ISDAT User's Manual
Client ghplot

Gunnar Holmgren
Swedish Institute of Space Physics, Uppsala Division
S-755 91 Uppsala, Sweden

December 8, 1999

Document Status Sheet			
1. Document Title: **ghplot users manual**			
2. Document Reference Number: **CWD-IRFU-SM-0006**			
3. Issue	4. Revision	5. Date	6. Reason for Change
Draft	0	94 Feb 14	New document
1	0-6		Not existing
1	7	94 Mar 22	valid for ghplot 1.7
2	0	95 Nov 10	Valid for ghplot 2.0

Contents

1 Introduction

General information on the ISDAT is given via the URL: http://www.irfu.se/isdat/.

ghplot is an application program (client) to be used in conjunction with the ISDAT[1] software package. It belongs to the *general* (project independent) class of ISDAT clients. *ghplot* is mainly aimed at displaying data, but does also accommodate a few basic processing tools. The graphics is based on PHIGS/PEX, implying that in most installations, X11R5 is required.

ghplot is capable of displaying up to 18 (3*6) data sets simultaneously. The data sets can be plotted on top of each other or in separate frames in a flexible manner. *ghplot* runs under control of a *time manager*, where the basic selecting parameter is time. Thus all output is based on a time slot given by the time manager. Should different time slots be desired, two or more processes can be run simultaneously, controlled by different time managers.

Each data set is specified by a set of parameters describing input data, processing and graphic format. The parameter set is first composed in the *current settings* which is eventually copied to a memory slot corresponding to one of the 18 plot-panels. This users guide first describes the user interface, then it explains how *ghplot* can be used. It is assumed that the reader is familiar with the ISDAT system.

2 User interface

As *ghplot* is started from the ISDAT *cuitm* client menu, two windows appear on the screen in addition to the *cuitm* window: the main *ghplot* window and the *ghplot* plot-plan window (see Figure 1). In addition to these two windows, a large number of auxiliary windows are used in working with *ghplot*. Most user communications with *ghplot* is done by mouse clicking on buttons, sliding "potentiometers", and selections on menus. In general, the left mouse button is used. All potentiometer inputs can be made via alphanumeric input by pointing within the potentiometer frame (not on the slide itself) and simultaneously press ctrl + right mouse key. An edit window will then appear. The edit windows use EMACS syntax.

2.1 The main ghplot window

The main window is active as long as *ghplot* is active. It consists of the graphic area and a menu bar at the top as shown in Figure 1.

The first time you use *ghplot*, the main window will probably appear as a tiny window, an you have to enlarge the x-window manually. If you intend to use *ghplot* regularly, it is

[1] Interactive Science Data Analysis Tool

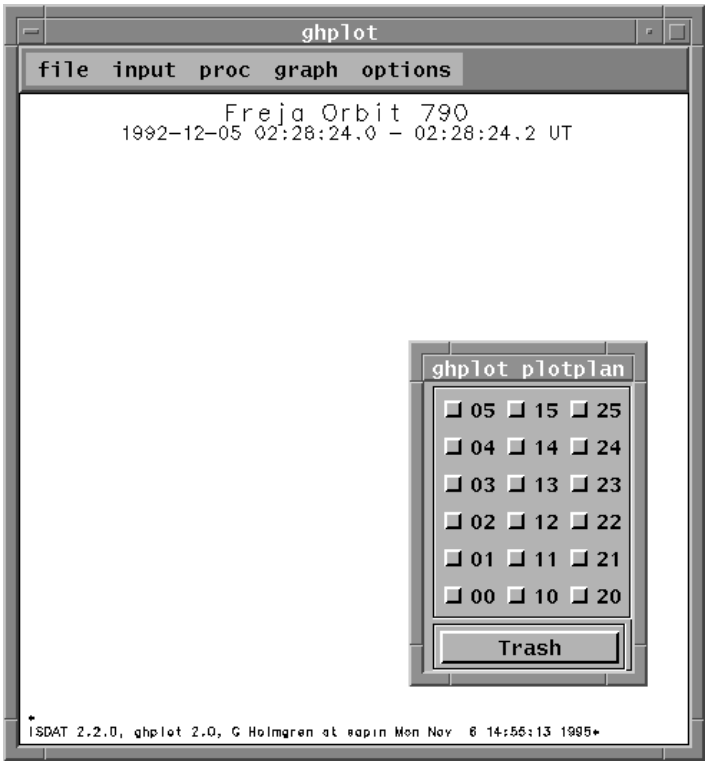

Figure 1: The ghplot start configuration

recommended to specify the desired size of the main window in your .Xdefaults file, see [Ref. 1].

2.1.1 The graphic area

The graphic area is cubic[2] in proportions as default. The proportions of it can be changed to a standard landscape or portrait format (see section 2.2.5). Changing of the proportions of the window beyon that is not possible. However, the size can be arbitrarily changed still preserving the proportions.

At the bottom of the graphic area you find one or more plot status lines of variable content depending on the project. As a standard the bottom status line always include the ISDAT version and revision, the ghplot version and revision, the user name, and the plot time according to the computer clock.

2.1.2 The menu bar

The menu bar is located at the top of the main window (see Figure 1). It has five top entries:

- file

[2]ghplot uses 3D graphics

- input
- proc
- graph
- options

They are each described below.

The file menu This menu includes functions of general character.

show plotplan hides or activates the *plotplan* window (toggle) (see 2.2.1).

show settings gives information on the settings at present. You can choose to view the general settings or the settings associated with data processing (FFT). These two entries hide or activate (toggle) the *settings* and *proc info* windows (see 2.2.2 and 2.2.3).

show data hides or activates (toggles) the *returned data* window (see 2.2.4).

save(d) settings gives you an opportunity to specify a directory and a file name. You then have a choice to read the settings from an existing file or to save your current settings in the specified file. Note that this does not work across ghplot revisions.

save graph allows you to specify a directory and file name and save the current graph as a CGM file.

demo square shows a simple string square as a test that PHIGS works on your screen.

demo cube shows a simple string cube as a test that PHIGS works on your screen.

show freja shows a simplified drawing of the Freja spacecraft. It will rotate, and thereby give you a measure of the performance of your current configuration.

quit is the controlled way of terminating your *ghplot* session.

