

Advanced Virgo dataDisplay tutorial

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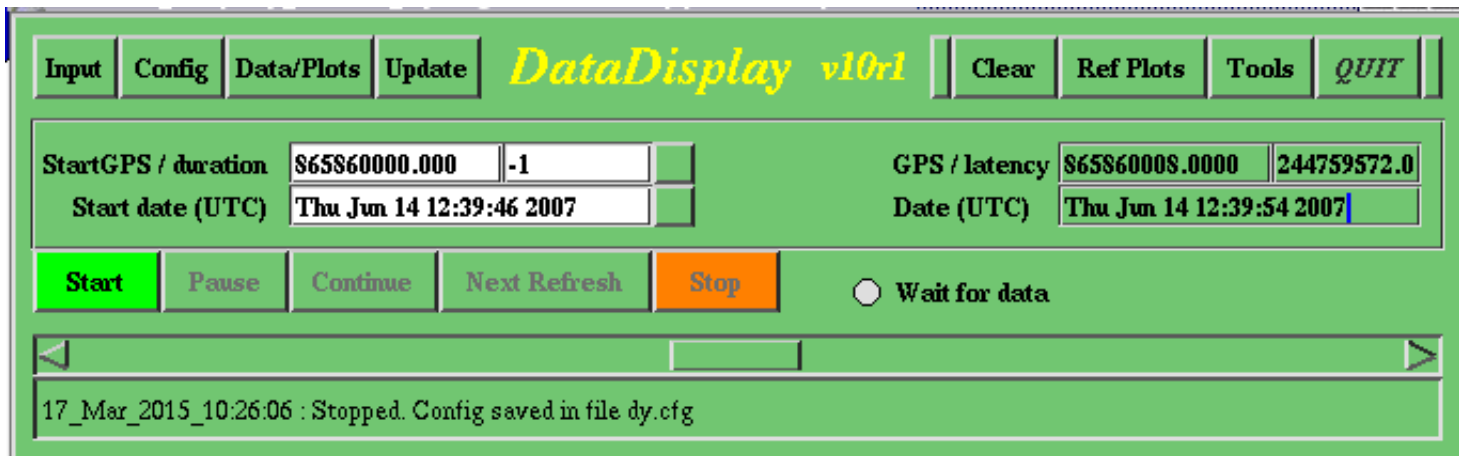
11th of May 2015

- Choose input files and do time plots
- Connect online and do FFT plots
- Configuration file
- Main browser features
- Edit plots parameters
- Use ROOT and dataDisplay features
- Use reference plots
- Tools and options

Choose input files and do time plots

First, type “dataDisplay” in an Xterm window

A mainpanel window should appear



Click on "Inputs" and Choose "Read FFL"

Read data online by connecting to one of the online data providers

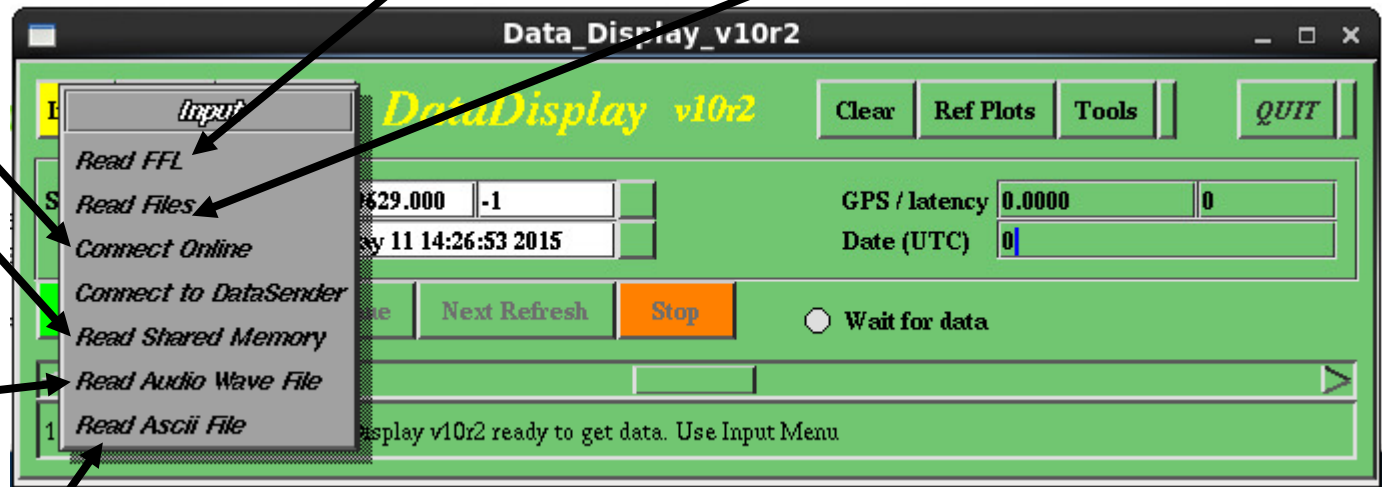
Read data from ffl files which points to frame formatted data files

Read data from frame formatted data files

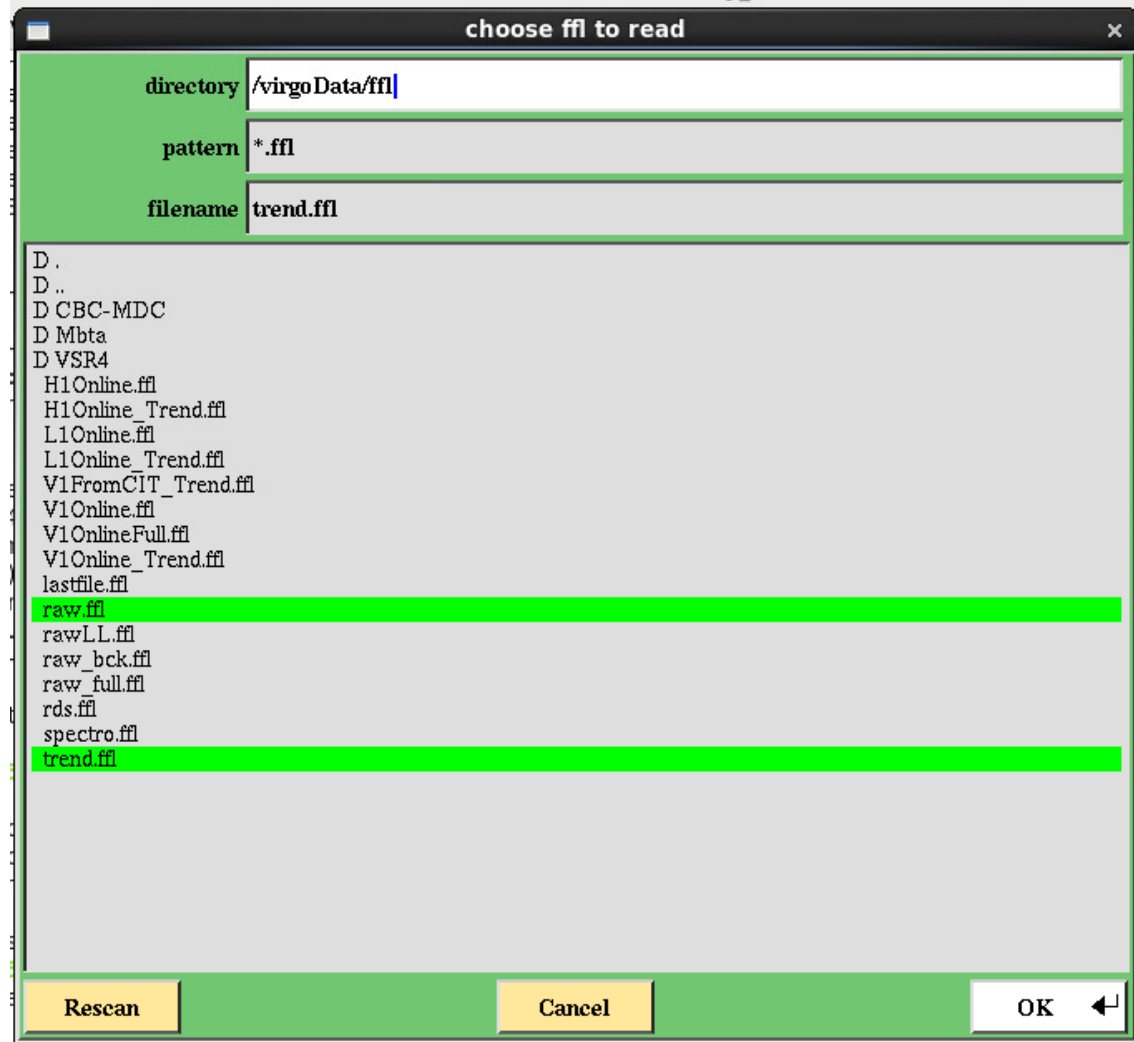
Read data online from a shared memory

Read data from an audio file (only one channel)

