



# Embedded WiSeNts Newsletter - August 2005



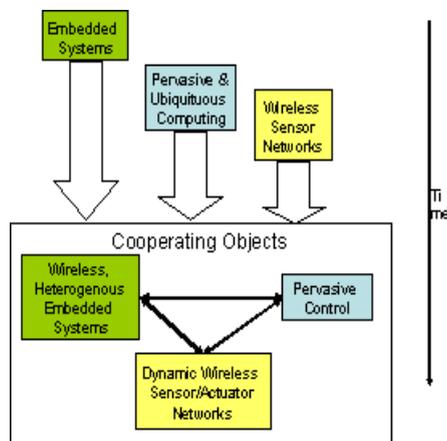
IST-004400

Dear Colleagues,

Welcome to the first issue of the *Embedded WiSeNts* Newsletter !

**Cooperating Embedded Systems for Exploration and Control featuring Wireless Sensor Networks - Embedded WiSeNts** is a joint effort between twelve partners from ten different European countries. All participants are among the top research institutions in wireless communication and distributed computing as well as in cooperating objects in general, and are at the forefront of ubiquitous communication and wireless sensor networks in particular.

**Embedded WiSeNts** aims to advance the development of **Wireless Sensor Networks (WSN)** and their applications, especially in the form of **Cooperating Objects (CO)** – along a **Research Roadmap** towards **Visions for Innovative Applications**.



The Cooperation Action has been running for one year now, a lot of activities have happened. Workshops, meetings have taken place and are under preparation. Just to give you an idea about the work of our consortium, project-specific events and news – **we invite you to our Newsletter**.

In this issue we try to keep you up to date with the latest activities, news, announcements. Beyond we present one event focussing a special issue of Cooperating Objects – here the “**Special Day on Ubiquitous Computing**” at INRIA – and a short profile of one of the partners – here **TU Berlin/TKN, the coordinator of the action**.

Please visit also our project web site at: <http://www.embedded-wisents.org>.

Hope you enjoy the first issue.

The Editorial Team

## 1. Progress of Work

- ◆ The 2<sup>nd</sup> European Workshop on Wireless Sensor Networks **EWSN 2005** was very successfully held in Istanbul on January 31<sup>st</sup> – February 2<sup>nd</sup>, 2005:
  - **Total Number of Papers Submitted:** 123
  - **Regular Papers Accepted:** 35
  - **Posters Accepted:** 10
  - **Presented European Projects:** 9 (COBIS, COMETS, EYES, E-next, GoodFood, NEWCOM, Smart Surroundings, Sustainable Bridges, European experience gained in sensor networks related projects)
  - **Number of Registered Participants:** 105
  - **Participant Countries:** Austria, Belgium, China, Finland, Germany, Greece, India, Ireland, Italy, the Netherlands, Singapore, Spain, Sweden, Switzerland, Taiwan, Turkey, United Kingdom and USA
  - **Proceedings** have been published
- ◆ **The Student Mobility Program is ongoing:**
  - 4 calls have been announced, first exchanges of PhD students are started please find information at:  
<http://www.embedded-wisents.org/WP4/StudentMobility.htm>
- ◆ **The Distinguished Visitor Program has been started**
- ◆ The main project workpackage “**Road Mapping and Technology Adoption**” is in a good progress:
  - **Four studies** – intended to give an in-depth analysis of current state-of-the-art and current research, to identify essential open issues critical for the development of future cooperating objects – are nearly completed
  - The results from the studies will be public available in October 2005
  - The basics for the **Research Roadmap Preparation** and the **Visions for Innovative Applications** are finalized
  - Two competitions are under preparation used to gather the visions for innovative applications:
    - **WiSeNts summer school competition** (small-scale)
    - **The Sentient Future Competition** (large-scale)
- ◆ Several **dissemination activities** took place:
  - **IST 2004**, Networking Session: “Embedded WiSeNts – Networking with industry and users”, November 2004
  - **Sensor+Test**, Congress contribution; fair participation, Nuremberg, May 2005
  - **IST Mobile&Wireless Communications Summit 2005**, Dresden, June 2005
  - **Cooperating Objects Workshop**, Brussels, June 2005
  - **ARTEMIS Annual Conference**, June 2005
  - **IFAC World Congress**; workshop on wireless sensor networks and cooperating objects, July 2005

