New Features in ibaAnalyzer 6.6.0

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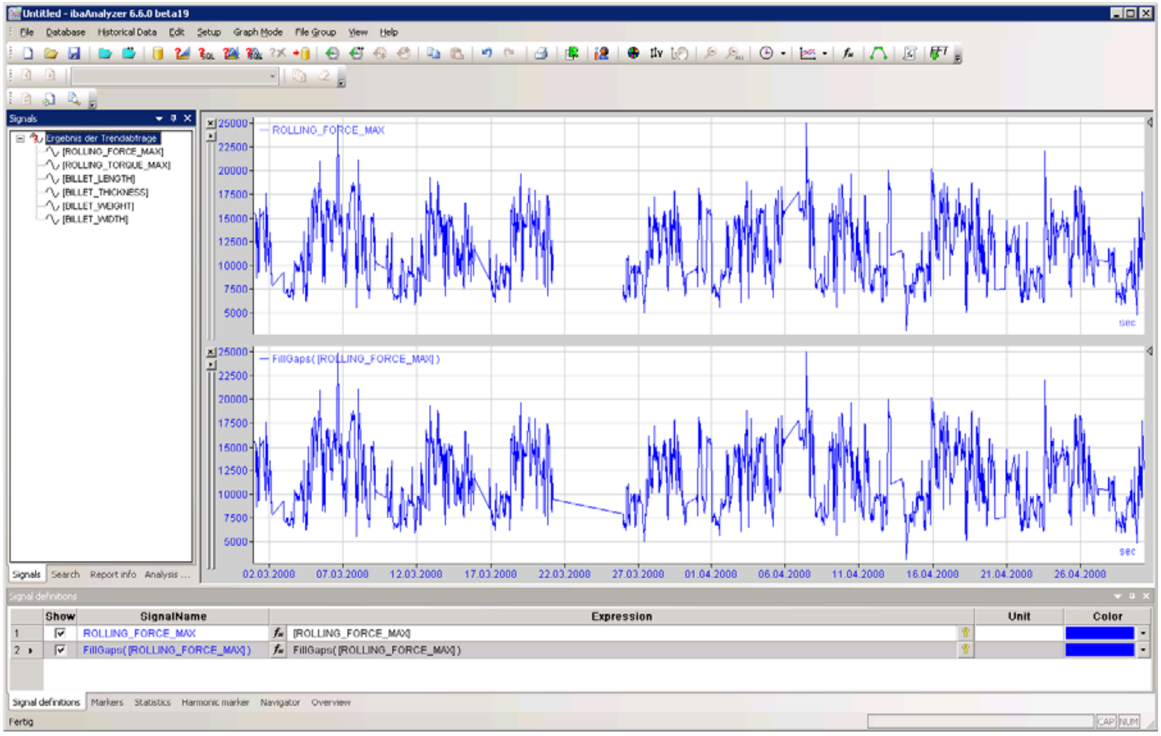
1 New functions

1.1 Fillgaps

This function removes gaps in a signal.

The function takes only one parameter, the signal for which the gaps need to be filled.

This function was mainly implemented to be used on trendquery results from databases were gaps are often caused by NULL values in the database tables and are undesirable.



	Show	SignalName	Expression	Unit	Color
1	☑	ROLLING_FORCE_MAX	[ROLLING_FORCE_MAX]		🟦
2	☑	FillGaps([ROLLING_FORCE_MAX])	FillGaps([ROLLING_FORCE_MAX])		🟦

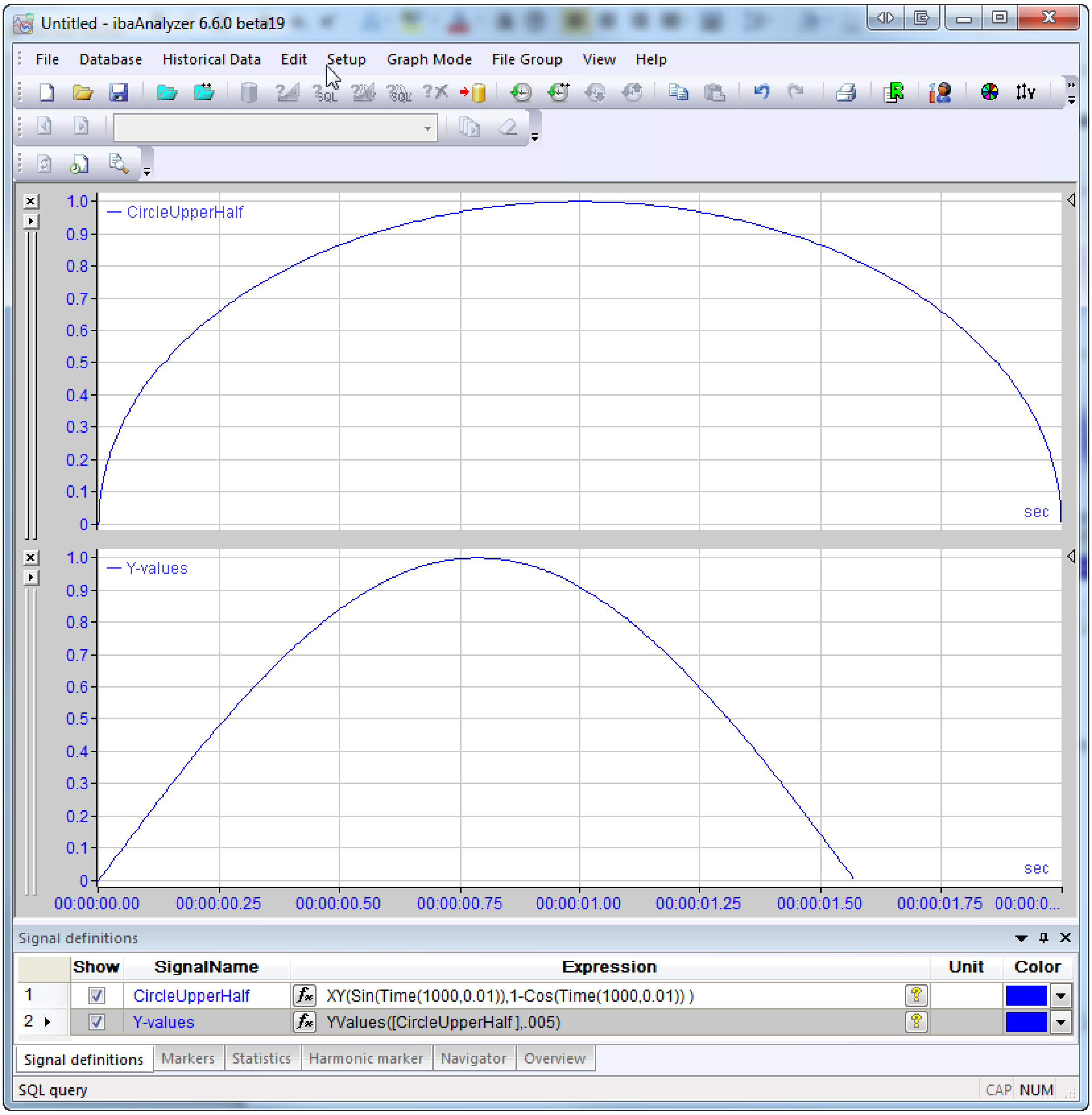
1.2 YValues

This function can be used on a non-equidistant signal to obtain only its Y-values and discard its X-values. The result is an equidistant signal with a specified sample interval.

This function can also be used to place an equidistant signal on a new timebase (or length base), obtaining similar results as the *XStretchScale* function; however without specifying a stretch factor but by immediately specifying the resulting sample interval.

The function takes the following arguments:

- ❑ Expression: Signal to take the Y-values from.
- ❑ XBase: The sample interval of the resulting signal in X-Axis units. This parameter is optional, if omitted a sample interval of 1 X-Axis unit will be taken.



	Show	SignalName	Expression	Unit	Color
1	☑	CircleUpperHalf	XY(Sin(Time(1000,0.01)),1-Cos(Time(1000,0.01)))		🟦
2	☑	Y-values	YValues([CircleUpperHalf],.005)		🟦

1.3 COALESCE

This function is inspired by the function with the same name available in many SQL variants.

This function takes an arbitrary number of arguments and returns the first of those arguments that contains data.

This function is useful for providing a fall back option in the case that a signal might be missing from a .dat file or in the case an expression might not return any results depending on the data.

1.4 Traverse

It happens that when measuring profiles (e.g. thickness, temperature), rather than having static equipment that does the measuring, the measurements are done by a measuring head traversing over the profile. If the measurement is available as a signal in a .dat file along with a signal indicating the position of the measurement head, the *Traverse* function can be used to reconstruct the profile.

The function takes the following arguments:

❑ Signal: The measurement signal.

❑ Position: The signal indicating the position along the profile.

❑ N: The number of zones; i.e. the number of elements in the resulting vector.

❑ Min: Optional lower threshold, values of *Signal* for which *Position* is lower will be discarded. This will also be the lowest reported zone in the profile. This parameter can be omitted in which case the value for *Min* will be equal to the minimum value of *Position*.

❑ Max: Optional upper threshold, values of *Signal* for which *Position* is higher will be discarded. This will also be the highest reported zone in the profile. This parameter can be omitted in which case the value for *Max* will be equal to the minimum value of *Position*.

❑ Average: One can choose to average the consecutive values when passing through the same zone. Only one sample is then added for each pass through a zone. The resulting profile is often much smoother. Specify 1 (or *True()*) to enable this behavior or 0 (or *False()*) to disable it. This parameter is optional and when omitted will equal 1, i.e. the behavior is by default enabled.

Note that for vectors, ibaAnalyzer reports the zone centers along the vertical axis in 2D top plots, with half zones at the bottom and top. This is done to have meaningful values reported along the zones and so that the interpolation is meaningful. To achieve this, the *Traverse* function determines the zones as follows:

❑ The bottom most zone contains the values from *Signal* where *Position* is between *Min* and $Min + \frac{Max-Min}{2.(N-1)}$: The reported value along the vertical axis is *Min*.