The input menu This menu includes functions related to the parameter settings. A selected item immediately goes into the *current settings*. The content depends on the current project. The ISDAT data channels are described in a hierarchical manner described in the ISDAT manuals. In brief, the hierarchy is: *project-member-instrument-sensor-signal-channel-parameter*. *ghplot* builds up the input menu by querying the ISDAT data base handler about the currently available hierarchy entries, starting at the instrument level. This is done once at the start-up of *ghplot*. I.e. even if you change the project on the ISDAT level, *ghplot* will remember the project that was specified at the time of the start of *ghplot*. This makes it possible to study two different project at a time by starting more *ghplot* clients under different projects.

The proc menu This menu includes functions related to the parameter settings. A selected item immediately goes into the *current settings*.The proc menu has the following entries:

units These settings are communicated to the data base handler of ISDAT.

phys Default setting. The DBH is requested to return data in physical units, Here you have a choice of *default* if you do not know what units are available. You can also be more specific by choosing mV/m, V/m or volt. For wave data, this gives you a possibility to choose between the measured quantity (volt) or the measured potential difference divided by the negative probe separation[3] .

corr ISDAT is requested to return data in raw units. This is sometimes used for diagnostic purposes. The returned data is returned in a processing level between telemetry and physical units. For example, for project Freja, *raw* returns TM units but with error correction applied. In most cases, however, this is identical to the *TM* request.

TM ISDAT is requested to return data in strict telemetry units.

max samples These settings are communicated to the data base handler of ISDAT. In this entry you specify the maximum number of samples to be returned by the data base handler in each call. The *reduction* entry specifies how data reduction is performed if necessary. Default is no limit. Currently, also the *no limit* entry actually puts a limit of 4096 samples,

reduction These settings are communicated to the data base handler of ISDAT. For an exact and updated description of the DBH response to the settings, the reader is referred to the on line DBH manual, section 3 for the actual ISDAT version and revision number.

none No data reduction is performed. If the number of samples is limited, the max number of samples is returned, and the requested time interval may not be covered by the data return.

average Default setting. If the possible actual number of samples within the interval exceeds the *max samples* parameter, averaging over 2, 3, 4 or more samples is performed until the resulting number of data words is less than the *max samples* parameter.

min value As the *average* option, but the max value within the "averaging interval" is returned instead of the average value.

max value As the *average* option, but the min value within the "averaging interval" is returned instead of the average value.

data gaps These settings are communicated to the data base handler of ISDAT. For an exact and updated description of the DBH response to the settings, the reader is referred to the on line DBH manual, section 3 for the actual ISDAT version and revision number.

no filling Where data gaps occur, ISDAT does not return anything.

[3]provioded that this option is implemented in the current DBH instrument software

interpolate Default setting. Where data gaps occur, ISDAT interpolates linearly over the data gap, and thus returns averaged data where the missing samples would have occurred.

fill zeroes ISDAT fills in zeroes where the missing samples would have occurred.

analysis This entry contains requests for processing by *ghplot* of data received from the data base handler. Currently, the following functions are implemented:

none Default setting.

PSD Power Spectral Density. You can choose between default FFT settings or to specify the FFT settings (see 2.2.8).

X-spect Cross spectral analysis. You must select phase or coherence to be displayed. The cross spectral analysis is specified by the FFT settings. You can choose between default FFT settings or to specify the FFT settings (see 2.2.8).

X-corr Cross correlation. The cross correlation is specified via the FFT setting parameters where applicable. You can choose between default FFT settings or to specify the FFT settings (see 2.2.8).

In all three of these entries, you have a choice to accept default settings or specify the settings. If you choose specify, a window (see 14) will appear that allows you to specify the FFT size, Number of FFT:s, time between individual FFT:s, and number of FFT:s to average. In the case of cross correlation analysis, the FFT spec panel is used although the phrasing is not entirely adequate.

special This entry contains requests for special processing of data. The requests are special in the sence that they may be applicable to only one or a few input data combinations (project-, instrument-, data type etc.). The functions may vary depending on the local installation.

The graph menu This menu includes functions related to the parameter settings. A selected item immediately goes into the *current settings*.The graph menu has the following entries:

type line line plot. Specifications may be entered via the *spec* entry described below.

type mark marker plot. Specifications may be entered via the *spec* entry described below.

type fill 2D Colour/gray scale surface plot. Specifications may be entered via the *spec* entry described below.

type scatter x/y plot. You have a chouce between line or marker plot. Specifications may be entered via the *spec* entry described below.

type stack line/marker plot along x-axis, but displaced along the y-axis. Specifications may be entered via the *spec* entry described below.

spec axes activates the *scales* window where axis ranges etc. can be specified (see 2.2.10).

spec colour You can specify a few basic colour or give the three RGB colour components for full flexibility (see 2.2.9). When you select an entry in this menu, the graph is immediately set to marker plot.

spec line type Here you specify the type of line (solid, dotted, dashed).

spec marker type Here you specify the type of line (dot, star, plus, circle, cross).

spec colour scale Here you specify the type of colour- or gray scale to be used. Presently available are: RGB, RGB II(default), RGB symmetric, HLS, black/white, and white/black.

spec plot plane Here you specify the plot plane. This specification only affects certain types of plots.

The options menu This menu includes a few options for the plotting mode. The entries are:

overview This activates the *overview spec* window which allows you to do overviews over long time periods, see 2.2.11.

plotspec This activates the *plot spec* window, see 2.2.5.

view allows you to rotate the picture either by moving an imaginary camera 2.2.6 or by applying the bacic PHIGS settings 2.2.7.

