

# INTRODUCTION

The ConText project develops technology to enable health advisory systems which measure stress and strain on the human body. Because of the application focused research, the application development is done in parallel with the technological research. In 2.5 years, some working prototypes of stress monitoring vests will be produced. These prototypes will be used to develop a commercially attractive marketing scenario.

## Musculo-skeletal disorders

A certain class of diseases related to repetitive workload and psychological stress is referred to as musculo-skeletal disorders. Typical examples are Repetitive Strain Injury (RSI) and lower back pain. These diseases have a huge social impact and cause enormous economical costs. They are responsible for 40 to 50 percent of all work-related illnesses in Europe. Some estimations reveal that 40 million workers in all sectors in Europe are affected. A tool to create awareness of the stress and strain during work will help to reduce the morbidity rate.



*The first prototype vest is optimised for comfort and reliable positioning of the sensors*  
[source:TNO]

*The ConText project develops a wearable vest for monitoring stress which makes the user aware of risks due to bad posture or working conditions*



## Technical objectives

For optimum comfort of the vest, two technologies are envisioned. First, the sensors and electronics in the vest will be integrated in textile. This means that both the transducers and the electrical interconnect should be made of conductive textiles where possible. Options are weaving or embroidery of textile yarns, or printing conductive ink on the textile. The second comfort-increasing technology is the use of contactless sensors for monitoring the muscle activity. Professional muscle monitoring techniques require the fixation

The ConText Newsletter is part of the dissemination activities of the EU funded IST-STREP project ConText – Contactless sensors for body monitoring incorporated in textiles.

For more information please visit our website:  
[www.context-project.org](http://www.context-project.org)

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### ConText Partners

|                                                                   | Country |
|-------------------------------------------------------------------|---------|
| Philips Research                                                  | NL      |
| Technische Universität Berlin                                     | D       |
| Katholieke Universiteit Leuven                                    | B       |
| Textile Research Institute<br>Thüringia-Vogtlandia (TITV)         | D       |
| Netherlands Organisation for<br>Applied Scientific Research (TNO) | NL      |
| Clothing Plus Oy                                                  | FIN     |

ConText is funded under the 6th EU-Framework programme (IST-2004-027291). The project duration is from 1 January 2006 to 30 June 2008.

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Information Society  
Technologies



SIXTH FRAMEWORK  
PROGRAMME

of electrodes to the skin. By using contactless sensors we bring a professional medical monitoring technique to the non-professional customer.

## Business awareness

The prototype vest will be used to trigger ideas for useful applications and concepts for marketing scenarios. By building up an application forum of experts in the field, we will find answers to questions like who can benefit the most from such a product and where can its use be the most effective.

# ConText

## Effekte 2006

### Textile Symposium "Micro Systems Technology in Textile and Flexible Structures"

by Heike Illing Günther, TITV, Greiz, Germany

Smart Textiles are resounded throughout the land. Micro systems, little helpers integrated in textiles, make the living easier in daily routine and work environment. Referring to this topic the TITV Greiz held his 10th - Textile Symposium "**Micro Systems Technology in Textile and Flexible Structures**" (Effekte'06).

This international conference took place on 02nd/3rd March 2006, participating more than 150 experts from The Netherlands, Sweden, Austria, Portugal and Germany. Micro systems play an important role in the competition for integrated intelligent solutions and products. Mostly invisible, but with a big effort they show great perspectives and unexpected possibilities. Many applications, from information and communication technology, automotive engineering, medical technology and optics cannot be imagined without micro systems

technologies. But, today there are chances for the textile industry as well. Besides Fraunhofer Institute for Reliability and Microintegration, successful companies and research institutes reported about current developments and possibilities. So, Rabin Bhattacharya from Philips Research, The Netherlands, assured that many problems can be solved with the help of intelligent and interactive systems in the future. He showed an increasing influence of textiles with luminescent pillows, backpacks or cuddly toys.