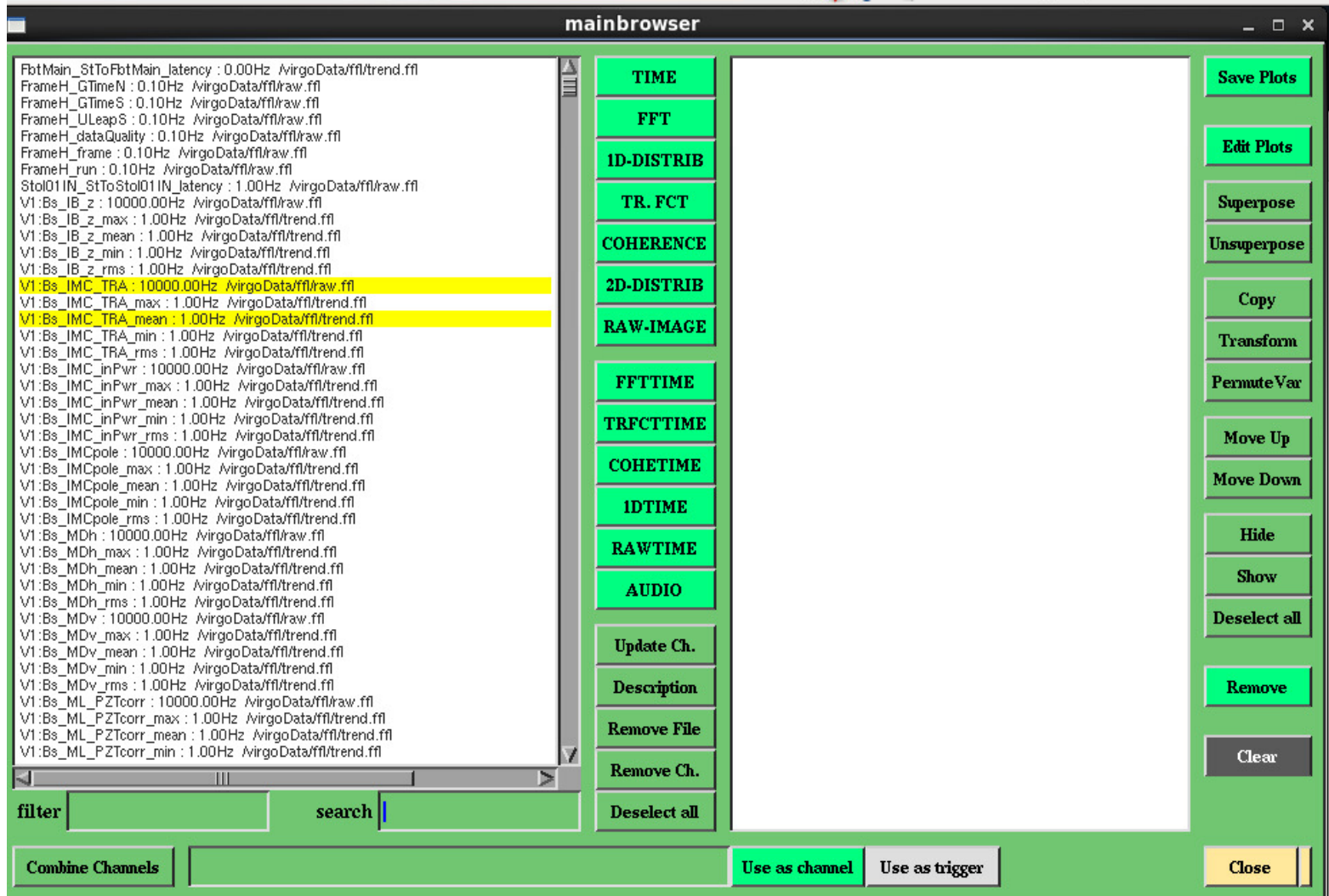
Read data from an ascii file properly formatted [time, sample value] (only one channel)



A list of files should appear
Choose “raw.ffl” and “trend.ffl”
Click on “OK” or press “Enter” on the keyboard



The mainbrowser panel should appear, with a list of channels, some taken from raw.ffl, some taken from trend.ffl
Select a couple of channels in the list



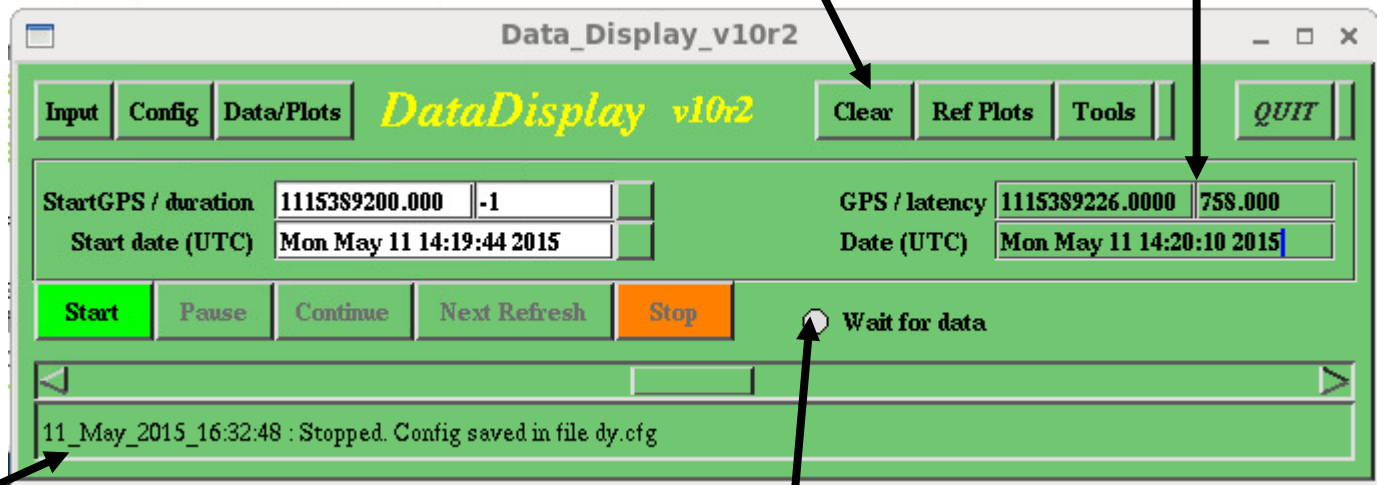
Click on “TIME” button
Two time plots are created
Select them and click on “Superpose”

The screenshot shows the 'mainbrowser' application window. On the left, a list of data channels is displayed, with two channels highlighted in yellow: 'V1:Bs_IMC_TRA : 10000.00Hz /virgoData/ffl/raw.ffl' and 'V1:Bs_IMC_TRA_mean : 1.00Hz /virgoData/ffl/trend.ffl'. The central menu contains buttons for various analysis functions: TIME, FFT, ID-DISTRIB, TR. FCT, COHERENCE, 2D-DISTRIB, RAW-IMAGE, FFTTIME, TRFCTTIME, COHETIME, IDTIME, RAWTIME, AUDIO, Update Ch., Description, Remove File, Remove Ch., and Deselect all. The right-hand toolbar includes buttons for Save Plots, Edit Plots, Superpose, Unsuperpose, Copy, Transform, Permute Var, Move Up, Move Down, Hide, Show, Deselect all, Remove, and Clear. At the bottom, there are buttons for 'Combine Channels', 'Use as channel', 'Use as trigger', and 'Close'. A search bar is located at the bottom left of the channel list.

Choose a start date on the mainpanel
And click on "Start"
To read data and do the plots

Remove the panel displaying the plots

GPS time, latency and UTC date of the data read



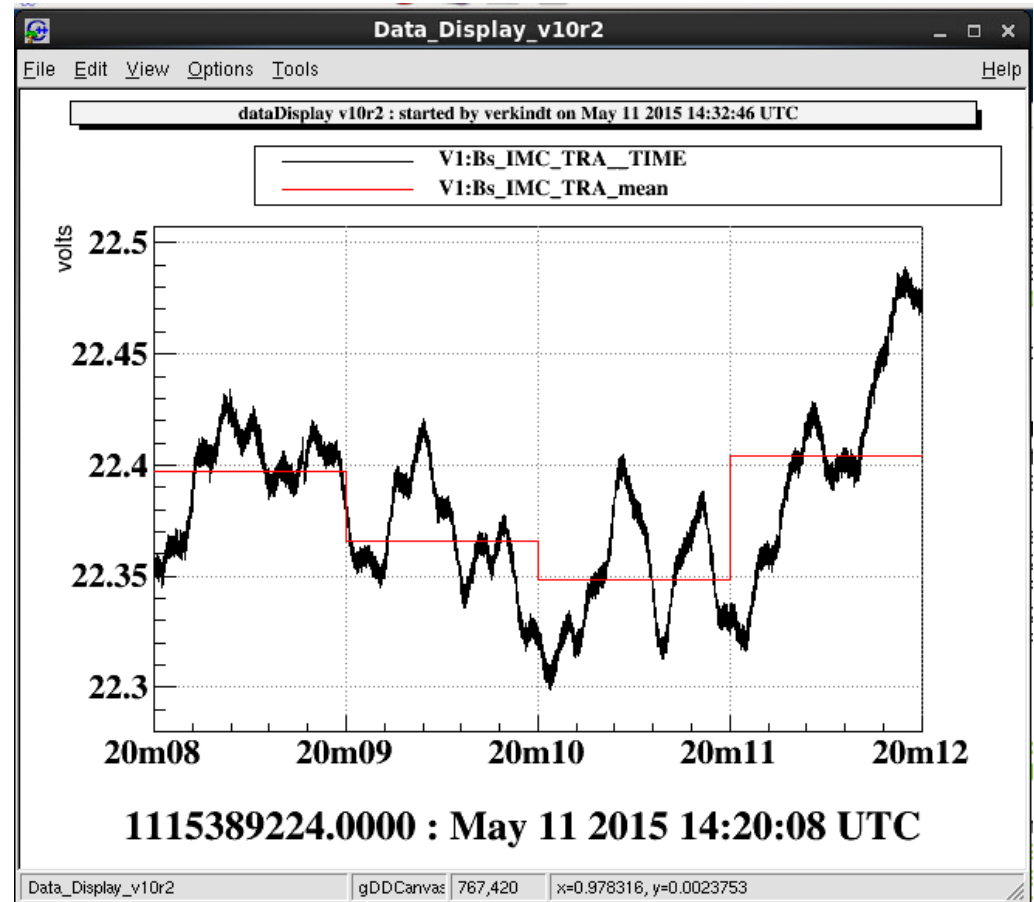
Info line about last activity of the dataDisplay

When you push this button, dataDisplay do not stop when reaching end of data file and wait for new data

