



SENSATION Overview & Aim

SENSATION is an FP6 Integrated Project co-funded by the European Commission under the 'Micro and Nano Systems' Unit of the Directorate-General 'Information Society'. SENSATION started in January 2004 and is about to complete the 3rd year of research. The project budget is 17 MEuro, of which 10 MEuro are funded by the EC. SENSATION aims to explore a wide range of micro and nano sensor technologies, targeting at unobtrusive, real-time monitoring, detection and prediction of human physiological state in relation to wakefulness, fatigue and stress. The developed sensors are integrated in multi-sensorial systems for monitoring human physiological state in medical and industrial applications to improve comfort, safety and quality of life.

IST '06 Exhibition Stand (Stand Number: 4M)

SENSATION welcomes you to its exhibition stand (4M) located at the Health, Safety & Security area of the IST '06 Event Exhibition hall, to look and test a series of high-end technology sensors measuring in real-time your physiology, such as:

The **ENOBIO sensor** has two important aspects: a Carbon Nanotube (CNT) substrate that provides a DRY electrode / skin interface and the electronic design that incorporates active amplification, flexible circuitry and wireless communication. For the live demonstration of EEG/EOG recording we shall replace the CNT substrate interface, with a AgCl pellet. This allows us to decouple the electronic components from the CNT interface which has not yet been certified for public use. The electrodes with CNT interfaces shall be available for display purposes. The demonstration includes a flexible head band with 4 electrodes and a wireless transmitter, which transmits data to the SENSATION PDPU, which in turn transmits data to a Laptop for display.

The **ACTIWRIST** sensor uses a wired (USB) interface to allow download of activity and sleep data. The demonstrator will wear the sensor for a period of 1-2 days prior to the event to collect some current demo data. This will then allow the demonstrator to discuss their activities and relate them to corresponding events in the data. The information will be downloaded and stored using the demonstration software created for this project. Graphics will be presented by use of Excel or other similar package.

The **EARSEN sensor** demo includes an earphone that can be worn by the user and his/her interbeat interval and activity level output is measured analogically. A voltmeter will be used to display your own heart beat and activity values.

The **FINGER RING sensor** demo consists of a finger ring that is worn by the user measuring the SpO2 and the heart rate, which are transmitted to the computer for online display of raw signals and offline display of SpO2 and heart rate. If wished, you can see your SpO2 lower by performing an apnea.

The EMFiT sensor foil is used within SENSATION for applications measuring physiological indicators unobtrusively either below bed mattress (**MATSENSE**) or at office/vehicle seat (**SEFO**). On-line demonstration of sensor signals are given at laptop screen. Off-line analysis of sleeping laboratory recordings, include comparison of MATSENSE with ECG heart beat interval and respiration belt.

The **Thermoelectric Generator (TEG)** is a watch-size sensor node for application on human wrist, which is fully energy-autonomous and is powered by the human body heat. The node is composed of a 0.2-mW thermoelectric generator, a sensor and a wireless module. The commercial smallest-size thermopiles of a custom design are used in the TEG for demonstrating the sensor node. The energy is stored in a small NiMH cell (1.2 V) which is continuously being recharged using human heat. A head ring with the TEG modules is used to demonstrate the produced power (0.6...0.8 mW) directly by powering two LEDs.

The first prototype of the **COMBINE sensor** consists of a 3 channel ECG, a 2 channel respiratory effort and a position sensor. All data are transmitted wirelessly via Bluetooth to a PC, where the data are visualized. All data recordings are shown online, to visualize the functionality of the sensor. Despite the fact that the ECG signal will be provided by an ECG simulator (but its settings can be changed and their effects can instantly be seen on the screen), the position and the respiratory effort are demonstrated on a "real human being". This provides the possibility to pretend different breathing types.

The **STEREOVIEW-EYE sensor** is a 3D-camera system, based on microCMOS technology, that monitors the eye behaviour and diagnoses in real-time the vigilance value. The sensor targets mainly driver fatigue monitoring in real-time. The first prototype of the sensor and the diagnosis algorithm, will be demonstrated interactively, integrated with the warning system.

The universal **warning system** consists physically of a watch-like main unit that is carried on the wrist. It includes a visual status indicator, a visual imminent alarm signal and a button for the user feedback, as well as a repeat button for voice messages. A vibration unit carried on the belt is used for tactile warning, whereas sound warnings are provided via loudspeakers or headphones. The hardware setup is driven by a laptop, which includes the warning strategy. Vigilance status is provided in real-time through the integration of the warning system with the STEREOVIEW-EYE sensor.

Win a fully-paid attendance to the 2nd International SENSATION Conference due for June 4-5, 2007 in **Chania, Crete, Greece!**

Ask for information at our stand!