❑ The top most zone contains the values from *Signal* where *Position* is between $Max - \frac{Max-Min}{2.(N-1)}$ and *Max*: The reported value along the vertical axis is *Max*.

❑ For the middle zones indexed from k=1 to k=N-2; the zone contains the values from *Signal* where *Position* is between

$Min + \frac{(2.k-1).(Max-Min)}{2.(N-1)}$ and $Min + \frac{(2.k+1).(Max-Min)}{2.(N-1)}$.

The reported value along the vertical axis is $Min + \frac{k.(Max-Min)}{N-1}$.

For example, if *Min* = 0 and *Max* = 10 and *N*=6, the zones are the intervals [0,0.5], [0.5,1.5], [1.5,2.5], [2.5,3.5],[3.5,4.5] and [4.5,5] and the reported zone centers are 0, 1, 2, 3, 4, 5.

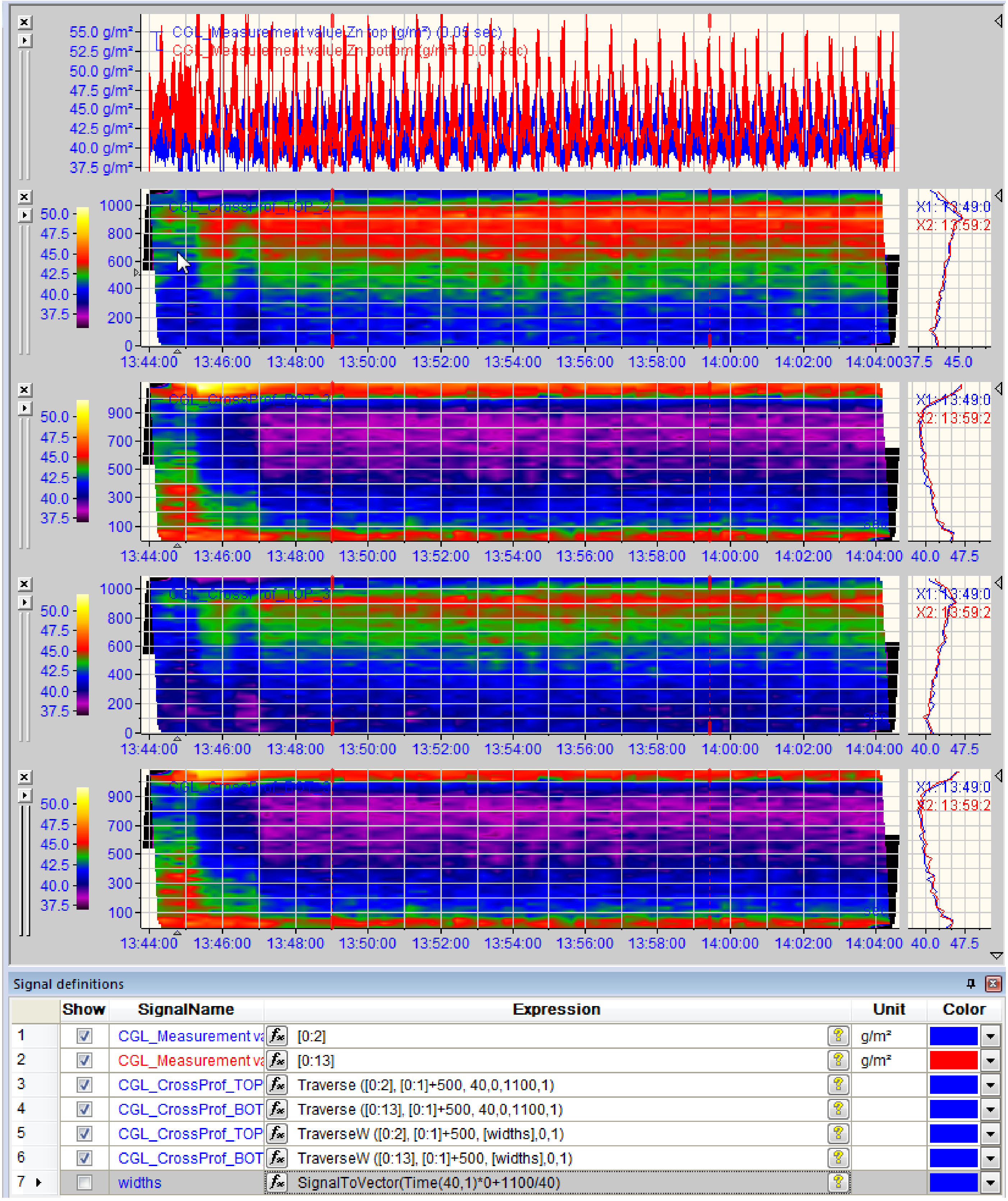
1.5 TraverseW

This function is similar to *Traverse* but requires specifying the zone widths explicitly.

The function takes the following arguments:

- ❑ Signal: The measurement signal.
- ❑ Position: The signal indicating the position along the profile.
- ❑ Widths: A vector containing the widths of the zones.
- ❑ Offset: Can be used to specify an offset where the zones start, this parameter is optional and is by default 0. The offset is to the center of the first zone.
- ❑ Average: One can choose to average the consecutive values when passing through the same zone. Only one sample is then added for each pass through a zone. The resulting profile is often much smoother. Specify 1 to enable this behavior or 0 to disable it. This parameter is optional and when omitted will equal 1, i.e. the behavior is by default enabled.

Similar as the function *SetZoneWidths* and specifying zone-widths and offset in the logicals dialog, the outer zones are only half depicted so that the interpolation is meaningful. However the entire zone width is taken into account to determine which values of Signal should be retained when *Position* passes through the outer zones.



	Show	SignalName	Expression	Unit	Color
1	☑	CGL_Measurement va	[0:2]	g/m²	🟦
2	☑	CGL_Measurement va	[0:13]	g/m²	🟥
3	☑	CGL_CrossProf_TOP	Traverse ([0:2], [0:1]+500, 40,0,1100,1)		🟦
4	☑	CGL_CrossProf_BOT	Traverse ([0:13], [0:1]+500, 40,0,1100,1)		🟦
5	☑	CGL_CrossProf_TOP	TraverseW ([0:2], [0:1]+500, [widths],0,1)		🟦
6	☑	CGL_CrossProf_BOT	TraverseW ([0:13], [0:1]+500, [widths],0,1)		🟦
7	□	widths	SignalToVector(Time(40,1)*0+1100/40)		🟦

1.6 ModuleInfofield and ModuleInfofieldText

Similar as file and channel infofields, module infofields can now be used in analyses. Module infofields are present since ibaPDA 6.33.0 e.g. in inspectra modules.

ModuleInfoField will return a numerical constant if only one file is opened and a varying signal if files are appended; i.e. the result can change at each timestamp a file ends and a new appended file starts. *ModuleInfoFieldText* will return for a selected infofield from a selected module, that infofield as a text channel.

The function *ModuleInfoField* takes the following parameters:

- ❑ File index: The file index the module belongs to
- ❑ Module index: Index of the module.
- ❑ InfoField: The infofield to take from the module
- ❑ Begin: Zero based index of the first character to take from the infofield. This parameter is optional, if it is omitted, the entire infofield will be taken.
- ❑ End: Zero based index of the last character to take from the infofield. This parameter is optional, if it is omitted, the entire infofield starting from Begin will be taken.

The function *ModuleInfoFieldText* takes the same parameters as *ModuleInfoField*.

Similarly as double clicking or dragging a file infofield or channel infofield from the signaltree to the recorder window, doing so on a module infofield will create the necessary expression in the signal grid and depict that expression in the recorder window.

Additionally, the contents of the infofield will be inspected to determine if it is a numerical value or not. In the latter case *ModuleInfoFieldText* will be used rather than *ModuleInfoField*.