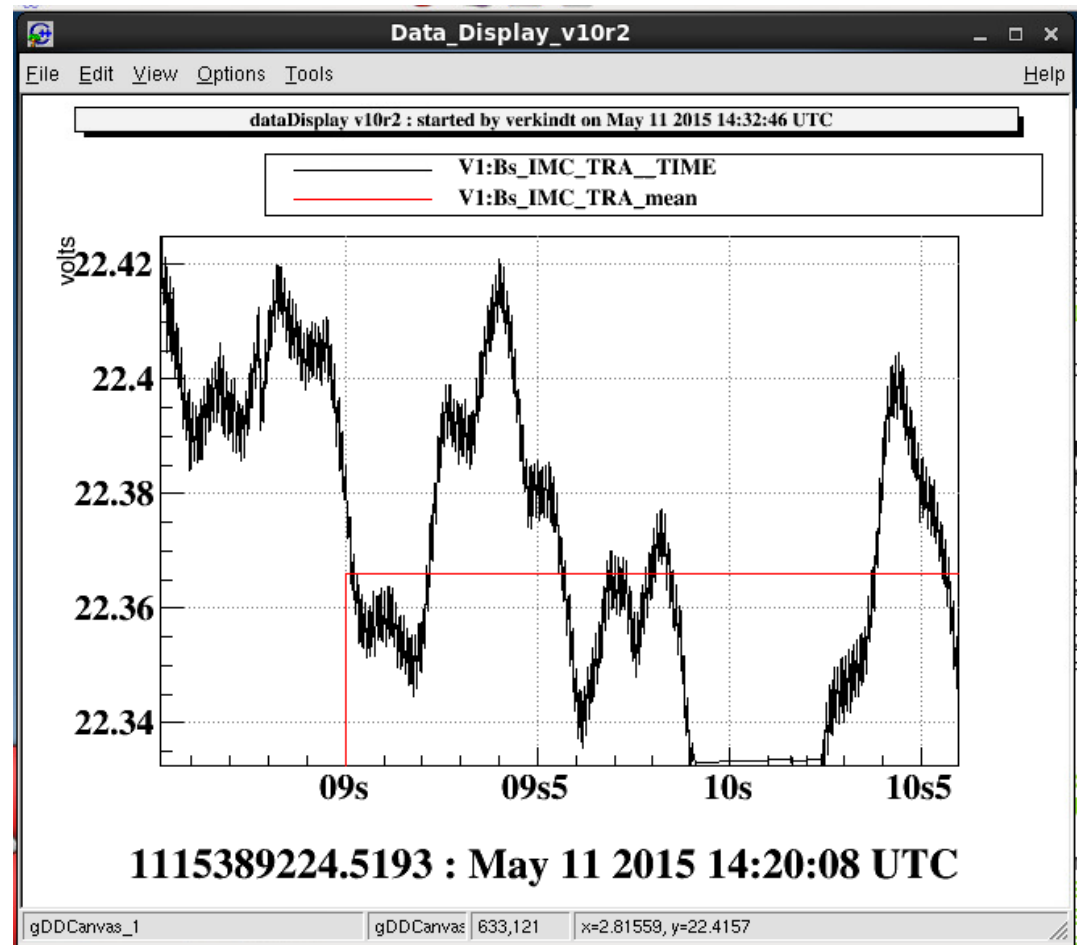
A window should appear containing the time plot of the two channels, superposed

On the X axis is shown the UTC time

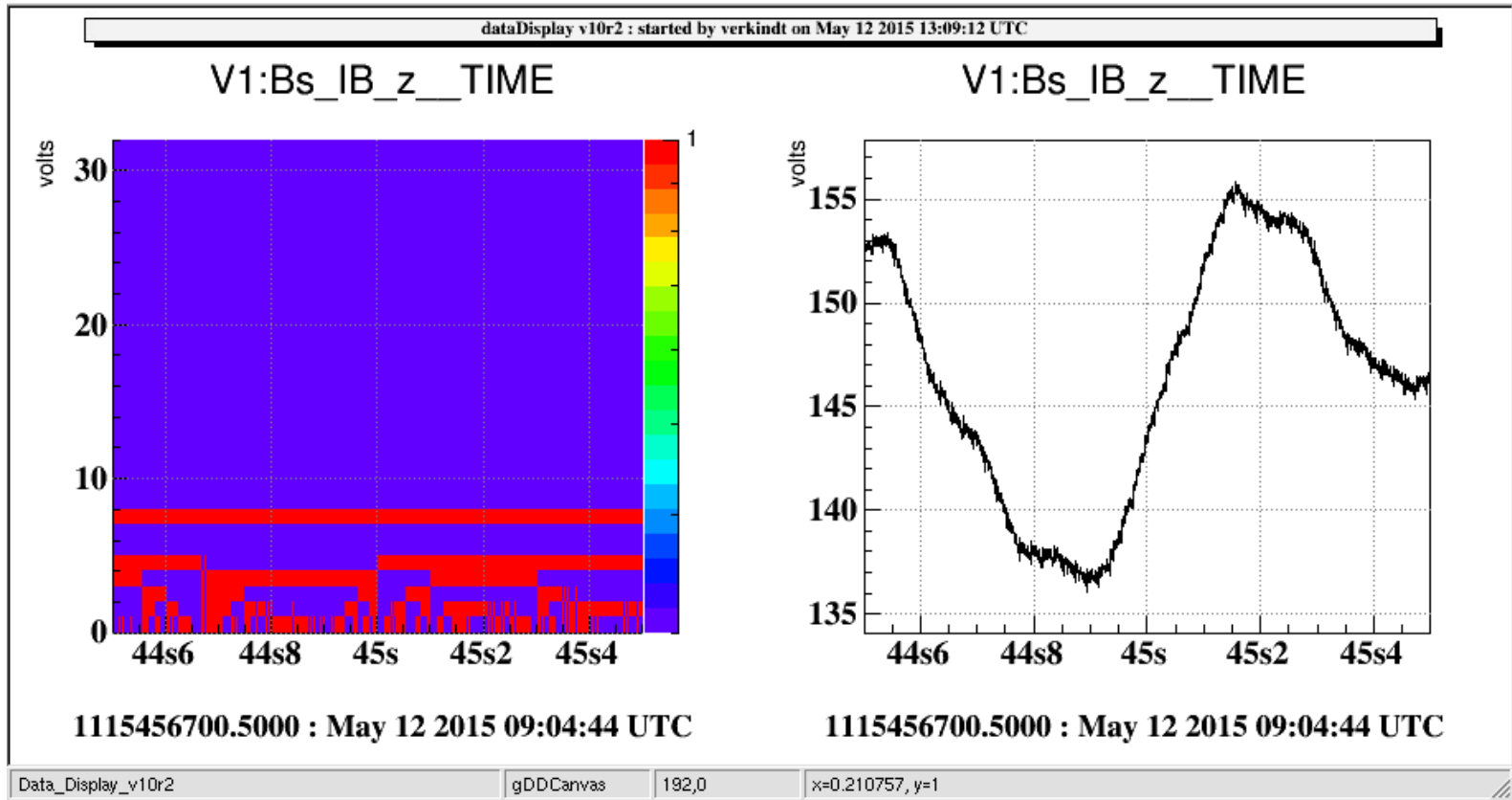
With time origin indicated in a string below the plot



Once you have pressed “Stop” button, you can modify the plot using the various ROOT features or the additional features introduced by dataDisplay
Use the mouse to select a zoom on X or Y axis
Use the right button of the mouse to list the features you can use



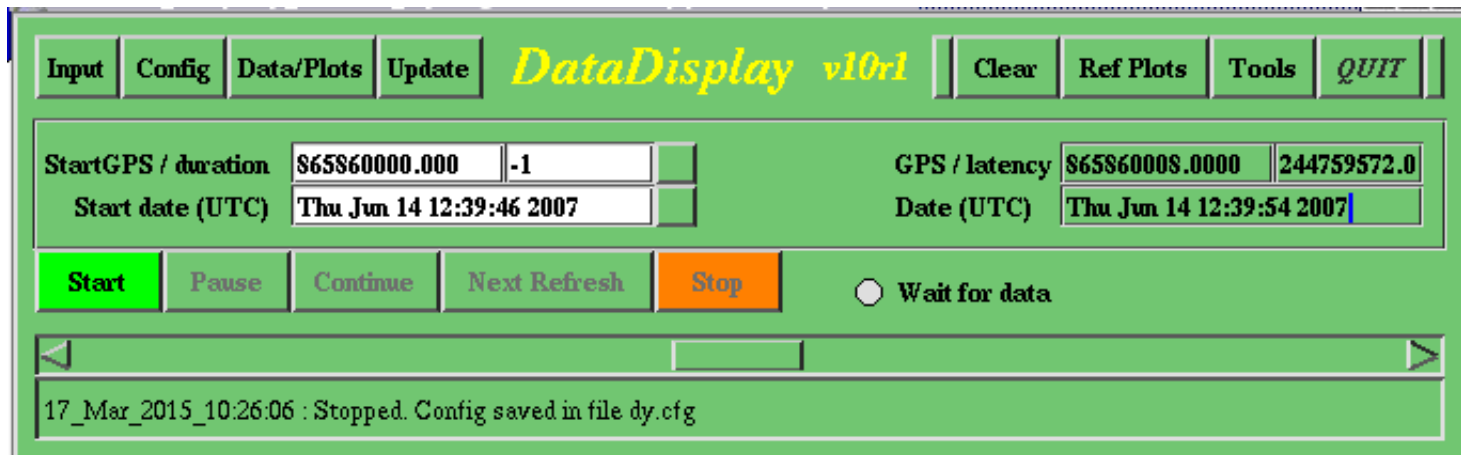
You can also visualize the bits of the data samples
(see “Edit TIME plot” section)



Connect online and do FFT plots

First, type “dataDisplay”

A mainpanel window should appear



Click on "Inputs" and Choose "Connect online"

Read data online by connecting to one of the online data providers

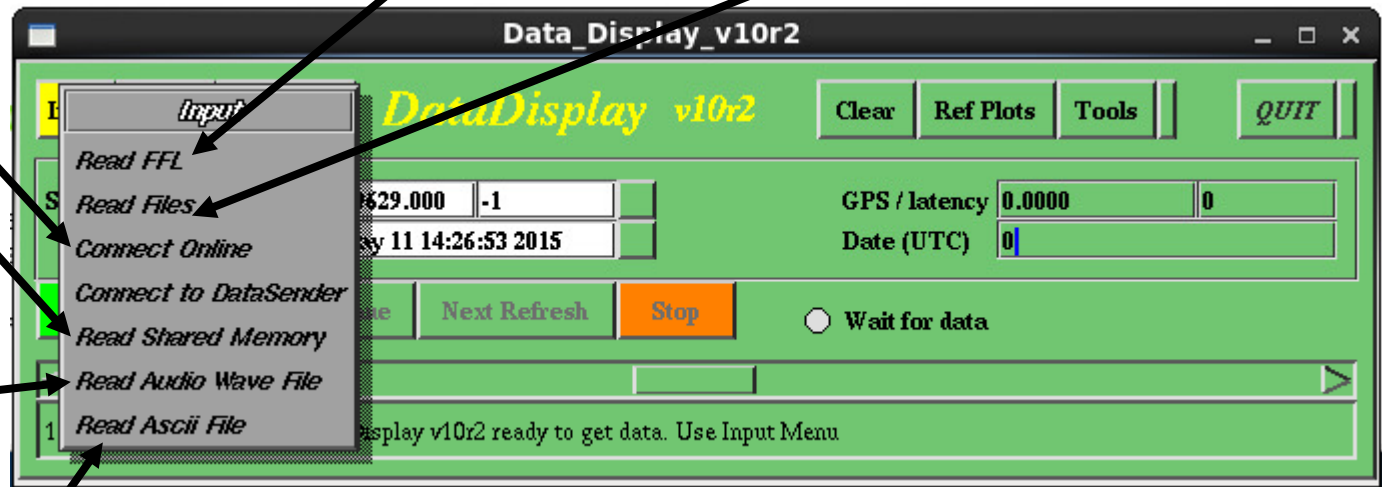
Read data from ffl files which points to frame formatted data files