The TITV itself presented interesting developments in the field of textile Microsystems technologies too. A basis for Smart Textiles is a technology for galvanic and electrochemical modifying of pre-structured conductive textile surfaces. Some prototypes on the basis of ELITEX™, - threads were already made. Textile transponder, textile



switches, design elements for car's interior and a glove with an integrated Bluetooth module show the variety of possible applications. New challenges for the TITV and its partners are the integration of electronic components, the manufacturing of woven bus structures, shielding and isolation of textile circuits and its contacting ([www.titv-greiz.de](http://www.titv-greiz.de)).

## Partner description: Philips Research

by Geert Langereis, Philips Research, Eindhoven, The Netherlands



Philips Research in 1914

When you are asked to think of the most important invention of Thomas Edison, you are likely to say that this is the electronic lightbulb. Royal Philips Electronics is convinced it is not the lightbulb, but the invention of the industrial research laboratory. Industrial research supports the long term technological and strategic backbone of the company and is therefore the driving engine for innovation. Philips Research was established in 1914 in Eindhoven and has grown to over 2200 people in eight laboratories over the world. The main location is still in Eindhoven, The Netherlands, currently located at the High Tech Campus.

The research activities facilitate the five Philips product divisions by means of open innovation with local and global technology partners. Although one might still think of Philips as a producer of consumer electronics, the ambition is to grow into a lifestyle and healthcare company. Therefore, the research program is more and more focused on life sciences and wellness.

By participation in projects like MyHeart and ConText, Philips Research can exploit and develop its in-house technology. Sharing resources with partners results in exchange of knowledge and is a way to comply to European trends and to come to partnerships with mutual advantages. See [www.research.philips.com](http://www.research.philips.com) for more information.



# Invitation to join the ConText application forum

By Lenneke de Voogd-Claessen, TNO Science and Industry, Eindhoven, the Netherlands

The project consortium has developed ideas for future applications in several fields of interest, whereby the use of contactless EMG sensors may lead to larger freedom and more comfort for the user, and the feasibility of continuous, unobtrusive, monitoring of people. Besides application in the prevention, monitoring and treatment of RSI, there are many other possibilities. For example in the medical field, a biosensor

shirt with a warning function for patients with a high health risk. In sports, for instance, clothing that measures muscle activity during training. Or at work, consider clothing that can warn a fire fighter to pull back.

In order to assess the market opportunities of EMG monitoring and textile integrated electronics, an 'application forum' with experts in the field will be formed with



*Construction worker at risk*

specialists in the field of EMG measuring, textiles and (wearable) electronics. By means of questionnaires and interviews with this forum, we mean to obtain feedback on the already developed ideas, but also to generate new ideas for applications in the fields of health care, occupational health (work and safety) and sports. In workshops we will demonstrate the working prototype EMG measuring vests developed in the project and together with the application forum we will identify technological limits and possibilities and relevant market trends. Altogether, this will be a valuable input for the project for further development of the technologies and for the development of an attractive business scenario.

If you are interested in learning about our ideas and sharing your views with us, please mail to: [langereis@context-project.org](mailto:langereis@context-project.org).

Or you can visit our web-site and sign up for the application forum on [www.context-project.org](http://www.context-project.org).

*Possible application: anti-RSI garment [source: TNO]*

## Partners and tasks

### Philips Research

- Project Management
- Development of sensors and other electronic components
- Development of sensor system architecture and signal processing hardware and software
- Application development

### Katholieke Universiteit Leuven

- Testing of EMG sensors
- Developing muscle activity algorithm
- Developing stress state algorithm
- User testing

### Technische Universität Berlin

- Electronic bonding of electronic modules with textile substrate
- Encapsulation and protection of electronics and their bonding with textile substrate
- Reliability tests of the electronic modules

### Textile Research Institute Thüringen-Vogtland

- Thread galvanising
- Weaving conductive yarns
- Development of conductive textile structures and interconnects for textile ECG and EMG sensors

