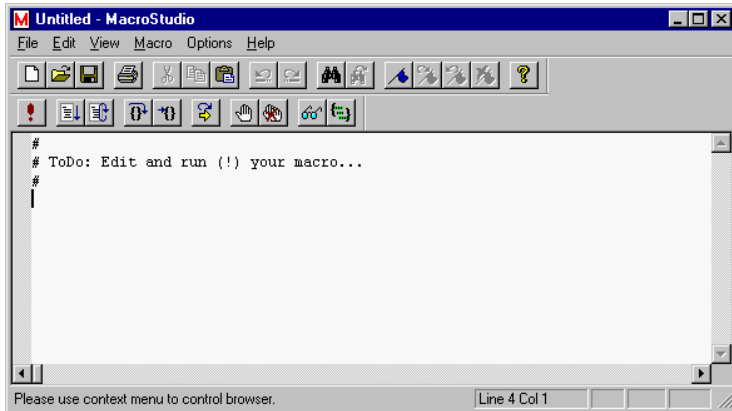


Figure 4-3: MacroStudio

You can program new macros, open already existing macros, edit them and save them under a new name.

To activate changes of an open macro file, save the changes within MacroStudio, then reload the saved macro within **HyperPage** via the menu option File/Reload.

### 4.2.2 Output of Errors

An output window informs you about errors that appear when **HyperPage** generates HTML files. By default, this window is not visible on the screen (hidden).

The menu option `View/Output Window` allows you to enable/disable the view of the output window.

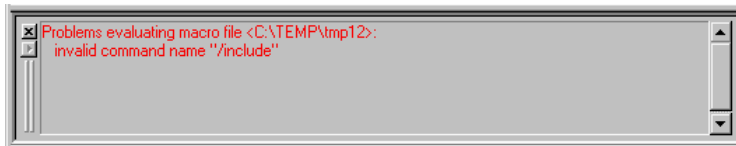


Figure 4-4: Output Window

The output window consists of the output area and a vertical scroll bar. If it is not fixed at the main window it has its own heading.

A context menu (open it via a right mouse click on the output window area) helps you to modify the layout of the window and to administrate the given messages.

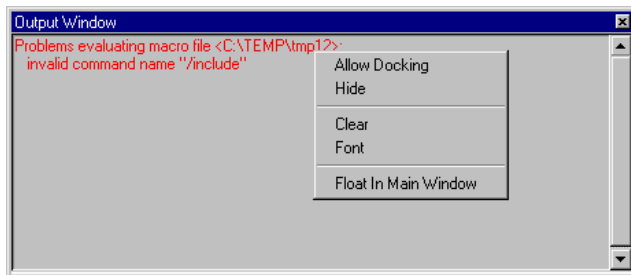


Figure 4-5: Output Window Context Menu

- Allow Docking** A toggle option. If it is marked with a ✓ sign, the output window will dock to a docking station of the client area. By default it is docked to the bottom of the screen. As soon as you drag the top of the window near to a docking station, such as the bottom of the client area or the toolbar area, the output window will dock there. If you disable this option, the output window becomes an independent, floating window, moveable to anywhere on the PC's screen.
- Hide** with this option you can close your output window until the next message appears. The window then shows up again and informs you of all messages since the start or since its contents has been deleted.
- Clear** deletes the contents of the output window. All messages are discarded..
- Font** opens a standard font selector dialog allowing you to change the font and font attributes of the output messages. By default, error messages are given in red color.
- Float in Main Window** if this option is activated, the output window is a child window of the **HyperPage** main window; corresponding to your settings it can also be visualized as a tab.

## 5. Options

The pull-down menu *Options* allows you to determine the following settings.

Report settings	Toggle sections of the document
Table of Contents	Toggle the table of contents
Customize...	Define toolbars

### 5.1 Report Settings

The dialog *Options* can be opened via the menu option *Options/Report Settings* or via the respective toolbar button. Its two pages serve the following main purposes:



*Page Report:*

1. Some documents that are visualized by **HyperPage** are extraordinary long. An example for a very long **HyperPage** document is the processing report of kinematically derived data. Long reports are often separated in several sections that can be individually activated or not. Thus, you can, e.g., modify the report for editing with your own text editor to come up to your expectations.
2. Some documents use colors or numbers to mark values that exceed a certain limit. You may customize the limit.

