

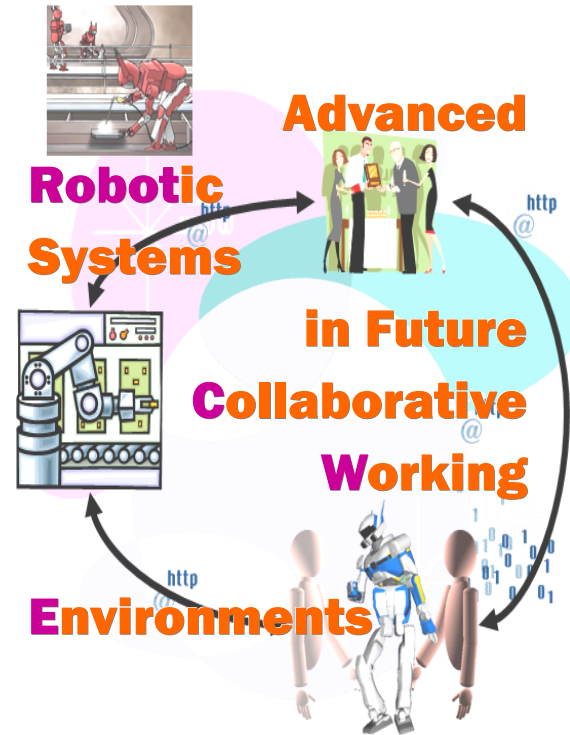
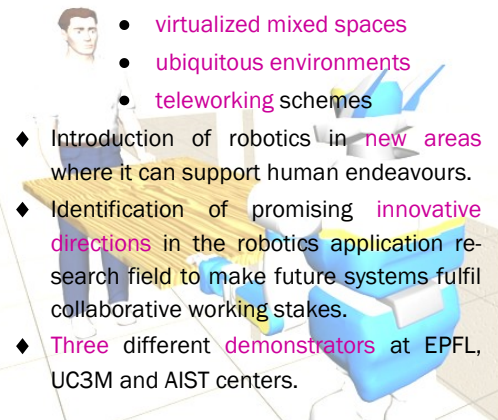
Breakthrough applications

Researches within Robot@CWE will indubitably open doors to several breakthrough applications. The following domains will be issued:

- ◆ Space applications
- ◆ Robotics in construction
- ◆ Multimedia technology
- ◆ Rescue systems

Key issues

- ◆ Consideration of **societal and stakes studies** to assess different choices and to predict their impact on our societies.
- ◆ **Participation of industries**. Safe and secure collaboration of human operators and robotic systems in real applications is an important issue of this research.
- ◆ Towards **“collaborative-working-centred”** design of robotic systems and **“IST robotics”** with integration of robotic systems within novel technologies frameworks:
 - **networking**
 - **multimedia communication**
 - **virtualized mixed spaces**
 - **ubiquitous environments**
 - **teleworking schemes**
- ◆ Introduction of robotics in **new areas** where it can support human endeavours.
- ◆ Identification of promising **innovative directions** in the robotics application research field to make future systems fulfil collaborative working stakes.
- ◆ **Three** different **demonstrators** at EPFL, UC3M and AIST centers.



www.robot-at-cwe.eu
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Specific Targeted Research Project

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Goal

The main objective of this STREP project is to research and demonstrate **integrative concepts of advanced robotic systems**, to be seen as **collaborative agents**, in various environments working together **with humans**. ROBOT@CWE will design suitable architectures and technologies to achieve this goal.

Two major concepts

Collaborative Working Environment

Environment where robots and humans work in conjunction and in synergy. Various taxonomies are possible but we can distinguish between environments where the space is shared between human or robots, or environments where only machines and robots are present.



IST-robot

Information Society Technology – Robot, this term has been invented within ROBOT@CWE to designate the evolving new category of service and personal robots that will have the potential to use ambient intelligence, interface to IT networking, or interact with humans and humans' communication infrastructure.



Science and technology objectives

It is well known that collaboration (between individuals and groups and between humans and machines) can be one of the most stimulating ways to develop new concepts and ideas, and solve problems. Without such collaboration there is less innovation and less problem solving.

The prime objective of this project is to:

Establish a concept for, and develop prototypes of, a collaborative working environment, conceived such as to include robots and, by so doing, to improve productivity and safety.



This objective will be met by the achievement of these subsidiary objectives:

- ◆ Analysis, research and identification of future **socially acceptable and beneficial collaborative work**
- ◆ **User centred** systems design
- ◆ Definition of the **collaborative work methods** and **human machine interfaces** for selected work
- ◆ Definition of a **high level knowledge oriented interface** to collaborative work with robots
- ◆ Specification of an **open architecture framework** for collaborative work, involving robots
- ◆ **Implementation** of the architecture and iterative **prototyping** with a number of robotic applications
- ◆ Establishing **methods for quantifying the benefit** of robot collaborative work by demonstration and evaluation
- ◆ Establish a **feasible roadmap** for overcoming technical obstacles to the establishment of ROBOT@CWE throughout Europe
- ◆ **Safety issues** are also to be considered when IST-robots work closely to humans, for instance when handling the same object. In particular, one should define the minimal distance necessary to achieve for a human user to be at ease.

Potential impact

The project proposes **robotic architectures to serve and increase usability and the potentialities of future advanced collaborative working environments**. The consortium will take extra-care in using most of the available communication, technology and devices standards in achieving a potential human-CWE-robot interfacing. However, the consortium aims at **developing methodological standards** for the investigation and evaluation of human-robot interaction. Based on approaches such as usability engineering and application and experience research (EAR), an approach will be developed which include a set of **well-defined methods**, including **questionnaires, interviews, scenario-based user tests and observation**.

Long term-innovation

ROBOT@CWE will create a large amount of knowledge on the architecture of collaborative environment including IST-robots, which does not exist to date. The expected long term knowledge will include:



- ◆ **Conceptual architectures** for a wide spectrum of real-life collaborative applications including IST-robots.
- ◆ Knowledge on the **impact of IST-robots** in a working environment.
- ◆ Efficient modalities for successful **human/IST-robot communication** while performing collaboratively a task.
- ◆ Technological requirements for seamless **data exchange between human/IST-robot/ICT-structure**.
- ◆ **New working models**.

At the short term (within 3 years), ROBOT@CWE will include main innovation in the following issues:

- ◆ IST-robot technology and interfaces
- ◆ Collaborative working environment centric design