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Synchronization between g.MOBIlab and Noldus Observer XT

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g.MOBIlab is a biosignal acquisition system for EEG, ECG, EMG, EOG and other sensors. In this tutorial the usage of the device for a recording of ECG, respiration and galvanic skin response (GSR) synchronized with the Noldus Observer XT will be shown.

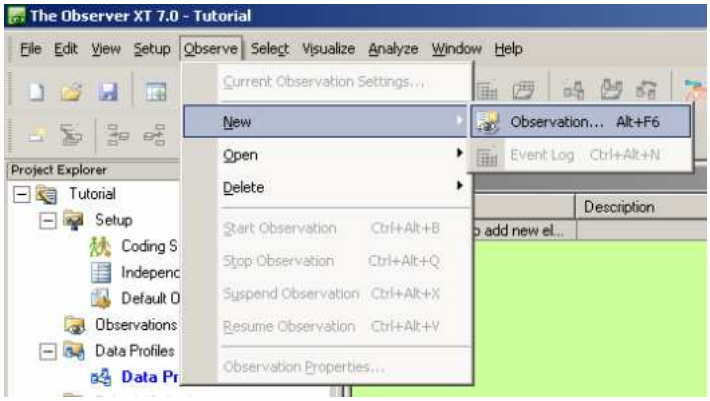
Software Settings and Hardware Setup

For this tutorial one PC running the Observer XT and another PC running the g.MOBIlab biosignal acquisition system are required. The Observer is providing a synchronization signal on the serial interface of the PC that can be acquired on the biosignal recording PC for synchronization with the biosignal data.

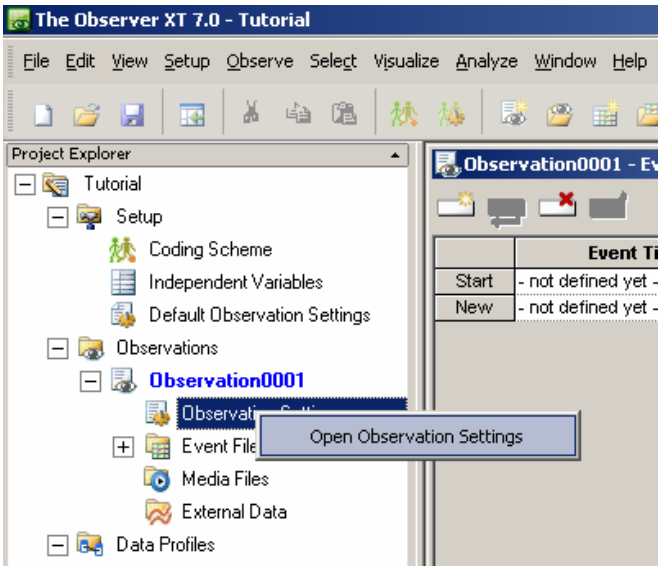
Perform the following steps:

Connect the COM port of the PC running the Observer XT with the COM port of the computer running the g.MOBIlab Highspeed On-line Processing for Simulink software.

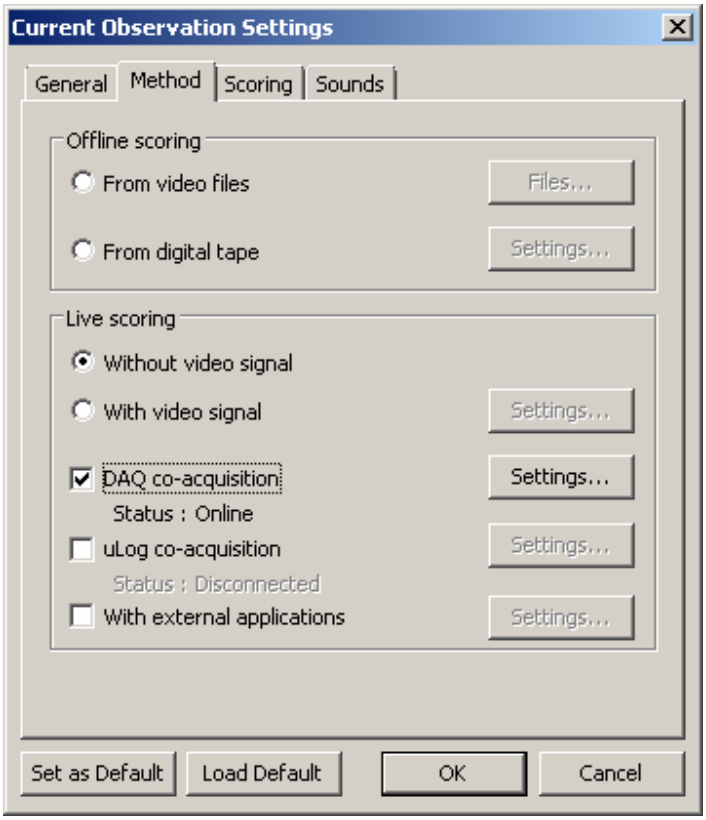
Inside the Observer start a new Observation.