2.2 The auxiliary windows

2.2.1 The plotplan window

This window is shown at the start of *ghplot*. It contains 18 toggle buttons labelled 00 to 25, and a regular button labelled *trash* as shown in Figure 2. The 18 toggle buttons represent the 18 possible plot panels. A data set and the corresponding parameter setting is hereafter referred to as a *plot-panel* At start-up time all the toggle buttons are released, indicating passive (no plot shown) states. As a passive (released) toggle button is pressed, the corresponding settings are copied to the *trash settings*. If the *current settings* are OK, the setting parameters residing in the *current settings* (see 3.3.1) are then copied to the memory area representing the plot panel in question, and the plot panel is marked as *active* (the plot panel is shown in the output page). When you release a pressed (active) button, the setting parameters of that plot panel is first copied to the *trash settings*, then the plot panel is marked as passive. However, the old settings are kept in memory for potential future activation. Examples of how this is done in practice are given in section 3.3. Pressing the button *trash* always copies the *trash settings* to the *current settings*. The present settings can always be inspected by activating the *settings window* (see 2.2.2).

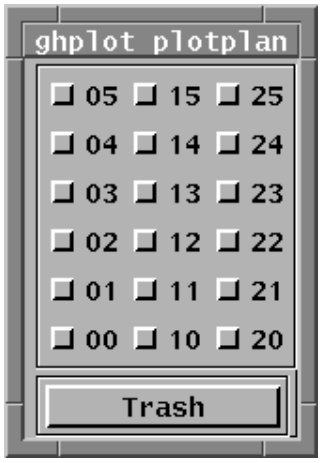

Figure 2: The plotplan window

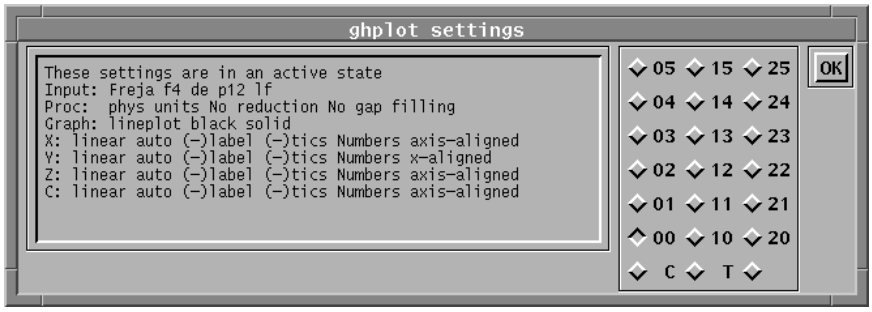

Figure 3: The settings window

The *plotplan* window can be hidden or activated via the *files* - *plotplan* entry from the menu bar. As default, the 18 plot panels are displayed side by side with a geometry corresponding to the layout of the toggle buttons.

How the display of the 18 plot panels can be changed is described in 2.2.5. Note that when you squeeze in many plot frames, the labelling of axes is automatically reduced (by necessity) until you do not get any information about the ranges of the axes.

2.2.2 The settings window

The *settings* window is activated or hidden by the *file* - *proc* - *settings* entry of the menu bar. It contains a alpha numeric part and a replica of the *plotplan* window as shown in Figure 3. The alpha numeric field shows the present settings corresponding to the radio button of the button panel that is pressed. In addition to the plot panel buttons, the buttons panel contains a *C* button for *current settings* and a *T* button for *trash settings*. The window can be hidden by pressing the *OK* button.

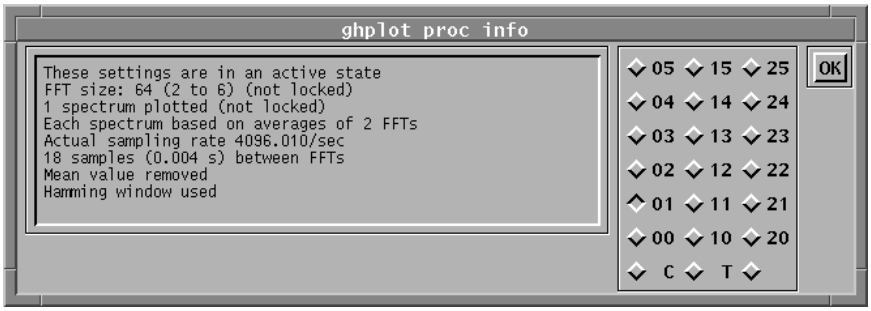

Figure 4: The proc info window

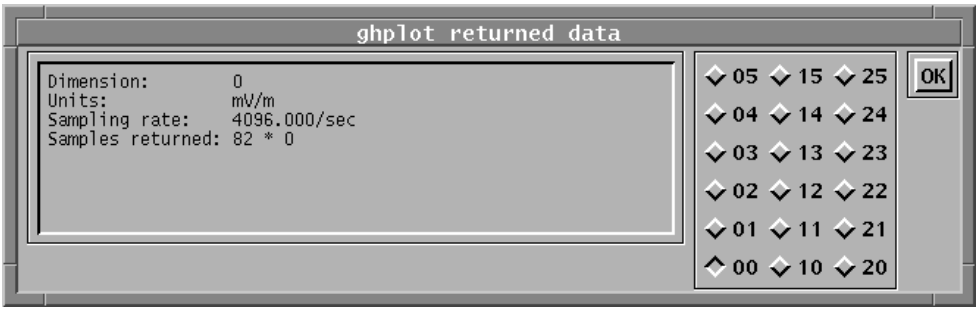

Figure 5: The returned data window

2.2.3 The proc info window

The *proc info window* is analogous to the *settings* window (see 2.2.2), but it shows the special setting parameters associated to data processes taking place in *ghplot*, in most cases FFT settings. Another addition is that the *proc info window* is to a certain extent updated with respect to actual data analysed during the last time the plot panel was active. For example, the actual sampling frequency is displayed. An example of the *proc info window* is shown in Figure 4. The *proc info* window is activated or hidden by the file - proc - settings entry of the menu bar. It can also be hidden by pressing the *OK* button.

2.2.4 The returned data window

The layout of the *returned data window* is analogous to the *settings* window, as shown in Figure 5. It gives info on the returned data in the plot panel requested. The *returned data* window is activated or hidden by the *file - proc - settings* entry of the menu bar. It can also be hidden by pressing the *OK* button.