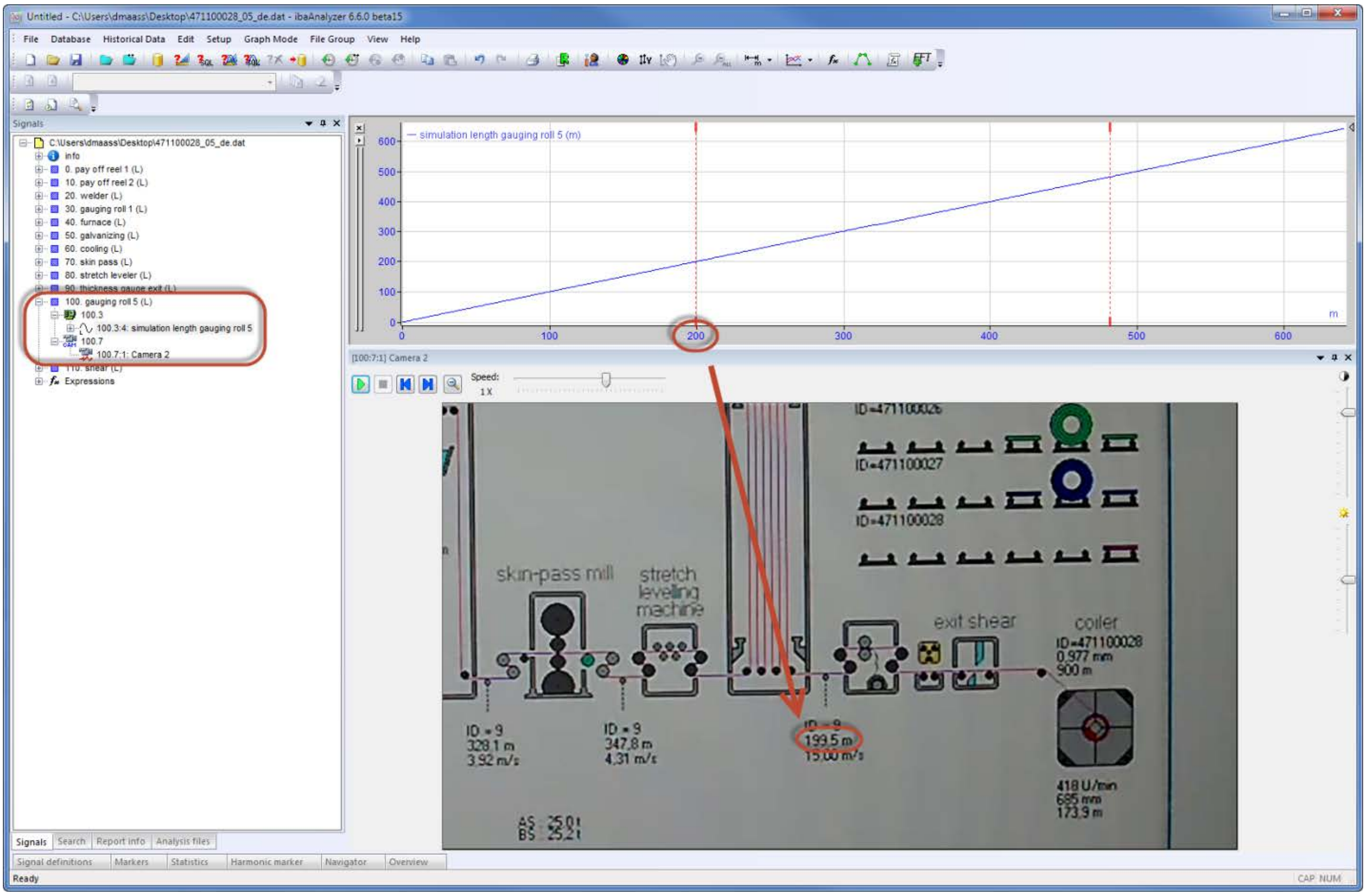
2 ibaCapture-CAM

2.1 Length based synchronization

In version 6.33.0 of ibaPDA it is implemented that length-based ibaCapture-CAM synchronization signals can be recorded (QDR). Each video that has a length-based synchronization channel can be synchronized in ibaAnalyzer on the length-based dynamic marker. Moving the marker in a length-based graph will cause the videos that have a length-based component to seek to an appropriate location and playing such videos will cause the markers in length-based graphs to move accordingly.

It is possible for a video to have both a time- and length-based synchronization channel. In which case both time- and length-based markers can be used to direct the video and if such video is played, both the time- and length-based markers will move.

When extracting to .dat files and choosing to embed videos or extract the videos alongside the .dat file, videos that have a length-based synchronization signal can also be extracted with a length-based profile.



Untitled - C:\Users\dmaass\Desktop\471100028_05_de.dat - ibaAnalyzer 6.6.0 beta15

Signals

- C:\Users\dmaass\Desktop\471100028_05_de.dat
  - info
  - 0. pay off reel 1 (L)
  - 10. pay off reel 2 (L)
  - 20. welder (L)
  - 30. gauging roll 1 (L)
  - 40. furnace (L)
  - 50. galvanizing (L)
  - 60. cooling (L)
  - 70. skin pass (L)
  - 80. stretch leveler (L)
  - 90. thickness gauge exit (L)
  - 100. gauging roll 5 (L)
    - 100.3
      - 100.3:4: simulation length gauging roll 5
    - 100.7
      - 100.7:1: Camera 2
  - 110. shear (L)
  - Expressions

[100:7:1] Camera 2

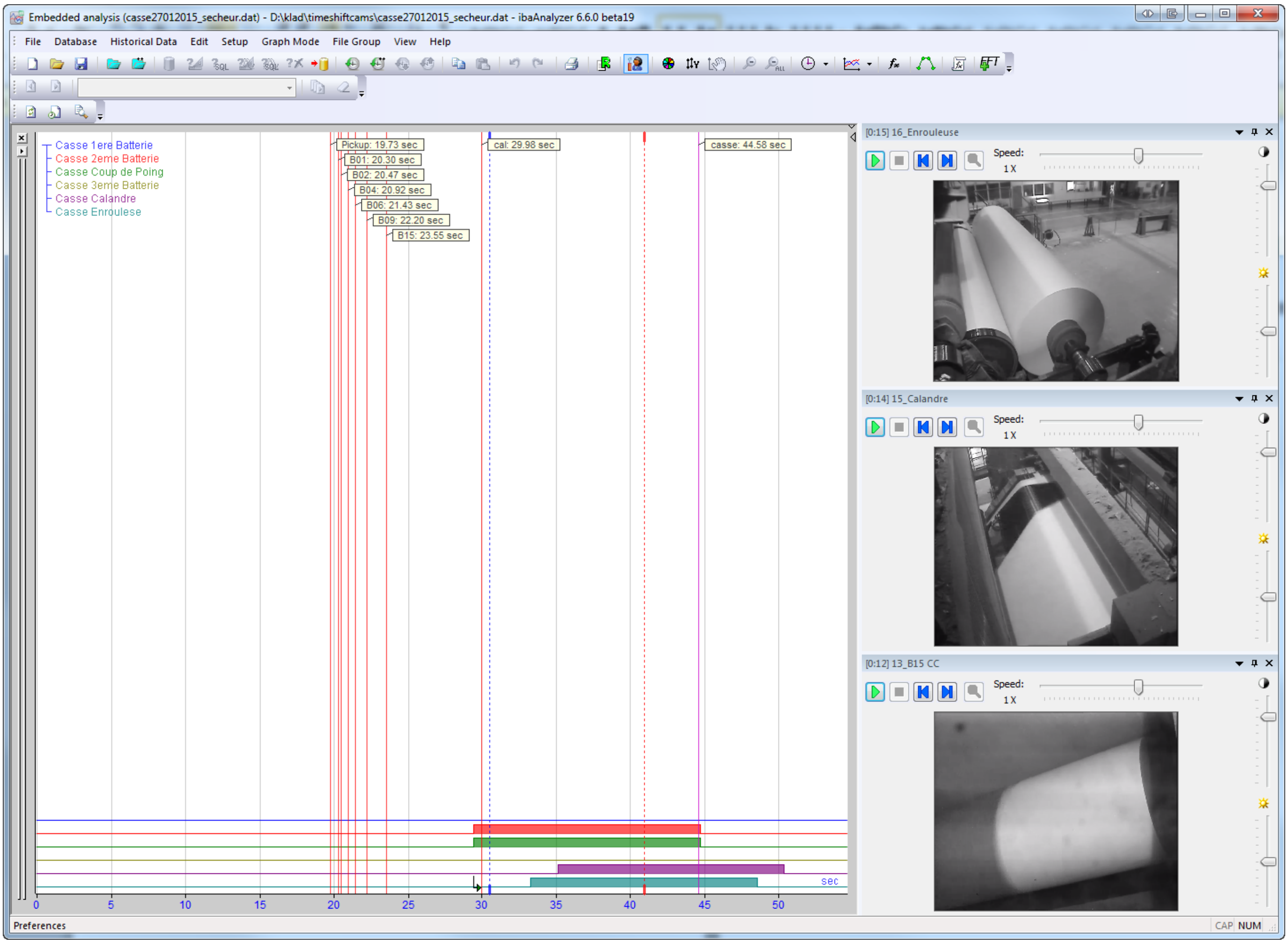
Speed: 1 X

Ready

2.2 Time delay

It is possible to set a delay on ibaCapture-CAM videos in ibaAnalyzer.

The intended use is to synchronize the videos so that if an interesting event happens, the effects of this event can be shown simultaneously on all videos along the assembly line or conveyor belt.

