AsTeRICS ModelGuide

Alpha Music Player

Model Characteristics:

Model Name	AlphaMusicPlayer.acs
Model file location	ACS\models\useCaseDemos\EEG&EMG
Purpose	This model allows the user to start/stop an audio player by measuring his/her relaxation level.
Requirements	• Enobio (cap montage) • .wav audio file placed in *AsTeRICS\bin\ARE\data\music*
Model Description	When the user closes his eyes and relaxes, the increase in the power of the alpha frequency band (8-13 Hz) will toggle the audio reproduction between start/stop state.

1 Model Setup

- Setup the Enobio cap following the next steps (refer to Annex I for more detailed instructions and figures):

    1. Put on the Enobio cap.
    2. Stick Enobio to the back part of the cap using the velcro.
    3. Connect the reference and put a bit of gel in it using the provided syringe.
    4. Clip the reference to the user's left ear lobe.
    5. Place the electrode pellet in the following positions labelled in the neoprene Enobio cap:

Enobio Channel	Pelet Head Cap Position
Channel 1	O1
Channel 2	Oz
Channel 3	O2
Channel 4	Fp1 or Fpz or Fp2

    6. Once pellet has been placed in the Enobio, cap conductive gel is needed to achieve the necessary conductivity. Put gel inside the electrode through its hole using the provided syringe. Be careful to put the necessary to reach the user's scalp but not too much.
    7. Connect the electrode holder to its cable and attach them to its position according to the table above.
    8. Clip the electrode holder in its corresponding pellet.
    9. Make sure all the electrodes have good skin contact.
    10. Connect the Antenna.
    11. Switch on the Enobio box.

- Start the ARE and the ACS (the ACS can be started on the same machine or alternatively on a different computer)
- Load the model (refer to the AsTeRICS user manual if these steps are not clear) and configure it according to the next section.

2 Model usage and GUI elements

- Select the audio file to be played in the Waveplayer.1 plugin in its filename property.
- Set your local path for the images to be displayed in the the plugins:
  1. StartText and StopText: text property
  2. StartImage and StopImage: default property
- Run the model. The graphical user interface (GUI) of the ARE will appear (Figure 1). Check channel two has been set to green and the signal is stable and clean.
- Ask the user to stay still during the whole experiment.
- Ask the user to close the eyes and relax every time he/she wants to start/stop the audio reproduction.
- BarDisplay2 plugin represents the relaxation level of the subject and the threshold that triggers the audio player.
- If the relaxation parameters of the subject do not correspond to the ones set as default it can be customized in the plugins:
  1. Threshold.1: ThresholdHigh and ThresholdLow set to the threshold value chosen for the current subject.
  2. BarDisplay.2: Threshold set to the new threshold value to monitorize the relaxation performance of the user.