Read data from frame formatted data files

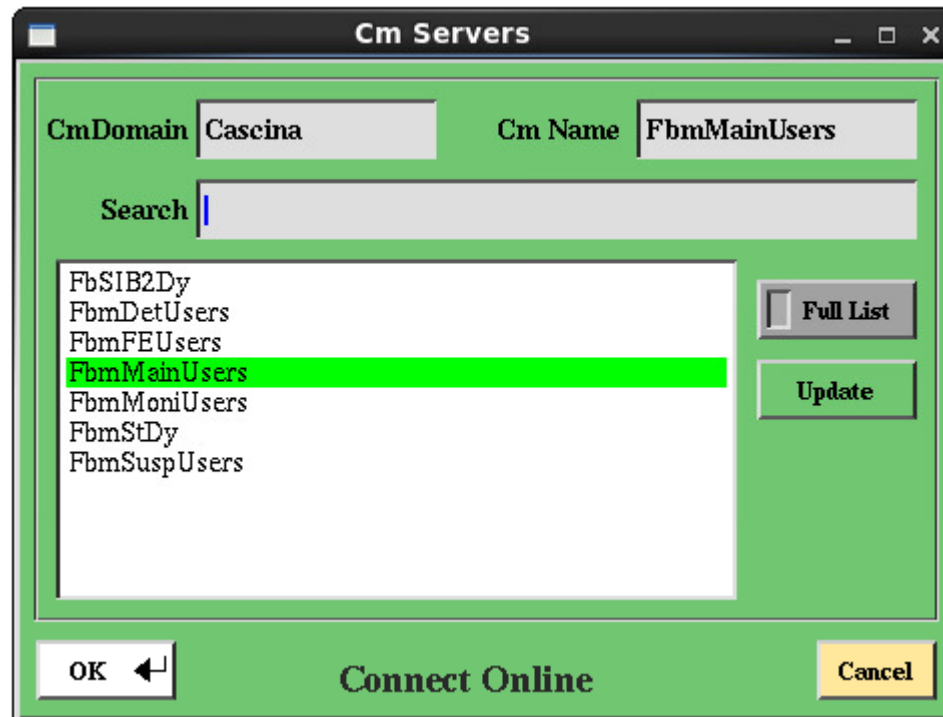
Read data online from a shared memory

Read data from an audio file (only one channel)

Read data from an ascii file properly formatted [time, sample value] (only one channel)



A list of data providers should appear
Choose one of them
Click on “OK” or press “Enter” on the keyboard



Next steps are the same as in the previous section
(just choose FFT instead of TIME plots in the mainbrowser)

Configuration file

Each time you click “Start”, a configuration file is written on disk, containing all the parameters used by the dataDisplay. Default name is “dy.cfg”

You can save and load configuration files. You can also start the dataDisplay with a configuration file provided as first argument : *dataDisplay dy.cfg*

Menu to save or load configuration files

```
DY_TIMING
starttime 1115456700.000000 (Tue May 12 09:04:44 2015)
duration -1.000000

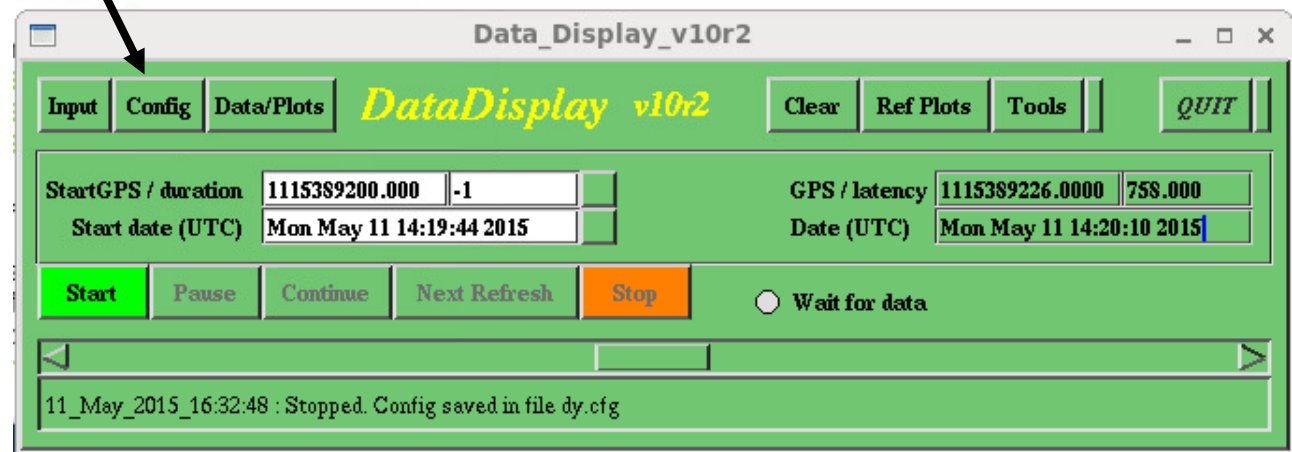
DY_OPTIONS
debug 0
debugtype 0
noplot 0
squareplot 0
autodeselectplot 1
autodeselectch 0
colorpalette 0
waitdata 0
fullwhite 1
linewidth 1
output_tag Qc_Moni*&Alp_Main*&Alp_Cali*&Pr_B1_ACP&h*

DY_INPUT
chindex 0 FrameH_GTimeN
inputtype 0
inputname /virgoData/ffl/raw.ffl

DY_TAG " V1:Bs_IB_z "

DY_PADS
ncol 0
nrow 0

DY_PLOT 1 dy12
type 7 TIME
numpad 1
superposed 0
hidden 0
```



Mainbrowser features

Click on the mainpanel button “Data and Plots” to get the mainbrowser panel

The mainbrowser panel allows

- to select channels
- to create plots for those channels
- to search for channels
- to combine channels to create new channels
- to manipulate plots or edit plot parameters

A set of buttons allows to act on the plots without editing them

PlotMain_StToPlotMain_latency : 0.00Hz /virgoData/ffl/trend.ffl
FrameH_GTimeN : 0.10Hz /virgoData/ffl/raw.ffl
FrameH_GTimeS : 0.10Hz /virgoData/ffl/raw.ffl
FrameH_ULeapS : 0.10Hz /virgoData/ffl/raw.ffl
FrameH_dataQuality : 0.10Hz /virgoData/ffl/raw.ffl
FrameH_frame : 0.10Hz /virgoData/ffl/raw.ffl
FrameH_run : 0.10Hz /virgoData/ffl/raw.ffl
StoI01IN_StToStoI01IN_latency : 1.00Hz /virgoData/ffl/raw.ffl
V1:Bs_IB_z : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_IB_z_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IB_z_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IB_z_min : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IB_z_rms : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_TRA : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_IMC_TRA_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_TRA_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_TRA_min : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_TRA_rms : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_inPwr : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_IMC_inPwr_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_inPwr_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_inPwr_min : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_inPwr_rms : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMCpole : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_IMCpole_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMCpole_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMCpole_min : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMCpole_rms : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDh : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_MDh_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDh_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDh_min : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDh_rms : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDv : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_MDv_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDv_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDv_min : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDv_rms : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_ML_PZTcorr : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_ML_PZTcorr_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_ML_PZTcorr_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_ML_PZTcorr_min : 1.00Hz /virgoData/ffl/trend.ffl

1 V1:Bs_IMC_TRA_TIME
2 V1:Bs_IMC_TRA_mean__TIME (s)
3 V1:Bs_IMC_TRA_FFT
4 V1:Bs_IMC_TRA_mean__FFT
5 V1:Bs_IMC_TRA_ID
6 V1:Bs_IMC_TRA_mean__ID
7 V1:Bs_IMC_TRA.over.V1:Bs_IMC_TRA_mean__TRFCT
8 V1:Bs_IMC_TRA.vs.V1:Bs_IMC_TRA_mean__COHE

filter search

Combine Channels Use as channel Use as trigger Close

Superpose the plots selected

Create a copy of the plots selected

Transform the plots selected into an other type

Permute the channels of a TRFCT, COHE or 2D plot

Remove the selected plots

Remove all the plots

A set of buttons allows to act on the plots without editing them

Plot list (left):

- FbtMain_StToFbtMain_latency : 0.00Hz /virgoData/ffl/trend.ffl
- FrameH_GTimeN : 0.10Hz /virgoData/ffl/raw.ffl
- FrameH_GTimeS : 0.10Hz /virgoData/ffl/raw.ffl
- FrameH_ULeapS : 0.10Hz /virgoData/ffl/raw.ffl
- FrameH_dataQuality : 0.10Hz /virgoData/ffl/raw.ffl
- FrameH_frame : 0.10Hz /virgoData/ffl/raw.ffl
- FrameH_run : 0.10Hz /virgoData/ffl/raw.ffl
- StoI01IN_StToStoI01IN_latency : 1.00Hz /virgoData/ffl/raw.ffl
- V1:Bs_IB_z : 10000.00Hz /virgoData/ffl/raw.ffl
- V1:Bs_IB_z_max : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IB_z_mean : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IB_z_min : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IB_z_rms : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IMC_TRA : 10000.00Hz /virgoData/ffl/raw.ffl
- V1:Bs_IMC_TRA_max : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IMC_TRA_mean : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IMC_TRA_min : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IMC_TRA_rms : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IMC_inPwr : 10000.00Hz /virgoData/ffl/raw.ffl
- V1:Bs_IMC_inPwr_max : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IMC_inPwr_mean : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IMC_inPwr_min : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IMC_inPwr_rms : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IMCpole : 10000.00Hz /virgoData/ffl/raw.ffl
- V1:Bs_IMCpole_max : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IMCpole_mean : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IMCpole_min : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_IMCpole_rms : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_MDh : 10000.00Hz /virgoData/ffl/raw.ffl
- V1:Bs_MDh_max : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_MDh_mean : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_MDh_min : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_MDh_rms : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_MDv : 10000.00Hz /virgoData/ffl/raw.ffl
- V1:Bs_MDv_max : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_MDv_mean : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_MDv_min : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_MDv_rms : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_ML_PZTcorr : 10000.00Hz /virgoData/ffl/raw.ffl
- V1:Bs_ML_PZTcorr_max : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_ML_PZTcorr_mean : 1.00Hz /virgoData/ffl/trend.ffl
- V1:Bs_ML_PZTcorr_min : 1.00Hz /virgoData/ffl/trend.ffl

Plot type menu (center):

- TIME
- FFT
- ID-DISTRIB
- TR. FCT
- COHERENCE
- 2D-DISTRIB
- RAW-IMAGE
- FFTTIME
- TRFCTTIME
- COHETIME
- IDTIME
- RAWTIME
- AUDIO
- Update Ch.
- Description
- Remove File
- Remove Ch.
- Deselect all