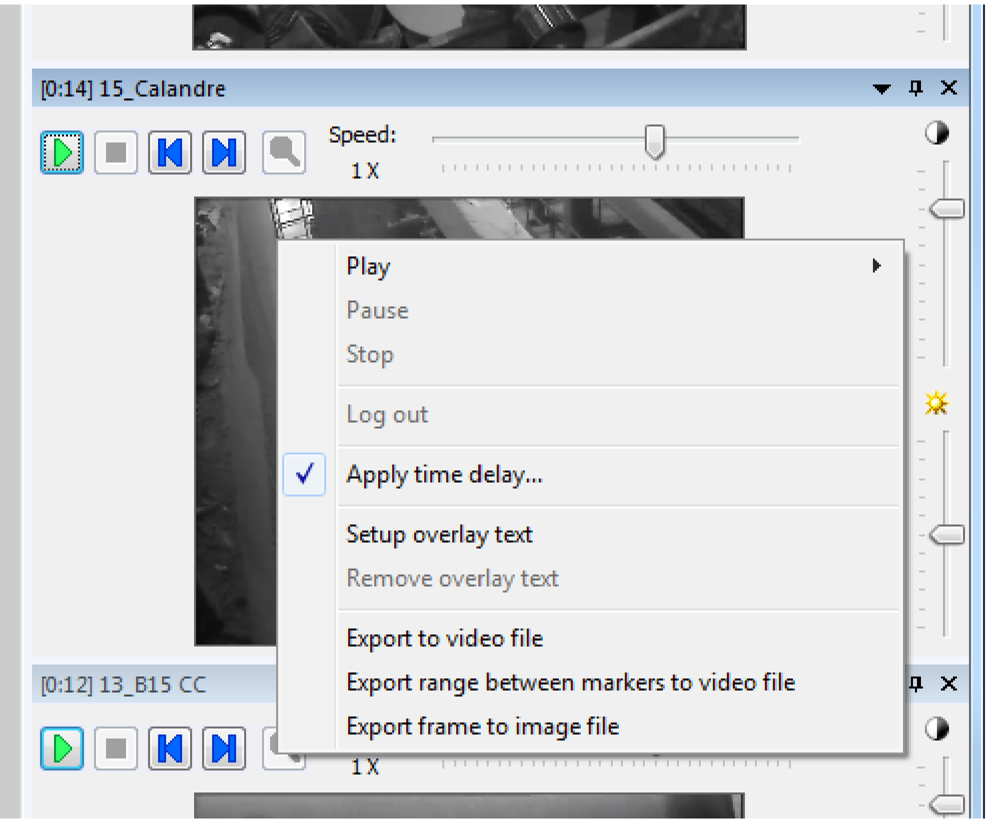


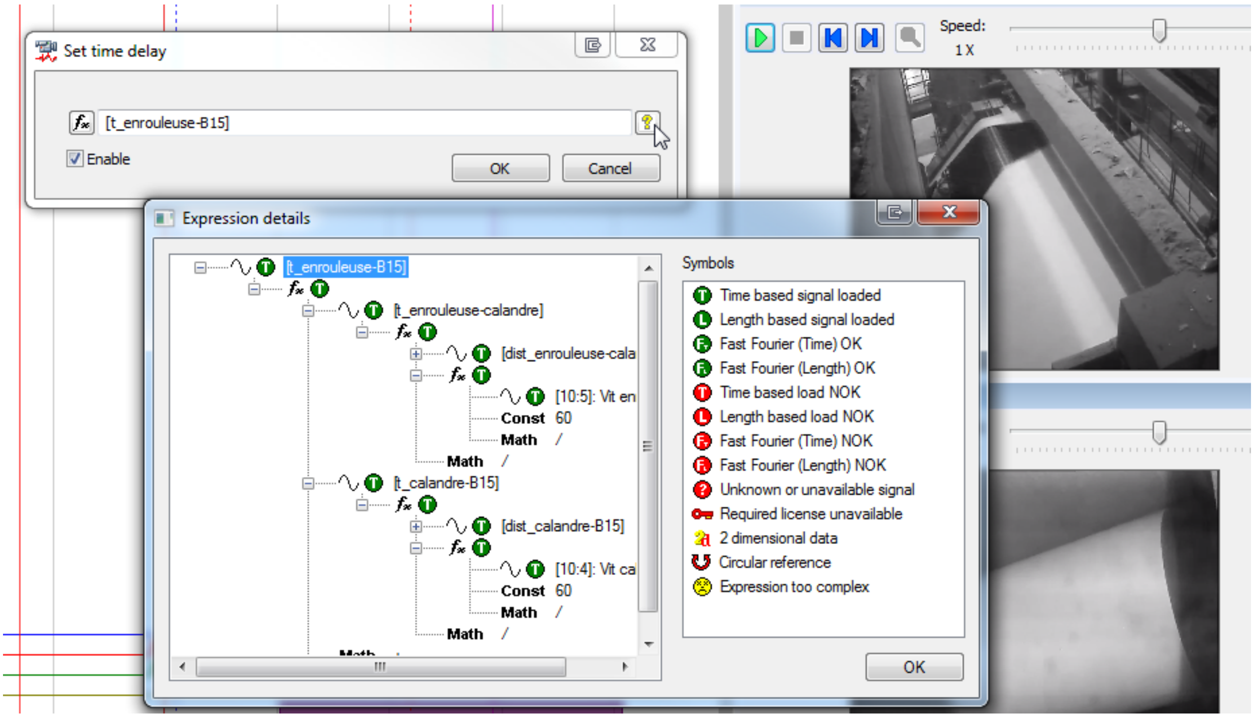
The delay must be expressed in seconds and be a positive value. Alternatively a negative value can be specified in which case an advancement instead of a delay is applied on the video.

The delay can be a constant value or an ibaAnalyzer expression.

The expression does not need to evaluate to a constant, the delay can be variable and for example take into account speed calculations. Any specified delays are persistent in the saved analysis.

The delay can be set by right clicking on the video and selecting the menu option “Apply time delay…” from the context menu. A dialog will popup where you can specify the delay in an ibaAnalyzer expression text input box (which has a diagnose button and expression builder button). Also there is a checkbox labeled “Enable” that you can uncheck so that the delay is not actually applied without the specified expression being lost. Whether or not if the delay is enabled is also visible in the context menu as there is a tick next to the menu option if the delay is enabled.





[t_enrouleuse-B15]

☑ Enable

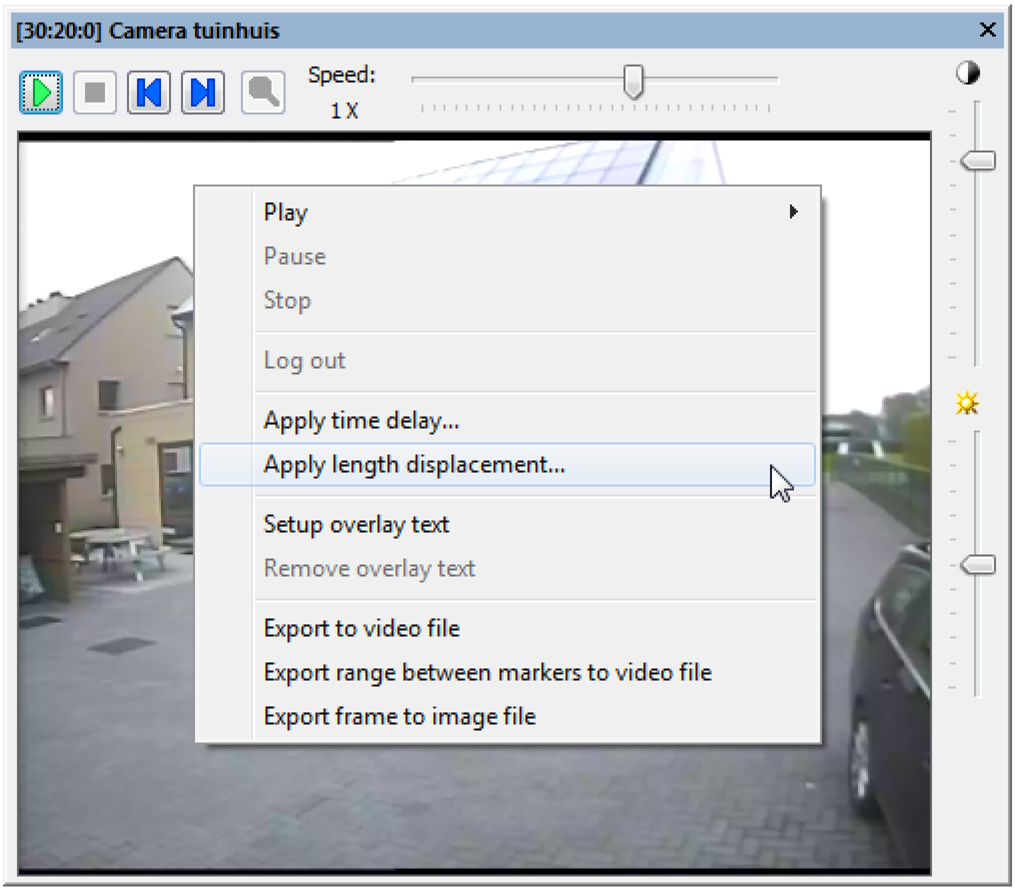
```
[t_enrouleuse-B15]
  fx
    [t_enrouleuse-calandre]
      fx
        [dist_enrouleuse-cala
        fx
          [10:5]: Vit en
          Const 60
          Math /
        Math /
    [t_calandre-B15]
      fx
        [dist_calandre-B15]
        fx
          [10:4]: Vit ca
          Const 60
          Math /
        Math /
```

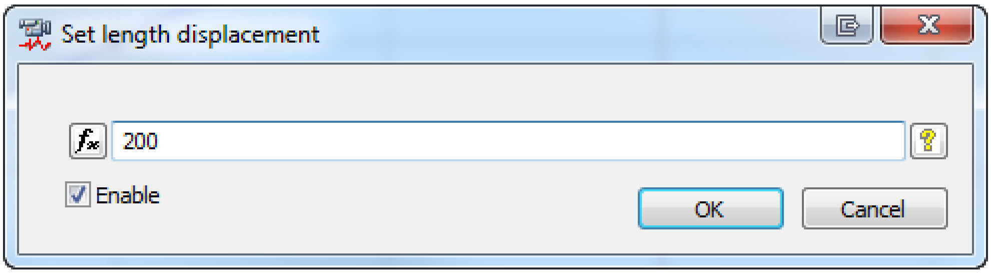
Symbols

- Time based signal loaded
- Length based signal loaded
- Fast Fourier (Time) OK
- Fast Fourier (Length) OK
- Time based load NOK
- Length based load NOK
- Fast Fourier (Time) NOK
- Fast Fourier (Length) NOK
- Unknown or unavailable signal
- Required license unavailable
- 2 dimensional data
- Circular reference
- Expression too complex

2.3 Length displacement

Similar as a for a time delay, a length displacement can be set for videos who have a length-based synchronization signal. Videos that have both a time- and length-based synchronization signal will have both options available...The menu option in the context menu is titled “Set length displacement…”. Specifying a positive value or an expression that evaluates to a positive value means a displacement to the left; i.e. showing video frames that would normally sync with a smaller length value. You can also specify a negative value or an expression that evaluates to a negative value to have a displacement to the right; i.e. showing video frames that would normally sync with a larger length value.