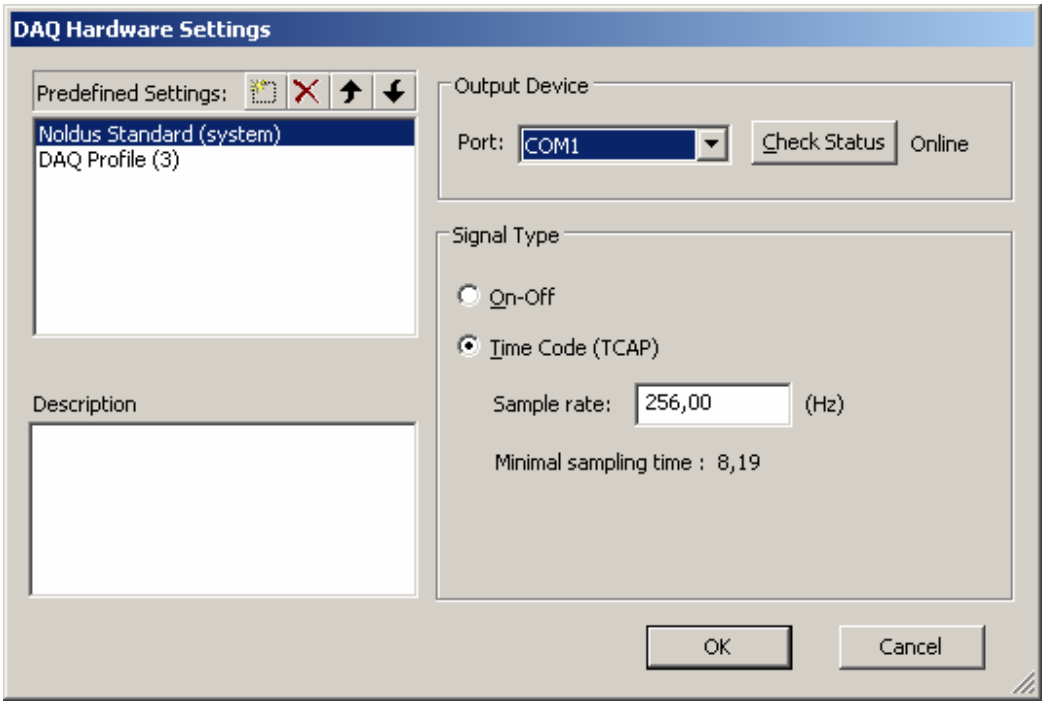
Then **Open Observation Settings**



Select under **Method** and **Live scoring**, **DAQ co-acquisition**



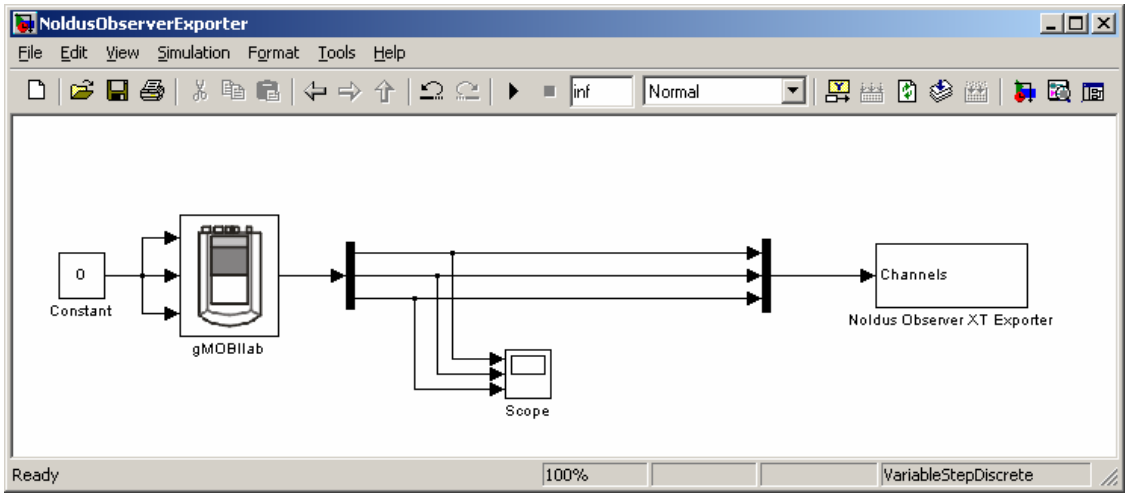
Under **Settings** select the COM port for the synchronization signal



Then press **OK** to close the windows.

