

# PROJECT PERIODIC REPORT

**Grant Agreement number: 216487**

**Project acronym: COMPANIONABLE**

**Project title: Integrated Cognitive Assistive & Domotic Companion Robotic Systems for Ability & Security**

**Funding Scheme: FP7 Collaborative Project**

**Date of latest version of Annex I against which the assessment will be made:**

**Periodic report:**                    1<sup>st</sup>     2<sup>nd</sup>     3<sup>rd</sup>     4<sup>th</sup>

**Period covered:**                    from 1<sup>st</sup> January 2010    to 31<sup>st</sup> December 2010

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# 1. PUBLISHABLE SUMMARY

## The CompanionAble Project

There are widely acknowledged imperatives for helping the elderly live at home (semi)-independently for as long as possible. Without cognitive stimulation support the elderly dementia and depression sufferers can deteriorate rapidly and the carers ill face a more demanding task. Both groups are increasingly at the risk of social exclusion.

CompanionAble will provide the synergy of Robotics and Ambient Intelligence technologies and their semantic integration to provide for a care-giver's assistive environment. This will support the cognitive stimulation and therapy management of the care-recipient. This is mediated by a robotic companion (mobile facilitation) working collaboratively with a smart home environment (stationary facilitation).

The distinguishing advantages of the CompanionAble Framework Architecture arise from the objective of graceful, scalable and cost-effective integration. Thus CompanionAble addresses the issues of social inclusion and homecare of persons suffering from chronic cognitive disabilities prevalent among the increasing European older population. A participative and inclusive co-design and scenario validation approach will drive the RTD efforts in CompanionAble; involving care-recipients and their close carers as well as the wider stakeholders. This is to ensure end-to-end systemic viability, flexibility, modularity and affordability as well as a focus on overall care support governance and integration with quality of experience issues such as dignity-privacy-security preserving responsibilities fully considered.

The collaboration of leading gerontologists, specialist elderly care institutions, industrial and academic RTD Partners, including a strong cognitive robotics and smart-house capability makes for an excellent confluence of expertise for this innovative project.

## The Objectives

1. Provide a new AAL solution through the synergetic combination of the strengths of an embodied mobile robotic companion with the advantages of a stationary smart home environment.
2. Semantic – Cooperative integration at sensor level.
3. Semantic-Cooperative integration between the robot and the smart house sensor network environment.
4. Semantic-Cooperative integration of personal therapy management (possibly involving home information spaces such as the home TV screen, healthcare staff, medical professionals, gerontologists).
5. Semantic-Cooperative integration between the home environment (including smart house sensor network plus the robot) and the care system (District nurse/social services/healthcare system) ostensibly mediated by the CompanionAble and including alerts as required.
6. To create a system for health education for the patient and family, providing self-confidence and improving quality of life.
7. To create a system able to help with improvement of contacts between the person and his/her carers and the wider social setting.
8. To create a system with more efficient homecare monitoring by enhanced communication and coordination with professional helpers.



9. Social inclusion and homecare of persons suffering from chronic cognitive disabilities.
10. To achieve the continuous availability of sense-ful close support and cognitive engagement of the elderly.



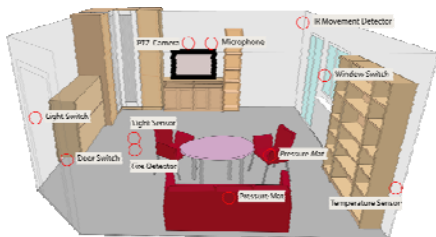
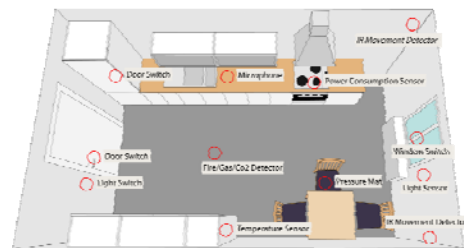
### Advantages of the Mobile Robot Companion

- Real interaction Partner – an embodied, anthropomorphic system with natural interface and human-like behaviour.
- Embodiment guarantees visible intimacy and privacy (e.g. by closing the “eyes”).
- Allows a plug-and-play solution (only requires “energy” and internet access).
- Low-cost solution without the need for reconstructing the home environment.
- Allows promising marketing policy: “Rent-a-robot” or “Robots-on-demand” as a personal social assistant.
- Mobility – allows mobile video conference, alarm evaluation, remote control by relatives / social care services.

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### Advantages of the Smart Home

- Numerous existing installations with a wide spectrum of functionality (incl. video-conferencing).
- High acceptance rates by the residents.
- 24 h reliability.
- Interoperability with domotics systems already successfully tested.



- Not limited to homes without stairs.
- Allows simultaneous monitoring of all rooms.
- Easy remote access to sensor systems and controllable devices.
- Low maintenance cost.

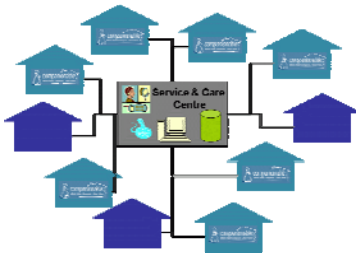
### Support for the Elderly

Through the integration of the two sub-systems CompanionAble provides a care environment that supports carers, both family members and therapists, in their daily tasks. This involves

1. Realisation of an intelligent day-time-management.
2. Content generation for cognitive stimulation and training and coherent delivery through multiple channels (stationary and mobile).
3. Reminder function for medication taking and analysis of acquired data regarding the health status of the care-recipient.



4. Efficient and natural social communication and care networking by means of audio-visual communication with relatives or care-givers.



### **Remote Care Support**

By developing the framework for central server support and integration, CompanionAble provides for the integration of Service Centres to ensure user safety and timely response to critical situations. This is supported by the ability to remotely control the robot, either by the service centre staff, therapist, or a family member.

### **Evaluation of the CompanionAble Solution**

The CompanionAble system will find its proving ground through its performance evaluation in various test beds in France, Spain, the Netherlands and Belgium. This will provide the opportunity to demonstrate the graceful integration of Smart Home Facilities and Mobile Robot Companion to enhance the life of the Elderly living at home.

This will ensure that the system is adaptable to the specific needs of the different nationalities and cultures thus ensuring the best social inclusion possible.

### **Summary of the Achievements of the 3<sup>rd</sup> period**

The third period focussed on the further elaboration and integration of the specified modules and the subsequent evaluation in user test bed in Spain and the Netherlands. The results show a strong support of the CompanionAble project in the user community and provide significant feedback to the development cycle in the project.

On the RCE side a complete re-design of the robot hardware has been realised that responds to the varying challenges in the cluttered home environment of elderly people. The new robot base was demonstrated during the ICT 2010 and other relevant events in Europe.

The CompanionAble Consortium prides itself on the excellent synergy of expertise and capabilities of the Partners in the major fields that underpin its Research-Technology-Development and Innovation, notably its access to world-class capabilities in Smart Home test beds (SmH), Service Robotics (UIL, MLAB, IBISC), and Sensor Networks and Sensor Fusion (GET, LEG, AIT, ESIG), as well as gerontology and behavioural psychology and day-time activity management (UDC, APHP).