2.2.5 The plot spec window

This window includes specifications that affect the plot window as a whole, not single plot-panels. The layout of the window is shown in Figure 6. The *plot spec* window is activated or hidden from the file - plot spec entry in the menu bar. Figure 7 shows the plot disposition with all plot spec parameters in default mode. The following parameters

Figure 6: The plot spec window

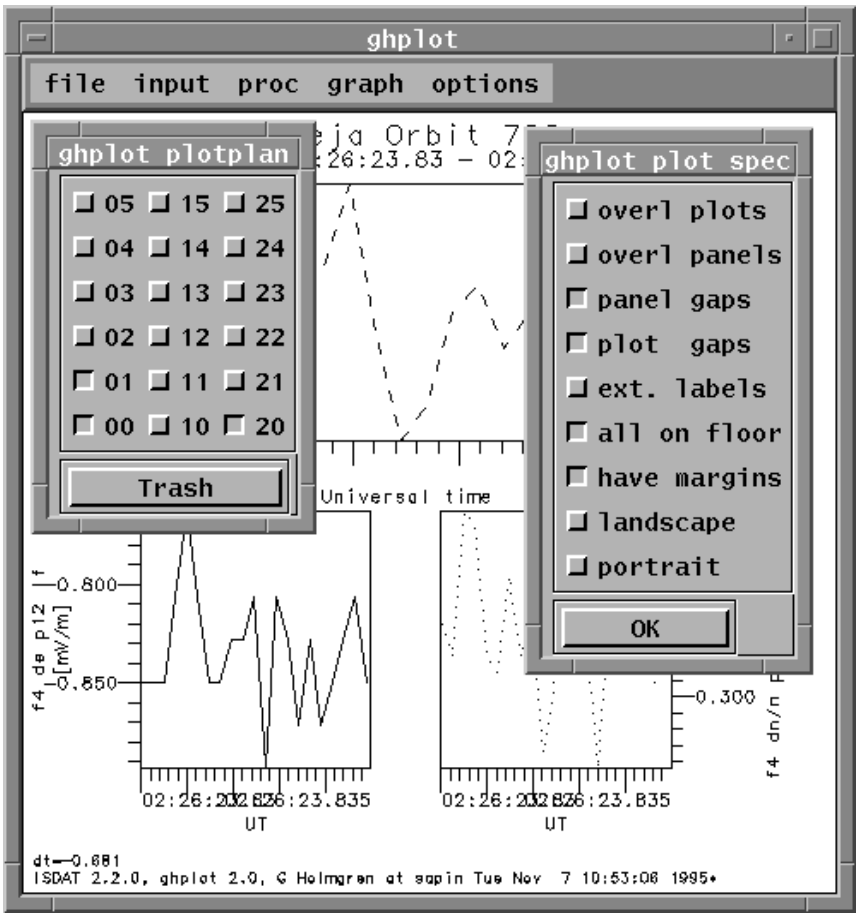

Figure 7: Plot disposition in default mode

are included:

overl plots Default: *off*. In *on* position, all three horizontally adjacent plot panels in the *plotplan* are plotted on top of each other in one single frame. In *off* position the three plot panels are given separate frames next to each other. An example of the plot disposition in *on* position is given in Figure 8.

overl panels Default: *off*. In *on* position, all six vertically adjacent plot panels in the *plotplan* are plotted on top of each other in one single frame. In *off* position the six plot panels are given separate frames above each other. An example of the plot disposition in *on* position is given in Figure 9.

plot gaps Default: *on*. In *on* position, there will be a horizontal gap between plot panels to allow for tic marks and labels. In no position, there will be o gap between plot frames in the horizontal direction.

panel gaps Default: *on*. In *on* position, there will be a vertical gap between plot panels to allow for tic marks and labels. In no position, there will be o gap between plot frames in the vertical direction. An example of a plot layout with *panel gaps* in no position is shown in Figure 10.

extend. labels default: *off*. In *on* position a number of auxiliary parameters are given on the time axis in addition to the UT time:

MLT Magnetic local time (corrected geomagnetic co-ordinates)

MLAT Corrected geomagnetic latitude

ALT Platform altitude above 6371.2 km.

FLON Footprint co-ordinates at 100 km altitude.

FLAT Footprint co-ordinates at 100 km altitude.

At present, no external field is used in the field model. The Kp is set to 0. The extended labelling currently only works for projects Freja and Viking.

all on floor Default: *on*. In *on* position, all plot panels are plotted relative to z=0. In *off* position, the three horizontal button columns of the *plotspec* window are plotted displaced along the z-axis with the left plot panel at z=0.

have margin Default: *on*. In *off* position, the true graphic area fills up the whole *ghplot* window, not allowing any tic marks or labels. This option is useful when scanning through data without making any hard copies, since it makes the process faster and allows for better graphic resolution. An example of this is given in Figure 11.

Landscape Default: *off*. Sets the graphic area in landscape proportions. Note that the X-window has to be re-shaped manually in order to set it in fitting proportions.

overview Default:

Portrait Default: *off*. Sets the graphic area in portrait proportions. Note that the X-window has to be re-shaped manually in order to set it in fitting proportions.