[30:20:0] Camera tuinhuis
Speed:
1 X
Play
Pause
Stop
Log out
Apply time delay...
Apply length displacement...
Setup overlay text
Remove overlay text
Export to video file
Export range between markers to video file
Export frame to image file



200

☑ Enable

3 Audio player

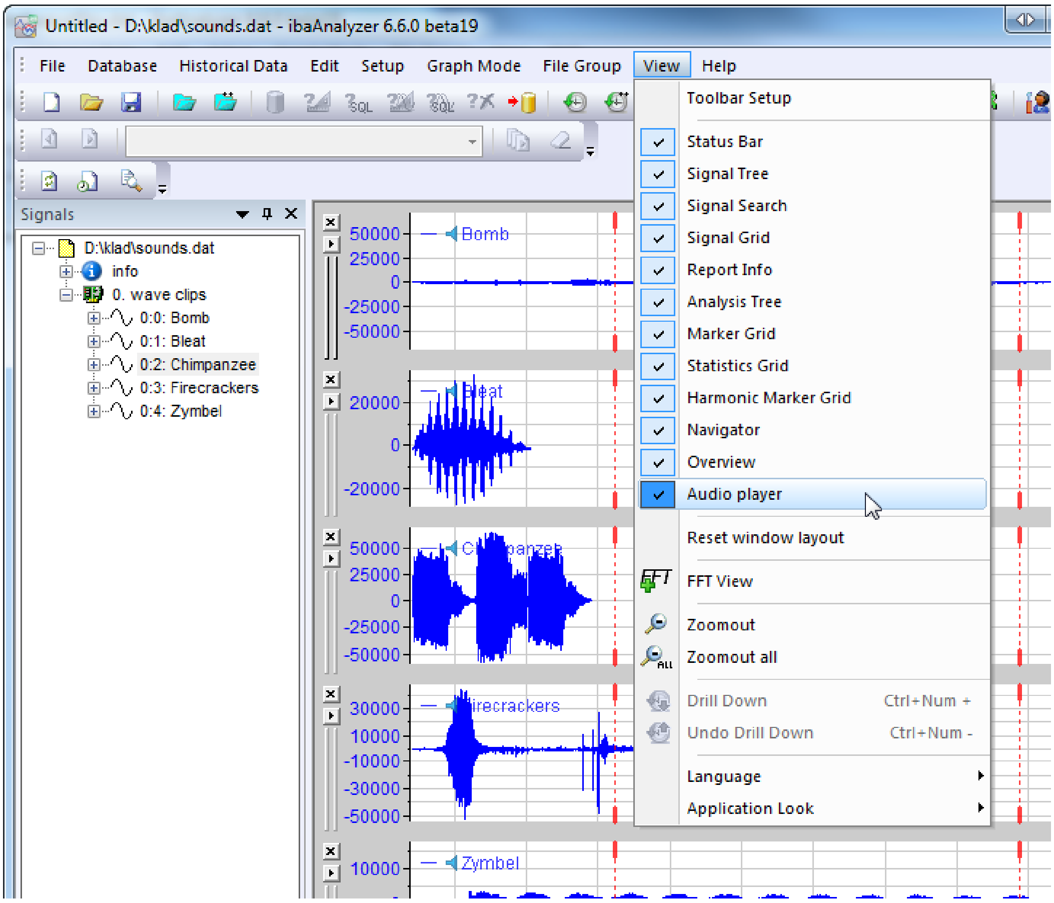
The current version of ibaAnalyzer allows time-based signals to be interpreted as sound waves and allows them to be played through the default audio device of the system.

3.1 Enabling the audio player

To enable the audio functionality, go to the main menu, select the “View” sub menu and select the “Audio player” menu option.

Speaker icons (🔈) will appear in front of the signal names in the legends in the graphs for the signals that can be played. Signals that are not time-based or for which the sample rate is too coarse (less than 100 samples per second), will not have a speaker icon and hence cannot be played.

The audio functionality can be disabled again with the same menu option. A checkmark next to the menu option indicates whether or not the audio functionality is enabled. This option is also saved in the ibaAnalyzer user settings and hence is persistent through ibaAnalyzer sessions.



3.2 Playing / pausing

To start playing an audio signal, click on the speaker icon next to the signal name in the legend. The audio will start playing from the position of the *X1* marker. The marker will move along to indicate the progression of the audio. The speaker icon will change into a pause icon (⏸).

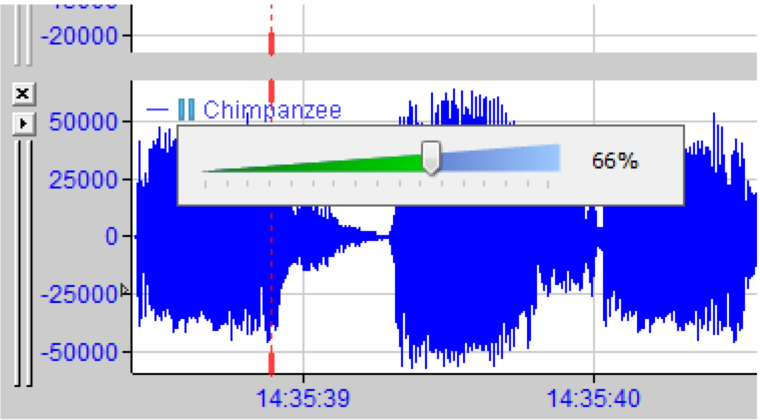
The audio is paused by either

- ❑ Clicking the pause icon in the legend.
- ❑ Moving the markers.
- ❑ Modifying the signals depicted in the recorder window, e.g. removing or adding a graph or signal, modifying an expression, etc…
- ❑ Loading or reloading a .dat file or other data source (trend- or HD query, database query, …)
- ❑ Playing a video.
- ❑ Disabling the audio player in the “View” submenu of the main menu.
- ❑ Letting the audio play until the end of the data.

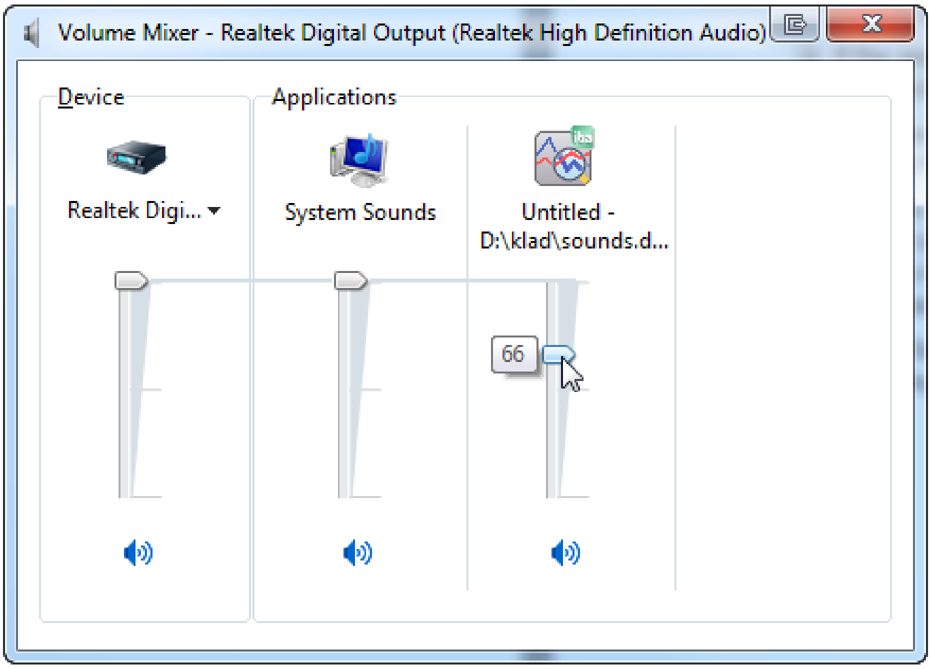
After the audio is paused, the pause icon in the legend changes back to a speaker icon.

3.3 Volume control

When playing a signal, a volume control is present below the legend of the signal where the volume of the audio playback can be adjusted.



The selected volume is persistent over the ibaAnalyzer session. The volume can also be adjusted from the Windows volume control in the system-tray.


Volume Mixer - Realtek Digital Output (Realtek High Definition Audio)
Device
Applications
Realtek Digi...
System Sounds
Untitled - D:\klad\sounds.d...
66

Note that it is not possible to adjust the volume by scaling an entire signal (e.g. multiplying with a positive factor) as the signal data is normalized before being sent to the audio device.

You can play two signals simultaneously by simply making an expression and adding the signals; the sound waves will be superimposed.

3.4 Synchronization with video

If ibaCapture-CAM videos are present, they will play along while an audio signal is played. The speed of the video will be 1 X, regardless of what speed is set on the video. Currently the playback synchronization is only in one direction, from audio to video; playing a video will not cause audio to be played.

4 Exporting graphs

4.1 Exporting graph signals to tab separated value file

Similar as a file export, the signals of a graph can be exported to an ASCII text file where the values for each signal will be present in tab separated columns. Unlike the file export, it is possible to also export the data if the graph is length-, frequency- or inverse length based.