Selected plots list (middle):

- 1 V1:Bs_IMC_TRA__TIME
- 2 V1:Bs_IMC_TRA_mean__TIME (s)
- 3 V1:Bs_IMC_TRA__FFT
- 4 V1:Bs_IMC_TRA_mean__FFT
- 5 V1:Bs_IMC_TRA__1D
- 6 V1:Bs_IMC_TRA_mean__1D
- 7 V1:Bs_IMC_TRA.over.V1:Bs_IMC_TRA_mean__TRFCT
- 8 V1:Bs_IMC_TRA.vs.V1:Bs_IMC_TRA_mean__COHE

Toolbar (right):

- Save Plots
- Edit Plots
- Superpose
- Unsuperpose
- Copy
- Transform
- Permute Var
- Move Up
- Move Down
- Hide
- Show
- Deselect all
- Remove
- Clear

Bottom buttons:

- Combine Channels
- Use as channel
- Use as trigger
- Close

Save the plots in a ROOT file

Move the selected plots up and down in the list

Do not show the selected plots

A set of buttons allows to create plots of different types

Create a FFT plot for each channel selected

Create a TIME plot for each channel selected

Create a 2D plot for each couple of channels selected

Create an audio file for each channel selected

The screenshot shows a software interface with a list of channels on the left, a central column of plot type buttons, and a list of selected channels on the right. The buttons include TIME, FFT, 1D-DISTRIB, TR. FCT, COHERENCE, 2D-DISTRIB, RAW-IMAGE, FFTTIME, TRFCTTIME, COHETIME, IDTIME, RAWTIME, and AUDIO. The right panel contains buttons for Save Plots, Edit Plots, Superpose, Unsuperpose, Copy, Transform, Permute Var, Move Up, Move Down, Hide, Show, Deselect all, Remove, and Clear. At the bottom are buttons for Combine Channels, Use as channel, Use as trigger, and Close.

```
FbtMain_StToFbtMain_latency : 0.00Hz /virgoData/ffl/trend.ffl
FrameH_GTimeN : 0.10Hz /virgoData/ffl/raw.ffl
FrameH_GTimeS : 0.10Hz /virgoData/ffl/raw.ffl
FrameH_ULeapS : 0.10Hz /virgoData/ffl/raw.ffl
FrameH_dataQuality : 0.10Hz /virgoData/ffl/raw.ffl
FrameH_frame : 0.10Hz /virgoData/ffl/raw.ffl
FrameH_run : 0.10Hz /virgoData/ffl/raw.ffl
Stol01IN_StToStol01IN_latency : 1.00Hz /virgoData/ffl/raw.ffl
V1:Bs_IB_z : 10000.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IB_z_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IB_z_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IB_z_min : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IB_z_rms : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_TRA : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_IMC_TRA_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_TRA_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_TRA_min : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_TRA_rms : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_inPwr : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_IMC_inPwr_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_inPwr_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_inPwr_min : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMC_inPwr_rms : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMCpole : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_IMCpole_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMCpole_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMCpole_min : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_IMCpole_rms : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDh : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_MDh_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDh_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDh_min : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDh_rms : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDv : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_MDv_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDv_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDv_min : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_MDv_rms : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_ML_PZTCorr : 10000.00Hz /virgoData/ffl/raw.ffl
V1:Bs_ML_PZTCorr_max : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_ML_PZTCorr_mean : 1.00Hz /virgoData/ffl/trend.ffl
V1:Bs_ML_PZTCorr_min : 1.00Hz /virgoData/ffl/trend.ffl
```

1 V1:Bs_IMC_TRA_TIME
2 V1:Bs_IMC_TRA_mean_TIME (s)
3 V1:Bs_IMC_TRA_FFT
4 V1:Bs_IMC_TRA_mean_FFT
5 V1:Bs_IMC_TRA_1D
6 V1:Bs_IMC_TRA_mean_1D
7 V1:Bs_IMC_TRA.over.V1:Bs_IMC_TRA_mean_TRFCT
8 V1:Bs_IMC_TRA.vs.V1:Bs_IMC_TRA_mean_COHE

filter search

Combine Channels Use as channel Use as trigger Close

A set of buttons allows to manage channels list

Filter: search

Combine Channels Use as channel Use as trigger Close

TIME
FFT
ID-DISTRIB
TR. FCT
COHERENCE
2D-DISTRIB
RAW-IMAGE
FFTTIME
TRFCTTIME
COHETIME
IDTIME
RAWTIME
AUDIO
Update Ch.
Description
Remove File
Remove Ch.
Deselect all

1 V1:Bs_IMC_TRA__TIME
2 V1:Bs_IMC_TRA_mean__TIME (s)
3 V1:Bs_IMC_TRA__FFT
4 V1:Bs_IMC_TRA_mean__FFT
5 V1:Bs_IMC_TRA__1D
6 V1:Bs_IMC_TRA_mean__1D
7 V1:Bs_IMC_TRA.over.V1:Bs_IMC_TRA_mean__TRFCT
8 V1:Bs_IMC_TRA.vs.V1:Bs_IMC_TRA_mean__COHE

Save Plots
Edit Plots
Superpose
Unsuperpose
Copy
Transform
Permute Var
Move Up
Move Down
Hide
Show
Deselect all
Remove
Clear

Filter: search

Combine Channels Use as channel Use as trigger Close

Sort channels according to a filter. For instance *IMC*

Search for a given channel name

A set of buttons allows to create new channels, by using standard C operators on existing channels

The screenshot shows a software interface for channel management. On the left, a list of channels is displayed, with several highlighted in yellow. A callout box points to this list with the text: "Modify channels combination according to your needs". Below the list, there is a search bar and a "filter" button. A callout box points to the search bar with the text: "Create a default combination of the channels selected". In the center, a vertical column of buttons includes "TIME", "FFT", "ID-DISTRIB", "TR. FCT", "COHERENCE", "2D-DISTRIB", "RAW-IMAGE", "FFTTIME", "TRFCTTIME", "COHETIME", "IDTIME", "RAWTIME", and "AUDIO". A callout box points to the "Use as channel" button with the text: "Create the new channel". On the right, a list of channel names is shown, with the first two highlighted in yellow. A callout box points to this list with the text: "Use the combination of channels as a trigger (not yet ready)". Below the channel list, there are buttons for "Use as channel" and "Use as trigger". On the far right, a vertical column of buttons includes "Save Plots", "Edit Plots", "Superpose", "Unsuperpose", "Copy", "Transform", "Auto Var", "Save Up", "Save Down", "Hide", "Show", "Deselect all", "Remove", "Clear", and "Close".

Edit the plots parameters

Select the plots you want to edit

Click on “Edit Plots” button

→ Only plots of the same type as the last one selected will be edited

The screenshot shows a software interface for editing plots. The interface is divided into several sections:

- Left Pane:** A list of plots. The selected plot is `V1:Bs_IMC_TRA_mean : 1.00Hz /virgoData/ffl/trend.ffl`.
- Middle Pane:** A list of plot types. The selected type is `TIME`.
- Right Pane:** A list of selected plots. The selected plots are:
 - 1 V1:Bs_IMC_TRA_TIME
 - 2 V1:Bs_IMC_TRA_mean_TIME (s)
 - 3 V1:Bs_IMC_TRA_FFT
 - 4 V1:Bs_IMC_TRA_mean_FFT
 - 5 V1:Bs_IMC_TRA_ID
 - 6 V1:Bs_IMC_TRA_mean_ID
 - 7 V1:Bs_IMC_TRA.over.V1:Bs_IMC_TRA_mean_TRFCT
 - 8 V1:Bs_IMC_TRA.vs.V1:Bs_IMC_TRA_mean_COHE
- Bottom Pane:** A set of buttons for editing and saving plots. The buttons are: `Save Plots`, `Edit Plots`, `Superpose`, `Unsuperpose`, `Copy`, `Transform`, `Permute Var`, `Move Up`, `Move Down`, `Hide`, `Show`, `Deselect all`, `Remove`, `Clear`, `Combine Channels`, `Use as channel`, `Use as trigger`, and `Close`.

Editing the parameters of TIME plot

Default values are:

- Chosen to shown 2000 samplings of data
- Or identical to last already existing TIME plot

The screenshot shows the 'plotime' dialog box with the following parameters and callouts:

- Time Window (s):** 4
- minmax:** A diamond-shaped icon with an arrow pointing to the 'Time Window (s)' field. Callout: "Read data by bunches of x % of the time window size".
- Sampl. Freq. (Hz):** 500
- Time shift (% of time window):** 50
- ymin / ymax:** 10.0927 | 12.8042
- y offset:** -360
- y scaling factor:** 0
- Band-pass Filter (fmin / fmax) (Hz):** Two empty input fields. Callout: "Apply a pass-band filter on the data".
- logx:**
- logy:**
- gridx:**
- gridy:**
- autoY:** . Callout: "Auto scale the Y axis instead of using the ymin and ymax values".
- unitsY:** . Callout: "Calibrate data values on Y axis".
- noDC:** . Callout: "Remove DC component".
- Show bits:** . Callout: "Show data values on Y axis as bits ON and OFF".
- Default:** A button.
- OK:** A button.
- Cancel:** A button.

Editing the parameters of FFT plot

The image shows a dialog box titled "plotfft <@lapps16e.in2p3.fr>" with various parameters for an FFT plot. The parameters are organized into sections:

- Time Window (s):** 4
- Sampl. Freq. (Hz):** 500
- Time shift (% of time window):** 50
- Number of FFTs to average:** 1
- refreshPeriod (in number of FFTs):** 1
- freqmin / freqmax (Hz):** 0 / 250
- ymin / ymax:** 4.03731e-05 / 0.200594

On the right side, there are several checkboxes and buttons:

- logx
- logy
- gridx
- gridy
- autoY
- unitsY
- noDC
- 1/Hz
- rms
- decay
- Default

At the bottom, there are "OK" and "Cancel" buttons, and the text "Spectrum Plot".

Annotations with arrows point to specific parameters:

- Compute FFT on this time window** points to "Time Window (s)".
- Between two FFT computations, increment data reading by x % of the time window size** points to "Time shift (% of time window)".
- Refresh the plot only every N FFT computations** points to "refreshPeriod (in number of FFTs)".
- Show only spectrum between fmin and fmax** points to "freqmin / freqmax (Hz)".
- Auto scale the Y axis instead of using the ymin and ymax values** points to "autoY".
- Calibrate data values on Y axis** points to "unitsY".
- Use 1/Hz instead of 1/sqrt(Hz) units** points to "1/Hz".
- Add a curve showing the rms vs frequency** points to "rms".
- Use a moving average of FFTs** points to "decay".