Page *Settings*:

3. The report can be sub-divided into pages. It may display a footer and headline numbering.

The following figure shows a processing report with default settings for reports:

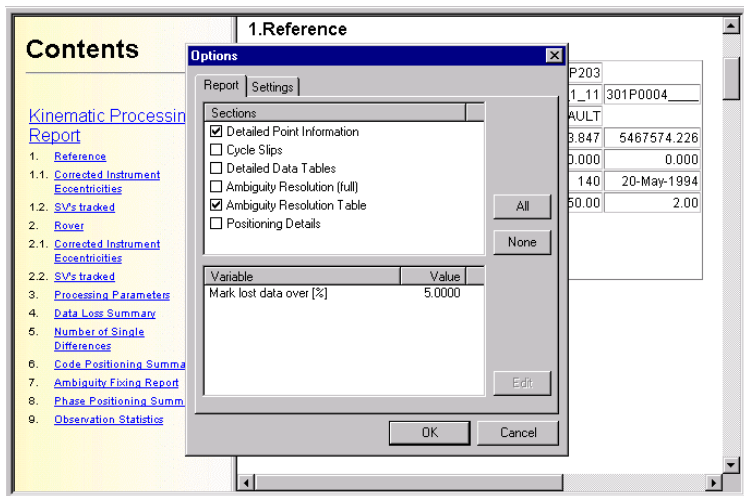


Figure 5-1: Report Settings

If a **HyperPage** document contains section markers, you will find them in the column *Sections* of the page *Report*. A section may consist of one or more tables. The figure above shows you that the kinematic report includes several sections; by default, however, only two of them are visualized. The table of contents refers to the visualized sections only!

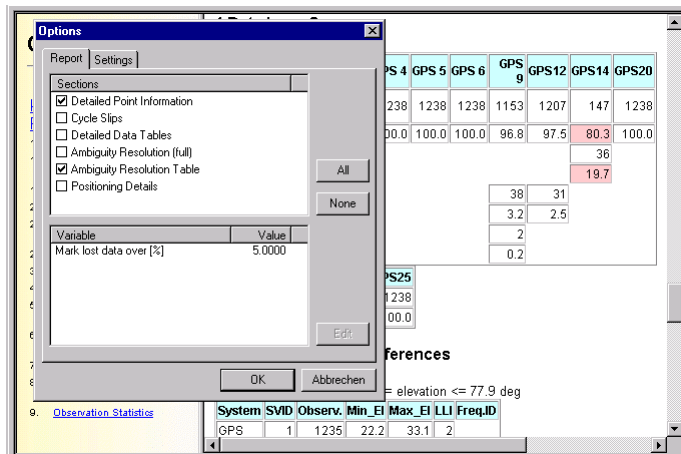
Only the sections with checked check boxes will be visualized in the reports, appear in the contents (if a contents is displayed) and will be copied to the clipboard via the menu option `Select all` from the



pull-down menu **Edit**. You may check or clear the checkboxes, to enable/disable the display of the respective section. The buttons **All** and **None** allow you to activate all sections or none.

The second box only shows up, if one or several threshold values are defined for the current **HyperPage** document. It includes for each the variable the limit value defined. **HyperPage** will mark variables that exceed those limits by colors or numbers.

The following example visualizes in the dialog *Options*, page *Report* the limit for **HyperPage** to mark the loss of data. The kinematic report simultaneously displays the section Data Loss Summary. In this example, 19.7 % of the epochs of the GPS14 satellite are missing. That exceeds the given limit of 5 %. That means that less than 95 % of the data is available for both receivers simultaneously.



**Figure 5-2: Marked Data Loss**

It is very easy to edit the variables for the limits. Click on a variable to activate the button **Edit** and then click on this button.