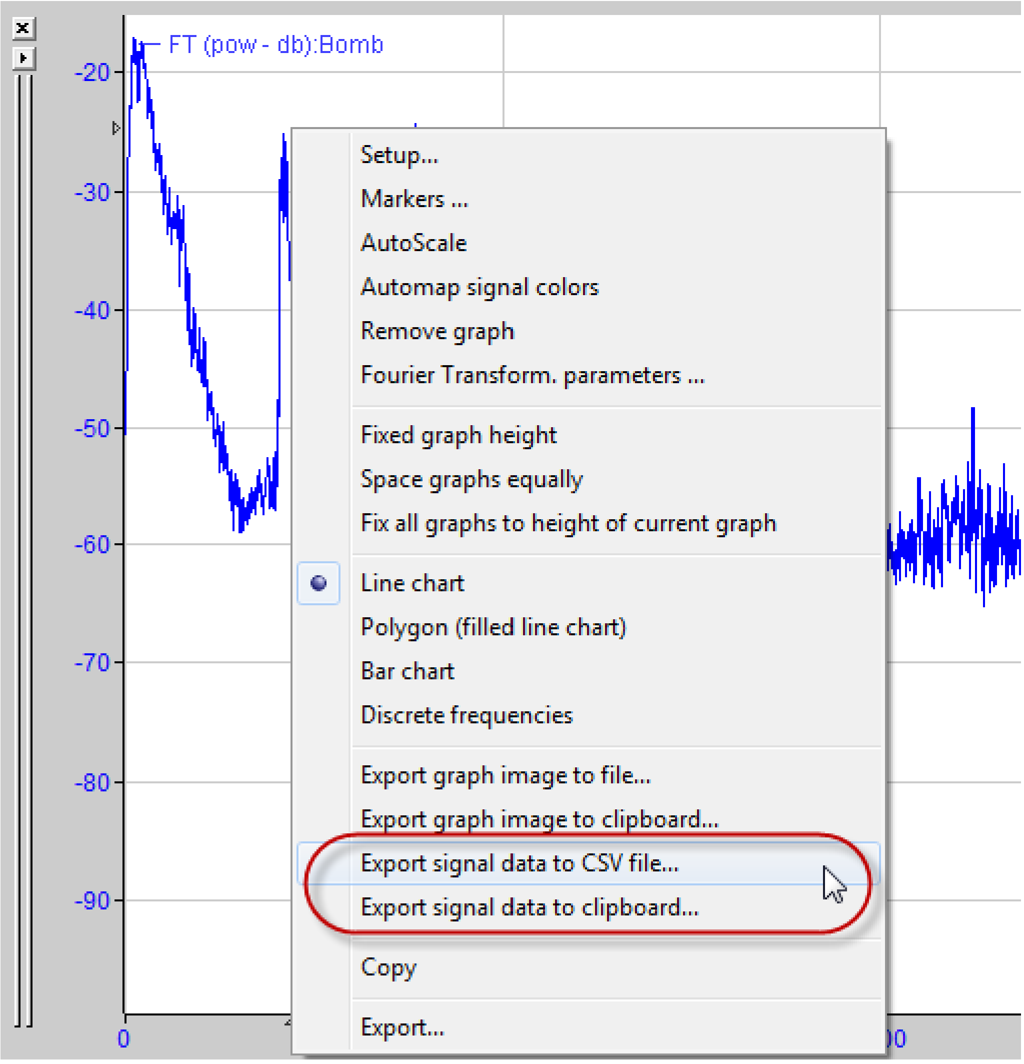
This can be done by right clicking on the graph one wishes to export and selecting the menu option “Export signal data to CSV file”. The term “CSV file” is a misnomer as the file is actually tab separated rather than comma separated, however we assume that “CSV file” is a more commonly understood term.

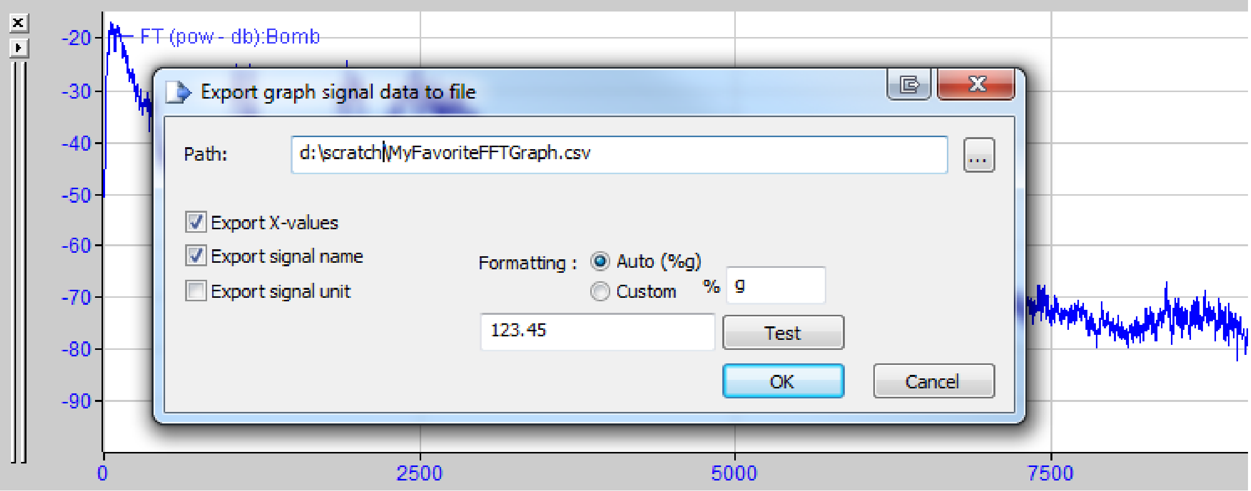
After selecting the menu option, a dialog will popup providing a number of options for the export. The dialog consists out of the following elements.

- ❑ A textbox where one can specify the location of the output text file, along with a browse button that will allow one to open a “File save” dialog to browse for a location.
- ❑ If the graph to be exported is time-based, there will be three radio buttons to indicate whether one wants to have times reported relative to the start of the source .dat file or absolute times or if no time column should be present at all.
- ❑ If the graph is length-, frequency- or inverse length based, a checkbox is present to select whether or not one wants a unit column in the text file.
- ❑ Two checkboxes to indicate if one wishes header lines in the text file that will contain the signal names and/or units.
- ❑ Options to specify the numeric formatting, similar as in the ibaAnalyzer *Export* or *Extract* dialogs. One can select auto formatting (labeled “Auto (%g)”) or specify a custom format string (C *printf* syntax, the %-sign must be omitted). A test button and input box are available to test the custom formatting.
- ❑ An *OK* button to confirm the export or a *Cancel* button to leave the dialog without exporting.

4.2 Exporting graph signals to clipboard

Rather than exporting to a text file, one also has the option to export to the clipboard; this allows one to paste the data in an application like e.g. Microsoft Excel. This can also be done by accessing the graph context menu and selection the “Export signal data to clipboard” menu option. A dialog will popup that contains the same elements as the dialog to export to text file, except that no output file needs to be specified.


FT (pow - db):Bomb
-20
-30
-40
-50
-60
-70
-80
-90
0
Setup...
Markers ...
AutoScale
Automap signal colors
Remove graph
Fourier Transform. parameters ...
Fixed graph height
Space graphs equally
Fix all graphs to height of current graph
● Line chart
Polygon (filled line chart)
Bar chart
Discrete frequencies
Export graph image to file...
Export graph image to clipboard...
Export signal data to CSV file...
Export signal data to clipboard...
Copy
Export...