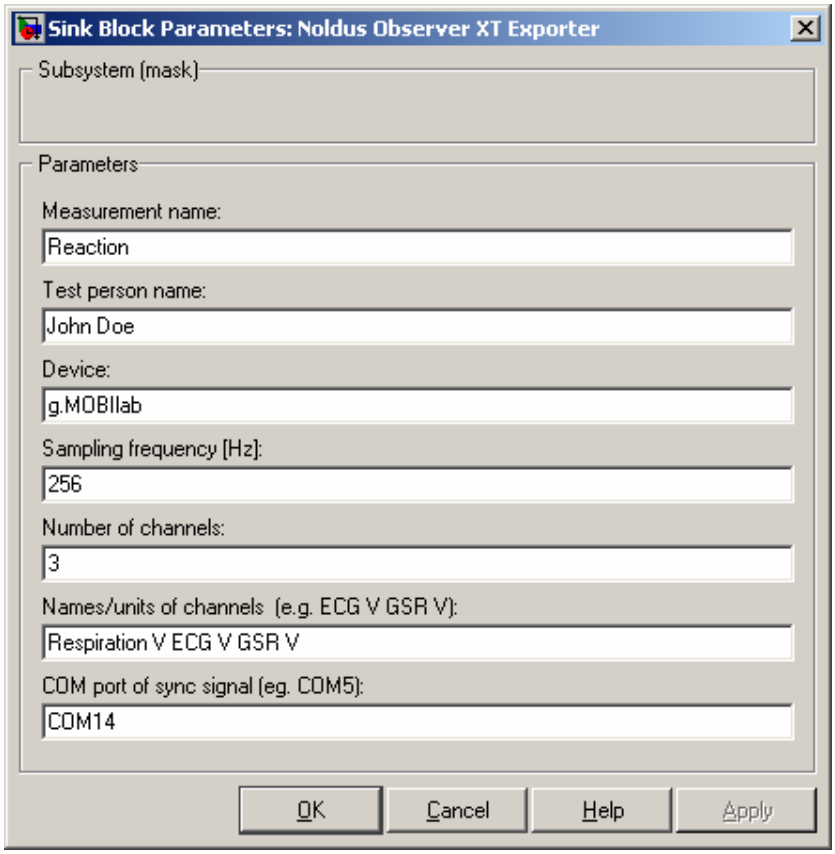
Simulink Model

On the biosignal recording PC open the Simulink model `NoldusObserverExporter.mdl`



In this example the **g.MOBIlab** block reads in three biosignal channels: respiration (channel 1), ECG (channel 2) and GSR (channel 3). The **Scope** block can be used to visualize the data.

