Perform Project

A sophisticated multiparametric system for the continuous effective assessment and Monitoring of motor status in parkinson's disease and other neurodegenerative diseases.

Grant Agreement no: 215952

Start date: February 2008
Duration: 36 months

Project Co-ordinator
Maria Garcia Robledo
SIEMENS, S.A.

SIEMENS Healthcare

Avda. Leonardo Da Vinci,
15-17-19
28906 Getafe

Madrid
Spain

Tel: (+34) 91 514 45 02
Fax: (+34) 91 514 47 87

Email: Perform.es@siemens.com

PERFORM PROJECT

Welcome to the 4th issue of the Perform Newsletter! This newsletter aims to provide the latest information on the Perform project and disseminate knowledge on related issues. The Perform newsletter is issued periodically to inform you about the latest news in our project. In this fourth issue of the newsletter you can find out more about the wearable system the PERFORM project is developing. You will also be updated on where you can meet us during the next period as we are continuing to be present in important industry conferences.

We hope you will find this information useful and please feel free to make suggestions on what you would like to see in future releases at: perform@talanton.info.

The Perform Project partners are:

SIEMENS, S.A.

MEDTRONIC IBERICA, S.A.

ANCO S.A.

POLITECHNIKA GDANSKA

LOGICOM LTD

THE UNIVERSITY OF WESTMINSTER

PAPASAVAS A.E.

UNIVERSITY OF IOANNINA

PATMOS S.R.L.

UNIVERSIDAD DE NAVARRA

TALANTON A.E.

Universidad Politecnica de Madrid

OXFORD COMPUTER CONSULTANTS LIMITED

Centro de Estudios e Investigaciones Técnicas de Gipuzkoa

Kingston Computer Consultancy Limited

PERFORM Wearable monitoring sets

Perform aims to achieve efficient monitoring and testing of patients status through the design and implementation of novel sensor technology. We use devices and smart applications to replace traditional clinical evaluation tests and to derive clinical relevant information compliant to the golden standard (UPDRS) in uncontrolled environments. Perform platform incorporates a robust and deployable wearable wireless network of sensors, envisaging to deploy 3 separate systems:

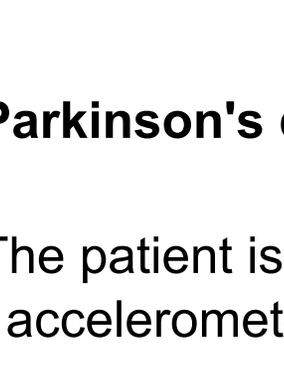
1. PARKINSON Test – Kit
2. PARKINSON Day-Monitoring set
3. PARKINSON Night-Monitoring set

At this point, first versions of the above systems are already CE marked and currently used for data collection and wearability evaluation.
Having pursued a state of the art study during the early stages of the project, it has become apparent that several systems already exist either as stand alone monitoring devices or as sensor networks, however very few of them met the requirements of PERFORM. The Consortium experimented with different sensor networks but it has not been possible to find something appropriate to be used as the PERFORM wearable system. Thus, the Consortium decided to design and implement custom wearable devices and sensor networks which would meet the monitoring needs of motor disorders.

