C O N E T

Cooperating Objects NETwork of Excellence

CONET aims at building a strong community in the area of Cooperating Objects capable of conducting the needed research to achieve, in the long run, the vision of Mark Weiser for ubiquitous computing.

KEYWORDS: Cooperating objects, wireless sensor networks, embedded systems, cooperative robotics, pervasive and ubiquitous computing

At A Glance: CONET

Cooperating Objects NETwork of Excellence

Project Coordinator

Name: *Prof. Dr. Pedro José Marrón*
Institution: *University of Duisburg-Essen, Germany*
Email: *pjmarron@uni-due.de*

Project website:

http://www.cooperating-objects.eu

Partners: University of Bonn *(Coordinator, Germany)*, AICIA *(Associated Coordinator, Spain)*, ISEP-IPP *(Portugal)*, SICS *(Sweden)*, ETH Zurich *(Switzerland)*, National University of Ireland *(Ireland)*, Technical University Berlin *(Germany)*, University of Cyprus *(Cyprus)*, University of Pisa *(Italy)*, Technical University Delft *(Netherlands)*, University College London *(UK)*, SELEX *(UK)*, SAP AG *(Germany)*, Boeing Research and Technology Europe *(Spain)*, Schneider Electric GmbH *(Germany)*, Telecom Italia *(Italy)*

Duration: *48 months*

Start: June 1st, 2008

Total Cost: € 10.406.827

EC Contribution: € 4.000.000

Contract Number: INFSO-ICT-224053

Main Objectives

A number of different system concepts have gained a lot of relevance in the area of embedded systems over the past couple of years: embedded systems for robotics and control, pervasive computing and wireless sensor networks. These three types of quite diverse systems share a lot of commonalities but also have some complementary aspects in common that make a combination into a coherent system vision promising.

CONET will focus on enabling the further establishment of the field of Cooperating Objects within the research and industrial community, thus strengthening the position of Europe in the research landscape.

The term "Cooperating Objects" was coined explicitly for the purpose of describing such systems. The vision of Cooperating Objects is, therefore, quite new and needs to be extended with inputs from the relevant individual communities that compose it. This enables us to better understand the impact on the research landscape and to properly manage the available resources.

The main goal of CONET is to build a strong community in the area of Cooperating Objects capable of conducting the needed research to achieve the vision of Mark Weiser. Therefore, the objectives of CONET are the following:

1. Create a visible and integrated community of researchers on the topics related to Cooperating Objects capable of driving the domain in the coming years.
2. Identify, arise awareness and steer academic research efforts towards industry-relevant issues without forgetting fundamental scientific issues.
3. Stimulate cooperation between researchers in order to achieve a lasting and sustainable architecture that is able to cope with the vision of Cooperating Objects.

Key Issues: Cooperation

The key issue addressed by CONET is that of **cooperation** between objects. Cooperation is defined as the ability of individual entities or objects to use communication as well as dynamic and loose federation to jointly strive to reach a common goal, which will typically be a goal in sensing or control. At the same time, these objects have to take care not to overtax their available resources which are, in general, very limited.

The term ***Cooperating Objects*** was coined explicitly for the purpose of describing such systems by the Embedded WiSeNts Consortium, a Coordination Action funded by the EC between September 1st, 2004 and December 31st, 2006 as part of the 6th Framework Programme. One of the main results of this Coordination Action was the publishing of the Embedded WiSeNts Research Roadmap that defines the concept of Cooperating Objects in the following way: "In the abstract sense, a Cooperating Object is a single entity or a collection of entities consisting of: Sensors, controllers (information processors), actuators or cooperating objects that communicate with each other and are able to achieve, more or less autonomously, a common goal."

Technical Approach

CONET, being a network of excellence, focuses its efforts in establishing the proper environment to enable joint research while providing an integration and dissemination framework that can be used for the spreading of excellence. CONET counts with a very strong Industrial and External Advisory Board composed of independent senior experts in the field. The main activities of the network are the following:

Research Roadmap for Cooperating Objects

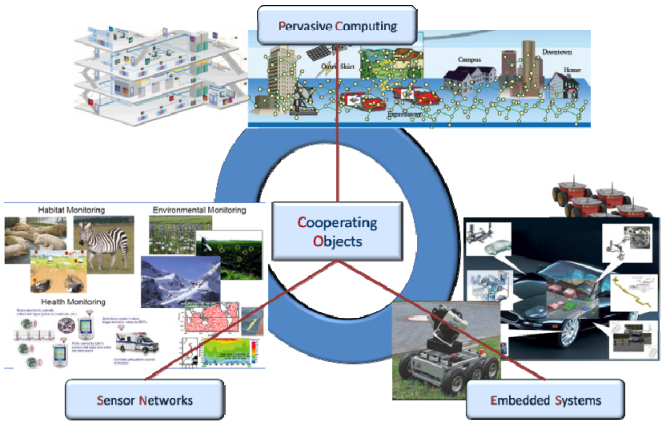
Lead by SAP and the University of Bonn, this activity takes care of creating a consolidated document that identifies the trends and current gaps that will drive research in the short, medium and long term. The first version will be ready by June 2009.

Integrated Testbed and Simulation Platforms

Lead by AICIA, this activity takes care of creating an integrated testbed for Cooperating Objects, federating existing testbeds and advancing the state of the art in simulation technologies to include and support Cooperating Objects natively.

Joint Research Activities: Research Clusters

Lead by the University College London (as a representative of academia) and by Schneider Electric (as a representative of industry), the CONET consortium has instantiated eight research clusters at the end of July 2008. Grouped in two categories (full and exploratory) these clusters cover some of the most relevant research topics as stated in the Embedded WiSeNTs Research Roadmap. Current clusters include research in scalable data management, deployment of sensor networks, ubiquitous integration of devices, mobility of cooperating objects and quality of service, just to name a few.



Spreading of Excellence Activities

Lead by ISEP-IPP, these activities deal with the coordination of publications in conferences and journals, sponsoring of events and research awards, stimulating publication in top conferences and journals, organizing summer schools and promoting a distinguished visitor programme.

Expected Impact

The expected impact of the establishment of a network of excellence in the area of Cooperating Objects is immense, given the importance of the topic as repeatedly mentioned in several of the most recent IST Advisory Group Reports.

More specifically, CONET contributes to the establishment of new services and applications by leveraging existing areas of research and focusing on the development of solutions that are both application-driven and context-based. CONET also defines a new area of research (that of Cooperating Objects) which, by definition, creates new market opportunities. In fact, there are already first estimations of the markets that will experience a major growth (and, therefore, have a bigger impact on the market) in the areas of Cooperating Objects, as can be read in the Embedded WiSeNts Roadmap.

Wireless Sensor Networks are at the heart of the Cooperating Object concept and have had a tremendous impact as an enabling technology for the development of applications to monitor the environment in a low-cost fashion. CONET contributes to the further development of such solutions, as well as to the study of the fundamental problems associated with this challenge. An integrated approach to looking into Wireless Sensor Networks that are better integrated in their environment will contribute to enabling the low-cost monitoring of the environment and of natural resources.