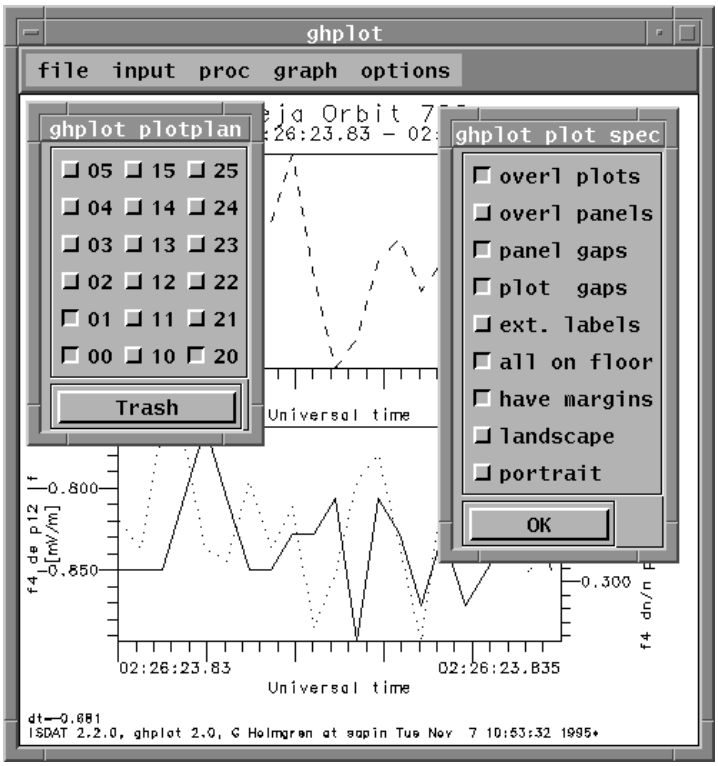

Figure 8: Plot disposition with overl plots on

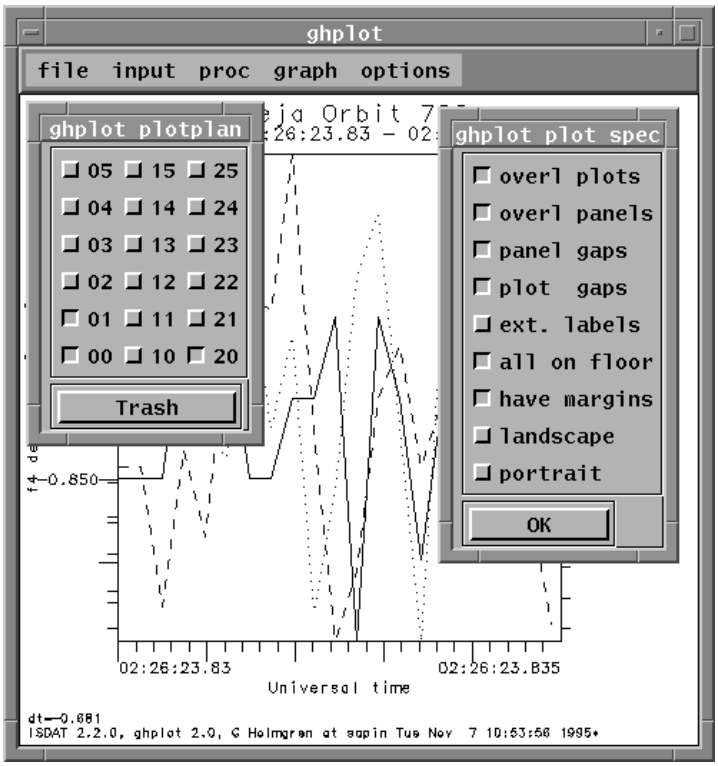

Figure 9: Plot disposition with *overl panels on*

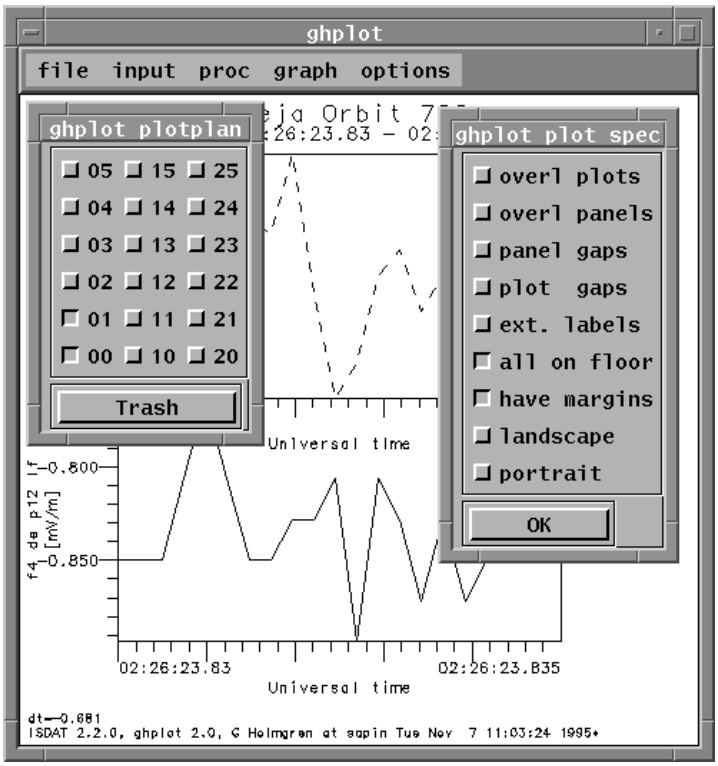

Figure 10: Plot disposition with *plot* and *panel gaps off*

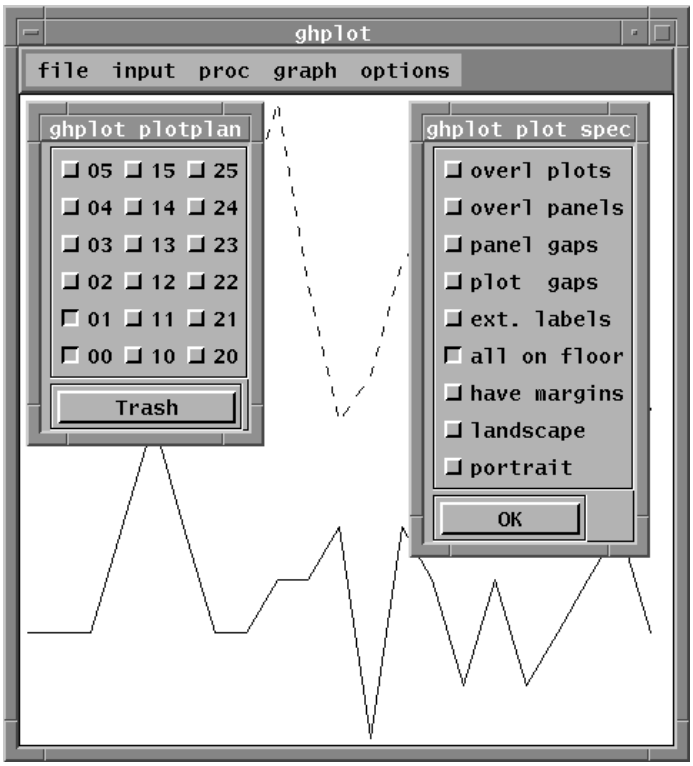

Figure 11: Plot disposition with have margin option off

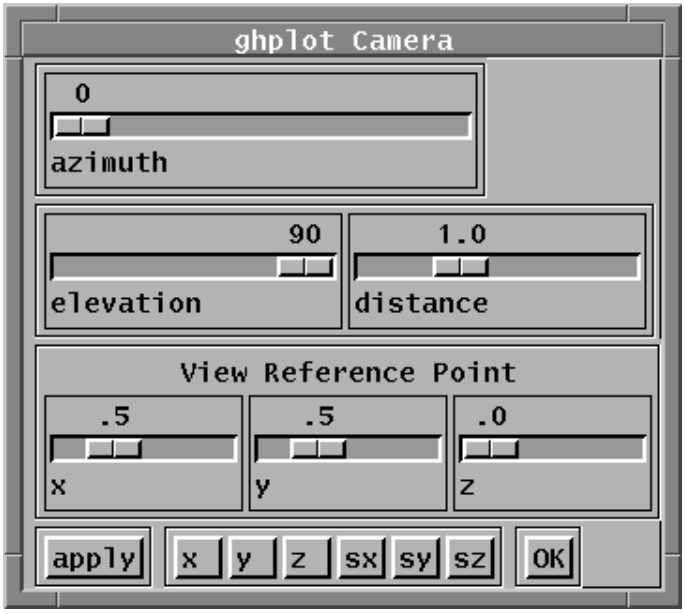

Figure 12: The Camera window

2.2.6 The Camera window

The *Camera* window is shown in Figure **??**.

It is activated from the *options-view-camera* entry of the menu bar. It can be hidden by pressing the *OK* button. Here you can change the view directions by specifying *azimuth*, *elevation*, and *distance* of an imaginary camera. Default is to look from the positive z-axis with the y-axis upwards. The viewing can be changed in retrospect, i. e. after the plot has been completed. There are also a few buttons for immediate setting of default directions and other standard viewing directions.

2.2.7 The rotations window

The *rotations* window shown in Figure 2.2.7 is analogous to the *camera* window (see 2.2.6), but here you specify the directions in terms of rotations around the x-, y-, and z-axes.

2.2.8 The FFT settings window

As shown in Figure 14, four parameters, the FFT size, number of analyses shown per time interval, lag time between shown analyses, and number of analyses to be averaged within one shown spectrum, can be specified (locked) or left to *ghplot* to set. Default is to have all four parameters.