Double click onto the **Noldus Observer XT Exporter** block to open the following window:



Enter the **Measurement name** and the **Test person name**. The biosignal data is acquired with the g.MOBIlab device and therefore enter `g.MOBIlab`. The data is sampled in this case with `256` Hz and is acquired from 3 channels. Then enter the names of the recorded channels and the units of each channel. In this case `Respiration`, `ECG` and `GSR` are recorded in Volts. Finally enter the **COM port** number where the PC running the Observer is connected.

Data Recording

When you start the Simulink model it will create a file

`MeasurementName_NameOfPerson_Date_Time.txt`

with the header information. During data acquisition a time stamp, a synchronization signal and the data will be recorded.

```
!!    Measurement:      Reaction
!!    Date [yyyy-MM-dd]:      2008-08-13
!!    Time [HH-mm-ss.fff]:    14-45-24.358
!!    Testperson: John Doe
!!    Device:     Mobilab
!!
```

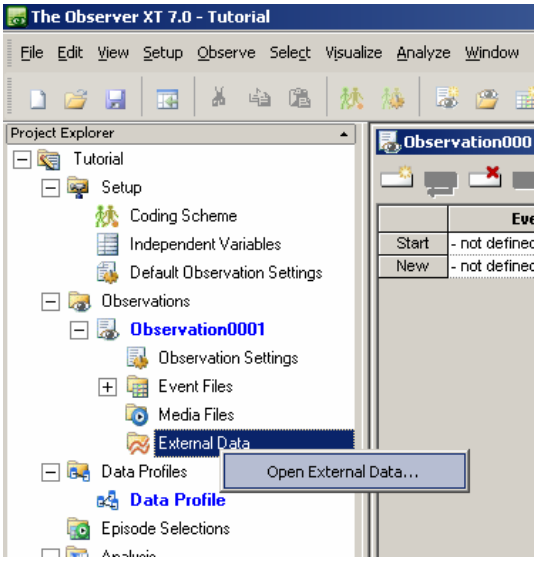
```
!!    Frequency [Hz]:   256
!!    Number of channels:     3
!!    Time
!!    sync
!!    Respiration V
!!    ECG   V
!!    GSR   V

0.000000    -11.521137  -0.000225   -0.000468   0.189781
0.003906    -11.516369  -0.000220   -0.000520   0.172043
0.007813    -11.512077  -0.000209   -0.000523   0.177002
0.011719    -11.562145  -0.000208   -0.000530   0.193214
0.015625    -11.491573  -0.000214   -0.000461   0.176620
```

After the measurement stop the Simulink model.

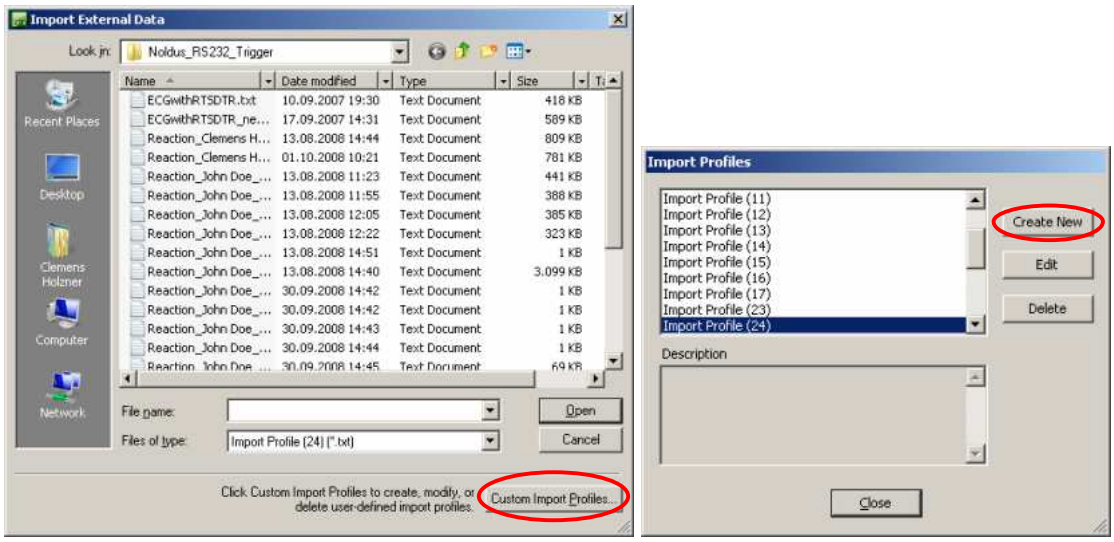
Data Import to Noldus Observer XT

With a right mouse click on **External Data** in the current Observation the data can be imported.