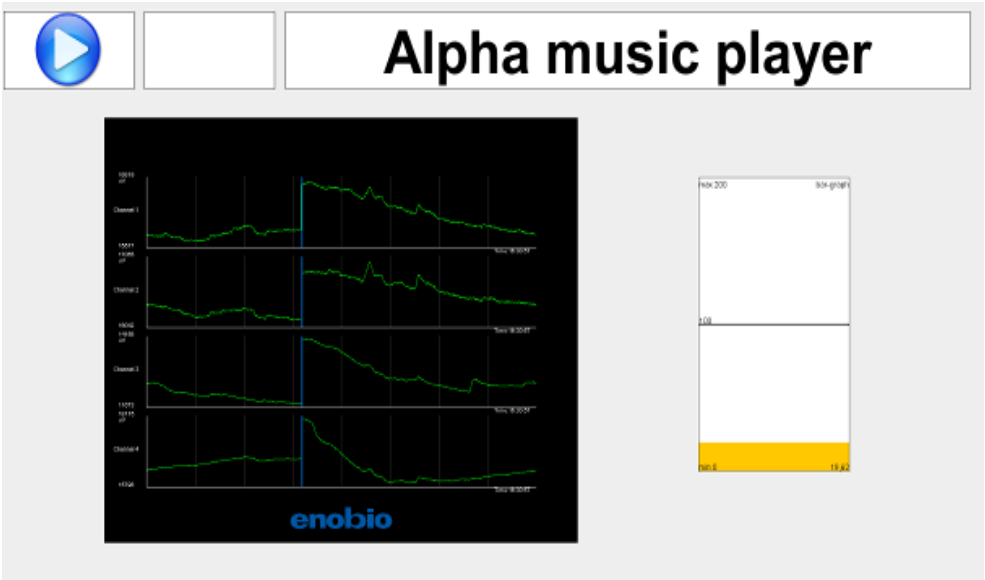


Figure 1: GUI that appears in the ARE showing the signals coming from the four channels of Enobio, the status of the music player (stop/play) and the current level of relaxation of the user.

Annex I: Enobio Set-Up

1. Introduction

Enobio is a wearable, modular and wireless electrophysiology sensor system for the recording of:

- EEG (Electroencephalogram - brain activity).
- ECG (Electrocardiogram - heart activity).
- EOG (Electrooculogram - eye muscle activity).

It consists of four independent channels that acquire biosignal measurements at 250 Hz measuring the voltage between the electrode attached to a channel and reference ,usually placed in the left ear lobe.

The following figure shows Enobio box ports and connections. For further information please check the user manual provided along with Enobio software.

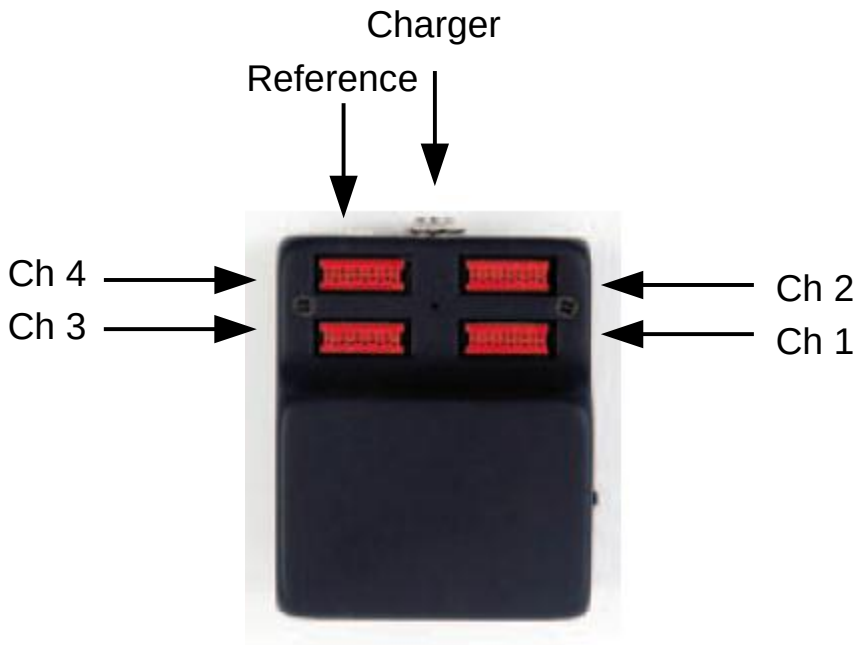


Figure 1 Enobio Box

2. Asterics Enobio Montage

Enobio is provided with a head cap and a band. All models provided by Starlab can be used with the head cap but only some of them with the band. This chapter describes how to correctly mount Enobio to run the available AsTeRICS models.