Editing the parameters of COHERENCE plot

Compute FFT on this time window

Between two FFT computations, increment data reading by x % of the time window size

Refresh the plot only every N FFT computations

Show only spectrum between fmin and fmax

Show a bicoherence plot (2D plot)

Show Y axis only between fmin and fmax in case of a bicoherence plot

Time Window (s) 2000

Channel 1 Sampl. Freq. (Hz) 10000

Channel 2 Sampl. Freq. (Hz) 1

Time shift (% of time window) 50

Number of FFTs to average 100000

refreshPeriod (in number of FFTs) 1

fmin / fmax (Hz) 0 0.5

ymin / ymax 0 1

Time shift between ch1 and ch2 (sec) 0

2Dcohe

Y axis fmin/fmax (Hz) 0 0.5

module

logx

logy

gridx

gridy

sqrt

phase

logx

logy

gridx

gridy

autoY

unitsY

noDC

decay

Default

OK Coherence Plot Cancel

Use square root of coherence module

Set a time shift between channel 1 and channel 2

Editing the parameters of TRFCT plot

Compute FFT on this time window

Between two FFT computations, increment data reading by x % of the time window size

Refresh the plot only every N FFT computations

Show only spectrum between fmin and fmax

Time Window (s) 2000

Channel 1 Sampl. Freq. (Hz) 10000

Channel 2 Sampl. Freq. (Hz) 1

Time shift (% of time window) 50

Number of FFTs to average 1

refreshPeriod (in number of FFTs) 1

freqmin / freqmax (Hz) 0 0.5

yMin / yMax 0 0

Time shift between ch1 and ch2 (sec) 0

module

- logx
- logy
- gridx
- gridy
- sqrt

phase

- logx
- logy
- gridx
- gridy

autoY

unitsY

noDC

decay

Default

OK ransfert Function Plc Cancel

Use square root of transfert function module

Set a time shift between channel 1 and channel 2

Editing the parameters of FFTIME plot

Time window over which spectrogram is shown

Frequency resolution of the spectrogram (determine the time window in which FFTs are done)

Between two FFT computations, increment data reading by x % of the time window size

Refresh the plot only every N FFT computations

Show only spectrum between fmin and fmax

The screenshot shows a dialog box titled 'plotfftime' with the following parameters and options:

Time Window for Time-Freq plot (s)	10	
Frequency resolution (Hz)	1	
Time resolution (s)	1	
Sampl. Freq. (Hz)	10000	
Time shift (% of FFT time window)	5	
refresh Period (% of Time window)	20	
Zoom freq min/max (Hz)	0	5000
zmin / zmax (color scale)	0	3.07379

Options on the right side:

- logx
- logy
- logz
- gridx
- gridy
- gridz
- autoZ
- unitsZ
- noDC
- decay
- median
- Default

Buttons: OK, Time-Frequency Plot, Cancel

Auto scale the Z axis instead of using the zmin and zmax values

Calibrate data values on Z axis

Remove DC component

Use a moving average of FFTs

Normalize spectrogram with a median value

Editing the parameters of 1D plot

Read data by bunches of 4 seconds

Do the distribution plot over 200 bins

Apply an offset and a scaling factor to the data

Refresh Period (s)	4
Sampl. Freq. (Hz)	500
nBin	200
x min	6.9838
x max	13.5817
x offset	-360
x scale	0

logx

logy

gridx

gridy

stat

autoX

unitsX

noDC

Default

OK 1D Distribution Cancel

Show statistics on the plot

Auto scale the X axis instead of using the xmin and xmax values

Calibrate data values on X axis

Remove DC component

Editing the parameters of 2D plot

Read data by bunches of 4 seconds

Do the distribution plot over 200 bins

Apply a shift of n samplings between channel1 and channel2

The screenshot shows a dialog box titled 'plot2d <@lappsl6e.in2p3.fr>'. It contains several input fields and checkboxes. The 'Refresh Period (s)' is set to 4. 'Channel 1 Samp. Freq.' and 'Channel 2 Samp. Freq.' are both set to 500. 'x nBin' is set to 200, with 'x min' at 369.458 and 'x max' at 371.107. 'y nBin' is set to 200, with 'y min' at 11.7725 and 'y max' at 12.7861. 'Shift (n samplings)' is set to 0. On the right side, there are checkboxes for 'logx', 'logy', 'logz', 'gridx', 'gridy', 'stat', 'autoXY', 'unitsXY', 'color', 'cont', 'lego', 'surf', and 'scat'. A 'Default' button is at the bottom right. At the bottom of the dialog are 'OK', '2D Distribution', and 'Cancel' buttons.

Show statistics on the plot

Auto scale the X and Y axis instead of using the xmin, xmax, ymin and ymax values

Calibrate data values on X and Y axis

Choose a display option of the 2D plot

Editing the parameters of RAW plot


In this case, data are read frame by frame and each raw vector of data read is shown as it is.

The image shows a dialog box titled 'plotraw <@lappsl6e.in2p3.fr>' with a green background. It contains several input fields and checkboxes. Annotations with arrows point to specific fields:

- Do the distribution plot over 200 bins:** Points to the 'Number of raw vectors to average' field, which is set to 1.
- Periodicity of plot's update:** Points to the 'refresh Period (s)' field, which is set to 1.
- Auto scale the Y axis or on Z axis:** Points to the 'autoY' checkbox, which is checked.
- Calibrate data values on Y axis (if 1 dim vector) or on Z axis (if 2 dim vector like camera images):** Points to the 'unitsY' checkbox, which is unchecked.
- Use a moving average:** Points to the 'decay' checkbox, which is unchecked.

Other visible parameters include: 'Sampling frequency' (500), 'y min' (0), 'y max' (0), 'logx' (unchecked), 'logy' (unchecked), 'gridx' (checked), 'gridy' (checked), and 'Default' (button). At the bottom are 'OK' and 'Cancel' buttons. The title of the dialog is 'Data-as-it-is Plot'.

Editing the parameters of AUDIO plot



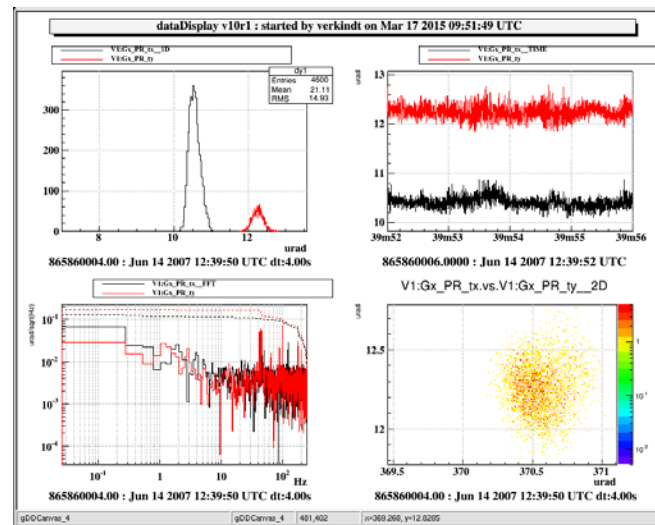
The screenshot shows a terminal window titled 'plotaudio <@lapps16e.in2p3.fr>' with a green dialog box titled 'Audio'. The dialog box contains the following fields and options:

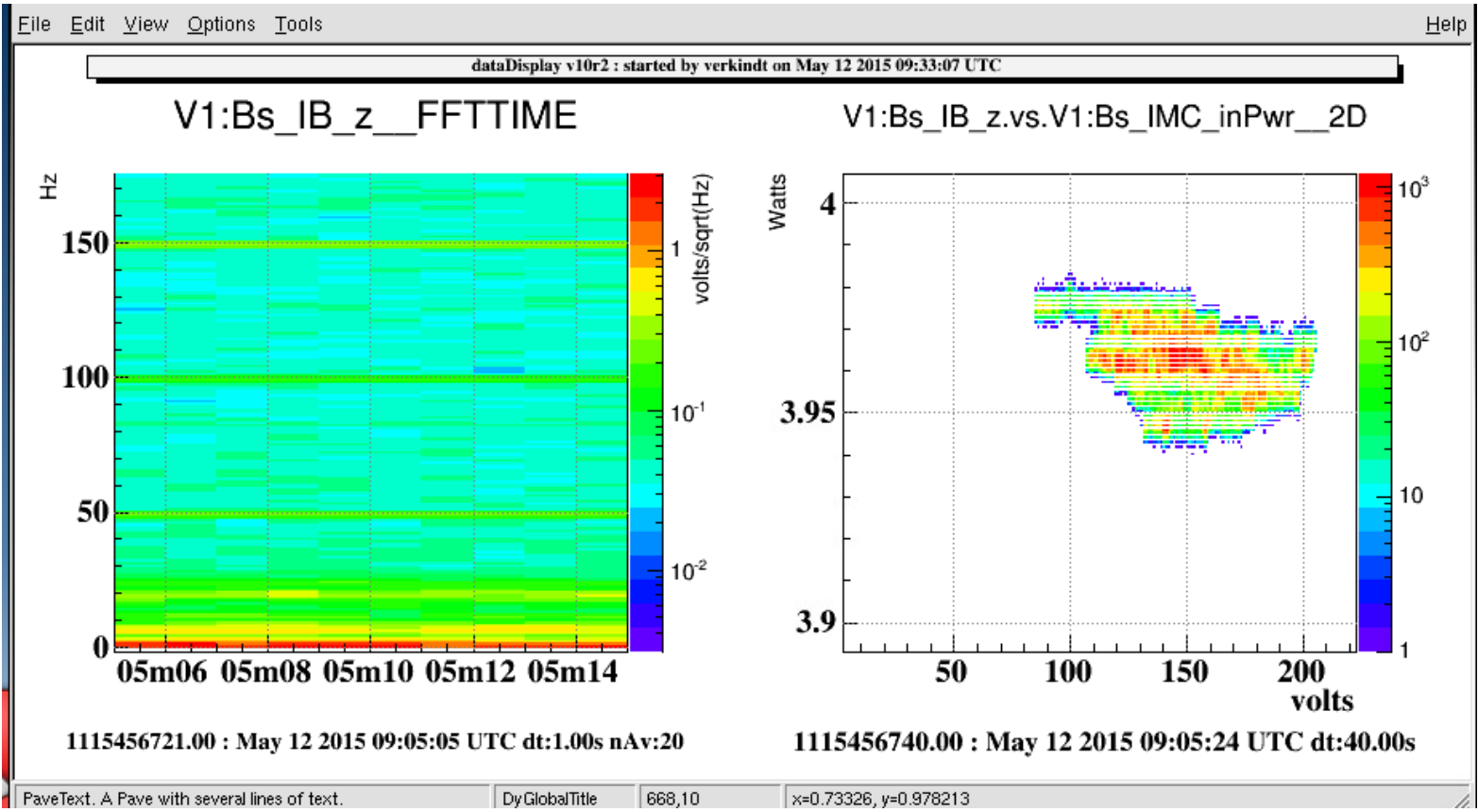
- 'Record start (offset to start GPS) (s)' with a text input field containing '0'.
- 'Record duration (s)' with a text input field containing '10'.
- '16 bits' checkbox, which is checked.
- 'online' checkbox, which is checked.
- 'Default' button.
- 'OK' and 'Cancel' buttons at the bottom.