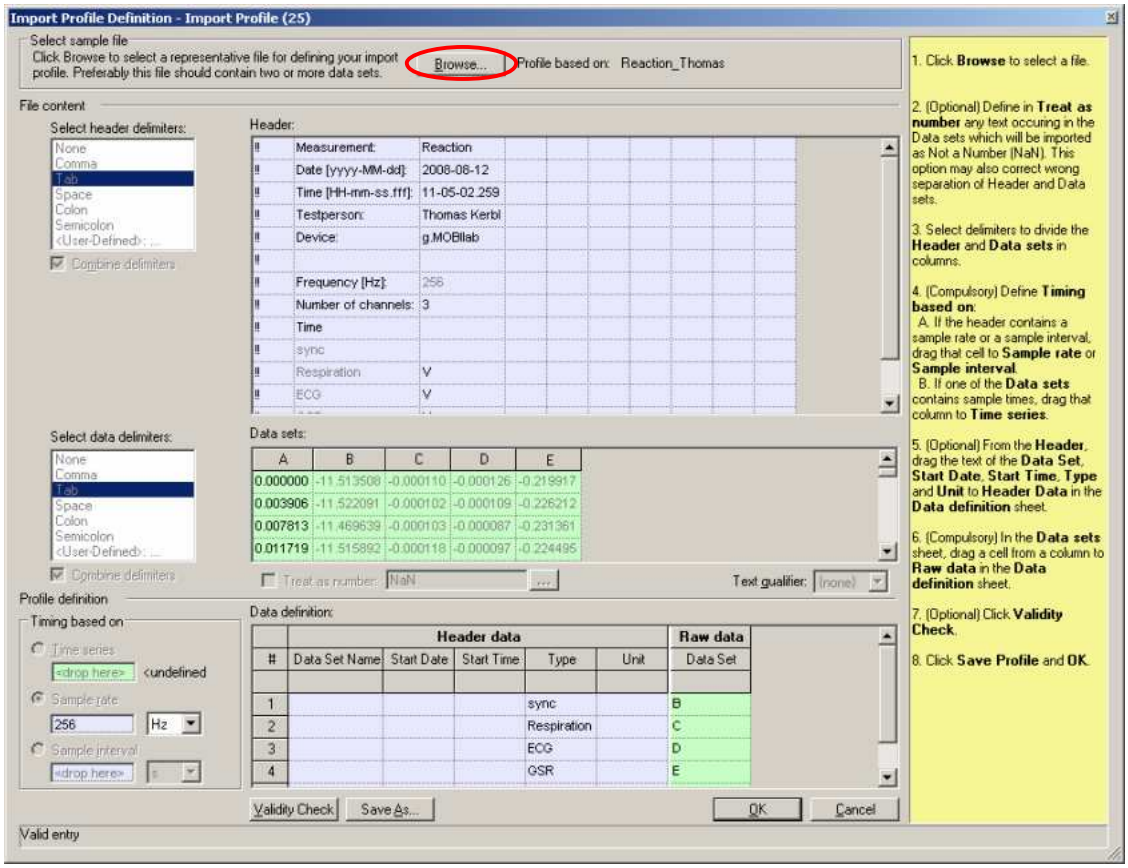


If you use the import function the first time an **Import Profile** must be created.

Therefore click onto **Custom Import Profiles** and create a new profil.