If left unlocked, *ghplot* will apply approximately the following approach, and in the given order;

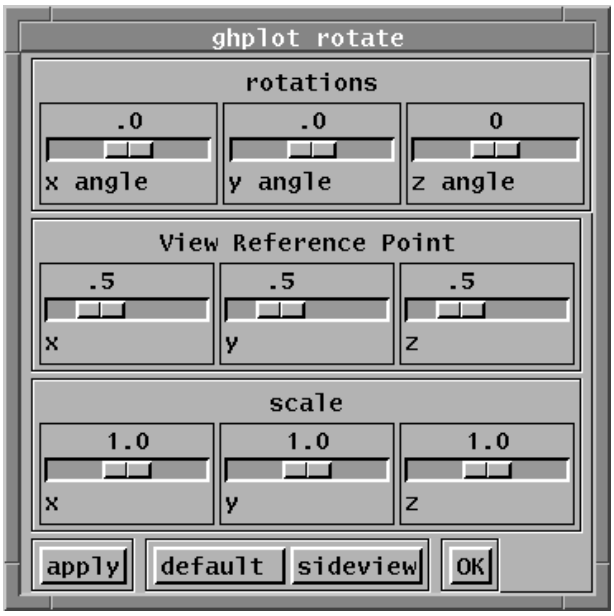

Figure 13: The rotations window

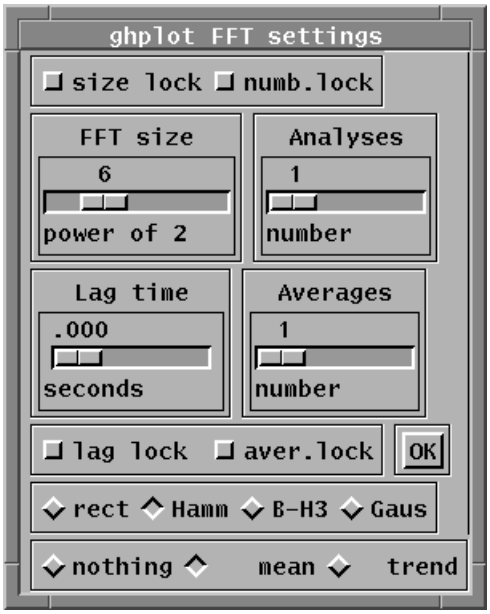

Figure 14: The FFT settings window

Number of analyses If the plot mode is *continuous mode*, the number of analyses per interval is set to one, otherwise if the type of graph is set to *stack* or *fill* (see 2.1.2), the parameter is set to 8, and in all other cases the parameter is set to one.

Number of averages In cross correlation analysis, the number of averages parameter is set to 4, in *line* or *mark* type of graph (see 2.1.2), the number of averages is set to 2^4, and in all other cases it is set to one.

FFT size The FFT size is set as large as possible with respect to the number of samples within the time interval considering that the FFT size has to be a power of 2. Currently, the FFT size may vary between 16 and 1024.

Lag time Given the other three parameters, the lag time is set to spread out the individual analyses over the whole time interval.

In *overview* plot mode (see 3.5.2), the unlocked settings are set based on the first time interval, then the parameters are locked for the rest of the overview plot. The parameters will remain locked after the end of the overview plot. A warning text will remind about that.