Three callout boxes with arrows point to specific settings:

- Left callout: 'Record 10 seconds of data in an audio file' points to the 'Record duration (s)' field.
- Top-right callout: 'Record samples over 16 bits instead of 8 bits' points to the checked '16 bits' checkbox.
- Bottom-right callout: 'Provide sound online in addition to recording it on file' points to the checked 'online' checkbox.

Use of ROOT and dataDisplay features dedicated to plots





Auto scale the Y axis
or on Z axis

TAxis::xaxis

Update Time/Freq
Log/Lin All
Zoom All Labels
Zoom All Legends
Zoom All StatBox

Zoom ALL X as last
Zoom X axis as last
UnZoom ALL X
UnZoomX

Zoom ALL Y as last
Zoom Y axis as last
Scale Y as last
Scale ALL Y as last
UnZoom ALL Y
UnZoomY

UnZoom ALL Z
UnZoom

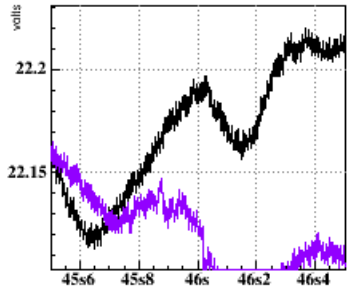
CenterTitle
LabelsOption
RotateTitle
SetMoreLogLabels
SetNoExponent
SetDecimals
SetRange
SetRangeUser
SetTicks
SetTimeDisplay
SetTimeFormat
ZoomOut

Dump
Inspect
SaveAs

SetNdivisions
SetAxisColor
SetLabelColor
SetLabelFont
SetLabelOffset
SetLabelSize
SetTickLength
SetTitleOffset
SetTitleSize
SetTitleColor
SetTitleFont

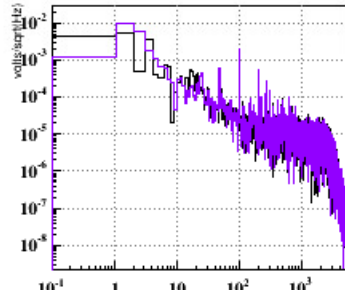
dataDisplay v10r2 : started by verkindt on May 12 2015 09:17:49 UTC

V1:Bs_IMC_TRA_TIME



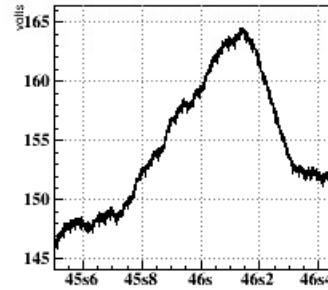
1115456704.0000 : May 12 2015 09:04:48 UTC
1115456701.5000 : May 12 2015 09:04:45 UTC

V1:Bs_IMC_TRA_FFT



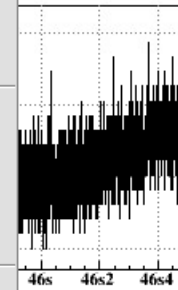
1115456704.0000 : May 12 2015 09:04:48 UTC
1115456702.00 : May 12 2015 09:04:46 UTC dt:1.00s

V1:Bs_IB_z_TIME



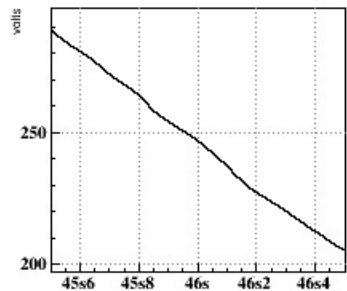
1115456701.5000 : May 12 2015 09:04:45 UTC

V1:Bs_IB_z_inPwr_TIME



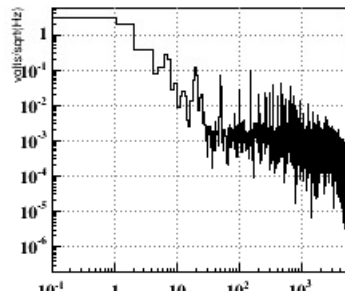
1115456701.5000 : May 12 2015 09:04:45 UTC

V1:Bs_IMCpole_TIME



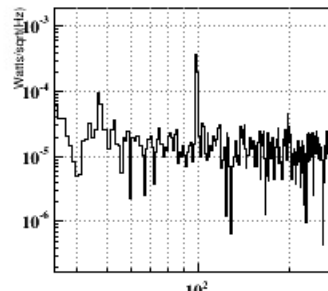
1115456701.5000 : May 12 2015 09:04:45 UTC

V1:Bs_IB_z_FFT



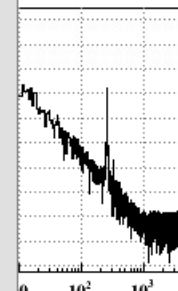
1115456702.00 : May 12 2015 09:04:46 UTC dt:1.00s

V1:Bs_IMC_inPwr_FFT



1115456702.00 : May 12 2015 09:04:46 UTC dt:1.00s

V1:Bs_IMC_inPwr_FFT



1115456702.00 : May 12 2015 09:04:46 UTC dt:1.00s

Data_Display_v10r2

gDDCanvas

992,197

x=0.995984, y=0.616732

Auto scale the Y axis
or on Z axis

The screenshot shows a data display interface with six plots arranged in a 2x3 grid. A context menu is open over the top-middle plot, listing various actions. The plots are:

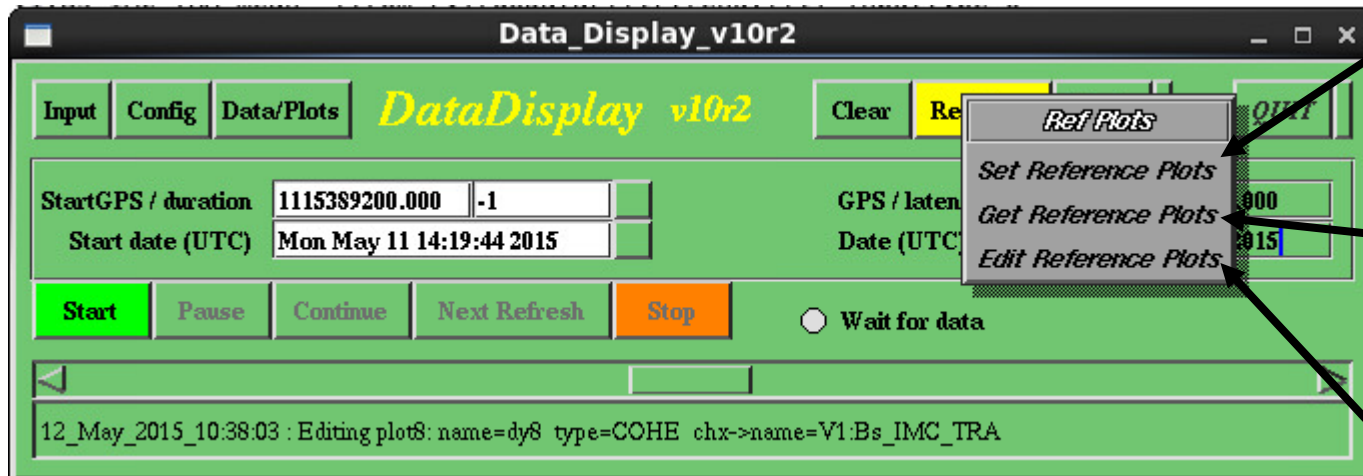
- V1:Bs_IMC_TRA_TIME**: Line plot of volts vs time (45s6 to 46s4). Y-axis ranges from 22.15 to 22.2.
- V1:Bs_IMC**: Log-log plot of volts(sqrt(Hz)) vs Hz. Y-axis ranges from 10^{-8} to 10^{-2} . X-axis ranges from 10^{-1} to 10^3 .
- V1:Bs_IMC_inPwr_TIME**: Line plot of volts vs time (45s6 to 46s4). Y-axis ranges from 145 to 165.
- V1:Bs_IMCpole_TIME**: Line plot of volts vs time (45s6 to 46s4). Y-axis ranges from 200 to 250.
- V1:Bs_IB_z_FFT**: Log-log plot of volts(sqrt(Hz)) vs Hz. Y-axis ranges from 10^{-6} to 10^0 . X-axis ranges from 10^{-1} to 10^3 .
- V1:Bs_IMCpole_FFT**: Log-log plot of volts(sqrt(Hz)) vs Hz. Y-axis ranges from 10^{-6} to 10^0 . X-axis ranges from 10^{-1} to 10^3 .