Browse for the recorded file

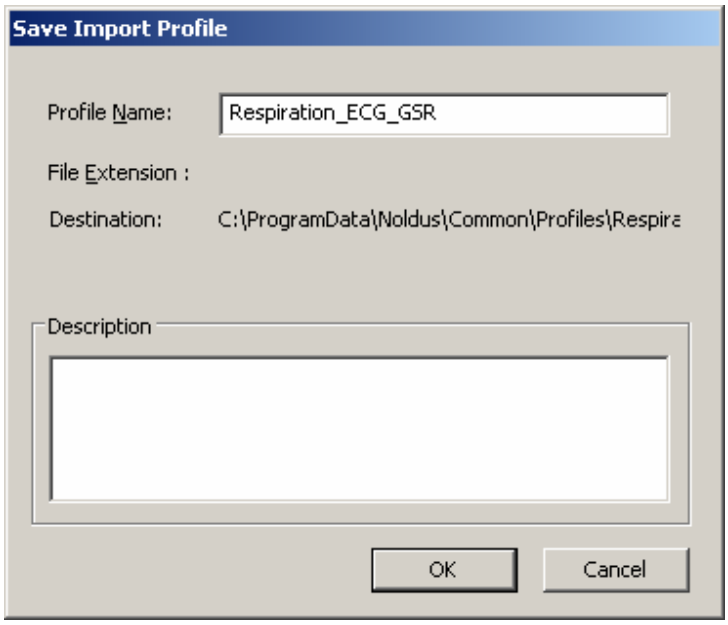


As delimiters for header and data select **Tab**. As time base either the timestamps in the first column or the sampling frequency can be used.

Then use e.g. the synchronization signal and drag and drop the column name from the header to the **Type** field. Afterwards do the same with the respiration, ECG and GSR signals.

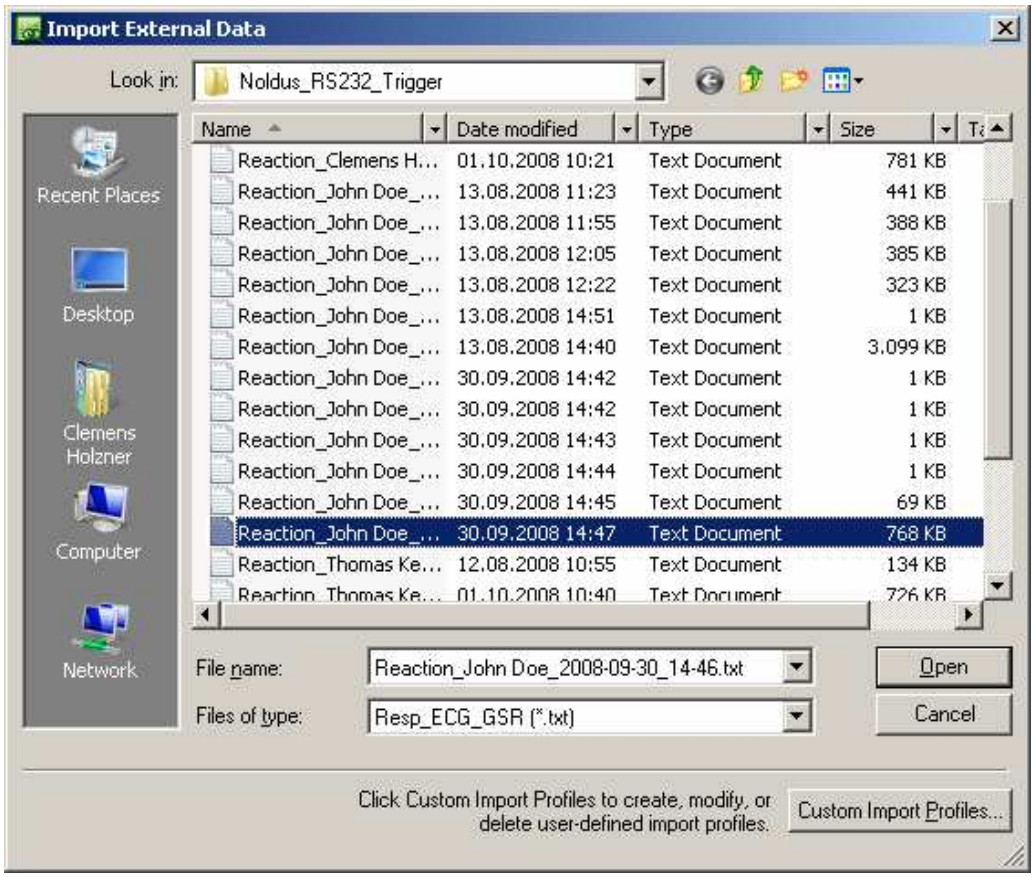
When the settings are performed click on **Validity Check** and then on **OK**.

