Assistive Technology Rapid Integration & Construction Set

The goal of the AsTeRICS Project is to develop a construction set for assistive technologies which can be adapted to the motor abilities of end-users. AsTeRICS is intended to allow access to different devices such as PCs, cell phones and smart home devices, with all of them integrated in a platform adapted as much as possible to each user.

This shall be realised via a system architecture which is composed of modular functional hardware and software components perfectly suited for utilisation in various Assistive Technology applications:

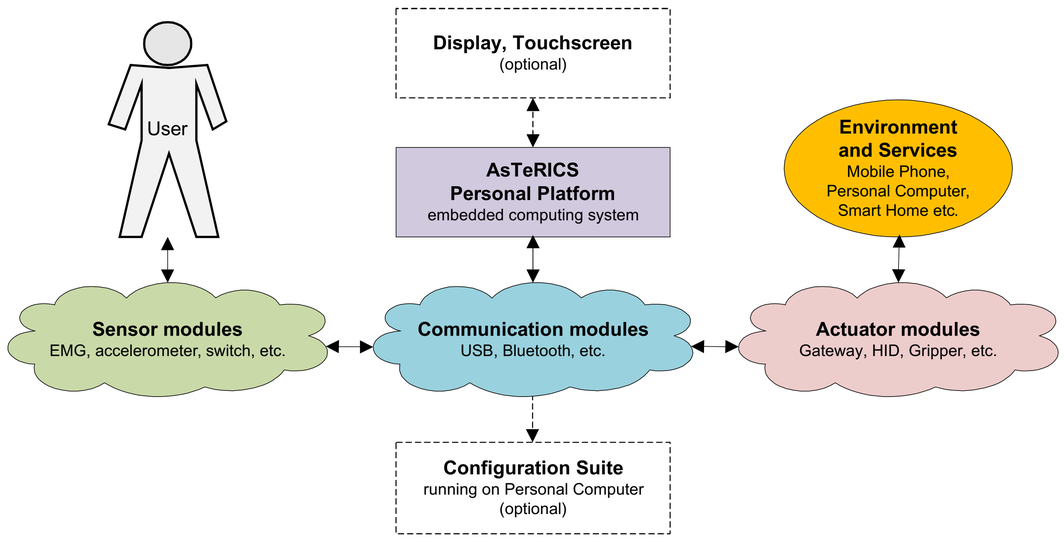

Figure 1: Concept of the AsTeRICS modular Assistive Technology system

Figure 1 outlines the concept of the AsTeRICS construction set, which contains several modules and a software suite for configuration of the system. The core element of the AsTeRICS system is the AsTeRICS Personal Platform, an embedded computing system which processes data from input modules and controls output to actuator modules. Configurations can be designed using a graphical software suite and downloaded into the AsTeRICS personal platform to perform the desired functions.

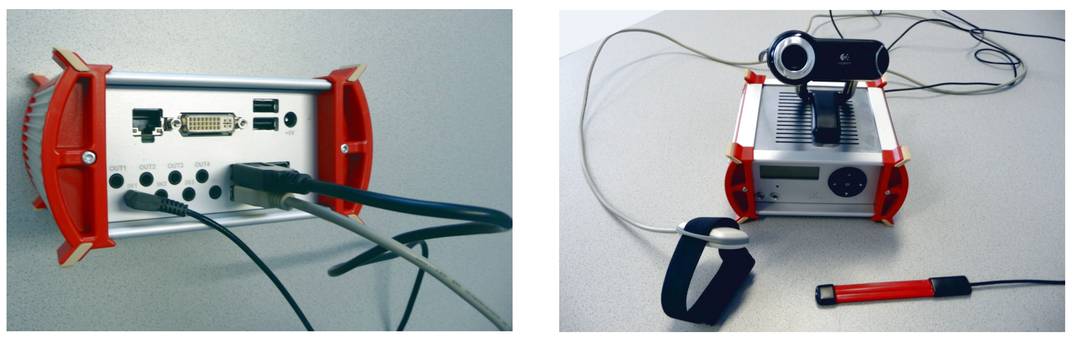

Figure 2: AsTeRICS Personal Platform Prototype 1

Figure 2 shows Prototype 1 of the AsTeRICS Platform. It also has a General Purpose Input/Output module already built in with the possibility to connect 4 sensors and 4 actuators. Additional sensors and actuators can be connected via an external module. In addition it is possible to connect a screen, e.g. for usage of an on-screen keyboard.

The AsTeRICS system is configured via an easy-to-use configuration suite that runs on a standard PC, which is connected to the AsTeRICS platform via a TCP/IP network connection. The graphical editor allows to position and connect different modules easily by drag and drop and to set a number of parameters for each module or connection. Of course the configurator can also be controlled by keyboard only, if usage of a mouse is not possible or convenient.