By activating the proc info window (see 2.2.3) the actual parameter settings can be inspected. The proc info window will be partially updated based on the actual data returned from the data base handler.

In addition to the four parameters discussed above, You may specify the preferred window to be applied to the FFT analysis. Default window is Hamming.

2.2.9 The RGB spec window

This window allows you to compose your own colours by specifying the red, green and blue components via potentiometers. The *RGB spec* window can be hidden by pressing the *OK* button. It is activated via the *graph - line - colour - spec* entry of the menu bar, or via corresponding entries for other graph types.

2.2.10 The scales window

The layout of the *scales* window is shown in Figure 15. It can be used to specify the scales of all the plotted quantities, as well as the labelling of the axes. As default, all axes are automatically linearly scaled, and tic marks and labels are printed on the "left/bottom" side of the panel. You can change all that by pressing buttons and editing the *min* and *max* editing fields. A few things have to be remembered when using the *scales* window:

- The window always shows the *current settings*. That is, if you want to change the scales of a particular plot panel, first copy the plot panel settings to the *current settings* by pushing the *plotplan* button and then pushing the *trash* button in the *plotplan* window.

[4] except when the number of samples within the time interval is exactly equal to the locked or automatically set FFT size

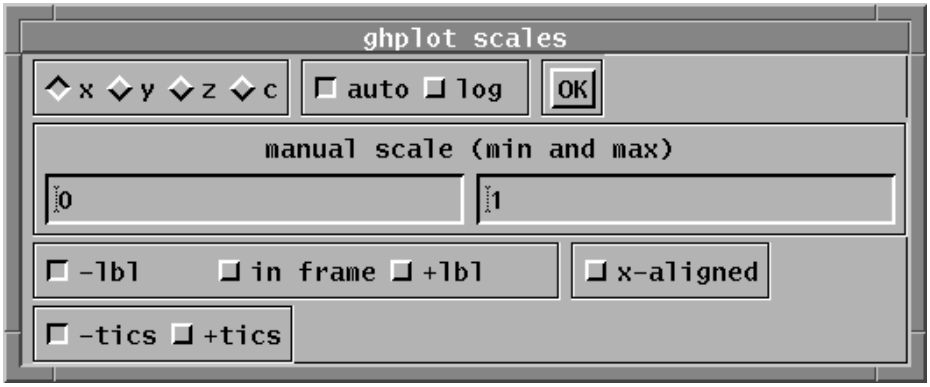

Figure 15: The scales window

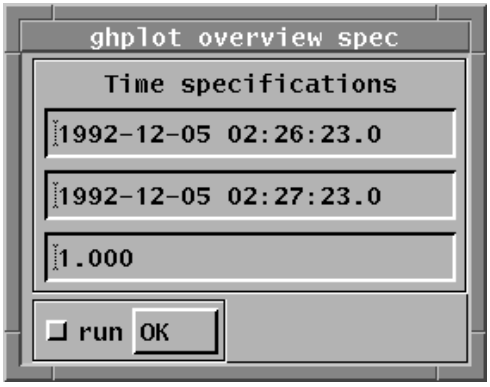

Figure 16: Overview spec window

- Make sure that the proper axis button (x, y, z, or c[5]) is pressed when you make the changes.
- Make sure you remember to release the *auto* button if you want to have fix scales.
- The scale settings has no effect on time axes. The time axis is entirely controlled by the *cuitm* settings.

The *scales* window is activated from the *graph* - *scales* entry of the menu bar. The window can be hidden by pressing the *OK* button.

2.2.11 The overview spec window

The *overview step* window is activated from the *options* - *overview* entry, and it is hidden by the *OK* button.

Here you can edit a start time, stop time and a smallest step (in seconds) between successive data requests. The data *interval* is still specified in the time manager window. Pressing the *run* button causes *ghplot* to automatically reuuest data from teh start time to the stop time adding step time between the requests. This mode, in general, causes the

[5] c means colour

plot to be continuously updated. However, this mode is particularly useful when plotting dynamic spectra over a long time interval.

2.2.12 The warnings window

The *warnings* window is automatically activated when needed by *ghplot*. It prints out warnings. The *warnings* window can be hidden by pressing the *OK* button.

2.3 Errors and warnings

ghplot can communicate error and warning messages in three ways:

1. via the *warnings* window
2. on the plot panel
3. via the *cuitm* error mechanism.

3 Using ghplot

3.1 Starting ghplot

ghplot is started by selecting *clients-general-ghplot* from the *cuitm* menu bar. At start time two windows: *ghplot* and *plotplan* appear on the screen. Note that *ghplot* will remember the *project* and *member* specified at start time, even if *cuitm* eventually alters the project or member. By this mechanism, it is possible to analyse data, for the same time slot, from two or more projects, by starting two or more *ghplot* processes under different project names but from the same time manager.

Having started *ghplot*, you then should compose an output page by filling in specifying parameters in one or several of the 18 memory slots represented by the 18 buttons of the plot-plan window.

3.2 Specifying the current setting parameters

Before the output graphic page is composed, see 3.3, the parameter set has to be specified. In most cases, the default values will do, however a large number of settings can be selected.

3.2.1 Selecting input data

Specifying the input data parameter is compulsory in ghplot. The reason that no default value can be used is that ghplot is project independent, and thus cannot know the data

hierarchy entries in advance. The data input parameter is the only parameter that do not always have a default value, and the plotplan will complain if you try to activate a plotpanel without having specified the input data parameter. Sometimes, two input data channels are requires, as for example in cross correlation or cross spectral analysis. In such cases, ghplot uses a two-level stack of input data parameters, i.e. you have to successively specify two input parameters. Also in this case, the plotplan will complain if two parameters have not been specified.

3.2.2 Specifying processing of data

Processing of data can take place either in the ISDAT data base handler or within *ghplot*. The available options are described in 2.1.2. Entries under *analysis* are performed by *ghplot*. They are not always compatible with the selected data. In such cases warnings or error messages are provided. The selected *ghplot* processing parameters can be inspected in the *FFT settings window* window (see 14).