The context menu is open over the V1:Bs_IMC plot and contains the following items:

- ExportAscii
- Scale_And_Offset
- Scale_AroundMean
- FFTOfDerivative
- FFTOfPrimitive
- Differentiate
- IntegrateUp
- IntegrateDown
- IntegrateRms
- SuperposeExternalPlot
- RemoveRefPlot
- Add
- Divide
- DrawPanel
- Fit
- FitPanel
- Multiply
- Rebin
- SetMaximum
- SetMinimum
- SetStats
- ShowBackground
- ShowPeaks
- Smooth
- SetName
- SetTitle
- Delete
- DrawClass
- DrawClone
- Dump
- Inspect
- SaveAs
- SetDrawOption
- SetLineAttributes
- SetFillAttributes
- SetMarkerAttributes

Use of reference plots

A menu “Reference plots” allows you to create a set of reference plots, to load a set of reference plots and to manage to reference plots files loaded

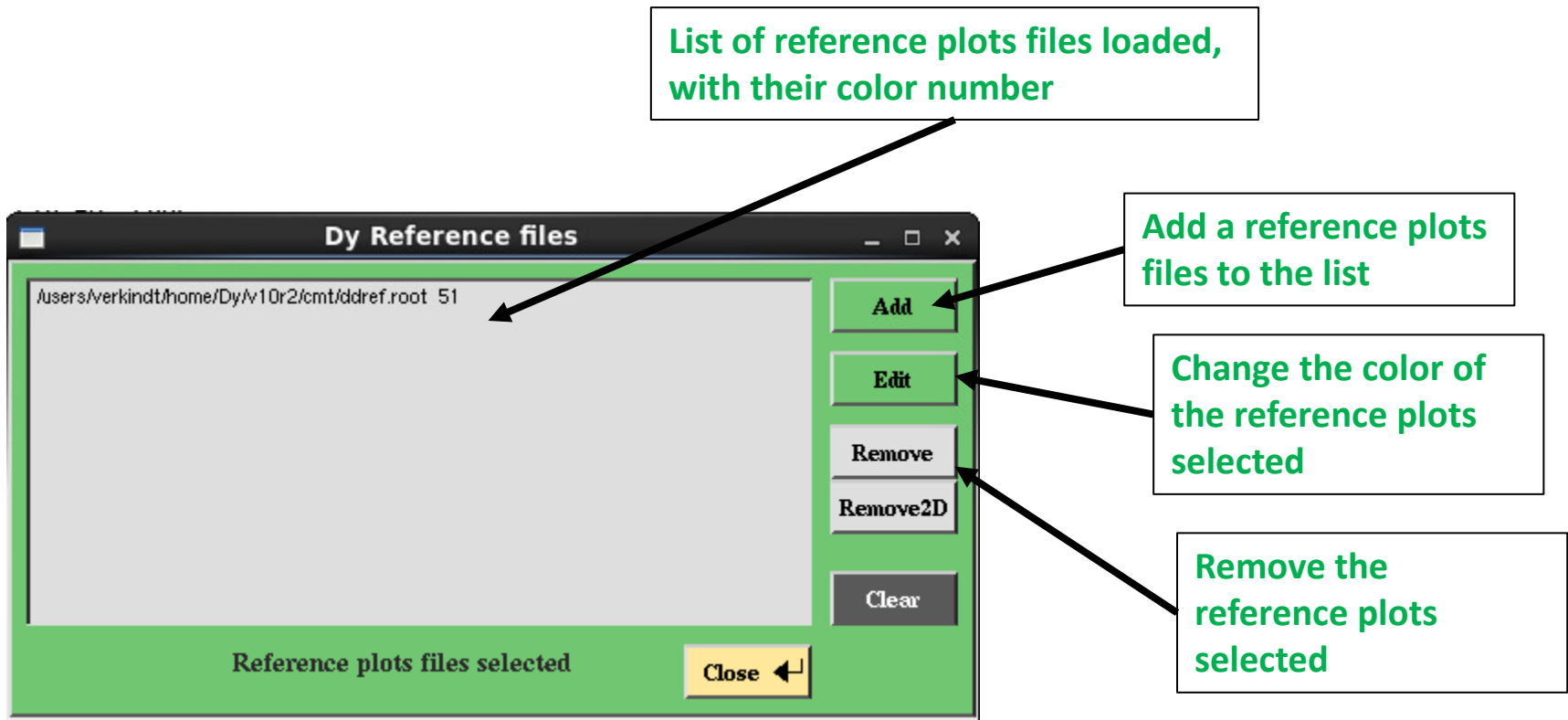


Save in a ROOT file the current plots

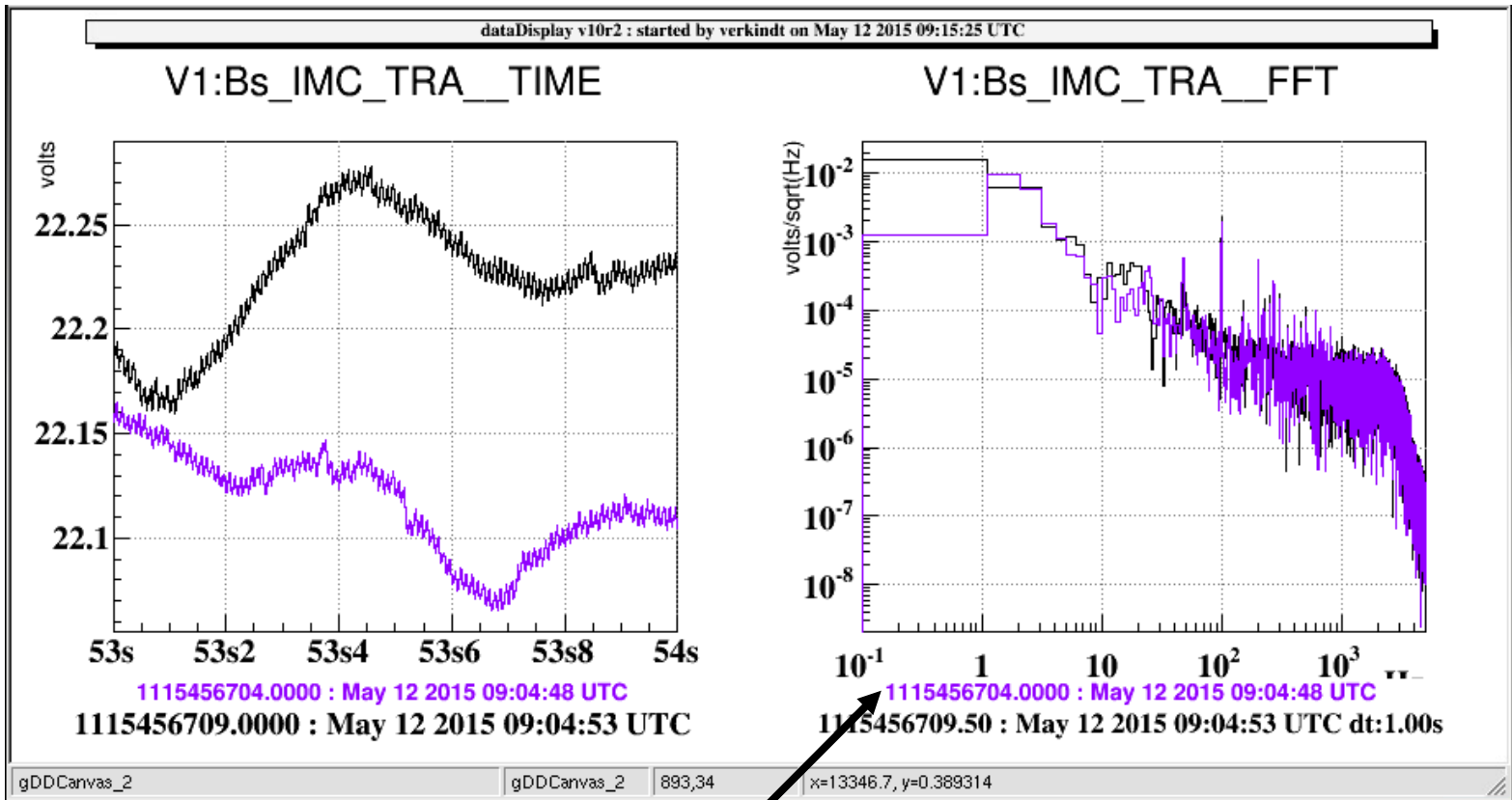
Read from a ROOT file the reference plots to be superposed to the current ones

Add, remove, change color of the reference plots

When choosing “Edit Reference Plots”, the panel below should appear



Once you “Get a Reference Plot”, the reference plots contained in the ROOT file you choose should appear, superposed to the current plots
 When clicking on “Start”, the reference plots continue to be shown superposed to the current ones.



Time origin of the reference plot

Tools and Options

The menu "Tools" provide access to various additional tools and options

The screenshot shows the **DataDisplay v10r2** software interface. The **Tools** menu is open, listing the following options: *Reset*, *Cols x Rows*, *Align plots in time*, *Define user functions*, *Output data files*, *Options*, *Checks*, *Debug*, and *Help*. Callout boxes provide the following descriptions for these options:

- Reset all, except the list of plots** (points to *Reset*)
- Choose the plots configuration on screen** (points to *Cols x Rows*)
- Load a user-defined function running on data vectors** (points to *Align plots in time*)
- Write on disk the data read by the dataDisplay** (points to *Output data files*)
- Access to options panel** (points to *Options*)

The main interface includes tabs for **Input**, **Config**, **Data/Plots**, **Clear**, **Ref Plots**, and **Tools**. It features input fields for **StartGPS / duration** (1115389200.000, -1), **Start date (UTC)** (Mon May 11 14:19:44 2015), **GPS / latency** (1115389226), and **Date (UTC)** (Mon May 11 14:19:44 2015). Control buttons include **Start**, **Pause**, **Continue**, **Next Refresh**, **Stop**, and a **Wait for data** radio button. A status bar at the bottom displays: `12_May_2015_10:38:03 : Editing plot8: name=dy8 type=COHE chx->name=V1:Bs_IMC_TRA`.

The "Options" panel provides various options about the plots display or the mainbrowser management

The image shows a screenshot of the 'Options' panel in a software application. The panel is green and contains several settings. Callout boxes with arrows point to specific settings:

- The color set used in 2D plots** points to the **Color Scale** setting.
- Set log scale or linear scale on the X axis of all the plots** points to the **Log/Lin X** setting.
- Set log scale or linear scale on the Y axis of all the plots** points to the **Log/Lin Y** setting.
- Text size of the legends** points to the **Zoom all legends** setting (value: 0).
- Text size of the statistics** points to the **Zoom all stat boxes** setting (value: 0).
- Text size of the time strings** points to the **Zoom all time strings** setting (value: 0).
- Text size of the X axis** points to the **Zoom all titles** setting (value: 0).
- Text size of the Y axis** points to the **Zoom all labels in X axis** setting (value: 0.05).
- Width of the plots curves** points to the **Zoom all labels on Y axis** setting (value: 0.05).

The 'Options' panel also includes the following settings:

- Plots line width** (value: 1)
- Auto-deselect Plots**
- Auto-deselect Channels**
- Plots not shown**
- Persistent reference plots**
- No vertical colored lines**
- Full white Canvas**
- Slower but nicer fonts**
- square Plots window**
- Trigger ON** **Pause when trigger**

The panel has a title **Options** and a **Close** button at the bottom right.

When choosing “Output data files” in the “Tools” menu, you should get the panel below, which allows to define the content and the characteristics of the data files (frame format) written on disk.

Put this button ON if you want to write on disk the data read by the dataDisplay

List of channels to be written on disk

Directory where data files will be written

Number of frames per file

Output Data

The menu “Tools” contains an item called “Help”.

**It provides access to an Help panel
with a button to active Help balloons.**

**If you need more help, send an email to
verkindt@lapp.in2p3.fr
describing the problem and
telling where can be find the configuration file dy.cfg
that you used**