## 2. Project events, announcements

- ◆ **Summer School on Wireless Sensor Networks and Smart Objects**  
August 29 - September 3, 2005, Schloss Dagstuhl, Germany

<http://www.vs.inf.ethz.ch/events/dag2005>



**The goal of the Summer School** is to provide a basic survey of the most relevant subfields, to present the perspectives and the underlying technologies, but also to identify the pertinent issues that form the field of wireless sensor networks and smart objects, as well as to identify important research themes. Furthermore, the school will provide a good opportunity to get to know other people working in the field, to meet distinguished scholars, and to establish contacts that may lead to research collaborations in the future.

- ◆ **European Workshop on Wireless Sensor Networks**  
ETH Zurich, Switzerland, February 13-15, 2006

<http://www.ewsn.org/>



**EWSN 2006**, the European Workshop on Wireless Sensor Networks, is the third of a series of annual meetings focusing on the latest research in the rapidly growing area of wireless sensor networks. EWSN 2006 will be held at ETH Zurich, Switzerland, on February 13-15, 2006. Previous workshops were held in 2004 in Berlin, Germany, and in 2005 in Istanbul, Turkey.

### Important Dates

- **Submission deadline:** September 2, 2005
- **Notification of acceptance:** November 11, 2005
- **Camera-ready version:** December 2, 2005
- **Conference dates:** February 13-15, 2006

### 3. Interesting links, project-related events

- ◆ **Artemis Technology Platform**



Advanced Research and Development on Embedded Intelligent Systems: <http://www.cordis.lu/ist/artemis/index.html>

- ◆ **IST Directorate G - Components and Systems / Unit G3 - Embedded systems**



<http://www.cordis.lu/ist/embedded>

- ◆ **MobiCom 2005**

The Eleventh Annual International Conference on Mobile Computing and Networking; August 28 - September 2, 2005, Cologne

<http://sigmobile.org/mobicom/2005>



- ◆ **ACM SenSys 2005**

The 3rd ACM Conference on Embedded Networked Sensor Systems, San Diego - November 2-4, 2005

<http://sensys.csail.mit.edu/>



## 4. Group of the Issue: TUB/TKN

**TKN** Telecommunication  
Networks Group



**Technische Universität Berlin/Telecommunication Networks Group** (<http://www.tkn.tu-berlin.de/>) is the coordinator of the *Embedded WiSeNts* project consortium.

**Technische Universität Berlin** is the largest German University of Technology. One of its eight faculties is the Faculty of Electrical Engineering and Computer Science, grouping over 40 Faculties on Associate Professor and Full Professor level, and working on close cooperation with 6 recognized applied research institutes (mostly belonging to Fraunhofer Gesellschaft). Within the Faculty the Institute of Telecommunication Systems groups 9 Faculties covering the whole scope from communications to distributed systems in close cooperation with two Fraunhofer Institutes: HHI and Fokus. In particular the areas of mobile communication, wireless and mobile networking, middleware and ubiquitous computing are strongly represented.

TUB has been one of the first European Universities which have started research in **Wireless Sensor Networks (WSN)**. The general interest of the Telecommunication Networks Group are architectures and protocols for communication networks in mobile and wireless communication systems, especially focusing on cross-layer issues for many different kinds of systems, from cellular to ad hoc and wireless sensor networks. We address fundamental issues, suggesting new architectural approaches and new protocols. For better understanding of these solutions we develop appropriate performance models (mostly simulation-based) as well as prototype implementations in hardware and software.