Finally select a name for the import profile and close the window:

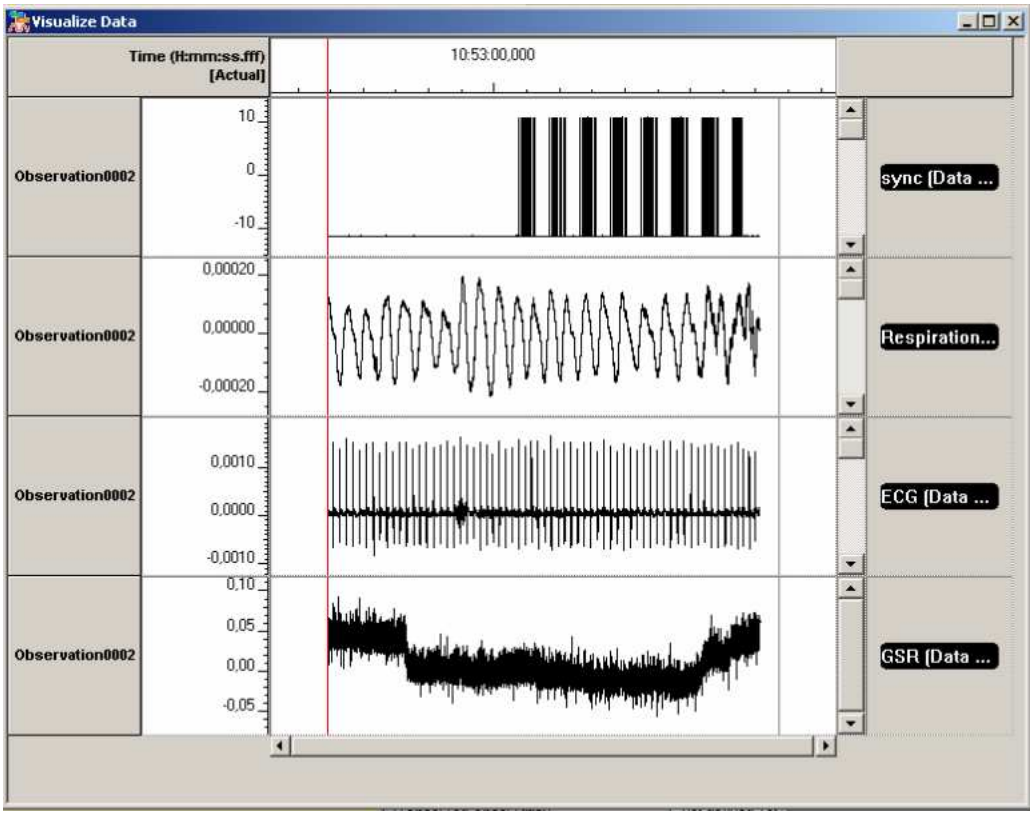


This will allow to easily import further recordings into the Observer.

Now open the file with the selected profile:



The **Visualize Data** window shows on the first channel the synchronization pulses, on the second channel the respiration signal, on channel 3 the ECG signal and on the 4th channel the GSR signal.



For further information see the Noldus Observer XT documentation.

To perform the tutorial the following components are required:

g.MOBIlab biosignal acquisition device
g.MOBIlab Highspeed Processing for Simulink
ECG electrodes
GSR sensor
Respiration sensor
PC or notebook with serial or USB connector
MATLAB and Signal Processing Toolbox
Observer XT

Enjoy working

Your g.tec team