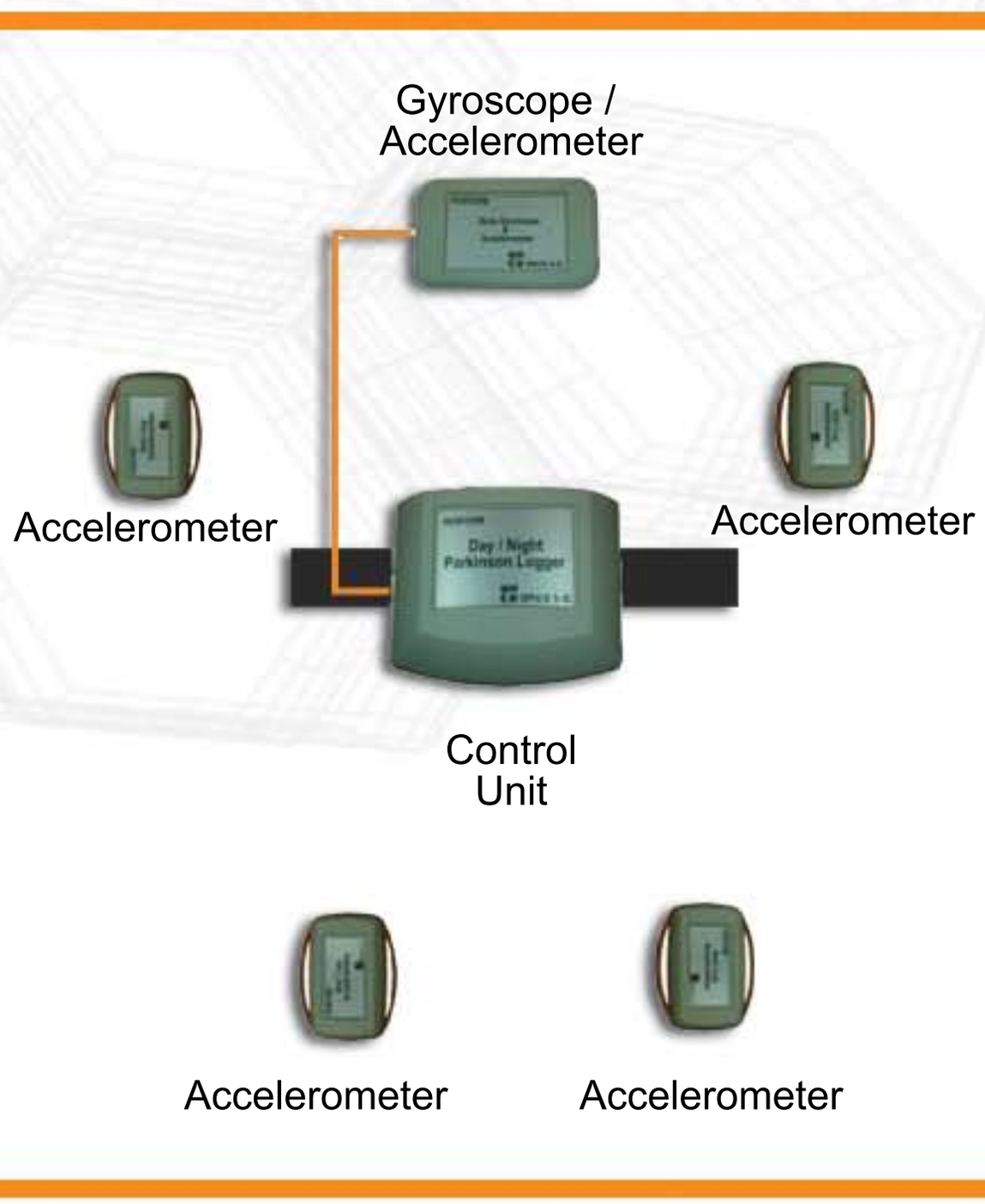
ANCO SA is developing the wearable devices to be used in the daily and nocturnal monitoring in PERFORM. These are comprised of a central unit and networks of wireless sensors. The central unit enables the synchronisation, transmission and storage of the signals recorded by the sensors while at the same time hosting the intelligence of the device by providing real time fall detection and alerting mechanisms (GPS/GPRS).

Parkinson's disease day monitoring and test kit sets.

The patient is wearing 4 accelerometers, one in every limb, and a gyroscope / accelerometer in the chest or waist.



Day Monitoring wearable



Parkinson's disease night monitoring sets

For the night monitoring set, the patient is wearing an EOG sensor, an SPO2 sensor and an accelerometer.

Night Monitoring wearable

EOG sensors

SpO2 sensor

Control Unit

Accelerometer

The PD test kit

There are several kits used for testing:

- ANCO's PD testing kit - composed of a logger and 4 accelerometers, plus 1 gyroscope / accelerometer.
- Commercial virtual gloves.
- Cameras
- Microphones

Test Devises for PD

Gyroscope / Accelerometer

VR Glove

Control Unit

VR Glove

Accelerometer

Accelerometer

What is the innovation in the wearable system we are developing?

Comprehensive & Objective monitoring	• Monitors symptoms no the whole body & covers around 85% of the motor examination of UPDRS (section III) • Enables objective monitoring of the patient in uncotrolled environments while the patient is carries out daily activities.
Durable monitoring	• Robust but light weight device with advanced battery enabling constant monitoring for about 16 hrs
Intelligence	• Fall detection • Emergency alerting, in case of falls, through SMS providing information on the location of the patient through GPS coordinates.
User Friendliness	• Straightforward user interaction through the use of simple buttons and LED screen.
WSN synchronisation	• Automatic synchronisation of sensor nodes in the wireless sensor network • No data loss or redundancy of data during wireless transmission

Dissemination

The Consortium continues the dissemination activities in selected industry events. You are most welcome to meet us in the following events where Perform will have a presence:

- *The 12th Mediterranean Conference on Medical and Biological Engineering and Computing – MEDICON 2010, 27-30 May 2010, Chalkidiki, Greece (www.medicon2010.org)*

- *phealth 2010, International Workshop on Wearable Micro and Nanosystems for Personalized Health, 26-28 May 2010, Berlin, Germany (www.phealth2010.com)*

- *The 7th International Conference on Rough Sets and Current Trends in Computing, June 2010, Warsaw, Poland (www.rsctc2010.org)*

- *32nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 31 August - 4 September 2010, Buenos Aires, Argentina (http://embc2010.embs.org)*

- *World Parkinson Congress 2010, 28 September -1 October 2010, Glasgow, Scotland, U.K. (www.worldpdcongress.org)*

For more information on other current dissemination activities please refer to the project website www.perform-project.com