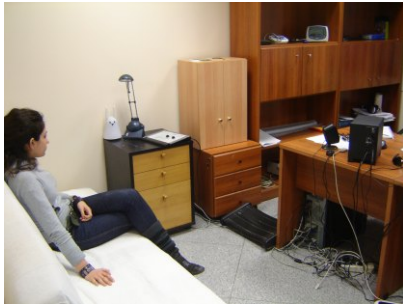


activities

AmlnOffice Lab

a single room office equipped with network infrastructure, a room control point and server, a multitude of sensors and an ecology of smart artifacts and robots.



The systems and tools that DAISy Unit has developed in the past have been deployed on this ecology.

Education and training of young students and researchers, in collaboration with:

- the Hellenic Open University (School of Sciences and Technology): DAISy Unit researchers will be responsible for the new graduate programme in "Ubiquitous Computing Systems" that will start in 2010
- the University of Patras (Department of Mathematics): DAISy Unit researchers teach the graduate programme and supervise several MSc theses
- the Technological Educational Institute of Patras: DAISy Unit researchers teach several courses in Computer Science and supervise student placement

Organization and hosting of international **conferences and workshops**, including:

- The Tales of Disappearing Computer, which epitomized the research achievements of the EU/FET/Disappearing Computer initiative, was organized in Santorini, Greece (2003)
- The series of Intelligent Environment (IE) conferences, sponsored by IET, IEEE and AAAI (since 2005); the 2nd edition (IE06) was organized in Athens, Greece and the 5th edition (IE09) will be held this year in Barcelona, Spain

Research Academic Computer Technology Institute



"A Greek Technology and Research Institute on Computers and Informatics with an International scope and European focus, working closely with the academic community, in the service of society»

In the 80s computer science set forth on its course with machines "primitive", by today's standards, large in size and surrounded by a shroud of mystery. In 1980 in the city of Patras the first university department was founded for the training of young, aspiring computer and informatics engineers. These were the heralds of a new era who by their research efforts contributed to the understanding and awareness of these technologies, still in their nascent state. In 1985 the Computer Technology Institute is founded, intrinsically affiliated with the University of Patras Department of Computer Engineering and Informatics, with the complementary objective to link research with the production and industry sectors.



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research unit 3

DAISy - Dynamic Ambient Intelligent Systems

The DAISy group was founded in 2001 and in 2009, it evolved into Research Unit 3 of CTI, focusing on the design of distributed technological systems, which are seamlessly integrated into objects and their environment, exhibit properties of autonomous systems, adapt to their environment and evolve, thus being intuitive to use. These systems are in principle composed of a large number of heterogeneous and resource-constrained nodes, some of them fixed but most of them mobile, which operate over unstable wireless networks. Current R&D activities of DAISy Unit evolve around four axes:

- **design of ubiquitous systems**, including the design of service-oriented architectures, the implementation of middleware, the study of emerging system behaviors and its adaptation to changing context and the incorporation into system design of trust and privacy requirements;
- **knowledge representation and management**, including architectures for ecologies of smart artifacts, agents and robots, ontology engineering, expert systems and decision support systems;
- **design of bio-inspired architectures**, including design of autonomous and self-evolving systems and swarms and the design and implementation of stigmergic communication protocols and systems;
- **end-user development**, including the design of user tools, such as end-user editors, developers' workbenches, etc and the design of social computing and pervasive awareness systems



**DAISy -
Dynamic
Ambient
Intelligent
Systems**



software & systems



“Adaptive and Trusted Ambient Ecologies”
(IST FET Pervasive Adaptation).

The overall objective of ATRACO project is to lay the foundations for the development of a new range of components, architectures and guidelines that underpins the development of ambient ecologies of collaborative devices and context aware artifacts, which support user activities. In ATRACO project, each activity is modeled as a “bubble” using finite resources to achieve the goals of its owner and having clearly marked borders, which realize the privacy requirements. This activity sphere adapts to different contexts by re-negotiating its borders, adopting suitable interaction modes and employing resource management models. In ATRACO project, adaptation will be researched in terms of artifact operation, ecology composition, network selection and man-machine interaction with respect to user context and behavior. The project started in 2008.



“Awareness Services and Systems - towards Theory and Realization”
(IST FET Open, Co-ordinated by DAISy group).

The project explores awareness systems supporting the concept of pervasive awareness, i.e., where awareness information is automatically generated as a result of personal and home devices capturing and exchanging information about the user. The project started in 2006.



“Self Organizing societies of Connectionist Intelligent Agents Capable of Learning”
(IST FET Open)

The project investigated methods based on stigmergy for engineering emergent collective behavior in large societies of micro scale collaborative autonomous agents that can learn and evolve. The project ended in 2005.



“Enabling Mixed Societies of Communicating Plants and Artifacts” (IST FET Open).

The project investigated ways of creating ontology-based “interfaces” between artifacts and plants, so that people could form mixed communities of interacting (and possibly co-operating at an elementary level) artifacts



“extrovert gadgets”
(IST FET Disappearing Computer, Co-ordinated by DAISy group).

The project adapted to the domain of ubiquitous computing the notions of component-oriented architectures and specified a framework within which many different configurations of associated artifacts could be consistently performed. It has produced a set of concepts, supporting middleware, an ontology and tools for the composition of ubiquitous computing applications.

“Study on Digital Territory: concept definition and implications”
(EC D-G JRC, Institute for Prospective studies).

The aim of the study was to elaborate and validate the concept of DT, analyze the underlying technological, economic, social and legal challenges and raise awareness as to what research and policy option avenues exist.

“Hearts: Home-based Everyday activities Analysis and Response Telecare System”, (national project).

The project focused on developing a methodological framework and a home-based infrastructure that integrated a number of next-generation key technologies to enable and support patients with congestive heart failure (CHF). Major outcomes include the design and implementation of specialized medical inference and decision-making algorithms, and the design of response scenarios as a means to interact with the user. A novel telecare system was realized that integrates all the above elements. The project ended in 2007.

GAS-OS

distributed operating system / middleware, which runs on autonomous resource-constrained artifacts. It provides interfaces to hardware components, and local management of resources (including sensors, actuators, memory and computing). Over the years, GAS-OS has evolved into a service-oriented knowledge-based system, which has been successfully used to support distributed ecologies of collaborating artifacts, precision agriculture systems, pervasive home care systems, pervasive awareness systems etc.

GAS Suite

set of tools that facilitate people in easily composing and managing their own ambient intelligence applications by combining services offered by GAS artifacts. It uses GAS-OS and has been tailored to run on PCs or PDAs. The tools in GAS Suite include graphical editors, workbenches, application managers and user community managers.

GAS ontologies

include both foundational (upper level) ontologies and domain ontologies. The former encode basic ubiquitous computing concepts thus enabling the interoperability among heterogeneous nodes of ubiquitous applications. The latter provide semantically rich representations of smart artifacts and environments, services, user profiles, policies (for privacy, interaction, decision making etc) and are also used as input to artifact ecology ontologies, via the application of ontology matching methodologies.

CAA Maker

makes possible the generation of VHDL code based on high level formal specification of component-based systems (used to develop Spiking Neural Nets).

ASTRA platform

the first ever pervasive social computing system that enhances presence and awareness via the use of GAS compatible artifact ecologies to convey people situation.