### **As for the Research Topics followed at the TUB, following areas are being investigated:**

- Research in the low-power protocols and node / network architectures for Wireless Sensor Networks (MAC, routing).
- Research in hardware abstraction for best structuring of operating systems in WSN.
- Research in services of WSN (service abstractions, service discovery).
- Testbeds - design and establishment of a big realistic testbed.
- Protocols for industrial wireless communications.
- Research in reliability and safety aspects of WSN.
- TUB is the only European Partner in the TinyOS 2.0 Core Working Group, defining the new generation of the most deployed operating system for Wireless Sensor Networks. We have ongoing vivid cooperation with the leading in this area University of Berkeley, CA.

**The research has been funded** by, among others, the European Community, German ministry of education and research (BMBF), German National Research Council (DFG), German International Exchange Agency (DAAD), Alcatel, DoCoMo Eurolabs, Microsoft Research, Siemens, Ericsson, and German Telekom. Within this scope over 20 scientists are employed with the aim to complete their PhD.

**In the last 5 years TKN has published** about 30 journal papers and book chapters and has presented around 150 papers at international and national conferences. **The first book on Wireless Sensor Networks written in Europe** has been authored by one previous and one actual member of the team, see: Holger Karl, Andreas Willig: "Protocols and Architectures for Wireless Sensor Networks", Wiley, Chichester, June 2005.

## 5. Special Issue - Ubiquitous Computing

A **Special Day on Ubiquitous Computing and Sensor Networks**, supported by *Embedded WiSeNts*, has been held on March 15<sup>th</sup>, 2005, at INRIA, Rennes.

Participants from industry as well as from the *Embedded WiSeNts* consortium took part. The conference was directed Michel Banâtre, INRIA.

### Summary

The notion of ubiquitous computing, or ambient computing, has been introduced by Marc Weiser, from the Xerox PARCTab team, in 1991. It has been defined as enhancing everyday life by implicitly using electronic devices. Hence a new research area has emerged with three directions: the ubiquitous computing specific hardware, the software design and the mobile communicating devices.

### Questions of discussion:

- ◆ **A distinction has to be made between ambient computing and mobile computing.** Mobile computing is nothing more than using existing applications on mobile devices. Ubiquitous and ambient computing consists in enhancing real-life with new applications. The goal is to merge computer science and real-life thanks to hidden computers.
- ◆ **The key concept of such applications is context awareness.** In context-aware applications, the available environment is not only limited to the computer memory, but takes into account the real world, with the users' activity and situation.
- ◆ **Possible consequences resp. 4G:** Many research labs are working on defining 4<sup>th</sup> generation mobile networks. From now on, 4G can be seen as an aggregate of radio technologies. Thus it brings difficulties for terminals and infrastructures to mix all these solutions. Choices have to be taken.
- ◆ **Visions on Uicom and Context:** The context for embedded systems such as mobile phones combines plural aspects. At the user level, it covers information such as social and mental activities and user profile. At the environmental level, it includes surrounding people and devices as well as light level, temperature, noise and so on. Finally, at the device level it covers logical information collected from sensors and network services.
- ◆ **Context-Awareness: What if Computers Know the World?**  
The rapid development of mobile communication networks and the availability of tiny and inexpensive sensors allow for multifunctional mobile devices to collect and communicate context information. Also the trend towards embedding these systems into everyday objects allows them to sense their environment. Consequently, it becomes possible to develop context-aware systems.
- ◆ **Sensor Networks – an overview:** The concept of sensor networks rose up about five years ago. Sensor networks are composed of many sensor nodes close to each others, with gateways to a back end infrastructure. A sensor node is a sensor with short range wireless communication capabilities, a processing unit and an energy source inside a packaging. Sensor networks allow creating a digital representation of a physical phenomenon by collecting environmental data.
- ◆ **From smart labels to sensor networks:** Organization of RFID tags is essentially small chips powered by communication waves. They usually contain only some hardware logics and a memory (about 256 bytes that can be read-only, write once, or read-write, password protected or not). RFID tags are powered by an electromagnetic field generated by an RFID tags reader. The classical application of such tags is electronic article surveillance. Even if it is possible to use a IP-compatible routing protocol, there is no need for.