Export graph signal data to file

Path: d:\scratch\MyFavoriteFFTGraph.csv

☑ Export X-values

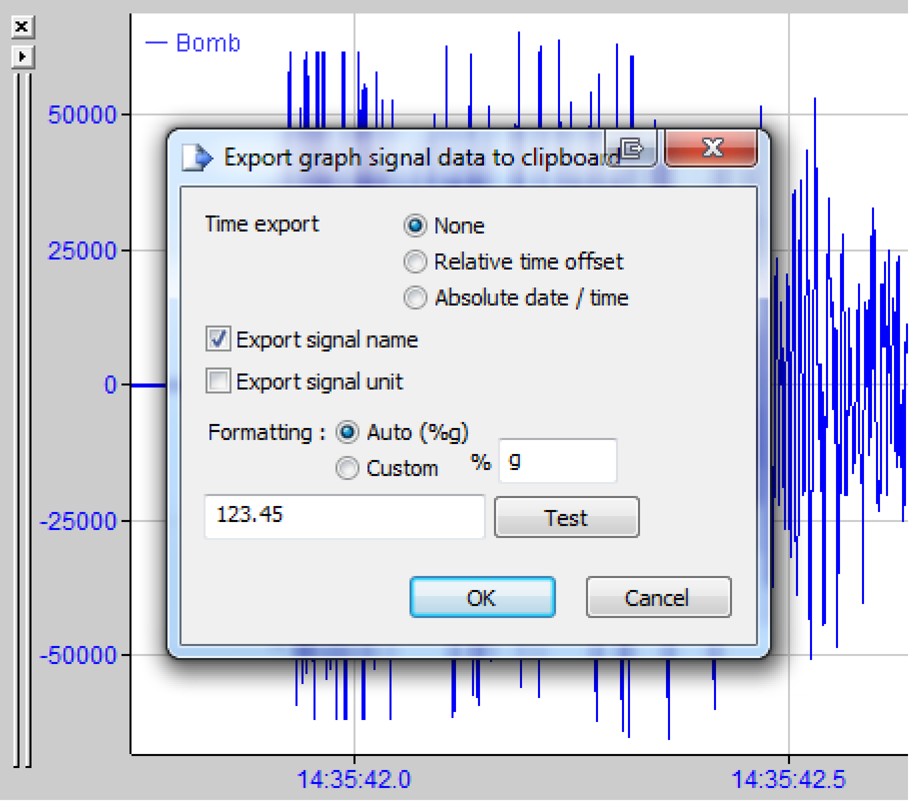
☑ Export signal name

☐ Export signal unit

Formatting : ● Auto (%g) ○ Custom % g

123.45 Test

OK Cancel



Export graph signal data to clipboard

Time export ● None ○ Relative time offset ○ Absolute date / time

☑ Export signal name

☐ Export signal unit

Formatting : ● Auto (%g) ○ Custom % g

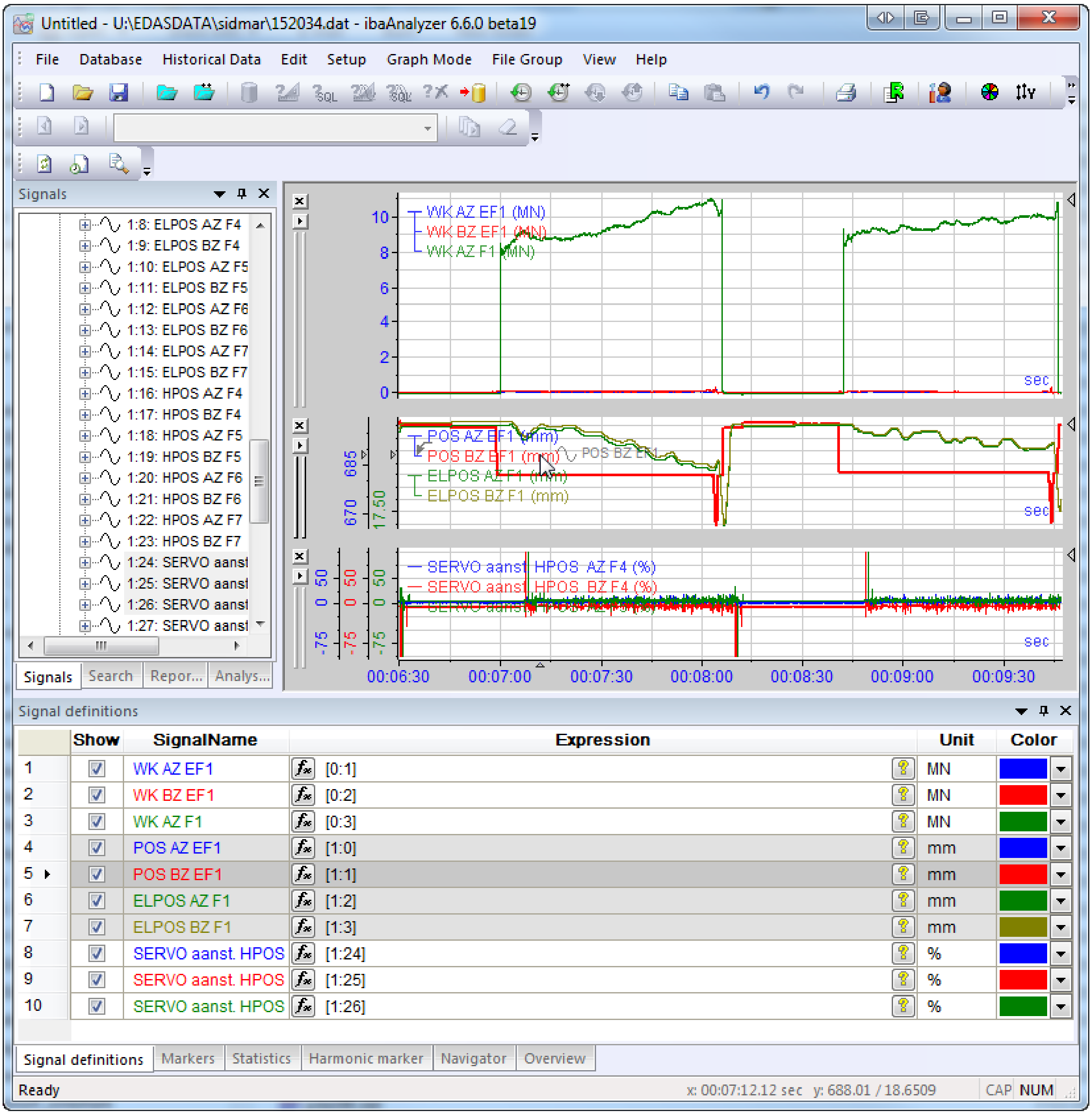
123.45 Test

OK Cancel

5 Miscellaneous new features

5.1 Selected graph grid coloring

In the signal and marker grids, the signals belonging to the selected graph have a light-gray background while the background of the actual selected signal is darkened.

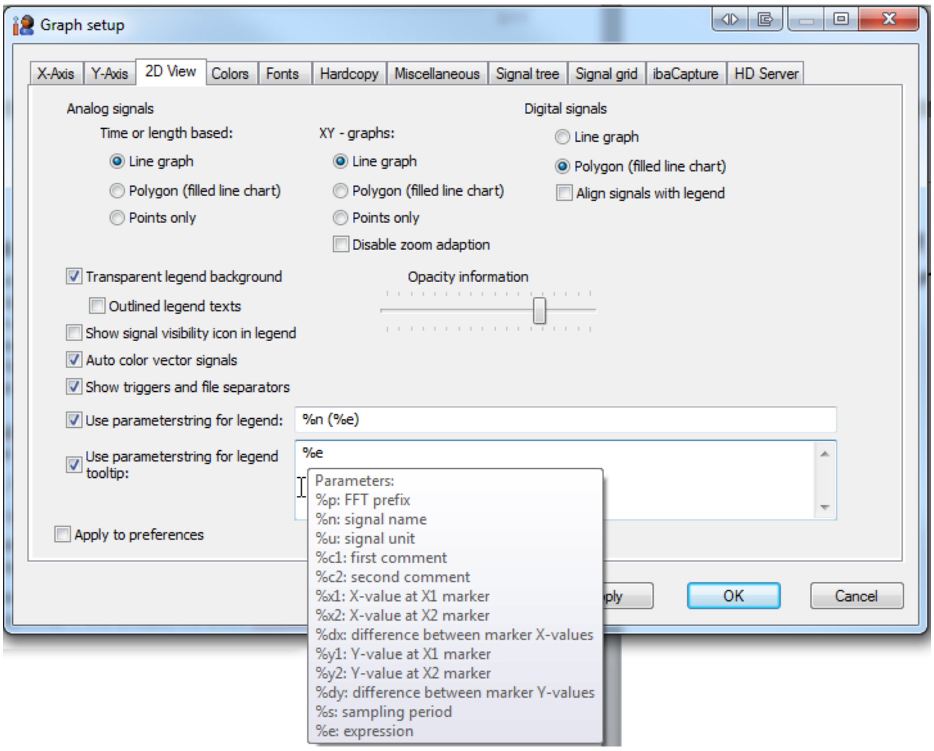


	Show	SignalName	Expression	Unit	Color
1	☑	WK AZ EF1	[0:1]	MN	🟦
2	☑	WK BZ EF1	[0:2]	MN	🟥
3	☑	WK AZ F1	[0:3]	MN	🟩
4	☑	POS AZ EF1	[1:0]	mm	🟦
5 ▸	☑	POS BZ EF1	[1:1]	mm	🟥
6	☑	ELPOS AZ F1	[1:2]	mm	🟩
7	☑	ELPOS BZ F1	[1:3]	mm	🟨
8	☑	SERVO aanst. HPOS	[1:24]	%	🟦
9	☑	SERVO aanst. HPOS	[1:25]	%	🟥
10	☑	SERVO aanst. HPOS	[1:26]	%	🟩

Ready x: 00:07:12.12 sec y: 688.01 / 18.6509 CAP NUM

5.2 Expression in parameterized legends and legend tooltips

When using parameterized legends or parameterized legend tooltips, a new parameter is available. The parameter **“%e”** will be replaced by the expression of the channel.



Graph setup

Analog signals

Time or length based:

● Line graph
○ Polygon (filled line chart)
○ Points only

XY - graphs:

● Line graph
○ Polygon (filled line chart)
○ Points only
□ Disable zoom adaption

Digital signals

○ Line graph
● Polygon (filled line chart)
□ Align signals with legend

☑ Transparent legend background
□ Outlined legend texts
□ Show signal visibility icon in legend
☑ Auto color vector signals
☑ Show triggers and file separators

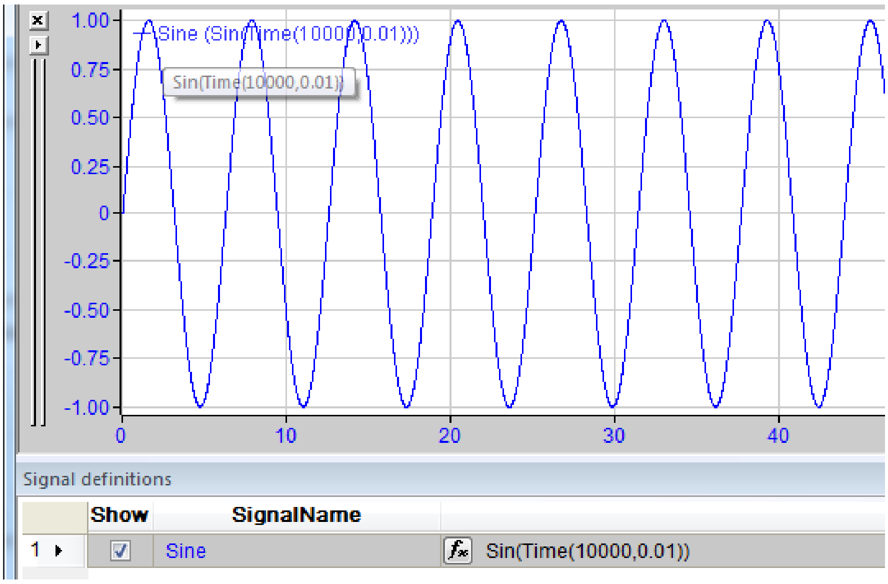
Opacity information

☑ Use parameterstring for legend: %n (%e)

☑ Use parameterstring for legend tooltip: %e

□ Apply to preferences

Parameters:
%p: FFT prefix
%n: signal name
%u: signal unit
%c1: first comment
%c2: second comment
%x1: X-value at X1 marker
%x2: X-value at X2 marker
%dx: difference between marker X-values
%y1: Y-value at X1 marker
%y2: Y-value at X2 marker
%dy: difference between marker Y-values
%s: sampling period
%e: expression