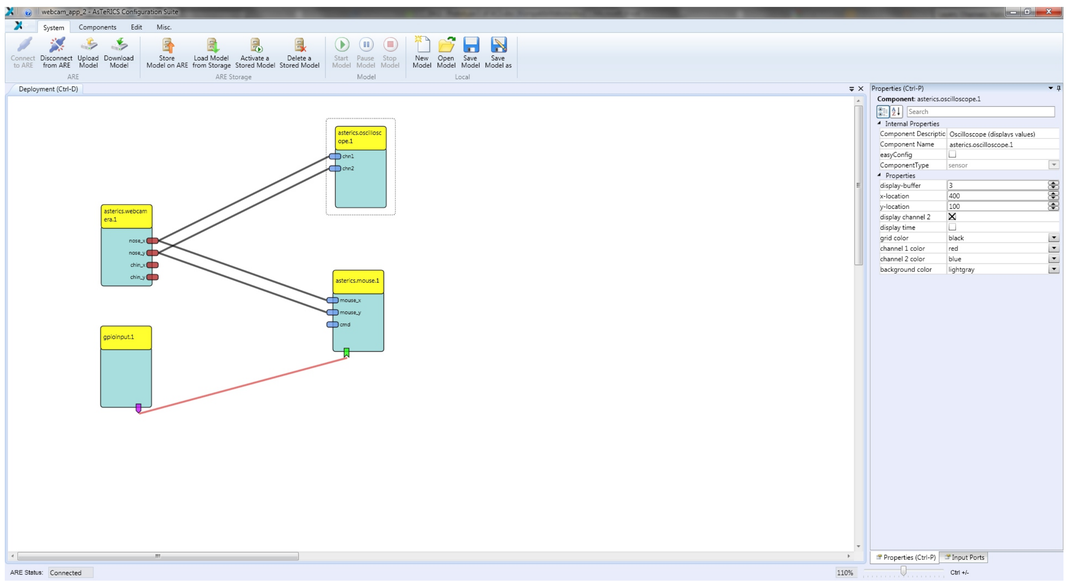

Figure 3: Screenshot of the AsTeRICS Configuration Suite

Figure 3 shows a very simple configuration on the configuration suite, where a mouse is controlled by nose-coordinated delivered from a webcamera. The clicking is done via two switches connected to the General Purpose Input/Output module.

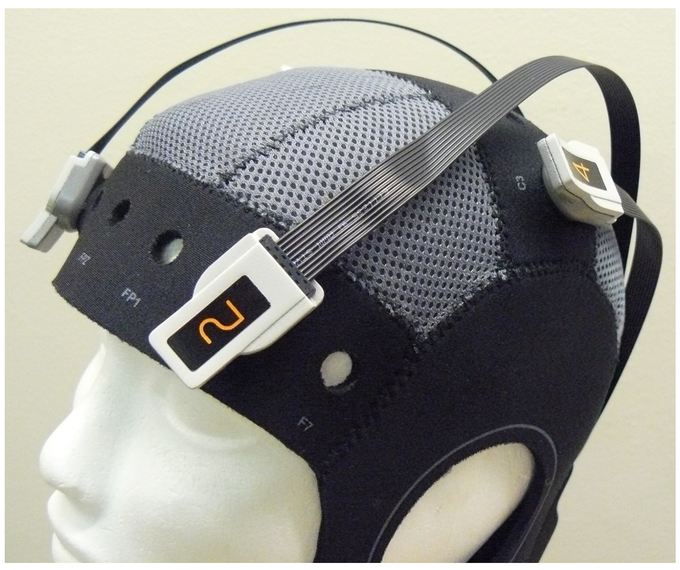

Figure 4: ENOBIO

One of the many input options for the AsTeRICS system is ENOBIO (Figure 4). ENOBIO is a wearable system which can be used to control AsTeRICS via EEG (electroencephalogram), EMG (electromyogram) and EOG (electrooculogram). ENOBIO can be used as sensor for Brain Computer Interfacing (EEG-BCI) or muscle triggered interaction.

The evaluation of the first integrated prototype will be performed during the summer of 2011 in four different settings (one in Austria, one in Poland and 2 in Spain; with people either living independently at their homes, with formal or informal caregivers, or residentialized in centres for people with disabilities). Based on the user requirements' study performed during 2010 in the same countries, with users with motor disabilities in upper limbs due to heterogeneous sources (multiple sclerosis, cerebral palsy, CVA, TBI, spinal cord injury…) and with multiple motor capabilities as a consequence (hemiparesia, hemiplegia, paraplegia and tetraplegia), it is expected that the configuration presented will show high levels of usability and acceptance by the users, as only a minority could use classical user interfaces without difficulties (i.e. QWERTY keyboard was used without problems by only 18% of a sample of n=33 users, mouse as used normally by 32.3%, and mobile phone numeric keyboard by 21,2% of the same sample). Results on the first prototype evaluation will be ready to be reported in September 2011.

For more information please check the project's website at **www.asterics.eu** or contact us via **asterics-info@ki-i.at**.

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SEVENTH FRAMEWORK PROGRAMME

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