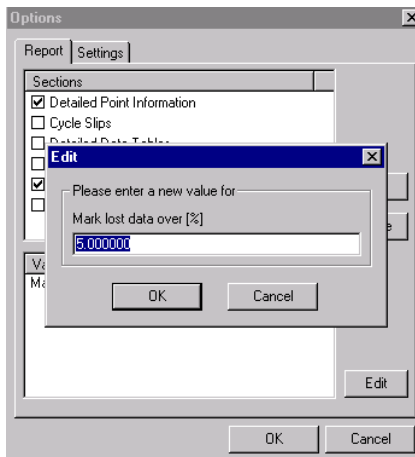


Figure 5-3: Edit the Limit Value

The dialog *Edit* allows you to edit the value for the chosen variable. Confirm with **OK**. Leaving the dialog with **OK** changes the values in the report corresponding to your entries. Leaving the dialog with **Cancel** will save the limit but not change the report.

On the page *Settings* of the *Options* dialog you find some general formatting settings referring to the report and its table of contents. The settings of the box *Report* refer to the report itself:

*Continuous File:*

If this option is checked all activated sections of the report will be displayed on a single page, which you can scroll using the scrollbar at its right-hand side. Some reports, however, offer a pagination option. If its checkbox is cleared, then only you may scroll through the pages

using the scrollbars and, additionally, the next page option. This option is usually available at the footer of the page. By default, the option is cleared.

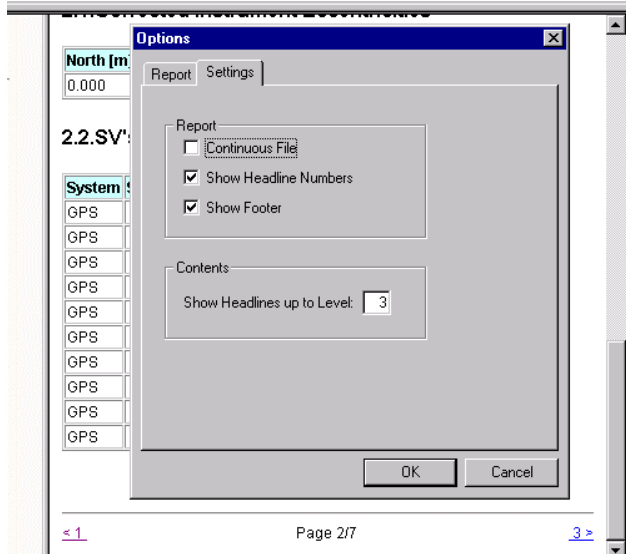


Figure 5-4: Settings

#### *Show Headline Numbers*

If this option is checked, the headlines of the sections show the numbers according to the contents numbering. By default, the option is checked.

#### *Show Footer*

A footer displays the number of pages the report is made of. At its left-hand and right-hand sides hot spots are located displaying the numbers of the previous and following page. Clicking onto a hotspot

allows you to jump to the respective page. (See figure above!) By default, the option is checked.

The setting of the box *Contents* refers to the table of contents: It allows you to define the level of headline style to be displayed in the table of contents (if it's activated). Edit the edit field *Show Headlines up to level xx*. By default, headlines down to the third level will be displayed.

## 5.2 Table of Contents

Many (but not all) reports have an own Table of Contents. It is given as a separate frame on the left side of the report using the headline Contents.

Use the hand-shaped cursor to click on the section you are interested in and the report will jump to the respective section.

You can switch off the display of the contents by choosing the menu option Options/Table of Contents or the respective button. If the option is activated, it is displayed as clicked icon.