3.2.3 selecting graphic presentation

Selecting type of graph Default type of graph is *line plot*. Other types of graphic representation of the data can be selected from the *menu bar-graph* entry. In case the preferred type of graph is not compatible with the input data, *plotplan* will complain when trying to activate a plotpanel in the *plotplan* window.

Specifying plotting scales The plotting scales window can be activated from the *menu bar-graph-scales* entry. Default is automatic scaling on all axes, including the colour scale. In the *scales* window, also the labelling can be specified. Default is to have tic marks and labels on the left/bottom side of the plotpanel.

3.3 Composing an output page

3.3.1 Handling of setting parameters

In working with ghplot, it is important to understand how setting parameters are handled in ghplot. There are in total 20 full sets of setting parameters:

current settings is the working area used when composing a new set of parameters. As described below, a parameter selected in the menu bar or in one of the auxiliary windows is always stored in the *current settings*.

trash settings is the area where rejected settings are stored temporarily. For example, as a plot-panel is de-activated, a copy of its parameter set is copied to the trash settings.

plotplan settings consists of 18 full sets of parameters. The plotplan settings are the parameters actually specifying the output plot-panels.

Transferring of setting parameters Copying of parameter sets between the different memory areas is done in the following way

- A selected individual parameter, it may be from the menu bar or from an auxiliary window, is always updating the *current settings*.
- Pressing a released (passive) button in the *plotplan* first copies the plotpanel settings to the *trash settings*, then the *current settings* are copied to the plotpanel corresponding to the pressed (activated) button.
- Releasing a pressed button in the *plotplan* marks that plotpanel as passive and the settings are copied to the *trash settings*. the plotpanel still remembers the settings.
- Pressing the *trash* button in the plotplan window, copies the *trash settings* to the *current settings*.

3.3.2 Example 1: Activating a plotpanel with current settings

If the plotpanel is in a passive state, simply press the plotpanel button. If the plotpanel is in an active state (button pressed):

1. Release the plotpanel button.
2. Press (activate) the plotpanel button.

3.3.3 Example 2: Modifying an active plotpanel setting

1. Release the plotpanel button.
2. Press the *trash* button
3. Update the parameter(s).
4. Press (activate) the plotpanel button.

3.3.4 Example 3: Reactivating a plotpanel with old settings

1. Press (activate) the plotpanel button.
2. Press the *trash* button.
3. Release the plotpanel button.
4. Press the plotpanel button.

3.3.5 Example 4: De-activating a plotpanel

1. Release the plotpanel button.

3.3.6 Example 5: Moving settings from one active plotpanel to another passive plotpanel

1. Release the source plotpanel button.
2. Press the *trash* button.
3. Press the destiny plotpanel button.

3.3.7 Example 6: Inspecting the content of a parameter set

1. Activate the settings window from the menu bar entry *file-settings-general*
2. Press the appropriate plotpanel or C (current) or T (Trash) button on the left part of the settings window.

3.3.8 Example 7: Hiding the plotpanel window

When all parameters are set and the output page has been composed, you may want to hide the *plotplan* window. The plotplan window can be hidden or activated via a toggling button in the *plotspec* window. The *plotspec* window is in its turn activated or hidden via the menu bar entry: *file-plotspec* entry.

3.4 Formatting the output page

So far, we have discussed settings specifying one single data set. Here we will describe how to specify the whole page. If all 18 plot panels are active, 18 separate plot areas will appear on the screen. they will be arranged as three areas horizontally (along x-axis) and 6 areas vertically (along y-axis). In order to identify them, we call one such area a *plotpanel*, and we number them 00 for the left/bottom plotpanel, 10, 20 for the other two bottom plot panels. Consequently, the uppermost/right plotpanel is labelled 25.

3.5 Analysing data

The data analysis and display is activated via an event from the *cuitm*. Possible events are *prev*, *next*, *redraw* button events, or a change of times in the *cuitm*, or pressing the *run* button in *continuous* plot mode.

3.5.1 Analysing a single data interval

A single data interval is analysed after a callback event from the *prev*, *next*, or *redraw* buttons of the *cuitm*. A change of times in the *cuitm*, or pressing the *run* button in *continuous* plot mode also activates a single interval analysis.

3.5.2 Continuous plot mode

Continuous is an option of the *cuitm*. It allows you to automatically step over several elementary time intervals, up to a specified stop time. *ghplot* can act upon *continuous cuitm* option in two ways:

Normal mode In *continuous/normal* plot mode, *ghplot* acts exactly as if the *cuitm next* button had been continuously pressed, that is the plot area is cleared and updated for every new interval.

Overview mode In *continuous/overview* mode *ghplot* sets the time axis from the cuitm start time to the final stop time, and fills the plot area in background until *cuitm* has reached the stop time. *ghplot* then, not before, clears the old plot, and fills in the new plot. The time resolution is determined by the *overview step* parameter (see 2.2.11). Note that long overviews may require a large memory. For Sun installations the memory usage is monitored, and the plot is left blank after a certain limit (30 MBytes) has been reached. For other installations, no active monitoring of used memory is implemented, and *ghplot* might fail, and it then has to be restarted.

3.6 Post-processing view adjustments

Post processing view adjustments can be made via the *Camera* (see 2.2.6 or *rotations* windows (see 2.2.7).

3.7 Leaving ghplot

Closing of the *ghplot* session is normally done via the *file* - *quit* menu bar entry.

4 Known Bugs

The following bugs are still present in the current version of *ghplot*:

- At present, the clipping is not handled as expected by PHIGS. Therefore, a primitive clipping mechanism has been temporarily implemented. This temporary clipping simply consists of removing samples that are outside the plotting frame. That implies that vector interpolation across plotting borders may give errors.
- The first spectrum in an *overview plot* may be compressed in time.
- The radio buttons [6] do not update properly sometimes.

[6] Radio buttons signify a set of buttons where only one may be pressed at a time

5 Reference Documents

[1] A. Lundgren and G. Holmgren. ISDAT Users Manual. Technical Report CWD-SUM-001, IRF-U, March 1994.