### Netherlands Organisation for Applied Scientific Research TNO

- Printing conductive inks on textile substrate for power and data transmission and/or data collection
- Determine the requirements of the textile to be used as a wearable object
- Reliability testing
- Garment design

### Clothing Plus Oy

- Definition of properties of conductive substrates
- Definition of properties of sensors
- Application development

## Related EU projects: The SFIT cluster

Seven projects funded by the European Committee constitute the cluster "Smart Fabrics-Interactive Textile and Flexible Wearable Systems", or shortly SFIT cluster. Cooperation is stimulated by the EC, for example by concertation meetings. By exchanging experiences, we avoid double scientific work and optimise our ambitions.

**Besides ConText the SFIT projects are:**

|         |                                                                                      |                                                                                                                     |
|---------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| MyHeart | Fighting cardio-vascular diseases by preventive lifestyle & early diagnosis          | <a href="http://www.hitech-projects.com/euprojects/myheart/">http://www.hitech-projects.com/euprojects/myheart/</a> |
| BIOTEX  | Bio-Sensing Textiles to Support Health Management                                    | <a href="http://www.biotex-eu.com/">http://www.biotex-eu.com/</a>                                                   |
| PROETEX | Protection e-Textiles: MicroNanostructured fibre systems for Emergency-Disaster Wear | <a href="http://www.proetex.org/">http://www.proetex.org/</a>                                                       |
| STELLA  | Stretchable Electronics for Large Area Applications                                  | <a href="http://www.stella-project.de/">http://www.stella-project.de/</a>                                           |
| MERMOTH | Medical Remote Monitoring of Clothes                                                 | <a href="http://www.mermoth.org/">http://www.mermoth.org/</a>                                                       |
| OFSETH  | Optical Fibre Sensors Embedded into technical Textile for Healthcare                 | <a href="http://www.ofseth.org/">http://www.ofseth.org/</a>                                                         |



## Events calendar

|                      |                                                                                                                                                                                                         |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 29 Aug - 3 Sept 2006 | IEEE IMBC Conference<br>New York City, USA<br><a href="http://embc2006.njit.edu/">http://embc2006.njit.edu/</a>                                                                                         |
| 24 - 27 Sept 2006    | NES 2006 Nordic Ergonomics Society<br>Hämeenlinna, Finland<br><a href="http://www.uta.fi/conference/nesc2006/">http://www.uta.fi/conference/nesc2006/</a>                                               |
| 27 - 29 Sept 2006    | Third ConText consortium meeting<br>Berlin, Germany                                                                                                                                                     |
| 11 - 14 Oct 2006     | ISWC 2006 Tenth International Symposium on Wearable Computers<br>Montreux, Switzerland<br><a href="http://www-static.cc.gatech.edu/gvu/ccg/iswc06/">http://www-static.cc.gatech.edu/gvu/ccg/iswc06/</a> |
| 11 - 12 Oct 2006     | Nanotechnologies and Smart Textiles for Industry and Fashion,<br>London, UK<br><a href="http://www.nano.org.uk/newsletter/smart_textiles">http://www.nano.org.uk/newsletter/smart_textiles</a>          |



Begijnhof, Leuven

## FiberMed 06



### FiberMed06

June 7-9, 2006, Tampere Hall, Finland  
Fibrous Product in Medical and Healthcare

FiberMed '06 is the conference for Fibrous Products in Medical and Health care. It is an annual conference organised by the University of Tampere (FIN) and the University of Bolton (UK). This year there were about 100 attendants, mainly from the academic world. The main scope of the conference is on the chemistry of fibres applied to human tissue. The latest trends in this field are advanced wound-dressings and artificial tissue for burnt skin. Drug eluting materials, inflammation inhibition and air transparency are properties where fibrous products meet the requirements of healthcare. The conference was chosen to give the first public exposure of the ConText project. A seven page paper is the result.

More info can be found at  
[www.tut.fi/fibermed](http://www.tut.fi/fibermed).