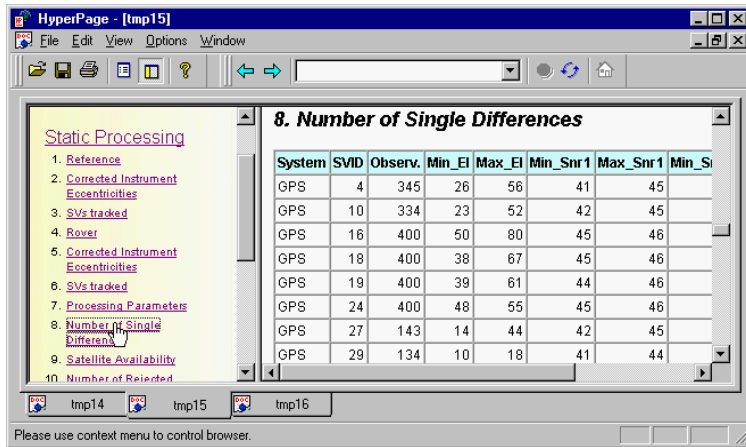


Figure 5-5: Table of Contents

### 5.3 Customize the Dialog

The current version of **HyperPage** offers two toolbars. One of them contains commands referring to files, while the second one is used for all Web-Browser activities. You may modify the toolbars and also create new toolbars coming up to your requirements.

Clicking the menu option `Options/Customize` to open the dialog *Customize*. The box *Toolbars* of the page *Toolbars* informs you of the built-in toolbars. Toolbars that are shown on the screen are marked.

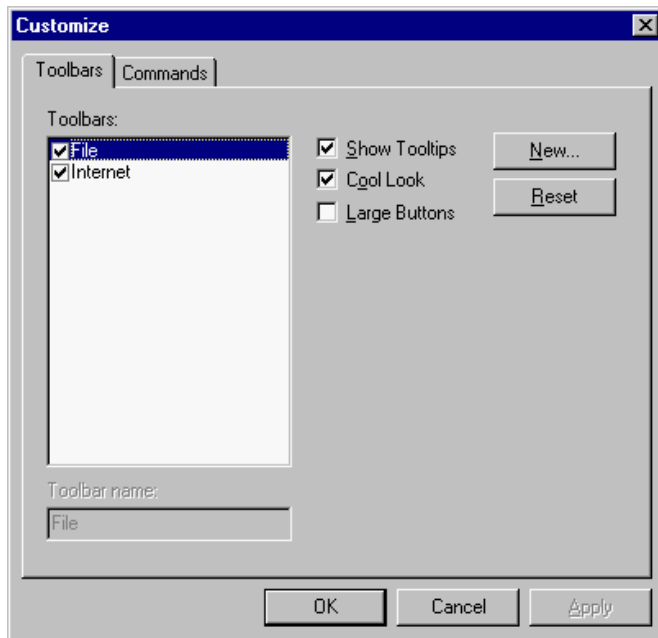


Figure 5-6: Dialog Customize

Using the page *Toolbars* you can set special layout options for all your toolbars:

Show Tooltips	gives quick information on the respective command when you move the cursor to a toolbar button.
Cool Look	display of icons instead of buttons.
Large Buttons	Enlarged view of the toolbars.

You can rearrange the icons (commands) on the toolbars, delete or add them, or even create new toolbars. Both pages of the dialog help you to do so.

The page *Toolbars* allows you to create new toolbars, delete user-defined toolbars or to reset the built-in toolbars to the default commands.

Button <b>New</b> :	opens the dialog <i>New Toolbar</i> and creates a new empty toolbar. Enter the name for the new toolbar and accept it with <b>OK</b> . A floating toolbar will show up. The list of the toolbars will include the new name, too. You may edit the name of the new toolbar within the edit field <i>Name</i> . To determine the commands for this toolbar use the page <i>Commands</i> .
---------------------	--