Models that can run using the Enobio band:

- EnobioVisualization
- EnobioCameraMouse
- BlinkDetectorTrainer

Models that can run using the Enobio cap

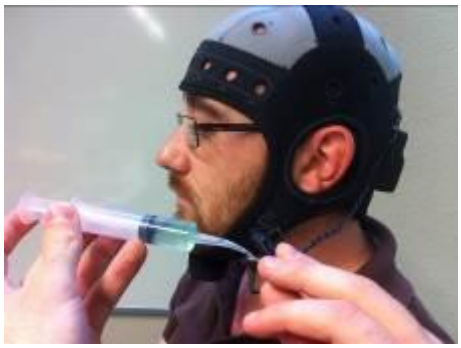
- EnobioVisualization
- EnobioCamerMouse
- BlinkDetectorTrainer
- AlphaMusicPlayer
- SSVEPMusicPlayer
- SSVEPTrainProtocol

2.1.1 Headcap montage

- Put on the Enobio cap.

- Stick Enobio to the back part of the cap using the velcro.

- Connect the reference and put a bit of gel in it using the provided syringe.



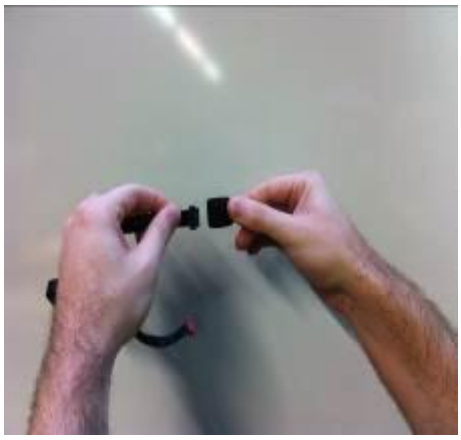
- Clip the reference to the user's left ear lobe.

- Place the electrode pellet in the following positions labelled in the neoprene Enobio cap.

Enobio Channel	Pelet Head Cap Position
Channel 1	O1
Channel 2	Oz
Channel 3	O2
Channel 4	Fp1 or Fpz or Fp2

- Once pellet has been placed in the Enobio cap conductive gel is needed to achieve the necessary conductivity. Put gel inside the electrode through its hole (see figure below left) using the provided syringe (see figure below right). Be careful to put the necessary to reach the user's scalp but not too much.

- Connect the electrode holder to its cable (see figure below left) and attach them to its position according to the table above (see figure below right).



- Clip the electrode holder in its corresponding pellet.

- Make sure all the electrodes have good skin contact.
- Connect the Antenna.
- Switch on the Enobio box.
- Run ARE.
- Run ACS
- Run the Enobio_Visualization.acs model
- Look at the signal of each electrode and make sure that every channel is in range (green color) and the signal is stable. If not put more gel in the electrodes that show any problem or press them to make good contact with the scalp surface.
- You are ready to start your session using Enobio!

3. Asterics head band montage

- Place a dry electrode in the Enobio band.

- Connect the electrode to channel 4. The channels connection when using the band is shown in the following table.

Enobio Channel	Head Cap Position
Channel 1	Not Connected
Channel 2	Not Connected
Channel 3	Not Connected
Channel 4	Forehead

- Connect the reference and put the Enobio box in the band pocket

- Wear the Enobio band. The electrode shall be placed in the forehead free of hair. Put some inside the reference and clip it in the left ear lobe.

- Connect the Antenna.
- Switch on the Enobio box.
- Run ARE.
- Run ACS

- Run the Enobio_Visualization.acs model
- Look at the signal of channel 4 and make sure it is in range (green color) and stable. If not put more gel in the reference or adjust the band until the signal goes to green.
- You are ready to start your session using Enobio!

4. Taking Care of Enobio

After every session take care of your equipment following the next steps:

- Remove the reference and clean it with water and a damp cloth.
- If you have used the cap remove the pellet from the electrode and clean it with water.
- Wash the Enobio head cap or band with water.
- Clean the electrode with a damp cloth.
- Charge your Enobio for it to be ready for the next session.
- Keep everything together in the Enobio box provided.