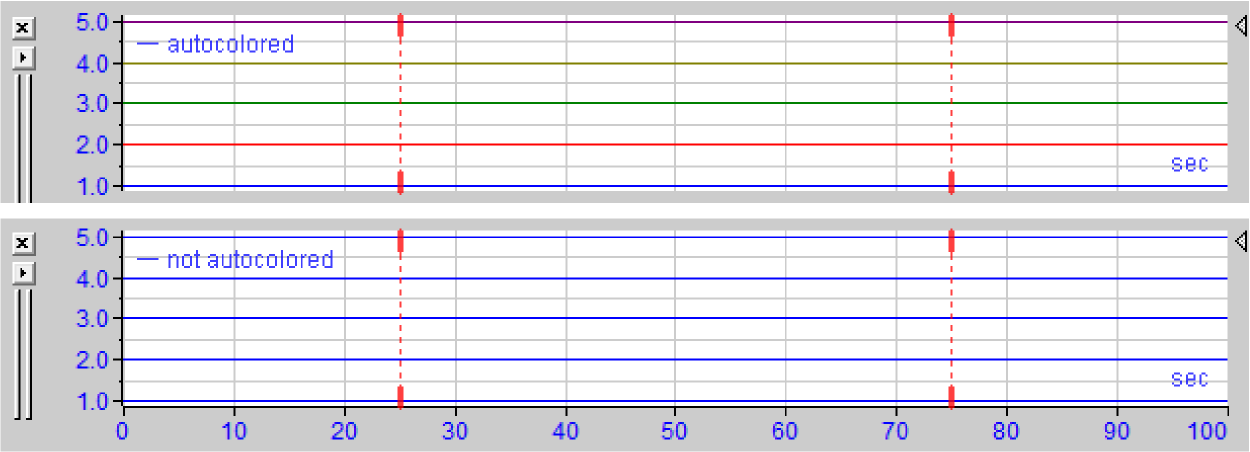


Signal definitions

	Show	SignalName	
1	☑	Sine	Sin(Time(10000,0.01))

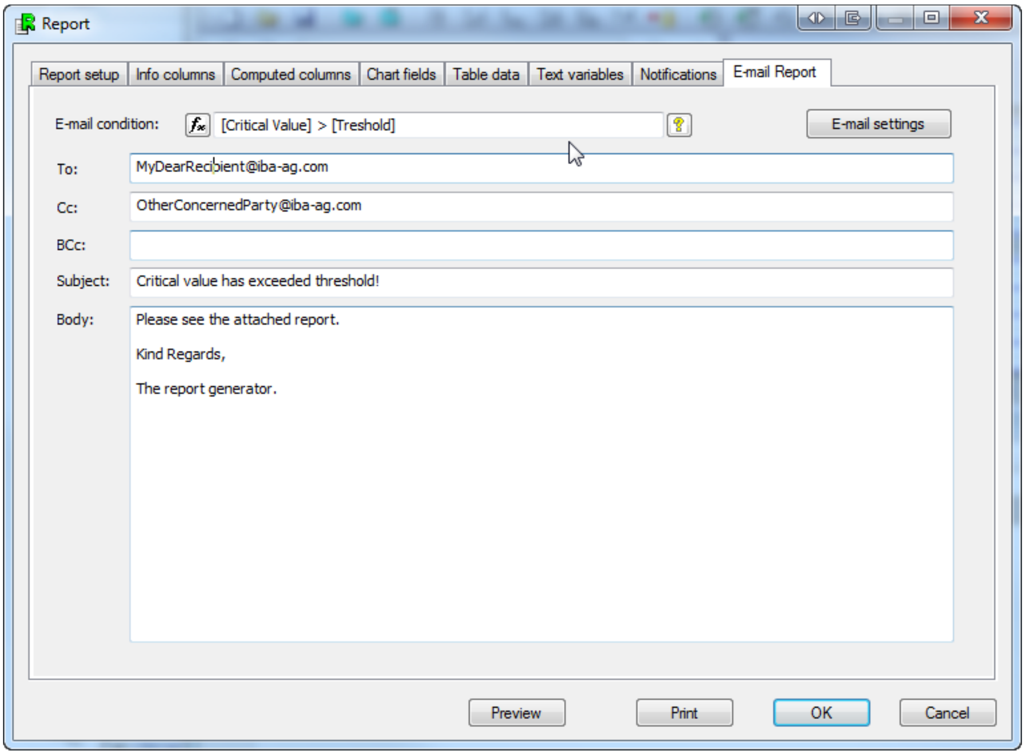
5.3 Vector auto coloring

When vectors are placed in standard view, by default each subsignal of a vector is assigned a color. The first subsignal is given the color as selected from the 16 predefined colors, the second the color after that, etc. going round- robin if necessary. This behavior can now be disabled. The option is labeled “Auto color vector signals” in the *Graph Setup -> 2D View* or *Preferences -> 2D View tab*. By default it is checked (and hence enabled), you need to uncheck the option if you do not want the vector auto coloring.



5.4 Report generation: conditional e-mails

Sending a report by e-mail can now be done conditionally by setting an ibaAnalyzer expression in the report e-mail options.



E-mail condition: [Critical Value] > [Treshold]

To: MyDearRecipient@iba-ag.com

Cc: OtherConcernedParty@iba-ag.com

BCc:

Subject: Critical value has exceeded threshold!

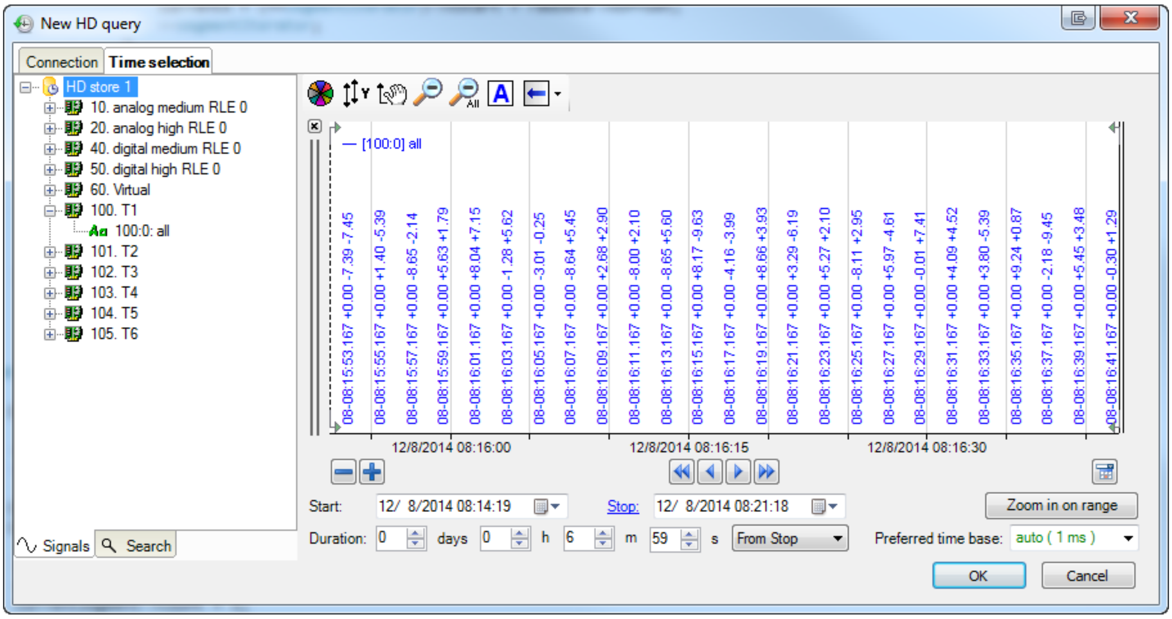
Body: Please see the attached report.

Kind Regards,

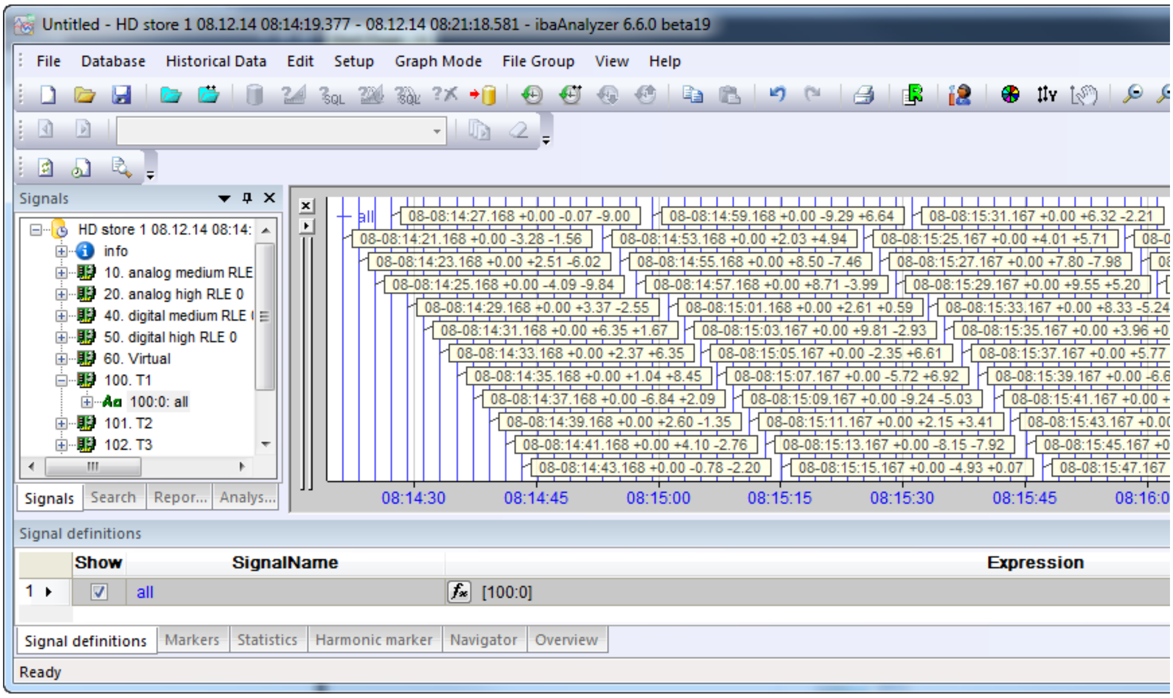
The report generator.

5.5 HD text channels

If text channels are present on the HD server, they will now be present in the signal tree after performing a HD query, and they can be depicted and used in expressions entirely identical as how a text channel in a .dat file can be used.



Start: 12/ 8/2014 08:14:19
Stop: 12/ 8/2014 08:21:18
Duration: 0 days 0 h 6 m 59 s From Stop
Preferred time base: auto (1 ms)



Signal definitions

	Show	SignalName	Expression
1	☑	all	[100:0]