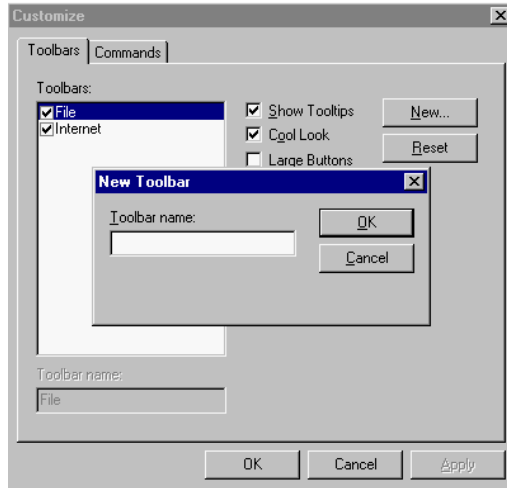


Figure 5-7: Create a new Toolbar

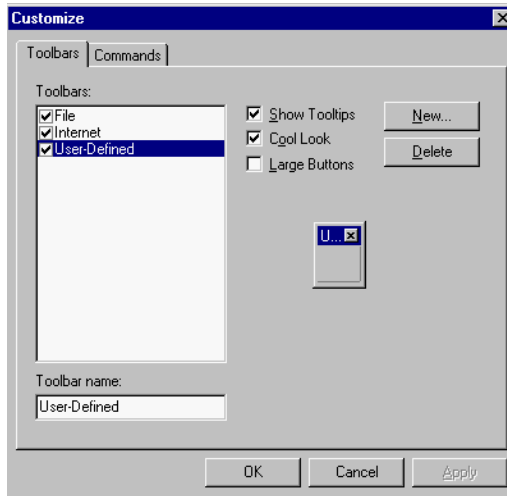


Figure 5-8: New Toolbar



Button **Delete**

You may delete a self-defined and highlighted toolbar by using this button.

Button **Reset**

this button helps you to set changes (such as rearranging, deleting or adding commands) done to the built-in toolbars back to default.

Choose the page *Commands* to edit the commands for the *visible* toolbars.

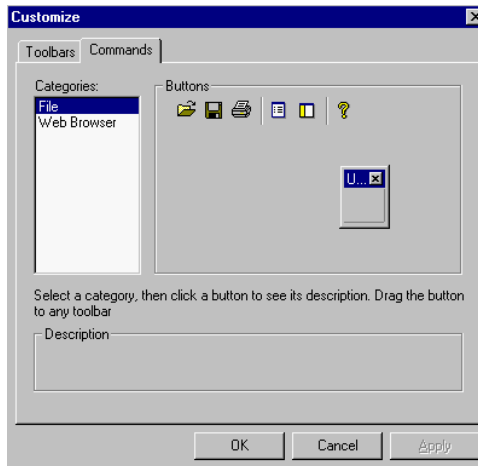


Figure 5-9: Page Commands

The block *Categories* offers you different kinds of command categories. The block *Buttons* displays the buttons offered by the activated toolbar. If you click one of the buttons displayed here, the block *Description* will offer a description of the respective command.

**To add a button** to a current toolbar, activate the category, click on the button and draw it using the cursor to the desired place within the

toolbar. The cursor will change its shape (it will be displayed as an arrow with a + sign) and the border of the button will be visible. This helps you to control the movement of the cursor at any time.

**To delete a button** from the toolbar, click the respective button (while the dialog *Customize/Commands* is active) and drag it away from the toolbar. The cursor will change its shape (it will be displayed as an arrow with a + sign) and the border of the button will be visible. This helps you to control the movement of the cursor at any time.

Use the same method for **rearranging the buttons**. Just drag the icon to the new place within the toolbar you prefer.

## 6. Using HyperPage as a Web-Browser

**HyperPage** also can be used as an Internet-Browser. It offers most of the important functions of any Internet browser.

The most important Internet functions are offered via the toolbar *Internet*.

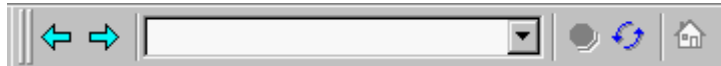


Figure 6-1: Browser Bar

Provided you already have Internet access, just enter the Internet address you want to visit into the given textbox and confirm with the **Enter** key of your keyboard. The arrow buttons of the browser bar allow you to switch between the two pages displayed last (e.g., for toggling the display of your report and an internet page).

Additionally you may:



Cancel the building-up of an Internet page,



Reload a page,



Visit our Home Page!

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